

MANAGEMENT SYSTEM

FIELD

[0001]

5 The present disclosure relates to a game token management system that prevents a wrong game token from being used at a gaming hall in a casino or another gaming facility that uses game tokens.

10 BACKGROUND ART

[0002]

There are baccarat and blackjack among many table games played in a gaming hall such as a casino. In a casino, game tokens are used for such games.

15 [0003]

Use of a wrong game token including a counterfeit game token and a broken game token is not allowed in a casino. In order to prevent use of a counterfeit game token in a casino, casinos have technology to determine authenticity of game tokens with a radio frequency identification (RFID) tag attached for preventing use of a counterfeit game token. A game token with RFID is known and disclosed in International Application Publication No. WO2008/120749.

20

25 PRIOR ART DOCUMENTS

PATENT LITERATURE

[0004]

Patent Literature 1: WO2008/120749

SUMMARY OF INVENTION

5 PROBLEM TO BE SOLOVED BY THE INVENTION

[0005]

With a game token based on conventional technology, it has been possible to determine authenticity of the game token itself by determining information written in a memory
10 area by reading RFID. However, information obtained during use of the game token at a casino site, in particular, information about an owner of the game token has not been able to be recorded and determined. Therefore, it has not been possible to determine, by reading RFID, presence of a
15 genuine game token having abnormal history in terms of usage, such as history of being used or exchanged by an owner different from an original owner, failing to prevent use of such a game token having strange use history in a casino.

20 [0006]

Therefore, it is desired to provide a system that makes it possible to determine and manage owner information of each game token.

[0007]

In order to solve the above-described conventional problem, the game token management system in one aspect includes

5 a game token to which individually identifiable RFID is attached,

a game table for playing a game by using the game token, including a chip placement area on which the game token is placed as a bet chip that is bet by a player participating in a game at the game table and as a payout chip that is
10 paid out from a chip tray of the game table by a dealer to a winning player,

a chip reader that reads the RFID of the game token placed on the chip placement area, and

15 a controller that determines a reading result by the chip reader,

in which the controller is able to acquire owner information of the game token on the basis of identification (ID) information of the RFID of the game token,

20 the controller is configured to be able to recognize that the bet chip of a winning player and the payout chip paid out to the winning player are transferred to outside the chip placement area, and associate, in a database, ID information of the payout chip with ID information of the
25 bet chip transferred to outside of the chip placement area at the same timing as the payout chip, and

the controller includes a function to associate, in the database, owner information of the bet chip indicated by the RFID of the bet chip to ID information held by the RFID of the payout chip.

5 [0008]

Further, the chip placement area may be divided for each player position and may include a payment area for placing the payout chip for each player position. The chip reader may be configured to be able to read the payment area
10 separately for each player position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Fig. 1 is a diagram of an overall overview of a table
15 game management system according to an embodiment;

Fig. 2 is a diagram of an overview of a database according to the embodiment;

Fig. 3 is an explanatory diagram of an RFID tag included in a game token according to a second embodiment;

20 Fig. 4 is a conceptual diagram of a method for recording data of a game token according to the second embodiment;

Fig. 5 is a diagram of an overall overview of a game token management system according to the second embodiment;

25 Fig. 6 is a diagram of a reader and writer of the game token according to the second embodiment;

Fig. 7A is an explanatory diagram of configuration of data of the game token according to the second embodiment;

Fig. 7B is an explanatory diagram of configuration of data of a game token according to another second

5 embodiment;

Fig. 8 is a diagram of a database according to the other second embodiment;

Fig. 9 is a diagram of an overall overview of a table game management system at a gaming hall having a plurality
10 of game tables according to a third embodiment;

Fig. 10 is a diagram of a result of reading a chip by a camera and RFID according to the third embodiment;

Fig. 11 is a diagram of a game table according to the third embodiment;

15 Fig. 12 is a diagram of a state of game tokens bet at the game table according to the third embodiment;

Fig. 13 is a diagram of a state of game tokens bet at the game table according to the third embodiment;

Fig. 14A is a diagram of a detail of the chip tray
20 according to the third embodiment;

Fig. 14B is a diagram of another example of a chip tray according to the third embodiment;

Fig. 15 is a diagram of the game table according to the third embodiment;

25 Fig. 16 is a diagram of a result of reading a chip by the camera and RFID according to the third embodiment;

Fig. 17 is a diagram of a game table according to another third embodiment;

Fig. 18 is a diagram of a game table according to the other third embodiment;

5 Fig. 19 is a diagram of a game table according to the other third embodiment;

Fig. 20 is a perspective view of a game token according to the third embodiment;

Fig. 21 is a cross-sectional view of the game token
10 according to the third embodiment;

Fig. 22 is a cross-sectional view of the game token according to the third embodiment.

Fig. 23 is the configuration of the management system of the first example according to a fourth embodiment;

15 Fig. 24 illustrates an example of updating the variation information in the first example according to the fourth embodiment;

Fig. 26 shows an example of the first example of the fourth embodiment for updating the variation information;

20 Fig. 27 shows the configuration of the second example management system according to the fourth embodiment;

Fig. 28 shows the configuration of the management system of the third example according to the fourth embodiment;

Fig. 29 shows an example of updating the database of the
25 third example according to the fourth embodiment;

Fig. 30 shows an example of updating the database of the third example according to the fourth embodiment;

Fig. 31 shows an example of updating the database of the third example according to the fourth embodiment;

5 Fig. 32 shows the configuration of the management system of fourth example according to the fourth embodiment;

Fig. 33 shows the configuration of the management system of the fifth example according to the fourth embodiment;

10 Fig. 34 shows the configuration of the management system of the sixth example according to the fourth embodiment;

Fig. 35 shows an example of updating the variation information of the sixth example according to the fourth embodiment;

15 Fig. 36 shows an example of updating the variation information of the sixth example according to the fourth embodiment;

Fig. 37 shows an example of updating the variation information of the sixth example according to the fourth embodiment;

20 Fig. 38 shows an example of updating the variation information of the sixth example according to the fourth embodiment;

Fig. 39 shows the configuration of the management system of the seventh example according to the fourth embodiment;

25 Fig. 40 shows an example of updating the database of the seventh example according to the fourth embodiment;

Fig. 41 shows an example of updating the database of the seventh example according to the fourth embodiment;

Fig. 42 shows an example of updating the database of the seventh example according to the fourth embodiment;

5 Fig. 43 shows an example of updating the database of the seventh example according to the fourth embodiment;

Fig. 44 shows an example of updating the database of the seventh example according to the fourth embodiment;

10 Fig. 45 shows the configuration of the management system of the eighth example according to the fourth embodiment;

Fig. 46 shows the configuration of the management system of the ninth example according to the fourth embodiment;

15 Fig. 47 shows an example of updating the variation information of the ninth example according to the fourth embodiment;

Fig. 48 shows an example of updating the variation information of the ninth example according to the fourth embodiment;

20 Fig. 49 shows an example of updating the variation information of the ninth example according to the fourth embodiment;

Fig. 50 shows an example of a betting area of the eleventh example according to the fourth embodiment;

25 Fig. 51A shows another example of the betting area of the eleventh example according to the fourth embodiment; and

Fig. 51B shows another example of the betting area of the eleventh example according to the fourth embodiment;

DETAILED DESCRIPTION OF NON-LIMITING EXAMPLE EMBODIMENTS

5 [0010]

(First embodiment)

An overall overview of a table game management system according to a first embodiment will be described with reference to Fig. 1. Fig. 1 is a diagram of an overall
10 overview of the table game management system. A game table 1004 for a baccarat game includes betting areas including player 1441, banker 1442, tie 1443, player pair 1444, and banker pair 1445 for each of player positions 1131 to 1135. Each of the player positions is provided with a chip
15 placement area 1025. The table game management system further includes a chip reader 1002 that reads RFID of game tokens 1001 placed on the chip placement areas.

[0011]

Each of the chip placement areas 1025 includes a payment
20 area 1026 on which a dealer places a game token 1001 removed from a chip tray 1009 of the game table 1004 when the dealer pays the game token 1001 out of the chip tray 1009 to a winning player.

[0012]

Further, the table game management system includes a controller 1003 that determines a result of reading RFID of the game token 1001 read by the chip reader 1002.

[0013]

5 First, a player who participates in a game bets a game token 1001 on a betting area in the chip placement area 1025. By the chip reader 1002 reading RFID of the bet game token 1001, the controller 1003 determines owner information of the game token 1001. The owner information
10 is associated with ID information of the RFID in a database.

[0014]

In a case where a casino wins based on a result of the game, the dealer collects a game token 1001 bet by a losing
15 player and places the game token 1001 in the chip tray 1009. The chip reader 1002 determines RFIDs of game tokens 1001 in the chip tray 1009, and the controller 1003 records in the database that the game token 1001 collected by the casino is owned by the casino.

20 [0015]

If a player wins based on the result of the game, the dealer pays a game token 1001 in an amount corresponding to an amount of a bet chip out of a chip tray to the winning player according to a rule of the game.

25 [0016]

At a time of payout, a payout chip may be placed on the above-described payment area 1026 or on a chip placement area 1025 other than the payment area.

[0017]

5 Here, a method for recording owner information of the payout chip will be described with reference to Fig. 2. Fig. 2 illustrates a method for recording owner information of the game token 1001 when the chip is paid to the winning player.

10 [0018]

In a case where a plurality of players place bet chips, and there are two or more stacks of the bet chips in the same player position, the chip reader 1002 collectively reads the game tokens 1001 placed on the chip placement
15 area 1025. Thus, during a game, the chip reader 1002 acquires an ID 1010 of the bet game tokens without determining which game token 1001 belongs to which player. When payment is to be made to a winning player after determination of a win/loss result of the game, the dealer
20 pays out to each winning player (for each stack) from the chip tray 1009. A game token 1001 removed from the chip tray 1009 is placed on a chip placement area 1025. The chip reader 1002 reads an ID 1011 of the payout chip placed on the chip placement area 1025.

25 [0019]

The winning player receives the paid out game token 1001 together with the originally bet game token 1001. At this time, because the bet chip and the payout chip transfer outside the chip placement area 1025, an ID of the bet chip and an ID of the payout chip disappear from the reading result by the chip reader 1002. With this arrangement, the controller 1003 determines to which player the payout chip has been paid by associating with the owner information of the bet chip.

10 [0020]

The controller 1003 stores the determined owner information of the payout chip in the database by associating the owner information with the ID of the game token.

15 [0021]

The above-described arrangement enables traceability of the owner of the game token 1001 and, in a case of wrong transfer of the game token 1001, detection of the owner information stored in the database being different from information of an actual owner.

[0022]

Note that the actual owner can be identified by using face authentication technology or an ID of a membership card.

25 [0023]

In the above description, an ID of each game token is managed in a database. However, the game token 1001 itself may store owner information.

[0024]

5 In addition to the above-described case where a payment area 1026 is provided to each player position, a payment area may be provided separately from the player positions, and the chip reader 1002 may perform reading independently.

[0025]

10 Use or non-use of the payment area 1026 may be selected depending on reading performance of the chip reader 1002.

[0026]

The table game management system may be able to use information mutually with an RFID reader that reads chips in the chip tray 1009 by RFID, a camera that reads a bet chip, a win/loss result determination device such as a shoe that determines a win/loss result of a game, or other device, which is connected to the table game management system.

20 [0027]

(Second embodiment)

First, a game token used in a game token management system according to an embodiment will be described. Fig. 3 illustrates a game token 1 used in the game token management system. In Fig. 3, an RFID tag 2 capable of storing various pieces of information is embedded in the

game token 1. The RFID tag 2 has a data non-rewritable area 21 and a data rewritable area 22.

[0028]

The data non-rewritable area 21 stores, as fixed
5 information 3, information that is not to be changed, that does not change, or that must not be changed while the game token 1 is used. Specifically, the data non-rewritable area 21 stores, as the fixed information 3, production information, product information, casino information,
10 amount information, a serial number, or the like of the game token 1. The production information includes date and time when the game token was manufactured, manufacturing machine used for manufacturing the game token, or other information. The product information includes, for
15 example, information indicating that the game token is a chip for a VIP area of a casino and information indicating a type of the chip (for example, rolling chip or cash chip).

[0029]

20 The data non-rewritable area 21 may be a functionally non-writable area due to a specification of the RFID tag, or may be a writable area locked to disable writing of data after necessary information is written.

[0030]

25 The data rewritable area 22 stores, as variable information 4, information that changes while the game

token 1 is used. For example, as illustrated in Fig. 3,
the data rewritable area 22 stores, as the variable
information 4, location information 220 including date/time
information 221, place/event information 222, owner
5 information 223, or other information.

[0031]

The fixed information 3 and the variable information 4
may be encrypted in order to prevent wrong reading or
writing of information by another person. Further, the
10 fixed information 3 and the variable information 4 may be
stored as metadata.

[0032]

Fig. 4 illustrates an example of a method for recording
data of the variable information 4 of the game token 1. As
15 illustrated in Fig. 4, the location information 220
including date/time information 221, place/event
information 222, and owner information 223 is set as a
block. Then, blocks of the location information 220 are
connected in a chain so that history of the location
20 information 220 of the game token 1 can be determined.

[0033]

Fig. 4 illustrates an example of the variable information
4 stored in the game token 1, and transference of the game
token 1 as described below can be determined. At 16:02 on
25 January 28, 2019, Mr. A exchanges cash and a game token 1
at a cage 5. At 16:15 on the same day, Mr. A makes a bet

at table No. 325 by using the game token 1. At 16:43 on the same day, Mr. B receives the game token 1 as a redemption for having won a bet at table No. 325. At 17:01 on the same day, Mr. B exits a casino, carrying the game token 1.

[0034]

The variable information 4 may be configured to store only latest location information as illustrated in Fig. 4 or store all written location information. Further, some of a plurality of pieces of location information may be selected and stored. In a case where some pieces of the location information 220 are selected and stored among all of the location information, a plurality of pieces of the location information including at least the latest location information 220 may be stored. With the above configuration, history of use or transference of a certain game token 1 is known from variable information 4 of the game token 1. That is, traceability information of the game token 1 is written in the game token 1 itself to be determined.

[0035]

Next, a management system for the game token 1 of the present embodiment will be described. Fig. 5 illustrates an overall overview of the management system.

[0036]

First, at a factory 6, a writer 14 writes, in the data rewritable area 22 of the RFID tag 2 of the game token 1, the variable information 4 including information of manufacturing completion or factory shipment as location information 220.

[0037]

The game token 1 shipped from the factory 6 is subjected to a receiving process in a backyard 7 of the casino. In the backyard 7, a reader 13 reads the variable information 4 stored in the data rewritable area 22 of the game token 1. Then, on the basis of the reading result, a management controller 15 determines whether or not the location information 220 indicating that the information has been written at the factory 6, which is expected to be written, is actually written as latest variable information 4. If there is no record of writing at the factory 6, an error signal is generated indicating that the game token is possibly being wrong. This allows the casino to refuse to receive the game token or to request a factory to conduct investigation. If there is no problem in record of writing, in the data rewritable area 22 of the RFID tag 2, the writer 14 writes location information 220 indicating a backyard. At a time of writing, the location information indicating the backyard may be written either in addition to the location information indicating the factory or after deleting the location information indicating the factory.

Further, reading and writing of the game token in the backyard 7 described above can be performed together with usual validation or activation of the game token.

[0038]

5 The game token 1 of which receiving inspection has been completed in the backyard 7 is carried to a warehouse 8 or cage 9 of the casino. In the warehouse 8 or the cage 9, the reader 13 reads the variable information 4 stored in the data rewritable area 22 of the game token 1. Then, on
10 the basis of a reading result, a management controller 15 determines whether or not the location information 220 indicating that the information has been written at the backyard 7, which is expected to be written, is actually written as latest variable information 4. Further, it may
15 be also inspected whether information indicating the factory 6 is written in history of the variable information 4. The management controller 15 determines whether or not any abnormality is present in the history of the location information, similarly to the above-described inspection in
20 the backyard 7. If there is no problem in a reading result, the writer 14 writes, in the data rewritable area 22, location information 220 indicating the warehouse 8 or the cage 9.

[0039]

25 A player purchases the game token 1 at the cage 9. When the player purchases the game token 1, a writer 14 at the

cage 9 writes, as the variable information 4, time at which the game token is purchased and information indicating change of the owner of the game token from the casino to a customer. The player may be identified and recorded by
5 face authentication technology or an ID card such as a membership card of the casino or an official ID card.

[0040]

The player makes a bet by placing the purchased game token 1 on a betting area 11 at a game table. From the
10 RFID tag 2 of the bet game token 1, a reader 13 reads the location information 220 including date/time information 221, place/event information 222, and owner information 223. The management controller 15 determines whether or not any abnormality is present. It can be determined that
15 abnormality is present, for example, in a case where a certain period has passed since last written date and time of information of use at a game table or information of cashing in at a cage, or in a case where the owner information 223 stored in the game token 1 and the owner
20 information 223 identified by face authentication or an ID card are different from each other.

