[0009]

Embodiments of the present invention seek to provide a novel game token tray system including a game token tray having a double tray structure in which the game token is stored.

Solution to Problem

[0009a]

An aspect of the present invention provides a management system configured to manage game tokens, each game token of the game tokens including a radio-frequency (RF) tag storing tag information and a side code associated with the tag information marked on a side of the game token, the management system comprising an image capturing device configured to capture an image of a plurality of the game tokens stored in a chip tray; an image analyzer configured to, based on the image and for each game token of the plurality of the game tokens, obtain a position of the game token and the side code; a reader configured to read, for each game token of the plurality of the game tokens stored in the chip tray, the RF tag of the game token to obtain the tag information of the game token; and a fraud detection device configured to: determine that a first game token of the plurality of the game tokens for which the side code obtained by the image analyzer does not correspond to the tag information of the plurality of the game tokens obtained by the reader, is a fraudulent game token or a potentially fraudulent game token, and identify the position of the fraudulent game token or the potentially fraudulent game token.

[0010]

According to the present disclosure, a game token tray provided on a game table and holding a game token, includes: an upper tray used to take in and out the game token during settlement of a game; and a lower tray disposed below the upper tray and storing the game token for replenishment to the upper tray. The game token includes a plastic layer, a specific color capable of specifying a type of the game token is at least partially provided in the game token, a printing layer representing the type of the game token is provided in upper and lower surfaces of the game token, an individually identifiable side code is given to a side surface of the game token, the game token has a structure in which an RF tag is fixed to the plastic layer, and a configuration in which the type of the game token can be specified by the specific color, an upper portion of the upper tray is open such that the game

[0024]

In the game token tray, the game token may have a configuration in which light color layers are provided on both sides of the specific color layer.

[0025]

With this configuration, the specific color layer is sandwiched between the light color layers, the plurality of game tokens are stacked, and the specific color layers of adjacent game tokens are not continuous when observed from the side surface, so that the number of game tokens can accurately be grasped.

[0026]

According to the present disclosure, a management system for a table game that uses a game table, includes: a game token including a plastic layer, a specific color capable of specifying a type of the game token being at least partially provided in the game token, a printing layer representing the type of the game token being provided in upper and lower surfaces of the game token, a side surface to which an individually identifiable side code is given, the game token having a structure in which an RF tag is fixed to the plastic layer, and a configuration in which the type of the game token being able to be specified by the specific color; a game token tray provided on the game table and holding the game token;

[0057]

With this configuration, the game token at various positions on the game table can be imaged at various angles.

[0058]

According to the present disclosure, a game token tray provided on a game table and holding a game token, includes: an upper tray used to take in and out the game token during settlement of a game; and a lower tray disposed below the upper tray and storing the game token for replenishment to the upper tray. The game token includes a plastic layer, a specific color capable of specifying a type of the game token is at least partially provided in the game token, a printing layer representing the type of the game token is provided in upper and lower surfaces of the game token, the game token has a structure in which an RF tag representing a value can be fixed to the plastic layer, the value being able to be individually specified by the specific color, an upper portion of the upper tray is open such that the game token placed on the upper tray can be imaged by a camera, and the RF tag of each game token placed on the lower tray can be read by an RFID reading device, the upper tray and the lower tray can take two modes of a state in which the upper tray and the lower tray are overlapped and an open state in which the game token on the lower tray can be taken in and out, and

[0061]

With this configuration, the number of game tokens located in the upper tray, a value of the game tokens, and a location of the game tokens can be specified.

[0062]

According to the present disclosure, a management system for a table game that uses a game table, includes: a game token including a plastic layer, a specific color capable of specifying a type of the game token being at least partially provided in the game token, a printing layer representing the type of the game token being provided in upper and lower surfaces of the game token, a value of the game token capable to being individually specified by the specific color, an RF tag representing the type being fixed to the plastic layer; a game token tray provided on the game table and holding the game token; a camera that images the game token placed on the game token tray; an RFID reading device that reads the RF tag of each game token placed on the game token tray; and a management control device that specifies and stores the value and a number of the game token on the game token tray using an imaging result of the camera and a reading result of the RFID reading device. The game token tray includes an upper tray used to take in and out the game token during settlement of a game and a lower tray disposed

[0065]

With this configuration, a value of game tokens located in the upper tray, and a location of the game tokens can be specified.

[0066]

In the management system, the management control device may determine whether the game token in the upper tray is a predetermined game token using the camera.

[0067]

With this configuration, the fraud game token can be determined.

[0068]

According to the present disclosure, a game token tray system includes: a double tray including a lower tray and an upper tray stacked on the lower tray to store a game token provided with an RF tag in which tag information is stored; image acquisition means for acquiring tray image data by imaging the game token stored in the upper tray; RIFD reading means for reading the tag information from the RF tag of the game token stored in the lower tray; and recording means for recording the tray image data and/or an image analysis result of the tray image data about the game token stored in the upper tray, and recording the tag information read by the RFID reading means about the game token stored in the lower tray.

based on the image analysis result.

[0086]

The game token tray system may further include fraud