[0041]

If there is no problem in a reading result, the writer 14 adds the location information 220 to the data rewritable
25 area 22 of the bet game token 1. The location information 220 includes date/time information 221, place/event

information 222, and owner information 223. At the table, for example, the writer 14 writes variable information 4 including information of a player position number where the game token 1 is placed and information of the player. The
5 player information may be identified by an ID card or face authentication. Usually, a plurality of game tokens 1 are stacked and placed on the betting area 11, and therefore writing is performed collectively for the stacked game tokens 1.

10 [0042]

When the player takes the game token 1 out of a casino floor, exit processing is performed at a gate 10. At a time of exit of the player, the reader 13 reads the location information 220, and the management controller 15
15 determines whether or not any abnormality is present with the variable information 4. Further, at the gate 10, the writer 14 writes the variable information 4 including place/event information 222 indicating the exit and owner information 223.

20 [0043]

In a case where the player brings in the game token 1, which has been taken out before, and enters the casino floor, the reader 13 reads the location information, and a management controller determines whether or not any
25 abnormality is present with the variable information 4. It is possible to determine that there has been transfer of

the game token outside the casino, for example in a case where the owner of the game token 1 once taken out of the casino is different between at the time of exit the casino and at the time of entry to the casino.

5 [0044]

The above-described management controller 15 may output an alarm to the cage 9 or to the gate 10 in a case where a reading result by the reader 13 is determined to be abnormal. On the basis of the alarm output by the
10 management controller 15, cashing in may be refused when the owner of the game token 1 attempts to cash in at the cage 9, or a check may be conducted individually when the owner of the game token 1 exits the gate 10. Further, in a case where a determination result is abnormal, the
15 management controller 15 may issue an alarm to a dealer of each game table to interrupt a game or may issue an alarm to a pit, and a pit manager may determine to interrupt or continue a game, or determine to exchange the game token 1. Alternatively, the management controller 15 may be
20 connected to an overall management controller 18 of the casino and may issue an alarm to the overall management controller 18.

[0045]

Similarly, the management controller 15 may determine
25 whether or not any abnormality is present in the variable information 4 read by the reader 13 when the game token 1

is exchanged for cash at the cage. Specifically, the management controller 15 may determine that abnormality is present in a case where a certain period has passed since latest written date and time of information of use at a game table or information of cashing in at the cage, or in a case where the owner information 223 stored in the game token 1 and information of a person who is going to exchange the game token 1 for cash are different from each other. In a case where abnormality has been determined to be present with the game token 1, the management controller 15 may output an alarm to refuse to exchange the game token 1 for cash.

[0046]

Further, the above description is given of a case where the reader 13 performs reading, a management controller performs determination, and then the writer 14 performs writing. However, the reading and the writing may be performed simultaneously.

[0047]

In the following, details of application of an embodiment will be described.

[0048]

At the factory 6, the RFID tag 2 is read and/or written at a time of production completion or product shipment.

The writer 14 writes the production information and the product information as the fixed information 3 and locked

it so as not to be rewritten if necessary, and writes the variable information 4.

[0049]

At the backyard 6, the game token 1 shipped from the
5 factory is received, and the RFID tag 2 is read and/or
written when the game token 1 is activated as a usable game
token 1.

[0050]

At the warehouse 8, the RFID tag 2 is read and/or written
10 when the game token 1 is transferred from the warehouse 8
to the cage 9, or from the cage 9 to the warehouse 8.
Alternatively, the RFID tag 2 of the game token 1 kept in
the warehouse 8 may be read and/or written at regular time
intervals or at a predetermined timing.

15 [0051]

At the cage 9, the RFID tag 2 is read and/or written when
the game token 1 is transferred from or to the warehouse 8
or when cash owned by a customer and the game token 1 are
exchanged. In a case where cash and the game token 1 are
20 exchanged at the cage 9, as the variable information 4,
place/event information 222 indicating the exchange and
owner information 223 indicating a player who exchanged the
cash and the game token 1 are written. The owner
information 223 can be acquired from a casino ID card of
25 the player, a face authentication system, a credit card, or
the like.

[0052]

At the gate 10, the RFID tag 2 is read and/or written on entry or exit of the player. To all game tokens 1 that a player takes out of the casino when exiting the casino, as
5 the variable information 4, place/event information 222 indicating the taking out and owner information 223 indicating a player who takes out the game tokens 1 are written and registered. Similarly, at a time of entry to the casino, as the variable information 4, place/event
10 information 222 indicating the bringing in and owner information 223 indicating a player who brings in the game token 1 are written and registered to the game token 1 brought in the casino.

[0053]

15 At the betting area 11, the RFID tag 2 of the game token 1 that a player placed on the betting area 11 to participate in a betting is read and/or written. The RFID tag 2 of a game token 1 that the dealer has placed on a betting area 11 as redemption to the player is read and/or
20 written.

[0054]

In a chip tray 12, the RFID tag 2 of each of the game tokens 1 collected in the chip tray and the RFID tag 2 of each of the game tokens 1 kept in the chip tray are read
25 and/or written.

[0055]

Further, the game table may include a payout area, and the RFID tag 2 of a game token 1 that the dealer has placed on the betting area 11 as redemption to a player may be read and/or written.

5 [0056]

The management controller 15 has a function to determine whether or not any abnormality is present in location information 220 obtained from a reading result by a reader 13 at each place. Determination of presence of abnormality is made in a case where the game token 1 has not been used for a predetermined period since last writing, or where location information, which is supported to be written, is not written.

[0057]

15 A situation where the game token 1 has not been used for a predetermined period since last writing is a situation where:

1) latest location information indicates the cage 9, and a predetermined period has passed before next information is written,

2) latest location information indicates entry at the gate 10, and a predetermined period has passed before next information is written, or

3) latest location information indicates exit at the gate 10, and a predetermined period has passed before next information is written.

[0058]

A situation where location information, which is supported to be written, is not written is a situation where:

5 4) at a time of entry to a gaming hall, information indicating exit at the gate 10 is not written as latest location information in data rewritable area 22 of the game token 1,

10 5) at a time of use at the cage 9, information indicating the backyard 7 is not written, or

6) at a time of exit from the gaming hall, information indicating the cage 9 or the backyard 7 is not written.

[0059]

On the basis of the owner information 223 obtained from the reader 13, the management controller 15 can determine presence of abnormality when:

1) a person different from a latest owner whose information is stored in the data rewritable area 22 exchanges the game token 1 for cash or another game token in the gaming hall, or exits the gaming hall, or

2) a person different from an owner at a time of exit whose information is stored in the data rewritable area 22 brings the game token in the gaming hall.

[0060]

25 On the basis of information obtained from the reader 13 and indicating a place of the betting area 11, or

information indicating location of the chip tray 12 or a payout area, the management controller 15 determines presence of abnormality when:

1) a person different from a latest owner whose

5 information is stored in the data rewritable area 22 uses the game token 1 at a game table,

2) a person different from the person who purchased, at the cage 9, a game token 1 without a record of use at the game table attempts to exchange the game token 1 at the

10 cage 9,

3) a game token 1 not including information indicating the cage 9 or the backyard 7 is used in the gaming hall, or

4) latest location information is information indicating the betting area 11 or the payout area, and after a

15 predetermined period has passed, the game token 1 is exchanged for cash at the cage 9 or is used at the game table.

[0061]

Fig. 8 illustrates a database according to another
20 embodiment. The management system further includes a database 17 that records similar fixed information 3 and variable information 4 outside the game token 1. The management controller 15 is able to record information in the database 17 on the basis of a reading result by the
25 reader 13, check the fixed information 3 and the variable

information 4 stored in the game token 1 with information in the database, and determine presence of abnormality.

[0062]

In the RFID tag 2 according to the embodiment, a
5 functionally non-writable area in the data non-rewritable area 21 may be a tag identifier (TID) area. An area in the data non-rewritable area 21, which is locked to disable further writing of data after necessary information is written, may be an electronic product code (EPC) area or a
10 user area. The data rewritable area 22 may be an EPC area or a user area.

[0063]

The reader 13 and the writer 14 may be changed in form depending on a place. For example, the reader 13 and the
15 writer 14 may be on a board at the factory 6 as illustrated in Fig. 6, and may be box-shaped at the gate 10. The betting area 11 or the chip tray 12 may include functions of the reader 13 and the writer 14. Further, the game token 1 either may be read and written in a stacked state
20 without any support or may be read and written while being contained, for example, in a chip case. Further, the reader 13 and the writer 14 may be unified.

[0064]

The above embodiment describes a case where a game token
25 has one RFID tag, and the single RFID tag has an area in which writing to data is impossible and a data rewritable

area. Meanwhile, there may be a case where two RFID tags are embedded in the game token. In this case, one RFID tag stores fixed information and then is locked to disable data writing, and another RFID tag is left data-rewritable to record variable information.

[0065]

However, in this case, when a plurality of game tokens are read collectively, an information group of fixed information 3 and an information group of variable information 4 are read separately as illustrated in Fig. 7A. Therefore, a problem arises in that a combination of fixed information and variable information of a specific game token cannot be determined, and a game token having abnormal variable information cannot be identified.

[0066]

On the other hand, in the case of one RFID tag, as illustrated in Fig. 7B, mutually corresponding fixed information and variable information that are read by a reader can be determined even when a plurality of game tokens are read collectively. Therefore, a game token having a single RFID tag is conceived to be preferable.

[0067]

In general, an RFID tag with a larger diameter has higher reading accuracy. Therefore, in a case where an RFID tag is embedded in the game token, a diameter of the RFID tag is preferably at least equal to or larger than a radius of

the RFID tag. Thus, it is not preferable that two RFID tags are embedded in the game token, in which case, the diameter of each of the RFID tags becomes smaller.

Further, the number of RFID tags to be read increases with a game token including two RFID tags, resulting in lower reading speed at a time of reading a plurality of game tokens.

[0068]

In view of the above, a game token having a single RFID tag is considered to be more effective.

[0069]

(Third embodiment)

Described below is an overall overview of a table game management system at a gaming hall having a plurality of game tables according to an embodiment. Fig. 9 is a diagram illustrating an overall overview of the table game management system. The table game management system having a plurality of game tables 2004 at a gaming hall includes a game recorder 2011 that records an image of a game at a game table 2004 including an image of the game token 1, via a plurality of cameras 2002, an image analyzer 2012 that performs image analysis on the recorded images, a chip reader 25 that reads RFID added to the game token 1, and a game result determination device 18 that determines and displays a result of each game played at the game table 2004.

[0070]

The game result determination device 18 is, for example, a card distributor 2003, which is a so-called electronic shoe that have been used by persons skilled in the art. A rule of a game is previously programmed in the card distributor 2003, which is configured to read information of a distributed card C and determine win or loss of the game. For example, in a baccarat game, a win of a banker, a win of a player, and a tie (draw) are basically determined by each rank of two to three cards, and a determination result (win/loss result) is displayed by a result display lamp 2013.

[0071]

In Fig. 9, a game table 2004 is a table for baccarat and provided with five sitting numbers 13, allowing five game participants to participate in a game. The five sitting numbers are "sitting number 1" 131, "sitting number 2" 132, "sitting number 3" 133, "sitting number 5" 134, and "sitting number 6" 135. A betting area 44 is provided to each sitting number 13. The betting area 44 of a sitting number 13 includes each area for player (PLAYER) 441, banker (BANKER) 442, tie (TIE) 443, player pair (P) 444, and banker pair (B) 445. Each game participant makes a bet by placing a game token 1 in an amount to be bet at a position corresponding to a bet target. In Fig. 9, for example, at a sitting number 5, two game tokens 1 are

placed on tie 443 and two game tokens 1 are placed on
player 441 for betting. The game table 2004 further
includes a player card area 45 for placing a drawn player
card and a banker card area 46 for placing a drawn banker
5 card.

[0072]

Via a camera 2002 and the image analyzer 2012, the
controller 2014 is able to determine on which position
(player, banker, tie, or pair) in a betting area 2008 each
10 player 2006 has bet a game token 1, and types and the
number of the bet game tokens 1. Different colors are
assigned to game tokens 1 in different values. That is, to
the controller 2014 can determine that, for example, at the
sitting number 5, two game tokens 1 are bet on tie 443 and
15 two game tokens 1 are bet on player 441.

[0073]

As illustrated in Fig. 9, the chip reader 25 is arranged
so that RFIDs of the game tokens 1 in a reading area can be
collectively read by regarding an entire betting area for
20 each sitting number as one reading area. In the RFID
attached to a game token 1, unique ID information, and an
amount, type, manufacturing information, owner information,
or the like, of the game token 1 are written.
Alternatively, the ID information and the amount, type,
25 manufacturing information, owner information, or the like,
of the game token 1 may be associated and stored in a

database. By reading the RFID attached to the game token 1, the chip reader 25 can determine a total amount or the number of game tokens 1 for each sitting number. That is, for example, a type, an amount, and an ID of each of four game tokens bet at the sitting number 5 can be determined. [0074]

As illustrated in Fig. 10, on the basis of types and the number of the game tokens 1 bet at each betting area of each sitting number based on an image analysis result by the image analyzer 2012, the controller 2014 determines a total amount or the total number of the game tokens 1 for each sitting number. Then, to determine agreement, the controller 2014 compares the determined a total amount or the total number of the game tokens 1 with a total amount or the total number of the game tokens 1 for each sitting number based on information of RFIDs of the game tokens 1 read by the chip reader 25. Furthermore, a sitting number for which an amount or the total number of the game tokens 1 determined to be disagreeing can be output, and therefore a sitting number having a problem can be identified. [0075]

In a case where the total amount or the total number of the game tokens 1 for each sitting number based on the image analysis result by the chip reader 25 is smaller than the total amount or the total number of the game tokens 1 for each sitting number based on the reading result by an

image analyzer 2012, there is a possibility that RFID
attached to a game token 1 is broken, the RFID cannot be
read, or RFID is not attached to the game token 1. In Fig.
10, the read total number of game tokens 1 bet at sitting
5 number 1, based on image analysis by the image analyzer
2012, is four, whereas the total number of the game tokens
1 based on reading of RFID by the chip reader 25 is three.
Therefore, it is conceivable that one of the four game
tokens 1 bet at the sitting number 1 has unreadable RFID.

10 [0076]

In a case where the total amount or the total number of
the game tokens 1 for each sitting number based on the
image analysis result by the chip reader 25 is larger than
the total amount or the total number of the game tokens 1
15 for each sitting number based on the reading result by the
image analyzer 2012, there is a possibility that the image
analyzer 2012 has not been able to read the game token 1
for such reasons that the game token 1 is in a blind spot
of a camera. In Fig. 10, the read total number of game
20 tokens 1 bet at sitting number 3, based on image analysis
by the image analyzer 2012, is one, whereas the total
number of the game tokens 1 based on reading of RFID by the
chip reader 25 is two. Therefore, there is a possibility
that only one of the two game tokens 1 bet at a sitting
25 number 3 has been recognized by the image analyzer 2012.
[0077]

ID information of the RFID attached to the game token 1 is registered in a database of a casino. Information of production and shipment at a factory, and information of reception, validation, and activation at the casino are recorded. The controller 2014 can check the information of the RFID read by the chip reader 25 with information in the database and determine authenticity of the registered information of the game token 1 to be used in the casino. [0078]

With this configuration, types and the number of the game tokens 1 bet at each betting area can be determined by the camera. Further, on the basis of RFID information of game tokens 1 read by the chip reader 25, a wrong or defective game token 1 can be identified for each sitting number.

[0079]

The table game management system further includes a game participant identification unit using a face authentication system or a player ID card, and the controller 2014 can associate game participant information identified by the game participant identification unit with a sitting number. For each game participant, the controller 2014 can store the bet amount, redeeming or collecting amount, and win/loss information, which are stored for each sitting number. Further, the controller 2014 can collectively store information of a plurality of games that game participants play at a plurality of tables.

[0080]

By using a chip tray determination device 12, the controller 2014 can determine a total amount of the game tokens 1 in a chip tray 17 of a dealer 2005 at the game table 2004. After a game end and settlement, the
5 controller 2014 can calculate to figure out whether a total amount of the game tokens 1 in the chip tray 17 has increased or decreased by comparing an amount of collected lost game tokens 1 that each player 2006 has bet with an
10 amount of payment 9W to a winning player 2006W for won chips, according to a win/loss result of the game. A chip tray determination device may capture an image of the game tokens 1 contained in the chip tray 17 by using the camera 2002 and, on the basis of analysis by an image analyzer
15 2012, determine the total amount of the game tokens 1 in the chip tray 17. Further, the chip tray determination device may detect the total amount of the game tokens 1 contained in the chip tray 17 by providing an RFID reader to the chip tray 17.

20 [0081]

In this example, a wrong or an error is detected on the basis of a win/loss result of the game, information about how many and what type of game token 1 has been bet on which position (player, banker, tie, or pair) in the
25 betting area 2008, and increase or decrease in amount of the game tokens 1 in the chip tray 17 after collection of

lost chips and redemption for a won game token 1.

Therefore, a wrong or an error can be detected without determining transference of the game tokens 1 after a game end, that is, whether a bet game token 1 has transferred to
5 a player side or a dealer side.

[0082]

Here, in a case of baccarat for example, a win/loss result of a game can be determined according to a rule of baccarat by the card distributor 2003 reading a rank of the
10 card C drawn out in the game. Further, the win/loss result can be determined by capturing an image of a top of the game table 2004 by a camera 2002, analyzing the image by the image analyzer 2012, and then checking an analysis result with a rule of the game by the controller 2014. In
15 this case, a game result determination device includes the camera 2002, the image analyzer 2012, and the controller 2014. Information of how many and what type of game tokens 1 a player at each sitting number 7 has bet on which position (player, banker, tie, player pair, banker pair) in
20 a betting area 2008 is obtained by the camera 2002 capturing an image of the game tokens 1 placed on the betting area 2008 and the image analyzer 2012 analyzing the image for each play position 7.

[0083]

25 Further, increase in amount of the game tokens 1 in the chip tray 17 from before collection to after collection of

a lost game token 1 and decrease in amount of the game tokens 1 in the chip tray 17 from before redemption to after redemption for a won game token 1 can be calculated by comparison of a total amount of the game tokens 1 in the chip tray 17 before the collection of the lost game token 1 and redemption for the won game token 1 with a total amount of the game tokens 1 in the chip tray 17 after the collection of the lost game token 1 and redemption for the won game token 1.

10 [0084]

For example, assuming that a total amount of the game tokens 1 in the chip tray 17 before start of the game is B_b , and a total amount of the game tokens 1 in the chip tray 17 after the end of the game and collection of lost chips and redemption for a won chip are completed is B_a . Further, assuming that, in this game, a total amount of the game tokens 1 bet on player areas of all play positions 7 is b_p , a total amount of the game tokens 1 bet on banker areas of all the play positions 7 is b_b , and a total amount of the game tokens 1 bet on tie areas of all the play positions 7 is b_t . For example, in a case where a banker is a winner as a win/loss result of the game, $B_a - B_b = b_p - b_b + b_t$ should be established. Alternatively, B_a , which is the total amount of the game tokens 1 in the chip tray 17 after the end of the game, should be $(B_b + b_p - b_b + b_t)$. If this is not the case, it can be determined that

there has been a wrong or an error in collection or redemption of the chips.

[0085]

Fig. 14A is a diagram illustrating details of a chip tray
5 of the present embodiment, and Fig. 14B is a diagram
illustrating another example of the chip tray. The chip
tray 17 includes a collection chip tray 171 for temporarily
keeping a collected game token 1L bet by a losing player
2006L, and a redemption chip tray 172 for keeping a game
10 token 1W to be redeemed. The image analyzer 2012 and the
controller 2014 determine positions, types, and the number
of the game tokens 1L bet by the losing player 2006L, and
calculate an increase in amount of the game token 1L, which
is the amount of the game token 1 expected to be in the
15 collection chip tray 171. Further, the image analyzer 2012
and the controller 2014 determine an actual total amount of
the game tokens 1 in the collection chip tray 171 after the
collection, and compare the expected total amount with the
actual total amount to determine whether or not there is a
20 difference.

[0086]

The controller 2014 further performs redemption for the
game token 1 to be redeemed, and after the redemption,
compares a total amount of the chips expected to be in the
25 chip tray based on the amount of the chips expected to be
redeemed in the game, which is calculated from positions,

types, and the number of chips each game participant bet at the game table and based on a game result, with the actual total amount of the chips in the chip tray to determine whether or not there is a difference.

5 [0087]

Further, the game token 1W is redeemed to the winning player 2006W by using a game token 1 in a redemption chip tray 172. Thus, it is possible to secure sufficient time for the image analyzer 2012 and the controller 2014

10 determine an actual total amount of the game tokens 1 in the collection chip tray 171 after the collection.

[0088]

As described above, in the present embodiment, the controller 2014 calculates, for each game, income and outgo
15 of chips from an amount of bet chips placed on the game table 2004 and a win/loss result of the game, and verifies an increase in balance of the chips in the chip tray 17 after the end of the game. If a difference is detected in this verification, the controller 2014 issues an alarm or
20 adds a record of the difference to a record of a video image captured by the camera 2002. A casino operator can track down a cause of the difference by reviewing the video image.

[0089]

25 A table game management system according to the present embodiment calculates, from total amount of the game tokens

1 in the chip tray 17 before settlement for each game, an increase or decrease in amount of chips in the game calculated from positions, types, and the number of game tokens 1 bet by all players 2006 of the game and from a win/loss result of the game obtained by a win/loss result determination device. Then, the table game management system compares an expected total amount of the game tokens 1 in the chip tray 17 after settlement of the game end with an actual total amount of the game tokens 1 in the chip tray 17 at the game end, which is obtained via the image analyzer 2012, to determine whether or not there is a difference.

[0090]

Via the image analyzer 2012, the controller 2014 determines positions, types, and the number of chips bet by each player, and determines an actual total amount of chips in the chip tray at an end of collection of all lost chips bet by each player. Then, the controller 2014 compares an expected total amount of the game tokens 1 in the chip tray 17, which is obtained by adding an increase in chips in the chip tray 17 determined by positions, types, and the number of chips bet by a losing player, to a total amount of chips of the game in the chip tray before settlement of each game, with an actual total amount of the game tokens 1 in the chip tray 17 to determine whether or not there is a difference.

[0091]

In a case where the controller 2014 compares an expected total amount of the game tokens 1 in the chip tray 17, which is obtained by adding an increase in chips in the chip tray 17 determined by positions, types, and the number of the game tokens 1 bet by a losing player, to a total amount of the game tokens 1 of the game in the chip tray 17 before settlement of each game, with an actual total amount of the game tokens 1 in the chip tray 17 and determines there is no difference between the expected total amount and the actual total amount, and in addition, compares an expected total amount of the game tokens 1 in the chip tray 17 after settlement at the end of the game with an actual total amount of the game tokens 1 in the chip tray 17 at the end of the game, which is obtained via the image analyzer 2012, and determines that there is a difference between the expected total amount and the actual total amount, the controller 2014 determines there has been a wrong payment and issues an error signal that notifies of the wrong payment.

[0092]

The chip tray 17 includes the collection chip tray 171 that collects and temporarily keeps the game tokens 1 bet by a losing player. The image analyzer 2012 compares an expected total amount of the game tokens 1 in the collection chip tray 171, which is obtained by adding an

increase in amount of the game tokens 1 in the game
calculated from positions, types and the number of the game
tokens 1L bet by the losing player, with an actual total
amount of the game tokens 1 in the collection chip tray 171
5 to determine whether or not there is a difference between
the expected total amount and the actual total amount.

[0093]

In a case where the controller 2014 determines a
difference in which a determined actual total amount of the
10 game tokens 1 in the chip tray 17 of the dealer 2005 at the
game table 2004 is not corresponding to an increase or
decrease in amount of chips calculated from an amount of
chips bet by all players and a win/loss result of the game,
the game recorder 2011 can play back with an index or time
15 attached to an acquired image or with a scene of collection
or payment of the game token 1 specified, so that a record
of the game in which the above different has occurred can
be analyzed in the game recorder 2011.

[0094]

20 As described above, the controller 2014 obtains a total
amount of chips in the chip tray 17 via the image analyzer
2012 after the settlement at the end of the game. In this
case, determination after settlement is performed when:

- 1) redemption for the won game token 1 is completed,
- 25 2) the card C used in the game is collected and discarded
in a discard area 41 or discard slot 42 of the table,

3) a predetermined button attached to a win/loss result determination device is pressed, or

4) a marker 43 that indicates win or loss is reset.

[0095]

5 Further, the controller 2014 has an artificial-intelligence utilization structure or deep-learning structure, which allows the controller 2014 to determine positions (player, banker, or pair) and an amount (types and the number) of chips bet at each play position 7 of the
10 game table 2004, and to extract win/loss history of each player 2006, which is obtained from a win/loss result of each game, and an amount of obtained chips (an amount of won chips) as an unusual situation specified by a casino, compared with statistical data of many games in the past
15 (big data). Typically, the controller 2014 includes an artificial-intelligence utilization structure or deep-learning structure, which can extract, as an unusual situation compared with statistical data (big data, or the like) of games in the past, a case of a winning amount of a
20 certain amount (one million dollars) or more, or a case of a series of several games in which amounts of bet chips are small in losing games and amounts of bet chips are large in winning games at a play position 7 of the game table 2004.
[0096]

25 Furthermore, unified with the image analyzer 2012, the controller 2014 of this table game management system is

configured to be able to identify an individual player 2006
at the play position 7 which has won a predetermined amount
or more or at which an unusual situation is extracted. In
identification of such a player 2006, in the image analyzer
5 2012, feature points of an image of a face is obtained by,
for example, extraction of a feature point, and the image
is identified by adding an identification number (ID, or
the like) to the image. Then, the controller 2014 has an
alarm function of notifying another game table of the
10 presence of a specific player when the specific player 2006
leaves the seat and sits at the other game table.
Specifically, a pit manager or a person in charge of each
table (or a dealer) who manages each game table 2004 is
notified to further prevent an unusual situation.

15 [0097]

The controller 2014 can identify a collected game token 1
for each sitting number on the basis of information of an
ID of RFID of the collected game token 1 determined by the
chip tray determination device and information of an ID of
20 RFID of the game token 1 read by the chip reader 25.

[0098]

In Fig. 11, game tokens 1 are bet as illustrated in the
detail tables in Figs. 12 and 13. In analysis by the image
analyzer 2012, places (player, banker, or the like) where
25 the game tokens 1 are bet and the number (and amount) of
the bet game tokens 1 can be determined. Meanwhile, in

reading by the chip reader 25, an ID of RFID attached to a game token 1 can be determined for each sitting number.

Further, because a chip tray determination device can determine IDs of game tokens 1 in a chip tray 9, the chip

5 tray determination device can determine a collected game token 1 by determining IDs added from before collection to after collection. In a case where a banker has won as a game result in Figs. 11 to 13, an analysis result by the image analyzer 2012 shows that, among IDs of the collected
10 chips determined by the chip tray determination device, two pieces of chips bet on banker pair should be collected, and that two pieces of chips of ID 6 and ID 18 that the chip reader 25 has read as chips bet at the sitting number 5 have been collected.

15 [0099]

The controller 2014 determines the total amount or the total number of the game tokens 1 expected to be collected for each sitting number, which is determined by using a measurement result of positions, an amount, and the number

20 of the game tokens 1 based on a game result obtained from the game result determination device and an image analysis result by the image analyzer. Therefore, the controller 2014 can compare, to determine agreement, the total amount or the total number of the game tokens 1 collected for each
25 sitting number, which is determined based on RFID, with the total amount or the total number of the game tokens 1

expected to be collected based on the image analysis result.

[0100]

For example, in a case where a reading result by the chip reader 25 of the sitting number 1 is "A, B, C, D, E", an analysis result by the image analyzer 2012 is "two pieces on tie, and two pieces on banker", the game result is "winning of banker", and a reading result by a chip tray determination device 18 is "A, B", it is understood that the chips A and B bet on tie have been correctly collected.

[0101]

The controller 2014 can determine whether or not information of an ID of RFID of the collected game token 1 determined by the chip tray determination device agrees with information of an ID of RFID of the bet game token 1 read by the chip reader 25. By this determination, it is possible to determine whether or not the game token 1 collected in the chip tray is the game token 1 bet on the game table, and whether or not the game token 1 is wrongly collected from another place.

[0102]

The controller 2014 can determine, on the basis of the RFID information read by the chip reader 25, a chip type such as a cash chip, a rolling chip, or a promotion chip, and can store an amount of bet money for each type of the

determined chips and an amount of money collected or redeemed.

[0103]

A rolling chip is a special chip that can be purchased by
5 a specific member and cannot be exchanged for cash, and an
amount of the purchased rolling chips is managed for each
member. A rolling chip must be consumed for betting, and
redemption for betting using a rolling chip is made by a
cash chip. By storing an amount of the rolling chips bet
10 or collected on the basis of the RFID information read by
the chip reader 25, an amount of rolling chips that a
specific member is expected to have can be determined.

[0104]

The chip reader 25 has a function of a confirmation area,
15 and can read a game token 1 placed for redemption. As
illustrated in Fig. 15, in a case where redemption is made
to banker at the sitting number 2, the game token 1 for the
redemption is placed and read in the chip reader 25. In
Fig. 15, the game tokens 1 are placed next to the won game
20 tokens 1 bet on banker at the sitting number 2. The
controller 2014 can compare an amount of redemption, which
is determined by using a measurement result of a position,
an amount, and the number of the game tokens 1 based on a
game result obtained from the game result determination
25 device and the image analysis result by the image analyzer,
with an amount of the game tokens 1 placed for each sitting

number, which is based on a reading result by the chip reader 25, determine whether or not the amount of the redemption agrees with the amount of the game tokens 1 placed for each sitting number, and output a determined
5 result. In Fig. 16, at the sitting number 1, the total number of the game tokens 1 expected to be paid is four, whereas a reading result by the chip reader 25 is three, which means the total number of the game tokens 1 and the reading result disagree. In a case where an amount of
10 redemption disagrees with an amount of the game tokens 1 placed for each sitting number, a signal indicating the disagreement is output, and the dealer can replace a game token 1 for redemption on the basis of the output signal. In a case where the game token 1 is replaced, determination
15 is performed again, and a determination result can be output. An area for placing the game token 1 for redemption may be anywhere in the chip reader 25. Further, as illustrated in Fig. 15, separately from a betting area, a payment confirmation area 26 may be arranged on a dealer
20 side of the betting area. In Fig. 15, a game token 1 for redemption is placed in a payment confirmation area 26 at a sitting number 6, the chip reader 25 performs reading, the controller 2014 makes determination, and a redemption chip is placed next to the won game token 1 placed in banker.

25 [0105]

For the confirmation area, the image analyzer 2012 may perform image analysis, and the controller 2014 may check a result of the image analysis with a reading result by the chip reader 25 to determine whether or not a total number of the result of the image analysis and a total number of the reading result by the chip reader 25 match.

[0106]

On the basis of the determination made, the controller 2014 can output a signal. The signal may be displayed in a display unit of the chip tray 9 or a display unit of a card distributor 2003, or may be output to the pit manager or to the backyard of the casino.

[0107]

The chip reader 25 may use an entire betting area as one reading area for each sitting number as illustrated in Fig. 17, or may use, for each sitting number, a set of a player betting area and a banker betting area as one reading area, and a set of tie betting area, player pair betting area, and a banker pair betting area as one reading area as illustrated in Fig. 18. Further, as illustrated in Figs. 19 and 22, each side betting area for a tie betting area, a player pair betting area, and a banker pair betting area may be treated as one reading area.

[0108]

A game token 1 used in an embodiment will be described below. Fig. 20 is an external view of and Fig. 21 is a

front sectional view of a game token 1 used in this system. The game token 1 has a multi-layer structure in which a plurality of plastic layers in different colors are laminated. The game token 1 includes at least an intermediate color layer 101 and white layers 102 or light color layers on both sides of the color layer 101. The light color layers, which are not illustrated, are required at least to be layers in color lighter than color of the color layer 101. With the multi-layer structure in which the intermediate color layer 101 and the white layers 102 or light color layers, which is not illustrated and required at least to be layers in color lighter than color of the color layer 101, on both sides of the color layer 101 are laminated, as illustrated in Fig. 20, to form a stripe pattern in a lamination direction on a side surface, and different colors (red, green, yellow, blue, or the like) are used for the color layer 101, a type (10 points, 20 points, 100 points, 1,000 points, or the like) of the game token 1 can be identifiable.

[0109]

As illustrated in Fig. 21, the color layer 101 may be formed of a plurality of colored layers (Fig. 21 illustrates three layers). Because the plurality of the colored layers (three layers in Fig. 21) are thermally press-bonded to one another, three-layer structure is not visible as illustrated in Fig. 21 that illustrates the

three layers for description. Furthermore, a bore B is partially provided in a middle of the three layers of the color layer 101, and RFID is embedded therein.

[0110]

5 A structure of the game token 1 is not limited to a structure in which plastic is laminated, and may be similar to the color layer 101 in appearance.

[0111]

A method for analyzing the game token 1 by the image
10 analyzer 2012 will be described below in detail. The image analyzer 2012 analyzes an image recorded on a recorder 11 and recognizes at least two colors, which are a specific color 121 that is at least partially attached to the game token 1 and a reference color R that is present in the
15 image and is different from the specific color 121. Note that the specific color 121 is at least partially provided to a predetermined position of a game token 1 or in a predetermined form. For example, the specific color 121 may be provided as the color layer 101, may be provided on
20 a side surface of the game token 1 in a circumferential direction, or may be provided on a surface of the game token 1 as a predetermined mark. Further, the reference color R may be, for example, a color of a specific area of the game table 2004, or may be a color attached to a place
25 different from the specific color 121 in the game token 1.

[0112]

The image analyzer 2012 includes an artificial intelligence device 12a that identifies a specific color by, for example, deep learning technology, and determines the number and types of the game tokens 1 placed on the game table 2004. A recognition device 12 may further determine a position of the game token 1 on the game table 2004.

[0113]

The image analyzer 2012 acquires a plurality of images of the game token 1 and reference color R, which are irradiated with different illuminances, learns the acquired images and a correct specific color 121 and reference color R of the game token 1 in each image as teaching data by teaching from a human, and creates a learning model 13a (recognition program). Note that a relative relation of the specific color 121 and the reference color R can be acquired, because in the images of the game token 1 and the reference color R irradiated with an illuminance of the same condition, the specific color 121 and the reference color R are irradiated with the same illuminance. For example, this relative relation may be used for recognition of the specific color 121.

[0114]

Further, without using artificial intelligence, a chip recognition device 12 may extract a center line C of the game token 1 with a method for measuring a feature of a

shape, brightness, saturation, and hue in the images by using a result of an image analysis of the images captured by a camera 2002 and recorded as images.

[0115]

5 Furthermore, the artificial intelligence device 12a is configured to recognize at least two colors of the specific color 121 and the reference color R, which is different from the specific color 121 in a peripheral image of a predetermined range around the extracted center line C, by
10 analyzing the peripheral image, which is for example a range of eight pixels orthogonal to the center line as a center. Note that, the extracted peripheral image of the predetermined range around the center line C may be analyzed as is, or after image processing such as color
15 emphasis and noise reduction so that the specific color 121 can be easily recognized.

[0116]

In summary, the artificial intelligence device 12a of the recognition device 12 is an artificial intelligence device
20 configured to extract the center line C from the image of the game token 1 and recognize at least two colors of the specific color 121 and the reference color R different from the specific color 121, which are in the peripheral image, by analyzing the peripheral image of the predetermined
25 range around the center line C as a center, and taught, as teaching data, the plurality of peripheral images of the

game token 1 and the reference color R irradiated with different illuminances.

[0117]

In another embodiment, the controller 2014 further
5 includes a function to determine at least one among whether or not:

1) in each game, there is transference of a chip from time of start of drawing cards or start of game operation by the dealer to time before display of a win/loss result
10 of the game by a card distributor,

2) after an end of each game, there is transference of a chip by a person other than the dealer while the dealer is collecting the chips bet by a loser among the game participants,

15 3) after an end of each game, any chip has been added while the dealer is collecting a chip bet by a loser among the game participants,

4) after an end of each game, the dealer has paid to a position of a chip that a winner among the game
20 participants has bet, and

5) after an end of each game, a winner among the game participants has taken a bet chip and a payed chip.

[0118]

Further, the controller 2014 may be configured to
25 determine at least one of 1) to 5) described above by detecting transference of hands of the dealer and game

participant, transference of chips, or transference of the hands and the chips by using an analysis result from the image analyzer 2012.

[0119]

5 As a feature function, the controller 2014 has functions described in 1) to 5) below to determine whether or not there is any wrong against a rule of a baccarat game:

1) In each game, the controller 2014 monitors, by information that the image analyzer 2012 obtains by using
10 the camera 2002, whether or not there is transference of a game token 1 from time of a signal that starts drawing of cards obtained from the card distributor 2003, or time of start of game operation by the dealer 2005 pressing a start button 4s to time before display of a win/loss result of
15 the game by the card distributor 2003.

2) After an end of each game, the controller 2014 monitors, by information that the image analyzer 2012 obtains by using the camera 2002, whether or not a loser 6 has wrongly taken a game token 1 while the dealer 2005 is
20 collecting a game token 1 bet by a loser among game participants 2006.

3) After an end of each game, the controller 2014 monitors, by information that the image analyzer 2012 obtains by using the camera 2002, whether or not a person
25 other than the dealer 2005 (winner or loser) has added a won game token 1W or has replaced the game token 1 to a

winning position not bet while the dealer 2005 is collecting a game token 1 bet by a loser among the game participants.

4) After an end of each game, the controller 2014 monitors, by information that the image analyzer 2012 obtains by using the camera 2002, whether or not the dealer 2005 has correctly placed a won game token 1W for payment to a position of the game token 1 that a winner among the game participants 2006 has bet.

5) After an end of each game (the dealer 2005 operates the card distributor 2003 to display a win/loss result in a display lamp 13), the controller 2014 monitors, by information that the image analyzer 2012 obtains by using the camera 2002, whether or not a winner 6W among the game participants 2006 has taken a bet game token 1 and a payed game token 1W.

[0120]

Note that, in the above embodiment, the image analyzer 2012 and the controller 2014 are devices having an artificial-intelligence utilization structure or deep-learning structure. Specifically, the image analyzer 2012 and the controller 2014 may analyze an image or perform various controls described above by using scale-invariant feature transform (SIFT) algorithm, a convolutional neural network (CNN), deep learning, machine learning, or the like. These technologies perform image recognition of a

captured image to recognize an object included in the image. In recent years, in particular, deep learning technology using a multilayered neural networks has been used to recognize an object with high accuracy. This deep
5 learning technology generally recognizes an object with high accuracy by, over a plurality of stages, layering in an intermediate layer between an input layer and an output layer of a neural network. Regarding this deep learning technology, a convolutional neural network, in particular,
10 has drawn attention for having higher performance than a conventional object recognizing method based on an amount of image features.

[0121]

In a convolutional neural network, a recognition object
15 image to which a label is attached is learned, and a main object included in the recognition object image is recognized. If there are a plurality of main objects in a learning image, learning is performed by designating a region with a rectangle and attaching a label to an image
20 corresponding to the designated region. Furthermore, in a convolutional neural network, it is also possible to determine a main object and position of the object in the image.

[0122]

25 To further describe a convolutional neural network, an object recognition process involves extraction of candidate

regions based on a local feature by performing edge extraction processing, or the like, on a recognition object image, input of the candidate regions to the convolutional neural network, classification of the candidate regions
5 after extracting feature vectors, and obtainment of a classified candidate region with a highest degree of certainty as a recognition result. A degree of certainty is quantity indicating how much similarity of an object in an image learned together with a certain image region and a
10 label is relatively higher than similarity of another class.

[0123]

As described above, various embodiments have been described. However, it is needless to say that a device of
15 the present embodiments may be modified by a person skilled in the art as appropriate within the scope of the preset disclosure according to a game to which the present disclosure is applied.

(Appendix)

20 [0124]

In order to solve the above-described conventional problem, a game token management system according to an embodiment has a configuration in which:

a single RFID tag having a data non-rewritable area and a
25 data rewritable area is attached to a game token,

the data non-rewritable area of the RFID tag stores, as fixed information, at least one of production information of the game token, product information of the game token, casino information, amount information of the game token,
5 or a serial number of the game token,

the data rewritable area stores, as variable information, location information of the game token, and

the variable information stored in the data rewritable area can be extracted from the fixed information stored in
10 the data non-rewritable area in an identical RFID tag, and
the game token management system further includes:

a writer that adds the location information of the game token to the data rewritable area,

a reader that can collectively reads the fixed
15 information stored in the data non-rewritable area of the plurality of game tokens and, on the basis of the read fixed information, can read the location information, which is a counterpart of the fixed information and stored in the data rewritable area, and

20 a management controller that examines the location information obtained from the reader,

in which the data rewritable area stores a plurality of pieces of location information including at least latest location information among all pieces of location
25 information written by the writer, and

the management controller includes a function to determine whether or not any abnormality is present in history of the location information obtained from the reader, and is configured to be able to, if there is
5 abnormality, generate an error signal and identify the fixed information of the game token, which has been determined to be abnormal.

[0125]

The data rewritable area is configured to store, together
10 with the location information, information of time at which the writer writes to the game token, and

the management controller is configured to determine, from the location information obtained from the reader, presence of abnormality by determining whether or not the
15 game token has not been used for a predetermined period since last writing, or whether or not the location information, which is supported to be written, is not written.

[0126]

20 In the management controller, the location information may include at least one of information indicating a cage, information indicating entry or exit, or information indicating a backyard,

a situation where the game token has not been used for a
25 predetermined period since last writing may be a situation where:

1) latest location information is information indicating a cage, and a predetermined period has passed before next information is written,

2) latest location information is information indicating
5 entry, and a predetermined period has passed before next information is written, or

3) latest location information is information indicating exit, and a predetermined period has passed before next information is written, and

10 a situation where location information, which is expected to be written, is not written may be a situation where:

4) at a time of entry to a gaming hall, information indicating exit is not written as latest location information in the data rewritable area of the game token,

15 5) at a time of use at the cage, information indicating a backyard is not written, or

6) at a time of exit from the gaming hall, information indicating a cage or a backyard is not written.

[0127]

20 The location information may include information about an owner who owns the game token.

[0128]

The management controller may have a function to determine, on the basis of the owner information obtained
25 from the reader, presence of abnormality when:

1) a person different from a latest owner whose information is stored in the data rewritable area exchanges the game token for cash or another game token in the gaming hall, or exits the gaming hall, or

5 2) a person different from an owner at a time of exit whose information is stored in the data rewritable area brings the game token in the gaming hall.

[0129]

The information about the owner of the game token may be
10 identified by face authentication or ID card reading.

[0130]

The location information may further include information indicating a place of a chip tray of a specific game table, information indicating a place of a betting area, or
15 information indicating a payout area.

[0131]

The management controller may have a function to determine, on the basis of information indicating location of the chip tray of the game table or information
20 indicating a place of the betting area or of the payout area, which is obtained from the reader, presence of abnormality when:

1) a person different from a latest owner whose information is stored in the data rewritable area uses the
25 game token at a game table,

2) a person different from the person who purchased a game token without a record of use at a game table attempts to exchange the game token at a cage,

3) a game token not including information indicating a cage or a backyard is used in the gaming hall, or

4) latest location information is information indicating a betting area or a payout area, and after a predetermined period has passed, the game token 1 is exchanged for cash at a cage or is used at a game table.

10 [0132]

Information that the RFID tag has may be encrypted.

[0133]

The data non-rewritable area may be configured to be functionally non-writable or locked to disable wiring of data.

15 [0134]

The reader may be configured to collectively read the fixed information stored in the data non-rewritable area and location information stored in the data rewritable area, and

20 the management controller may be configured to extract and determine, from the plurality of pieces of fixed information of the plurality of game tokens, which are obtained from the reader, the location information stored in the data rewritable area in an identical RFID tag.

25 [0135]

In order to solve the above-described conventional problem, the game token according to an embodiment includes a single RFID tag having a data non-rewritable area and a data rewritable area,

- 5 in which the data non-rewritable area stores, as fixed information, at least one of production information of the game token, product information of the game token, casino information, amount information of the game token, or a serial number of the game token,
- 10 the data rewritable area is configured to store, as variable information, location information of the game token written by the writer, and configured to extract the variable information stored in the data rewritable area based on the fixed information stored in the data non-
- 15 rewritable area in an identical RFID tag.

[0136]

- The game token may be configured to be able to collectively read the fixed information stored in the data non-rewritable area of the plurality of game tokens by a
- 20 reader, and to read the location information stored in the data rewritable area on the basis of the read fixed information.

[0137]

- In order to solve the above-described conventional
- 25 problem, the table game management system according to an embodiment includes:

a game token to which an individually identifiable RFID is attached,

a game table for playing a game by using the game token,

a game recorder that records, via a camera, an image of a
5 game token bet by each game participant of a game played at
the game table,

an image analyzer that performs image analysis on the
recorded image of the game token,

a chip reader that reads RFID attached to the game token
10 bet by each game participant, and

a controller that determines an image analysis result by
the image analyzer and a reading result by the chip reader,

in which the game table includes a plurality of betting
areas including at least a player betting area and a banker
15 betting area for each sitting number,

the chip reader reads the game token regarding an entire
betting area as one reading area for each sitting number,
or reads the game token for each of a plurality of reading
areas by dividing the entire betting area into a plurality
20 of reading areas which are less than the number of betting
areas, and

the controller is configured to be able to determine
types and the number of the bet game tokens separately for
each betting areas including at least the player betting
25 area and the banker betting area, on the basis of an image
analysis result by the image analyzer, determine whether or

not a total amount or the total number of the game tokens
for each of the sitting numbers or for each of the reading
areas based on an image analysis result by the image
analyzer agrees with a total amount or the total number of
5 the game tokens for each of the sitting numbers or for each
of the reading areas based on a reading result by the chip
reader, and output a determination result.

[0138]

The controller may be configured to be able to output a
10 sitting number with a determination result of disagreed
amount or number.

[0139]

The controller may be configured to be able to generate a
signal that indicates a possibility that RFID attached to
15 the game token is broken or RFID is not attached to the
game token in a case where a total amount or the total
number of the game tokens for each of the sitting numbers
based on a reading result of the chip reader is smaller
than a total amount or the total number of the game tokens
20 for each of the sitting numbers based on an image analysis
result by the image analyzer.

[0140]

The controller may further be configured to be able to
generate a signal that indicates a possibility of a reading
25 error by the image analyzer reading the game token in a
case where the total amount or the total number of the game

tokens for each of the sitting numbers based on a reading
result of the chip reader is larger than the total amount
or a total number of the game tokens for each of the
sitting numbers based on an image analysis result by the
5 image analyzer.

[0141]

The table game management system may include a database
storing an ID of RFID attached to the game token, and

the controller may be configured to be able to check an
10 ID of RFID based on a reading result by the chip reader
with an ID stored in the database, determine authenticity
of the game token, and output a determination result.

[0142]

The table game management system includes:

15 a chip tray that keeps a game token used by a dealer at a
game table,

a chip tray determination device that can determine types
and the number of the game tokens contained in the chip
tray, and

20 a game result determination device that determines a game
result of each game at the game table,

in which the controller may include:

a calculation function that calculates income and outgo
at a game table for a casino, at every collection and
25 redemption for each game by using a measurement result of
positions, an amount, and the number of game tokens based

on a game result obtained from the game result determination device and an image analysis result by the image analyzer,

a collection determination function that, after
5 collection of lost chips bet by each game participant, compares an amount of chips at the game expected to be collected, which is calculated from positions, types, and the number of chips bet by each game participant at the game table, and the game result with an amount of actually
10 collected chips in the chip tray, and determines whether or not there is a difference between the amount of the chips expected to be collected and the amount of the actually collected chips to determine whether or not there has been any wrong or an error with the collection of the game
15 token, and

a redemption determination function that performs redemption for a chip expected to be redeemed, compares, after the redemption, a total amount of chips expected to be in the chip tray based on an amount of the chips to be
20 redeemed in the game, which is calculated from positions, types, and the number of chips bet by each game participant at the game table, and the game result, with an actual total amount of chips in the chip tray, and if having determined that there is a difference between the expected
25 total amount and the actual total amount, determines that there has been a wrong or an error with the redemption.

[0143]

The controller may be configured to identify the collected game token for each sitting number on the basis of information of an ID of RFID of the collected game token
5 determined by the chip tray determination device and information of an ID of RFID of the game token read by the chip reader, compare, IDs, an amount, or the number of the identified game tokens with IDs, an amount, or the number of the game tokens expected to be collected for each
10 sitting number, which has been determined by using a measurement result of positions, an amount, or the number of the game tokens based on a game result obtained from the game result determination device and an image analysis result by the image analyzer, and determine whether or not
15 the IDs, an amount, or the number of the identified game tokens agrees with the IDs, an amount, or the number of the game tokens expected to be collected for each sitting number.

[0144]

20 The controller may be configured to be able to determine, at each game, a type of the game token classified by application or purpose of use on the basis of information of ID of RFID of the game token read by the chip reader, and store, for each sitting number, an amount of the bet
25 game tokens or an amount of the collected or redeemed game tokens by the type.

[0145]

The controller may be configured to be able to store a cumulative amount of the game tokens bet by type or a cumulative amount of the collected or redeemed game tokens
5 for each sitting number in a plurality of games.

[0146]

A type of the game token may be at least a cash chip, a rolling chip, or a promotion chip.

[0147]

10 The controller may be configured to be able to identify an owner on the basis of ID information of the rolling chip and store a cumulative amount of bet, collected, or redeemed rolling chip for each owner.

[0148]

15 The chip reader may be configured to read the game token for redemption placed on the chip reader for each sitting number, and

the controller may be configured to be able to compare an amount of redemption, which is determined by using a
20 measurement result of a position, an amount, and the number of the game tokens based on a game result obtained from the game result determination device and an image analysis result by the image analyzer, with an amount of the game tokens placed for each sitting number, which is based on
25 the reading result by the chip reader, determine whether or not the amount of the redemption agrees with the amount of

the game tokens placed for each sitting number, and output a determined result.

[0149]

Further, the controller may be configured to be able to display disagreement in a case where a determination result of the redemption disagrees, perform determination again in a case where there has been any change in amount of the game tokens placed on and read by the chip reader for each sitting number, and output agreement or disagreement again.

10 [0150]

The controller may be configured to be able to compare an amount of the game tokens placed for redemption for each sitting number with increase or decrease in amount of the game tokens in the chip tray from before redemption to after the redemption and determine whether or not there is a difference.

[0151]

The chip reader may include a payment confirmation area, which is arranged on a dealer side of the betting area, for placing the game token for redemption.

20 [0152]

the table game management system may further include a game participant identification unit using a face authentication system or a player ID card, and

the controller may be configured to be able to associate the sitting number with information of the game participant identified by the game participant identification unit.

[0153]

- 5 A display unit that displays based on output of the controller may be included.

[0154]

- The game table may include a side betting area,
 in which the side betting area may be adjacently provided
10 with a betting area for each sitting number,
 the chip reader may be able to collectively read at least one side betting area, and

- the controller may be configured to be able to determine types and the number of the game tokens bet at least one
15 side betting area on the basis of an image analysis result by the image analyzer, determine whether or not a total amount or the total number of the game tokens in at least one side betting area based on an image analysis result by the image analyzer agrees with a total amount or the total
20 number of the game tokens in the side betting area based on a reading result by the chip reader, and output a signal of a determination result.

[0155]

- Another embodiment is a table game management system
25 including:

a game token to which an individually identifiable RFID is attached,

a game table for playing a game by using the game token,

a game recorder that records, via a camera, an image of a
5 game token bet by each game participant of a game played at
the game table,

an image analyzer that performs image analysis on the
recorded image of the game token,

a chip reader that reads RFID attached to the game token
10 bet by each game participant, and

a controller that determines an image analysis result by
the image analyzer and a reading result by the chip reader,

in which the game table includes a betting area including
a player betting area, a banker betting area, and a side
15 betting area,

the side betting area is adjacently provided with a
betting area for each sitting number,

the chip reader is able to collectively read at least one
side betting area, and

20 the controller is configured to be able to determine
types and the number of the bet game tokens separately for
at least one side betting area on the basis of an image
analysis result by the image analyzer, determine whether or
not a total amount or the total number of the game tokens
25 for at least one side betting area based on an image
analysis result by the image analyzer agrees with a total

amount or the total number of the game tokens of the side betting based on a reading result by the chip reader, and output a signal of a determination result.

[0156]

- 5 The controller may be configured to be able to output the side betting with a determination result of disagreeing amount or number.

[0157]

- 10 The controller may be configured to be able to generate a signal that indicates a possibility that RFID attached to the game token is broken or RFID is not attached to the game token in a case where a total amount or the total number of the game tokens for each side betting based on a reading result of the chip reader is smaller than a total amount or the total number of the game tokens for each side betting based on an image analysis result by the image analyzer.

[0158]

- 20 The controller may be configured to be able to generate a signal that indicates a possibility of a reading error by the image analyzer reading the game token in a case where a total amount or the total number of the game tokens for each side betting based on a reading result of the chip reader is larger than a total amount or the total number of the game tokens for each side betting based on an image analysis result by the image analyzer.
- 25

[0159]

The controller may include a database storing ID of RFID attached to the game token and may be configured to be able to check an ID of RFID based on a reading result by the
5 chip reader with an ID stored in the database, and determine authenticity of the game token.

[0160]

The controller may be configured to be able to identify the collected game token for each side betting on the basis
10 of information of an ID of RFID of the collected game token determined by the chip tray determination device and information of an ID of RFID of the game token read by the chip reader, compare IDs, an amount, or the number of the game tokens expected to be collected for each side betting,
15 which has been determined by using a measurement result of positions and an amount of the game tokens based on a game result obtained from the game result determination device and an image analysis result by the image analyzer, with IDs, an amount, or the number of the game tokens collected
20 for each side betting, and determine whether or not a collecting amount agrees for each side betting.

[0161]

(Fourth embodiment)

The following is a description of the fourth embodiment
25 of the present invention.

[0162]

(First example)

Fig. 23 shows the configuration of the management system of the first example of the fourth embodiment of the present invention. The management system 110 traces the
5 holders of game tokens without using a database. For this purpose, the information of the holder is stored in the game token. The management system 110 has a roughly oval-shaped game table 4004. The player 82 is located on one side of the table (lower side in Fig. 23), and the dealer
10 (omitted) is located on the other side. On the top surface of the game table 4004, betting areas 41a to 41e (hereinafter collectively referred to as "betting areas 41") are laid-out for each of multiple playing positions. Betting area 41 is an area for players 82 to bet by placing
15 game tokens 83. A chip tray 12 is provided on the dealer position side of the game table 4004 for placing the dealer's game tokens 82.

[0163]

The game token 83 has the same configuration as the game
20 token in the form described above. The RFID tag 2 has a non-rewritable area 21 for storing the fixed information 3 and a rewritable area 22 for storing the variable information 4. The RFID tag 2 stores a chip ID (identification information) that uniquely identifies the
25 game token 83 as unique information 3. The RFID tag 2 stores, as unique information 3, a chip ID (identification

information) that uniquely identifies the holder of the game token 83 as variable information 4.

[0164]

In addition, a common user ID is assigned to the casino
5 or dealer, and when the game token 83 is owned by the casino (including when it is stored in the chip tray 12), the user ID indicating the casino or dealer is stored in the variation information 4.

[0165]

10 In each of the betting areas 41a to 41e of the game table 4004, RFID antennas 511a to 511e (hereinafter collectively referred to as "RFID antennas 511") are provided.

Specifically, the RFID antennas 511 are embedded under a raxa (woolen cloth) of the game table 4004, respectively,
15 where the corresponding betting areas 41 are demarcated. RFID antennas 513 are also provided on the chip tray 12.

[0166]

The RFID antenna 511 reads and writes data to the RFID tags 2 embedded in the game tokens 83 placed in the
20 corresponding betting area 41. The RFID antenna 513 reads and writes data to the RFID tags 2 embedded in game tokens 83 placed on the chip tray 12.

[0167]

The RFID antennas 511a-511e and the RFID antenna 513 are
25 connected to the RF control device 54. In Fig. 23, only the line connecting antenna 511e and RF control device 54 is

shown, and the line connecting antennas 511a-511d and RF control device 54 is omitted for the sake of clarity of the figure, but antennas 511a-511d are also connected to RF control device 54 in the same way as antenna 511e. The RF control device 54 performs read and write control for each antenna. For this purpose, each antenna is assigned an area ID that uniquely identifies the area to be read and written by that antenna. When reading, the RF control device 54 performs reading periodically.

10 [0168]

By referring to this area ID, it is possible to identify whether the game token 83 that is read is in the chip tray 12 or in the betting area 41, and for the betting area 41, it is also possible to identify which betting area 41a to 41e is for which playing position.

15

[0169]

When reading, the RF control device 54 receives from each antenna the data read by that antenna, and also identifies which area the data was read in, i.e., the area ID. In addition, when writing, the RF control device 54 identifies the antenna to be written, i.e., the area ID, and transmits the data to be written. This allows the RF control device 54 to control reading and writing for each antenna individually.

25 [0170]

Based on the data read at each antenna, the RF control device 54 outputs the user ID ("User ID" in Fig. 23) of the game token 83 and the area ID ("Area ID" in Fig. 23) of the area where the user ID was read. The management system 110
5 further has a management control device 56 connected to the RF control device 54. The management control device 56 receives the user ID and area ID from the RF control device 54, and specifies the user ID to be written on the RFID tag 2 to the RF control device 54.

10 [0171]

As explained below, the user ID stored in the RFID tag 2 of the game token 83 is changed as the game token 83 is moved, but the RFID tag 2 stores not only the latest user ID but also the past user IDs as variation information 4.

15 Therefore, by referring to this variation information 4, it is possible to examine the change in the holder of each game token 83. In the following explanation, expressions such as "rewriting the user ID" mean changing at least the latest user ID, and do not necessarily mean simultaneously
20 erasing the information on past user IDs.

[0172]

The management control device 56 updates the variation information 4 of the game token 83 based on the data (user ID and area ID) of the game token 83 received from the RF
25 control device 54. The method of updating the variation information 4 is described below.

[0173]

Figs. 24 to 26 illustrate examples of updating the variation information. As shown in Fig. 24, a player bets game token 831 in the betting area 41b. The user IDs of the bet chips 831 and the area ID of its betting area 41b, obtained by reading the RFID tags 2 of the bet chips 831 (hereinafter referred to as "bet chip 831"), are input to the management control device 56.

[0174]

At the stage of betting, as shown in Fig. 24, the same user ID (in the example of Fig. 24, "P1") is read from the betting area 41b, and the same ID (in the example of Fig. 24, "D" indicating that the holder is a casino or dealer) is read from the chip tray 12. If the player wins the game, the dealer pays out (redeems) the game tokens (hereinafter referred to as "payout chips 832") from the chip tray 12 to be placed next to the bet chips 831 in the betting area 41b, as shown in Fig. 25.

[0175]

Then, "D" as well as "P1" will be read from the betting area 41b as the user ID. If there are two types of user IDs of game tokens 83 read from the same betting area 41, and one of them is "D" and the other one is the user ID assigned to the player, the management control device 56 changes the user IDs of all game tokens 83 in the betting area 41 to the user ID assigned to the player ("P1" in the

case of Fig. 25). In this case, the same "P1" is further written as the latest user IDs in the bet chips 831 in which "P1" was stored as the user ID.

[0176]

5 On the other hand, if the player loses the game, the bet chips 831 are collected by the dealer into the chip tray 12, as shown in Fig. 26. Then, "P1" as well as "D" will be read from the chip tray 12 as the user ID. If there is a user ID assigned to a player ("P1" in the example of Fig. 10 26) other than "D" in the user IDs of the game tokens 83 read from the chip tray 12, the management control device 56 rewrites the user IDs of all the game tokens 83 in the chip tray 12 to "D".

[0177]

15 In addition, a collection float for temporarily storing the game tokens 83 collected in the chip tray 12 may be provided, and an antenna for the collection float may be separated from the antennas for other parts, so that the above process is performed only for the game tokens 83 20 collected in the collection float.

[0178]

By the above process of the management control device 56, the user ID stored in the game token 83 is updated according to the change in the actual holder. In other 25 words, in this embodiment, the user ID is stored in the RFID tag 2 of the game token 83 and the user ID is updated

for the payout chip 832 so that it is the same holder as the holder of the bet chip 831. This makes it possible to trace the transition of the holder due to the game played on the game table 4004 without using the database or the
5 player identification system described below, and without the management control device 56 having to keep track of the progress of the game (betting phase, game phase, and settlement phase).

[0179]

10 When a player purchases a new game token 83, the player is identified using the player identification system described below, and the user ID of the casino or dealer is rewritten to the user ID of the identified player before the game token 83 is given to the player. In addition, when
15 the player redeems the game token 83, the user ID of the game token 83 given by the player is rewritten to the user ID of the casino or dealer.

[0180]

(Second example)

20 Fig. 27 shows the configuration of the management system of the second example of the fourth embodiment. In the management system 120, a player identification system is introduced in addition to the configuration of the management system 110 of the first example. The player
25 identification system may be either an image recognition system comprising a camera 52 and an image recognition

device 55 or a card authentication system comprising a card 81 and a card reader 53.

[0181]

The camera 52 photographs the face of a player 82
5 positioned in a playing position and outputs the image
generated by the photographing to the image recognition
device 55. The image recognition device 55 is equipped with
a face recognition engine based on a neural network that
has learned the face images of a plurality of pre-
10 registered players 82 (hereinafter referred to as
"members"). By inputting a face image from the camera 52
into the neural network, the image recognition device 55
identifies which of the registered members the input face
image is. If the image from the camera 52 is not the face
15 image of any of the registered members, the image
recognition device 55 outputs the result that the face
image is the face image of a non-member.

[0182]

The image recognition device 55 also identifies the
20 playing position of the member in question based on the
position in the image where the face was recognized. The
image recognition device 55 outputs the area ID ("Area ID"
in Fig. 27) of the identified playing position along with
the user ID ("User ID" in Fig. 27) of the member
25 corresponding to the image from the camera 52. If the image

recognition device 55 is unable to identify any of the members, it outputs "Unknown" as the user ID.

[0183]

The card reader 53 scans the member's card 81 handed from
5 the player 82 to the dealer, and reads the information
stored in the member's card 81. The member's card 81 is a
magnetic card on which a magnetic stripe is formed, and the
magnetic stripe stores at least the user ID of the player
82 (member). When the dealer receives the member's card 81
10 from the player 82, the dealer scans the member's card 81
using the card reader 53 and inputs the playing position of
the player 82 into the card reader 53. The card reader 53
outputs the user ID ("User ID" in Fig. 27) read from the
member's card 81 and the area ID ("Area ID" in Fig. 27) of
15 the playing position entered by the dealer.

[0184]

The user ID and the area ID stored in the game token 83
and read using the antenna 511 are input to the management
control device 56 from the RF control device 54, the user
20 ID and the area ID identified based on the face image of
the player are input from the image recognition device 55,
and the user ID obtained by reading the member's card 81
and the area ID specified by the dealer are input from the
card reader 53.

25 [0185]

If the user ID read from the antenna 511, i.e., the user ID stored as the holder of the game token 83 that is bet in the betting area 41 and the user ID read from the member's card 81 or user ID identified by the image recognition device 55, i.e., the user ID identified by the player identification system do not match for the same area ID, the management control device 56 controls the RF control device 54 to rewrite the user ID stored as the holder in the variable area 4 of the game token 83 bet in the betting area 41 to the user ID of the player identified by the player identification system.

[0186]

The RF control device 54 uses the antenna 511 to write the user ID of the player identified by the player identification system in the rewritable area 22 of the RFID tag 2 of the game token 83 placed in the betting area 41. At this time, the RF control device 54 also records in the writable area 22 that the user ID as holder information has been rewritten due to a mismatch in the user ID. This allows the casino or dealer to know that there has been a discrepancy in the holder by referring to the history of the change of the holder when the casino or dealer acquires the game token 83, and it is also possible to identify the player who was involved in such a discrepancy.

[0187]

In the player identification system, only one of the identification of the player by the face recognition system and the identification of the player by reading the member's card 81 may be performed. In other words, the registered members do not necessarily have to be identified by the member's card 81 when they arrive at the playing position, in which case the player is identified only by the face recognition system. In such a case, the player is identified only by the face recognition system. Also, even if the player's face cannot be photographed properly and face recognition cannot be performed, the player may be identified by the member's card 81.

[0188]

In addition, the player may be identified by both face recognition and the member's card 81. In this case, the user ID of the player identified by face recognition and the user ID of the player identified by the member's card 81 may differ. If the user ID of either of them matches the user ID read from the game token 83, the management control device 56 controls the RF control device 54 to write the user ID of the one that does not match the user ID read from the game token 83 in the writable area 22 of the game token 83. In the case of a player who has not been identified by the player identification system, the player identification system shall record the fact that there was a discrepancy in the identification of the player.

[0189]

In this example, as in the first example, the user ID stored in the game token 83 is updated according to the actual holder. Furthermore, in this example, when the user ID of the player identified by the player identification system and the user ID stored in the game token 83 do not match, the discrepancy is corrected and the fact that there was such a discrepancy is recorded in the game token 83. Therefore, by referring to this record of the game token 83, it can be known that there has been a transfer of the game token 83 between players, and the player involved can be identified.

[0190]

When redeeming a game token 83, if the user ID of a player (user who intends to redeem) identified by face recognition or a member's card 81 by using a player identification system described above differs from the user ID stored in the game token 83 to be redeemed, an alarm to notice such a discrepancy may be output and the operator may not approve the redemption.

[0191]

(Third example)

Fig. 28 shows the configuration of the management system of the third example of the fourth embodiment. The management system 130 has a database 57 in addition to the configuration of the management system 110 of the first

example. In the database 57, a chip ID ("Chip ID" in Fig. 28) that uniquely identifies the game token 83 and a user ID of a player who possesses the game token 83 are associated and stored. As described above, the holder
5 changes as the game token 83 is purchased, used in games, and redeemed, and the history of past holders is recorded in the database 57. Therefore, by referring to the database 57, it is possible to know the change in the holder of each game token 83s.

10 [0192]

In this example, the game token 83 need only have a non-writable area 21 and need not have a writable area 22. In other words, it is sufficient that the game token 83 has at least a chip ID stored in it. In addition, the RF control
15 device 54 need not have the function of writing, and may be an RF reader having only the function of reading.

[0193]

The management control device 56 updates the database 57 based on the data (chip ID and area ID) of the game token
20 83 received from the RF control device 54. The method of updating the database 57 is described below.

[0194]

Figs. 29 to 31 illustrate examples of updating the database 57. As shown in Fig. 29, a player bets 831 game
25 tokens in the betting area 41b. The chip ID of the bet chip 831 and the area ID of the betting area 41b thereof,

obtained by reading the RFID tag 2 of the bet chip 831 bet by the player in the betting area 41b, are input to the management control device 56.

[0195]

5 At the stage of betting, as shown in Fig. 29, "C00001" to "C00005" are read from the betting area 41b as the chip IDs, and "C20001" to "C20100" are read from the chip tray 12 as the chip IDs. The RF control device 54 then outputs the pairs of the chip IDs read by the antennas 511 and 513
10 and the area IDs corresponding to the antennas 511 and 513 to the management control device 56. In the example of Fig. 29, the RF control device 54 obtains the combination of the chip IDs "C00001" to "C00005" and the area ID "Area 2", and the combination of the chip IDs "C20001" to "C20100" and
15 the area ID "Area T" (area ID representing the chip tray 12), and outputs those to the management control device 56.
[0196]

 If this player wins the game, the payout chips 832 are paid out (redeemed) from the chip tray 12 by the dealer and
20 placed next to the bet chips 831 in the betting area 41b, as shown in Fig. 30. Then, the RF control device 54 obtains the combination of the chip IDs "C00001" to "C00005" and "C20001" to "C20005" with the area ID "Area 2", and the combination of the chip IDs "C20006" to "C20100" with the
25 area ID "Area T", and output those to the management control device 56.

[0197]

The management control device 56 refers to the database 57 for all the read chip IDs to obtain the user ID associated with the chip ID. Then, the management control device 56 refers to the combination of chip ID and area ID obtained from the RF control unit 54 and updates the database 57 if the user IDs associated with multiple chip IDs with the same area ID are different from each other to make those user IDs the same user ID.

10 [0198]

Specifically, if there is a player's user ID and a casino or dealer's user ID as the user IDs of multiple game tokens 83 read with the area ID of the same betting area 41, the management control unit 56 rewrites the casino or dealer's user ID to the player's user ID to unify the user IDs associated with the chip IDs paired with the same area ID.

[0199]

On the other hand, if the player loses the game, the dealer collects the bet chips 831 in the chip tray 12, as shown in Fig. 31. The RF control device 54 reads the chip IDs "C20001" to "C20100" and "C00001" to "C00005" from the chip tray 12 as well as the area IDs "C20001" to "C20100" and "C00001" to "C00005". The RF control device 54 obtains pairs of these chip IDs "C20001" to "C20100" and "C00001" to "C00005" and the area ID "Area T" of the chip tray 12, and outputs those to the management control device 56.

[0200]

The management control device 56 refers to the database 57 for all the read chip IDs to obtain the user ID associated with the chip ID. Then, the management control device 56 refers to the combination of chip ID and area ID obtained from the RF control unit 54 and updates the database 57 if the user IDs associated with multiple chip IDs with the same area ID are different from each other to make those user IDs the same user ID.

10 [0201]

Specifically, if there is a player's user ID and a casino or dealer's user ID as the user IDs of multiple game tokens 83 read with the area ID of the same betting area 41, the management control unit 56 rewrites the player's user ID to the casino or dealer's user ID, thereby changing the user ID of all chip IDs associated with the area ID of the chip tray to the casino or dealer's user ID.

[0202]

By the above process of the management control device 56, the user ID stored in the database 57 is updated according to the actual holder. In other words, in this embodiment, the database 57 is rewritten to unify the user IDs of game tokens 83 associated with different user IDs in the same area with one of the user IDs, depending on the area. Thus, without using the player identification system described above and without the management control device

56 having to keep track of the progress of the game (betting stage, game stage, and settlement stage), the transition of the holder due to the game played on the game table 4004 can be traced.

5 [0203]

In the above example, the management control unit 56 determined that the chips those were read in the betting area 41 and whose user IDs was "D" in the database 57 are the payout chips 831, and rewrote its user ID to the
10 player's user ID. Alternatively, the chip IDs of the payout chips 832 may be identified based on the difference in chip IDs read from the chip tray 12 before and after the payout.
[0204]

For example, in the examples of Figs. 29 and 30, before
15 the payout, as shown in Fig. 29, chip IDs "C20001" to "C20100" are read from chip tray 12, whereas after the payout, as shown in Fig. 30, chip IDs "C20006" to "C20100" are read from the chip tray 12, as shown in Fig. 30.
Therefore, the management control device 56 can determine
20 that chip IDs "C20001" to "C20005" have been paid out based on the difference.

[0205]

(Fourth Example)

Fig. 32 shows the configuration of the management system
25 of the fourth example of the fourth embodiment. In addition to the configuration of the management system 110 of the

first example, the management system 140 has a player identification system, a database 57, and a card distribution device (electronic shoe) 4003. In a game table 4004, pay areas 42a to 42e (hereinafter collectively referred to as "pay area 42") are provided on the dealer side from the betting area 41 of each playing position. In addition, antennas 512a to 512e (hereinafter collectively referred to as "antennas 512") are provided in pay areas 42a to 42e, corresponding to the respective areas.

10 [0206]

When the dealer pays out (redeems) game token 83 to a player 82 who has won a game, the dealer positions the game tokens 83 taken from the chip tray 12 in the pay area 42 of the winning player 82 and then places it in the betting area 41 of that player 82.

[0207]

The camera 52 in this example takes a picture of the player 82 as well as the bet chips 831 that have been bet in the betting area 41. The image recognition device 55 performs image recognition processing not only on the player's face but also on the bet chips 831 in the betting area 41, and recognizes which betting target (player, banker, tie, player pair, banker pair, etc.) the bet chips 831 in each betting area 41 have been bet on in the betting area 41. The system recognizes which bet chips 831 in each betting area 41 are wagered on which betting target

(player, banker, tie, player pair, banker pair, etc.) in the betting area 41, and outputs the recognition result as the betting contents ("Betting" in Fig. 32).

[0208]

5 A camera for capturing the face of the player 82 and a camera for capturing the bet chip 831 may be separate cameras. Also, an image recognition device for identifying the player based on the image of the player's face and the image recognition device for recognizing the bet contents
10 based on the image of the bet chip 831 may be separate devices.

[0209]

 In this example, the card distribution device 4003 determines the progress of the game (i.e., whether the game
15 is in betting, in game, or in settlement) and outputs it to the RF control device 54. The card distribution device 4003 determines that the game has started when the first card is drawn, and determines that the game has ended based on the reading of the drawn card according to the game rules of
20 baccarat. The card distribution device 4003 also determines that the settlement has been completed and betting has started when the button for game start is pressed.

[0210]

 By reading at least the rank of the card drawn, the card
25 distribution device 4003 determines the game outcome, such

as player wins, banker wins, tie, player pair, banker pair, etc., according to the rules of the baccarat game.

[0211]

The management control device 56 determines which playing
5 position will receive a payout based on the bet details
obtained from the image recognition device 55 and the game
outcome obtained from the card distribution device 4003.
The management control device 56 also obtains the user ID
of the player for each playing position from the image
10 recognition device 55 and the card reader 53, so it
determines which player will receive the payout based on
this information as well.

[0212]

The RF control device 54 activates the antenna 512 of the
15 pay area 42 to read and write to the RFID tag of the game
token 83 when the game progress status received from the
card distribution unit 4003 is under settlement.

[0213]

The management control device 56 refers to the database
20 57, and if the user ID associated with the chip ID of the
payout chip 832 read from the pay area 42 is a casino or
dealer user ID, the user ID is replaced with the user ID
associated with the chip ID of the bet chip 831 placed in
the corresponding betting area 41.

25 [0214]

When the dealer collects a losing player's bet chip 831, the antenna 512 in the pay area 42 may also read the chip ID of the bet chip 831, but in this case, the chip ID read in the pay area 42 will match the chip ID read in the
5 corresponding betting area 41 immediately before it, therefore based on this, it is determined that the chip ID was read in the pay area 42 during collection, and the user ID of the game token 83 read in the pay area 42 should not be rewritten.

10 [0215]

In this example, the management system 140 is described as having a player identification system, a database 57, and a card distribution device (electronic shoe) 4003.

However, as in the first example, in a management system
15 without the player identification system, the database 57, and the card distribution device (electronic shoe) 4003, the pay area 42 and the corresponding antenna 512 may be provided to update the user ID as in this example.

[0216]

20 In the management system 140 of the present example, the pay area 42 is provided to read and write the RFID tag of the game token 83 separately from the betting area 41, so that the payout chip 832 paid out from the chip tray 12 can be read and written at a high speed. In other words, if the
25 same antenna 512 as the bet chip 831 is used to read and write the payout chip 832 as in the first through third

examples above, it is necessary to also read and write the bet chip 831 in order to read and write the payout chip 832, which takes time. However, since only the payout chip 832 needs to be read and written in the payout area 42, the reading and writing can be done in a relatively short time and does not interfere greatly with the game operation.

[0217]

(Fifth example)

Fig. 33 shows the configuration of the management system of the fifth example of the fourth embodiment. The management system 150 has the same configuration as the management system 140 of the fourth example shown in Fig. 32. That is, in addition to the configuration of the management system 110 of the first example, the management system 150 has a player identification system, a database 57, and a card distribution device (electronic shoe) 4003.

[0218]

The camera 52 in this example captures the bet chips 831 bet in the betting area 41 as well as the player 82. The image recognition device 55 performs image recognition processing not only on the player's face, but also on the bet chips 831 in the betting area 41, and recognizes which betting target (player, banker, tie, player pair, banker pair, etc.) the bet chips 831 in each betting area 41 are placed on in the betting area 41. The system recognizes which bet chips 831 in each betting area 41 are placed on

which betting target (player, banker, tie, player pair, banker pair, etc.) in the betting area 41, and outputs the recognition results as betting contents ("Betting" in Fig. 32).

5 [0219]

A camera for capturing the face of the player 82 and a camera for capturing the bet chips 831 may be separate cameras. Also, an image recognition device that identifies the player based on the image of the player's face and an
10 image recognition device that recognizes the bet contents based on the image of the bet chip 831 may be separate devices.

[0220]

The card distribution device 4003 reads at least the rank
15 of the cards drawn in sequence to determine the game outcome, including player wins, banker wins, ties, player pairs, and banker pairs, according to the rules of the baccarat game.

[0221]

20 The management control device 56 determines which playing position will receive a payout (redemption) based on the bet details obtained from the image recognition device 55 and the game outcome obtained from the card distribution device 4003. The management control device 56 also obtains
25 the user ID of the player for each playing position from the image recognition device 55 and the card reader 53, and

thus determines which player will receive the payout (redemption) based on this information as well.

[0222]

A pair of the area ID of the betting area 41 and the chip ID of the bet chip 831 read in the betting area 41 is input to the management control device 56 from the RF control device 54 for each betting area 41. As described above, the management control device 56 determines which playing position is to receive a payout, so it refers to the database 57 to obtain the user ID associated with the chip ID read at the playing position that is to receive a payout, and updates the user ID to be associated with the chip ID of the payout chip 832 with the obtained user ID.

[0223]

The management control unit 56 recognizes the chip ID that is no longer read from the chip tray 12 due to payout as the chip ID of the payout chip 832. When there is a plurality of players who receive payouts, the dealer makes payouts in order from the end in a predetermined direction (for example, payouts are made in order from the right-hand end of the dealer to the left-hand end of the dealer). This makes it possible to determine to which playing position or player the payout chips 832 taken out of the chip tray 12 are to be paid out, even when there are multiple players to receive the payout.

[0224]

In addition, since the management control device 56 can determine the playing position of the losing player, it updates the database 57 so that the user ID associated with the chip ID read from the betting area 41 of the playing position is "D" representing the casino or dealer.

[0225]

As described above, in this example, the management control device 56 can determine which player or playing position's bet chips 831 will receive payouts and which player or playing position's bet chips 831 will be collected by ascertaining the betting contents and game outcomes. Since the management control unit 56 can also identify the chip IDs of those bet chips 831 and payout chips 832, it can change the user IDs associated with which chip IDs in the database 57 and determine which user IDs should be changed. This allows the tracing of the holder of the game tokens 83.

[0226]

(Sixth Example)

Fig. 34 shows the configuration of the management system of the sixth example of the fourth embodiment. The management system 160 has the same configuration as in the second example. In baccarat, as described above, a plurality of playing positions are provided in the game table 4004, and a betting area 41 is provided for each playing position at a position corresponding to each

playing position in the game table 4004. In principle, one player plays in one playing position.

[0227]

However, if all the playing positions are filled, some
5 players (back betting players) may appear from behind a player playing in a playing position (sitting player) and bet in the betting area 41 assigned to that sitting player, and some casinos or game tables 4004 allow this type of betting. The back bet will result in multiple game tokens
10 83 bets for the game with different user IDs in the same betting area. The management system 160 in this example allows tracing the holder of the game tokens 83 in such a case.

[0228]

15 In the management system 160 of this example, as in the second example, the user ID of the game token 83 is stored in the rewritable area 22 of the RFID tag 2 of the game token 83, and no database is used. However, it has a player identification system that identifies the player.

20 [0229]

In the example of Fig. 35, a bet chip 831a with user ID "P1" and a bet chip 831b with user ID "P2" are bet in the same betting area 41b. At this time, "P1" and "P2" are read from the betting area 41b as the user IDs of the game
25 tokens 83.

[0230]

Figs. 36 to 38 illustrate examples of payouts when both players win the game. First, as shown in Fig. 35, a payout is made to the player 82a with the user ID "P1". At this time, the management system 160 is unable to distinguish whether the payout is made to the player 82a with user ID "P1" or to the player 82b with user ID "P2", and it is also unable to distinguish between multiple game tokens 83 for play in one betting area 41. The management control device 56 controls the RF control device 54 to rewrite the user ID to the selective information "P1 or P2" for all the game tokens 83 in the betting area 41b.

[0231]

When the paid-out player 82a takes his own bet chip 831a and payout chip 832a from the betting area 41b, the betting area 41b remains with the bet chip 831b whose user ID is "P1 or P2", as shown in Fig. 37. The dealer confirms that the player 82a has taken the game tokens 83, and pays out the payout chip 832b, whose user ID is "D", to the bet chip 831b, as shown in Fig. 38. At this time, the management control device 56 controls the RF control device 54 to rewrite the user ID to "P1 or P2" for all game tokens 83 for play in the betting area 41.

[0232]

As a result, players 82a and 82b who have placed bets in the same betting area 41 will both possess game tokens 83 with "P1 or P2" recorded as the user ID.

[0233]

If these players 82a and 82b bet on the same betting area 41 using their game token 83 again, then both bet chips 831a and 831b will have "P1 or P2" recorded as the user ID.

5 Alternatively, some betting chips may contain game tokens 83 whose user ID is "P1" or "P2". In these cases as well, when making a payout according to the game outcome, the management control device 56 controls the RF control device 54 to selectively write "P1 or P2" as the user ID of all
10 game tokens 83 for play placed in the betting area 41 at the time of the payout.

[0234]

When a bet chip 831 with a user ID of "P1 or P2" is collected in the chip tray 12, "D" representing a casino or
15 dealer is written as the user ID.

[0235]

Thereafter, if a player 82a or 82b alone bets in the betting area 41 a game token 83 in which the user IDs of a plurality of users are selectively recorded, and if the
20 user ID of the player identified by the player identification system matches any of the selective user IDs, then the management control device 56 controls the RF control device 54 to rewrite the selective user ID of the game token 83 to the user ID matched.

25 [0236]

For example, when a player 82a places a bet in the betting area 41 alone with the game token 83 in which "P1 or P2" is recorded as the user ID, the RF control device 54 reads the user ID "P1 or P2" from the bet chip 831 in the betting area 41, and the player identification system recognizes that the user ID of the player who placed the bet in the betting area 41 is "P1". In this case, since the user ID "P1" matches P1 in the "P1 or P2", the management control device 56 controls the RF control device 54 to rewrite the user ID of the bet chip 831 in the betting area 41 to "P1".

[0237]

On the other hand, when a player who owns a game token 83 whose user ID is selectively recorded bets, and a player who has a user ID that is not in the selective player IDs bets in the same betting area 41 and receives a payout according to the game outcome, the user ID of the game tokens 83 is written to further include the user ID of that player in the choices.

[0238]

For example, when a player 82a bets a game token 83 with "P1 or P2" recorded as the user ID in the betting area 41, and another player bets a game token 83 with "P3" recorded as the user ID in the same betting area 41, and the payment is made according to the game outcome, the management control device 56 controls the RF control device 54 to

rewrite the user IDs of all the game tokens 83 including the payout chips in the betting area 41 to "P1, P2 or P3".

[0239]

As described above, by allowing selective recording as the user ID, the present example allows tracing of the holder even when multiple players have bet on the same betting area. Furthermore, by using the player identification system, it is possible to definitively rewrite the selectively recorded user ID.

[0240]

If multiple players are betting on the same betting area 41, and some players win and some players lose, the betting chips of the losing players will be collected first, since the betting chips of the losing players will be collected first, so "D" will be recorded as the user ID when the chip tray 12 reads the collected bet chips, and the above process can be performed for the payout chips 832 and the remaining bet chips to which the payout chips 832 are to be paid out.

[0241]

(Seventh example)

Fig. 39 shows a configuration of the management system of the seventh example of the fourth embodiment. The management system 170 has the same configuration as the management system 130 of the third example. In the management system 170, it is also possible to trace the

holder of the game tokens 83 even when multiple players bet on the same betting area 41.

[0242]

Figs. 40 to 44 illustrate an example of updating the
5 database 57. When a player 82a bets a bet chip 831a in a betting area 41b and a player 82b bets a bet chip 831b in the same betting area 41b, as shown in Fig. 40, in the RF control device 54, from this betting area 41b, as the user ID, the chip IDs "C00001" to "C00005" of the bet chips 831a
10 and the chip IDs "C10001" to "C10005" of the bet chips 831b are read out from this betting area 41b and output to the management control device 56 as a combination with the area ID "Area 2" of the relevant betting area 41. In addition, the chip IDs "C20001" to "C20100" are read from the chip
15 tray 12, and the combination with the area ID "Area T" of the chip tray 12 is obtained by the management control device 56.

[0243]

As shown in Fig. 40, at this point, in the database 57,
20 the chip IDs "C00001" to "C00005" are associated with the user ID "P1", the chip IDs "C10001" to "C10005" are associated with the user ID "P2", and the chip IDs "C20001" to "C20100" are associated with user ID "D".

[0244]

25 Assuming that both of these players 82a and 82b win according to the game outcome, a payout is first made by

the dealer for either bet chip 831a or bet chip 831b, as shown in Fig. 41. At this time, in addition to the chip IDs "C00001" to "C00005" for bet chips 831a and "C10001" to "C10005" for bet chips 831b, the chip IDs "C20001" to "C20005" for payout chips 832a are read from the betting area 41b and output to the management control device 56 as a combination with the area ID "Area 2" of the betting area 41.

[0245]

10 At this stage, the management control device 56 cannot yet determine whether the payout chip 832a has been paid out to the bet chips 831a with chip IDs "C00001" to "C00005" or to the bet chips 831b with chip IDs "C10001" to "C10005". Therefore, the database 57 is not updated.

15 [0246]

Next, when the player 82a takes the bet chips 831a and the payout chips 832a that were paid out to the bet chips 831a from the betting area 41b, as shown in Fig. 41, only the chip IDs "C10001" to "C10005" of the remaining bet chips 831b are read from the betting area 41b. Based on this change, the management control device 56 determines that the payout chips 832a with chip IDs "C20001" to "C20005" read from the betting area 41b have been paid out for the bet chips 831a with chip IDs "C00001" to "C00005" and stores them in the database 57 is rewritten from "D" to "P1", i.e., from "D" to the user ID associated with the bet

20

25

chips 831a that were removed from the betting area 41b along with the payout chips 832a with chip IDs "C20001" to "C20005".

[0247]

5 The dealer after confirming that the bet chip 831a and the payout chip 832a paid out to it are removed from the betting area 41b, as shown in Fig. 43, pays out the payout chips 832b to the bet chips 831b in the same betting area 41b. Thus, the chip IDs "C10001" to "C10005" of the bet
10 chips 831b and the chip IDs "C20006" to "C20010" of the payout chips 832b are read from the betting area 41b and recorded in the management control device 56 in combination with the area ID "Area 2" of the betting area 41.

[0248]

15 Thereafter, when player 82b takes this bet chip 831b and payout chip 832b, as shown in Fig. 44, no chip ID is read from betting area 41b, and only the chip ID read from chip tray 12 is input to the management control device 56. Based on this change, the management control device 56 determines
20 that the payout chips 832b with the chip IDs "C20006" to "C20010" have been passed to the same players as those with the chip IDs "C10001" to "C10005", and updates the database 57 so that the user IDs associated with chip IDs "C20006" to "C20010" are the same as the user IDs associated with
25 chip IDs "C10001" to "C10005".

[0249]

As described above, according to the management system 170 in this example, the system detects that the bet chips 831 and the payout chips 832 have been removed from the betting area together and updates the database 57 so that the user IDs of the payout chips 832 are the same as the user IDs of the bet chips 831. Therefore, even when multiple players' game tokens 83 are bet in the same betting area 41, by paying out to those players in order, it is possible to determine to which player the payout chips 832 were paid out to update the database 57, making it possible to trace the holders of the game tokens.

[0250]

(Eighth example)

Fig. 45 shows the configuration of the management system of the eighth example of the fourth embodiment. The management system 180 has the same configuration as the management system 140 of the fourth example. However, in the management system 180, a player pair area 44, a tie area 45, and a banker pair area 46 are provided as betting areas in the game table 4004. In addition, antennas 514, 515, and 516 are provided in the game table 4004 corresponding to the player pair area 44, tie area 45, and banker pair area 46.

[0251]

Each of these areas 44 to 46 is divided into sections for each playing position, and when betting in these areas 44

to 46, a player places his/her betting chips in the position (section) corresponding to his/her playing position within these areas.

[0252]

5 In other words, player pair area 44, tie area 45, and banker pair area 46 are each a shared betting area shared by multiple players. In the example of Fig. 45, players 82a to 82c are participating in the game, of which players 82b and 82c have placed bet chips 831b and 831c, respectively,
10 in tie area 45.

[0253]

In this example, the holders of the game tokens 83 can be traced in the same way as in the sixth or seventh example for the shared betting areas 44 to 46. Even if the
15 management system 180 does not have the database 57, the tracing of the holder of the game token 83 can be performed in the same manner as in the sixth example, and even if the management system 180 does not have the player
identification system, the tracing of the holder of the
20 game token 83 can be performed in the same manner as in the seventh example for the shared betting area.

[0254]

(Ninth example)

Fig. 46 shows the configuration of the management system
25 of the ninth example of the fourth embodiment. The management system 190 is equipped with a player

identification system. In this example, the game tokens 83 is traced without using the database 57. The game table 4004 has pay areas 42a to 42e and their corresponding antennas 512a to 512e. In the fixed information 3 of the
5 RFID tag 2 of the game token 83, information indicating the amount (value) of the game token 83 is stored, and the user ID of the holder is stored in the variable information 4.
[0255]

In this example, the database 57 may be used, in which
10 case the chip ID is stored in the game token 83, and the amount (value) of the game token 83 and the user ID of the holder are stored in the database 57 in association with the chip ID.
[0256]

15 As shown in Fig. 47, when the bet chips 831a (five chips with the amount "100") of the player 82a and the bet chips 831b (two chips with the amount "1000") of the player 82b are placed in the betting area 41b, five bet chips 831a with the amount "100" and the user ID "P1" are read, and
20 two game tokens 83 with the amount "1000" are read, from the betting area 41b, and those are output together with "Area 2" that is an area ID to the management control device 56.
[0257]

25 The management control device 56 detects the betting amount for each player by calculating the total amount of

betting chips for each betting area 41. In the case of Fig. 47, the management control device 56 detects that the bet amount for user ID "P1" is "500" and the bet amount for user ID "P2" is "2000".

5 [0258]

If both players 82a and 82b win as a result of the game, the dealer pays out (redeems) to each of the bet chips 831a and 831b in turn. As shown in Fig. 48, when paying out the payout chip 832a for the bet chip 831a first, the dealer
10 places the payout chip 832a in the pay area 42b.

[0259]

At this time, the RF control device 54 reads the game tokens 83 in the pay area 42b, reads that there are five game tokens 83 with the amount "100", and outputs this
15 information to the management control device 56. The management control device 56 detects the payout amount by calculating the total amount of the payout chips 832a read in the pay area 42b.

[0260]

20 The management control device 56 compares the payout amount of the payout chips 832a with the bet amount for each player in the betting area 41b to identify the player whose bet amount matches the payout amount. In the case of Fig. 48, five payout chips 832a with the amount "100" are
25 read from the pay area 42b, and the payout amount is detected to be "500". The management control device 56

determines that this payout amount "500" matches the bet amount "500" of the bet chip 831a with the user ID "P1", and rewrites the user ID of the payout chip 832a to "P1".
[0261]

5 Then, when player 82a takes the payout chip 832a and the bet chip 831a, the bet chip 831b of the player 82b remains in the betting area 41b, as shown in Fig. 49. When the dealer places the payout chip 832b in the pay area 42b for paying out for the bet chip 831b, the management control
10 device 56 detects the payout amount of the payout chip 832b by calculating the total amount of the payout chip 832b.
[0262]

 The management control device 56 compares the payout amount of the payout chip 832b with the bet amount for each
15 player in the betting area 41b, and identifies the player whose bet amount matches the payout amount. In the case of Fig. 49, two payout chips 832b with the amount "1000" are read from the pay area 42b, and the payout amount is detected to be "2000". The management control device 56
20 determines that this payout amount "2000" matches the bet amount "2000" of the bet chip 831b with the user ID "P2", and rewrites the user ID of the payout chip 832b to "P2".
[0263]

 As described above, even if multiple players have placed
25 bets in the same betting area 41, when their betting amounts are different, the management and control system

190 of this example determines which player the payout chips are being paid out to based on the betting amount and the payout amount of the payout chips.

[0264]

5 (Tenth example)

In the above first to ninth examples, if the player 82 is a non-member who is not registered as a member, the player 82 cannot be identified by the player identification system because such a non-member is not assigned a user ID. In
10 addition, as described above, "Unknown" is recorded as the user ID for the game token 83 owned by the non-member, because a valid user ID cannot be stored in the RFID tag 2 or the database 57.

[0265]

15 When paying out the payout chips 832 to a non-member player, the management system makes the user ID of the payout chip 832 to be "Unknown", and when the bet chips 831 are collected from a non-member player, the management system makes the user ID of the bet chip 831 being
20 collected to be "D".

[0266]

When a player who is a member and a player who is a non-member bet on the same betting area 41, if both players win the game, the dealer may perform pay out under a rule in
25 which the payout chips are always paid out from the non-member first or always paid out from the member first.

[0267]

For example, if the rule of always paying out non-members first is in operation, the management system rewrites the user ID as "Unknown" for the first payout chips 832 that is
5 paid out, and rewrites the user IDs of the payout chips 832 that are later paid out to the user ID of the player who is a member, using the above example.

[0268]

For example, if the rule of always paying out members
10 first is in operation, the management system rewrites the user ID of the first payout chip 832 to the user ID identified from the bet chips 831, and for payout chips 832 that are paid out later, the user ID is rewritten as "Unknown."

15 [0269]

When the dealer identifies a player using the card identification system, the dealer scans the member's card
81 by himself/herself and can know which player is a member, but when the player is identified using the face
20 recognition system, the dealer cannot know which player is a member. Therefore, as a result of recognition by the face recognition system, visual information indicating the playing position or betting area where the user ID was recognized may be shown to the dealer by a monitor or the
25 like.

[0270]

(Eleventh Example)

Fig. 50 shows an example of a betting area in the eleventh example of the fourth embodiment. In this example, the betting area 41 of each playing position is divided into a betting area 411 for members and a betting area 412 for non-members, and the antennas are also divided into antennas 511 for members and antennas 5112 for non-members. [0271]

By controlling the RF control device 54, the management control device 56 rewrites the user ID of the game token 83 as in the first to ninth examples above for the bet chips 831 bet in the betting area 411 for members, and for the bet chips 831 bet in the betting area 412 for non-members. The user IDs of all payout chips 832 that are paid out to the bet chips 831 are rewritten to "Unknown". [0272]

According to this example, the game token 83 whose user ID assigned to the player is stored in itself or in the database 57 and the game token 83 whose user ID assigned to the player is not stored in itself or in the database 57 (the user ID is "Unknown") will not be mixed and read, thereby the game token 83 whose user ID assigned to the player is stored in itself or in the database 57 can be traced effectively. [0273]

In this example, instead of antennas 511 and 5112, one antenna may be provided across the betting area 411 for members and the betting area 412 for non-members. In this case, when the game tokens 83 is bet in the betting area
5 411 for members and the betting area 412 for non-members, respectively, the dealer can recognize which bet chips 831 belong to the members and which bet chips 831 belong to the non-members.

[0274]

10 When paying out for any of the betting chips, the dealer may perform the payout under the operating rule of paying out to the bet chips 831 of members first. In this way, the management system can determine that the payout chip 832 paid out first is the one paid out to the member. It is
15 also possible for the dealer to pay out according to the operation rule of paying out to the bet chips 831 of non-members first. In this case, the management system can determine that the payout chip 832 paid out first is the one paid out to the non-member.

20 [0275]

Figs. 51A and 51B show other examples of betting areas in the eleventh example of the fourth embodiment. In this example, the betting area 41 for each playing position is selectively set to either the betting area 41 for members,
25 as shown in Fig. 51A, or the betting area 41 for non-members, as shown in Fig. 51B.

[0276]

In the vicinity of each betting area 41, there is a display 413 that variably indicates whether the betting area 41 is set for members or for non-members,

5 respectively. This display section 413 is installed under the raxa of the game table 4004, and the displayed information is visible to the player through the raxa.

[0277]

The means of visually indicating whether each betting
10 area 41 is set for members or non-members is not limited to the display 413 embedded under the raxa of the game table 4004. For example, a monitor installed on the game table 4004 that is visible to the players may indicate whether each betting area 41 is set for members or non-members.

15 [0278]

By controlling the RF control device 54, the management control device 56 rewrites the user IDs of the bet chips 831 that are bet in the betting area 41 as in the first to ninth examples above when the betting area 41 set for the
20 members, and rewrites all the user IDs of the payout chips 832 that are paid out to the bet chips 831 that have been bet in the betting area 41 to "Unknown" when the betting area 41 set for the non-members.

[0279]

25 According to this example, the game token 83 whose user ID assigned to the player is stored in itself or in the

database 57 and the game token 83 whose user ID assigned to the player is not stored in itself or in the database 57 (the user ID is "Unknown") will not be mixed and read, thereby the game token 83 whose user ID assigned to the
5 player is stored in itself or in the database 57 can be traced effectively.

[0280]

(Twelfth Example)

In the first to ninth examples above, it is also possible
10 to trace the holder of the game token 83 when the game token 83 is exchanged between the dealer and the player at the game table 4003. In this case, the management system is provided with means for determining the progress of the game (i.e., whether a game phase is "betting", "playing",
15 or "settlement"). As such progress determination means, the card distribution device 4003 can be used, but any other means may be used.

[0281]

In the management system of this example, the management
20 control device 56 controls the RF control device 54 to cause each antenna to read periodically at predetermined time intervals during betting. During betting, the management control device 56 determines that the game tokens 83 is being exchanged when the game tokens 83 whose
25 user ID is "D" is read at one of the betting areas 41 or one of the pay areas 42 (hereinafter referred to as the

"reading area of the game table 4004"), and when the game tokens 83 whose user ID is the user ID assigned to the member is read at the chip tray 12.

[0282]

5 This is because, in terms of baccarat operation, during betting, the game token 83 cannot be moved from the chip tray 12 to the game table 4003 except for exchange, and the game token 83 of the player on the game table 4003 cannot be moved to the chip tray 12. If the game phase is

10 "playing," such movement of the game token 83 for game use is a fraudulent act, and the management control device 56 may output an alarm when it detects such a movement of the game token 83 during the "playing".

[0283]

15 If a game token 83 whose user ID is the user ID assigned to a member or "Unknown" is read by the chip tray 12 during betting, the management control device 56 determines that the game token 83 is a game token 83 (chip before exchange) that was placed on the game table 4004 by the player for

20 exchange between chips.

[0284]

Specifically, when the user ID is stored in the game token 83 itself, the management control device 56 determines that it is an exchange when the user ID assigned

25 to the member or "Unknown" is read from the chip tray 12 during betting. In the case that the user ID is stored in

the database 57, the management control device 56 determines that an exchange is taking place when the number of game tokens 83 read from the chip tray 12 decreases during betting. Alternatively, if the user ID is stored in the database 57, when the number of game token 83 read from the chip tray increases during betting, the management control device 56 may determines that an exchange is taking place.

[0285]

10 In addition, if, a game token 83 whose user ID is "D," indicating that it is held by the casino or dealer, is read in the read area of the game table 4004 during betting, the management control device 56 determines that the game token 83 is a game token 83 (chip after the exchange) that is
15 given to the player corresponding to the chip before the exchange.

[0286]

Specifically, when the user ID is stored in the game token 83, the management control device 56 determines that
20 it is an exchange when the user ID "D" is read from the reading area of the game table 4004 during betting, and when the user ID is stored in the database 57, the management control device 56 reads the reading area of the game table 4004 periodically during betting, and by
25 referring to the database 57 at each reading, determines

that the game token 83 whose user ID is "D" has been read from the reading area of the game table 4004.

[0287]

The management control device 56 rewrites the user ID of
5 the chip before exchange to "D" representing the casino or
dealer, and rewrites the user ID of the chip after exchange
to the user ID of the chip before exchange. Specifically,
if the user ID is stored in the RFID tag 2 of the game
token 83, the management control device 56 controls the RF
10 control device 54 to rewrite the user ID stored in the
corresponding chip before exchange and chip after exchange,
and if the user ID is stored in the database 57 in
association with the chip ID, the management control device
56 rewrites the user ID associated with the corresponding
15 chip ID in the database 57.

[0288]

After identifying the chip before exchange and chip after
exchange, the management control device 56 may control the
RF control device 54 to exchange their user IDs (if the
20 user ID is stored in the game token 83) or update the
database 57 to exchange their user IDs (if the user ID is
stored in the database 57).

[0289]

In the above embodiment, the member's card 81 is a
25 magnetic card and the card reader 53 is a magnetic card
reader that reads information from the magnetic stripe of

the member's card 81, but alternatively, an RFID tag may be embedded in the member's card 81 and the user ID may be recorded in the RFID tag. In this case, an RFID reader consisting of an antenna and an RF control device 54 is
5 used as the card reader 53. Such an antenna may also be provided at each playing position. In this case, the player does not hand his own member's card 81 to the dealer, but has it read at each playing position. From each antenna, the user ID read from the member's card 81 is transmitted
10 to the RF control device 54, along with information identifying the playing position. Furthermore, the antennas 511 in the betting area 41 and the RF control device 54 may be used as RFID readers for reading the member's card 81. In this case, the player can have the antenna 511 read the
15 user ID by placing the member's card 81 in the betting area 41 at his own playing position.

[0290]

By the first to eleventh examples of the fourth embodiment described above, the following techniques are
20 disclosed.

(A1) A management system that manages a game token, comprising:

a holder identification device configured to, when the game token is used, identify a holder of the game token by
25 referring to a memory device that stores a holder of the game token;

a player identification device configured to, when the game token is used, identify a player who used the game token; and

a control device configured to, for the game token used,
5 store the player identified by the player identification device as the holder in the memory device when the holder identified by the holder identification device and the player identified by the player identification device do not match.

10 [0291]

(A2) The management system according to (A1), wherein the control device stores the fact that there is a discrepancy in the memory device when, for the game token used, the holder identified by the holder identification device and
15 the player identified by the player identification device do not match.

[0292]

(A3) The management system according to (A1), wherein the player identification system identifies the player who used
20 the game token by face recognition or by reading an ID card.

[0293]

(A4) The management system according to (A1), wherein said memory device is a database or an RFID tag embedded in
25 the game token.

[0294]

(A5) A management system that manages a game token,
comprising:

a memory device configured to store a holder of the game
token;

5 a player identification device configured to identify a
player who receives payout of the game token; and

a control device configured to store the player as the
holder in the memory device for the game token paid out.

[0295]

10 (A6) The management system according to (A5), further
comprising an identification device configured to a betting
area assigned to the player, wherein

the control device determines to which player the game
token is paid out by identifying to which betting area the
15 game token to be paid out is paid out.

[0296]

(A7) The management system according to (A5), wherein in
case that in the betting area, the game token for which the
player identified by the identification device is stored as
20 the holder and the game token in which the player
identified by the identification device is not stored as
the holder are wagered,

the control device stores, in the memory device, the
player identified by the identified device as the holder of
25 the game token which is paid out to the game token for

which the player identified by the identification device as the holder.

[0297]

(A8) The management system according to (A5), further
5 comprising a detection device configured to detect amount of the game token paid out, wherein

in case that in the betting area, the game token for which the player identified by the identification device is stored as the holder and the game token in which the player
10 identified by the identification device is not stored as the holder are wagered,

the control device stores the player identified by the identification device as the holder of the game token paid out in the betting area after detecting, by the detection
15 device, an amount corresponding to payout to the game token for which the player identified by the identification device is not stored as the holder.

[0298]

(A9) The management system according to (A5), further
20 comprising a detection device configured to detect amount of the game token paid out, wherein

in case that in the betting area, the game token for which the player identified by the identification device is stored as the holder and the game token in which the player
25 identified by the identification device is not stored as the holder are wagered,

the control device stores in the memory device the player identified by the identification device as the holder of the game token first detected by the detection device for the betting area.

5 [0299]

(A10) The management system according to any of (A6) to (A9), wherein the betting area comprises: an area for betting the game token for which the player identified by the identification device is stored as the holder; and an
10 area for betting the game token for which the player identified by the identification device is not stored as the holder.

[0300]

(A11) The management system according to any of (A6) to
15 (A10), further comprising an output device configured to output visual information for distinguishing the betting area in which the game token for which the player identified by the identification device is stored as the holder is bet and the betting area in which the game token
20 for which the player identified by the identification device is not stored as the holder is bet.

[0301]

(A12) A management system that manages a game token, comprising:

25 a memory device configured to store a holder of the game token; and

a player identification device configured to identify a plurality of candidate players who may receive a stack of the game tokens to be paid out; and

a control device configured to store the plurality of
5 candidate players as the holders for each of the gaming tokens constituting the stack to be paid out.

[0302]

(A13) The management system according to (A12), wherein the player identification device identifies a plurality of
10 players who receive the payouts as a result of betting on the same betting area as the plurality of candidate players.

[0303]

(A14) The management system according to (A12), wherein
15 the player identification device configured to identify a player betting the game token,

the management system further comprises a holder identification device configured to identify the plurality of candidate players stored as the holder in the memory
20 device for the bet game tokens, wherein

the control device, when the betting player identified by the player identification device matches any of the plurality of the candidate players identified by the holder identification device, determine and stores it in the
25 memory the matched candidate player as the holder.

[0304]

(B1) A management system that manages chips storing identification information, which are used in games on a game table, comprising:

a first identification device configured to read the identification information stored in betting chips placed in a betting area on the game table;

a second identification device configured to acquire the identification information stored in the payout chips that are paid out for the betting chips;

a memory device configured to store the identification information in association with the holder of the chip that stored the identification information; and

a control device configured to store in the memory device the holder associated with the identification information read from the bet chip by said first identification device as the holder associated with the identification information of the payout chip acquired by the second identification device.

[0305]

(B2) The management system according to (B1), wherein the second identification device is the first identification device, and acquires the identification information stored in the payout chip by reading the identification information stored in the payout chip placed in the betting area.

[0306]

(B3) The management system according to (B1), wherein the second identification device is a device configured to read the identification information stored in the plurality of chips in the chip tray of the dealer, and is configured to obtain the identification information stored in the payout chips from the difference between the plurality of identification information read before the payout chips are dispensed and the plurality of identification information read after the payout chips are dispensed.

10 [0307]

(B4) The management system according to (B1), wherein the second identification device acquires the identification information stored in the payout chip by reading the identification information stored in the payout chip placed in a payout area different from the betting area on the game table.

[0308]

(B5) The management system according to (B1), wherein the first identification device periodically reads the identification information, and

20 when the first identification device no longer reads the identification information read from the betting chip by the first identification device, the control device stores the holder associated with the identification information no longer read by the first identification device in the memory device as the holder associated with the

25

identification information of the payout chip acquired by the second identification device.

[0309]

(B6) The management system according to (B1), wherein the
5 second identification device acquires the identification information by periodically reading the identification information stored in the payout chip, and

when the second identification device no longer reads the identification information that the second identification
10 device has read from the payout chip, the control device changes the holder associated with the identification information that the first identification device has read from the bet chip to the holder associated with the identification information that is no longer read.

15 [0310]

(B7) A management system that manages chips that store identification information used in games at a game table, comprising:

a first identification device configured to acquire the
20 identification information stored in chips before the exchange that are placed on the game table by a player for exchange between chips; and

a second identification device configured to acquire the identification information stored in the chips after the
25 exchange that are given to the player corresponding to the chips before the exchange;

a memory device configured to store the identification information in association with the holder of the chip that stored the identification information; and

a control device configured to store the holder
5 associated with the identification information of the chip before the exchange obtained by the first identification device in the memory device as the holder associated with the identification information of the chip after the exchange obtained by the second identification device.

10 [0311]

(B8) The management system according to (B7), wherein the control device further stores the holder associated with the identification information of the chip before the exchange obtained by the second identification device in
15 the memory device as the holder associated with the identification information of the chip after the exchange obtained by the first identification device.

[0312]

(B9) The management system according to (B7), wherein the
20 first identification device is a reader configured to read the identification information of a plurality of the chips in a chip tray of a dealer and acquire increased identification information as the identification information stored in the chips before the exchange.

25 [0313]

(B10) The management system according to (B7), wherein the second identification device is a reader configured to read the identification information of the plurality of chips in the chip tray of the dealer and acquire decreased
5 identification information as the identification information stored in the chips after the exchange.

[0314]

(B11) A management system that manages an exchange of chips storing identification information used in a game at
10 a game table, comprising:

a reading device configured to read the identification information stored in the chips placed in a reading area on the game table for exchange;

a memory device configured to store the identification
15 information and the holder of the chip that stored the identification information in association with each other;
and

a control device configured to, when associated with the identification information stored on a first chip read by
20 the reading device is different from the holder associated with the identification information stored on a second chip, which is different from the first chip, read by the reading device, store the holder associated with the identification information stored on a first chip read by
25 the reading device as the holder associated with the

identification information stored on a second chip, in the memory device.

[0315]

Explanation of reference

- | | |
|----|-----------------------------|
| 5 | 1 Game token |
| | 2 RFID tag |
| | 3 Fixed information |
| | 4 Variable information |
| 10 | 5 Block chain information |
| | 6 Factory |
| | 7 Backyard |
| | 8 Warehouse |
| | 9 Cage |
| 15 | 10 Gate |
| | 11 Betting area |
| | 12 Chip tray |
| | 13 Reader |
| | 14 Writer |
| 20 | 15 Management controller |
| | 16 RFID antenna |
| | 17 Database |
| | 21 Data non-rewritable area |
| | 22 Data rewritable area |
| 25 | 41 Betting area |
| | 42 Pay area |

- 44 Player area
- 45 Tie area
- 46 Banker area
- 53 Card reader
- 5 54 RF control device
- 55 Image recognition device
- 56 Management control device
- 57 Database
- 61 Card reading area
- 10 81 Member's card
- 82 Player
- 83 Game token
- 110-190 Management system
- 220 Location information
- 15 221 Date/time information
- 222 Place/event information
- 223 Owner information
- 511~513 Antenna
- 831 bet Chip
- 20 832 Payout chip
- 1001 Game token
- 1002 Chip reader
- 1003 Controller
- 1004 Game table
- 25 1009 Chip tray
- 1025 Chip placement area

- 1026 Payment area
- 2002 Camera
- 2003 Card distributor
- 2004 Game table
- 5 2005 Dealer
- 2006 Guest (game participant/player)
- 2007 Chair
- 2008 Betting area
- 2009 Chip
- 10 2010 Area
- 2010P Player area
- 2010B Banker area
- 2011 Game recorder
- 2012 Image analyzer
- 15 2013 Result display lamp
- 2014 Controller

Claims:

1. A management system that manages a game token, comprising:
 - a holder identification device configured to, when the game
 - 5 token is used, identify a holder of the game token by
 - referring to a memory device in which the holder of the game
 - token is stored;
 - a player identification device configured to, when the game
 - token is used, identify the player who used the game token;
 - 10 a control device configured to generate an error signal when
 - the holder identified by the holder identification device and
 - the player identified by the player identification device do
 - not match for the game token used.
- 15 2. The management system according to claim 1, wherein the
- memory device is provided in the game token.
3. The management system according to claim 2, wherein the
- memory device is a rewritable area of an RFID tag attached to
- 20 the game token that can rewrite data.
4. The management system according to claim 3, wherein the
- holder identification device is an RFID reader configured to
- read the rewritable area of the game token used.
- 25 5. The management system according to claim 1, wherein the
- game token has identification information attached thereto to
- identify the game token,

the memory device is a database configured to store the identification information in association with the holder, and

the holder identification device identifies the holder of the game token used by referring to the database on the basis of
5 the identification information acquired from game token used.

6. The management system according to claim 5, wherein the game token has an RFID tag storing the identification information.

10

7. The management system according to claim 1, further comprising an alarm output device configured to output an alarm based on the error signal.

15

8. The management system according to claim 1, wherein the control device configured to store the player identified by the player identification device as the holder in the memory device when the holder identified by the holder identification device and the player identified by the player identification
20 device do not match with respect to the game token used.

25

9. The management system according to claim 8, wherein the control device configured to store in the memory device that there was a discrepancy between the holder identified by the holder identification device and the player identified by the
25 player identification device for the game token used, when the holder does not match the player identified by the player identification device.

10. The management system according to claim 1, wherein the player identifying device is configured to identify the player who used the game token by face recognition or reading the ID card.

5

11. A management system that manages a game token, comprising:
a memory device configured to store a holder of the game token; and

a player identifying device configured to identify a player
10 who purchases the game token; and
a control device configured to store the player as the holder in the memory device for the game token to be purchased.

12. A management system that manages a game token, comprising:
15 a memory device configured to store a holder of the game token;

an identification device configured to identify a player who receives payout of the game token; and

a control device configured to store the player as the holder
20 in the memory device for the game token paid out.

13. The management system according to claim 12, wherein the identification device configured to further identify a betting area assigned to the player, and

25 the control device is configured to determine which player the game token is to be paid out by identifying which the betting area the game token is to be paid out in.

14. The management system according to claim 13, wherein in case that in the betting area, the game token for which the player identified by the identification device is stored as the holder and the game token in which the player identified by the identification device is not stored as the holder are wagered,

the control device stores, in the memory device, the player identified by the identified device as the holder of the game token which is paid out to the game token for which the player identified by the identification device as the holder.

15. The management system according to claim 12, further comprising a detection device configured to detect amount of the game token paid out, wherein

in case that in the betting area, the game token for which the player identified by the identification device is stored as the holder and the game token in which the player identified by the identification device is not stored as the holder are wagered,

the control device stores the player identified by the identification device as the holder of the game token paid out in the betting area after detecting, by the detection device, an amount corresponding to payout to the game token for which the player identified by the identification device is not stored as the holder.

16. The management system according to claim 12, further comprising a detection device configured to detect amount of the game token paid out, wherein

in case that in the betting area, the game token for which the player identified by the identification device is stored as the holder and the game token in which the player identified by the identification device is not stored as the holder are wagered,

the control device stores in the memory device the player identified by the identification device as the holder of the game token first detected by the detection device for the betting area.

10

17. The management system according to any of claims 13 to 16, wherein the betting area comprises: an area for betting the game token for which the player identified by the identification device is stored as the holder; and an area for betting the game token for which the player identified by the identification device is not stored as the holder.

15

18. The management system according to any of claims 13 to 17, further comprising an output device configured to output visual information for distinguishing the betting area in which the game token for which the player identified by the identification device is stored as the holder is bet and the betting area in which the game token for which the player identified by the identification device is not stored as the holder is bet.

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19. A management system that manages a game token, comprising: a memory device configured to store a holder of the game token; and

a player identification device configured to identify a plurality of candidate players who may receive a stack of the game tokens to be paid out; and

a control device configured to store the plurality of
5 candidate players as the holders for each of the gaming tokens constituting the stack to be paid out.

20. The management system according to claim 19, wherein the player identification device identifies a plurality of players
10 who receive the payouts as a result of betting on the same betting area as the plurality of candidate players.

21. The management system according to claim 19, wherein the player identification device is configured to identify a
15 player betting the game token,
the management system further comprises a holder identification device configured to identify the plurality of candidate players stored as the holder in the memory device for the bet game tokens, wherein
20 the control device, when the betting player identified by the player identification device matches any of the plurality of the candidate players identified by the holder identification device, determine and stores it in the memory the matched candidate player as the holder.

25

22. A management system that manages chips storing identification information, which are used in games on a game table, comprising:

a first identification device configured to read the identification information stored in betting chips placed in a betting area on the game table;

5 a second identification device configured to acquire the identification information stored in the payout chips that are paid out for the betting chips;

a memory device configured to store the identification information in association with the holder of the chip that stored the identification information; and

10 a control device configured to store in the memory device the holder associated with the identification information read from the bet chip by said first identification device as the holder associated with the identification information of the payout chip acquired by the second identification device.

15

23. The management system according to claim 22, wherein the second identification device is the first identification device, and acquires the identification information stored in the payout chip by reading the identification information

20 stored in the payout chip placed in the betting area.

24. The management system according to claim 22, wherein the second identification device is a device configured to read the identification information stored in the plurality of

25 chips in the chip tray of the dealer, and is configured to obtain the identification information stored in the payout chips from the difference between the plurality of identification information read before the payout chips are

dispensed and the plurality of identification information read after the payout chips are dispensed.

25. The management system according to claim 22, wherein the
5 second identification device acquires the identification information stored in the payout chip by reading the identification information stored in the payout chip placed in a payout area different from the betting area on the game table.

10

26. The management system according to claim 22, wherein the first identification device periodically reads the identification information, and

when the first identification device no longer reads the
15 identification information read from the betting chip by the first identification device, the control device stores the holder associated with the identification information no longer read by the first identification device in the memory device as the holder associated with the identification
20 information of the payout chip acquired by the second identification device.

27. The management system according to claim 22, wherein the
25 second identification device acquires the identification information by periodically reading the identification information stored in the payout chip, and

when the second identification device no longer reads the identification information that the second identification device has read from the payout chip, the control device

changes the holder associated with the identification information that the first identification device has read from the bet chip to the holder associated with the identification information that is no longer read.

5

28. A management system that manages chips that store identification information used in games at a game table, comprising:

10 a first identification device configured to acquire the identification information stored in chips before the exchange that are placed on the game table by a player for exchange between chips; and

15 a second identification device configured to acquire the identification information stored in the chips after the exchange that are given to the player corresponding to the chips before the exchange;

a memory device configured to store the identification information in association with the holder of the chip that stored the identification information; and

20 a control device configured to store the holder associated with the identification information of the chip before the exchange obtained by the first identification device in the memory device as the holder associated with the identification information of the chip after the exchange obtained by the

25 second identification device.

29. The management system according to claim 28, wherein the control device further stores the holder associated with the identification information of the chip before the exchange

obtained by the second identification device in the memory device as the holder associated with the identification information of the chip after the exchange obtained by the first identification device.

5

30. The management system according to claim 28, wherein the first identification device is a reader configured to read the identification information of a plurality of the chips in a chip tray of a dealer and acquire increased identification
10 information as the identification information stored in the chips before the exchange.

31. The management system according to claim 28, wherein the
15 second identification device is a reader configured to read the identification information of the plurality of chips in the chip tray of the dealer and acquire decreased identification information as the identification information stored in the chips after the exchange.

20 32. A management system that manages an exchange of chips storing identification information used in a game at a game table, comprising:

a reading device configured to read the identification
information stored in the chips placed in a reading area on
25 the game table for exchange;

a memory device configured to store the identification information and the holder of the chip that stored the identification information in association with each other; and

a control device configured to, when associated with the identification information stored on a first chip read by the reading device is different from the holder associated with the identification information stored on a second chip, which
5 is different from the first chip, read by the reading device, store the holder associated with the identification information stored on a first chip read by the reading device as the holder associated with the identification information stored on a second chip, in the memory device.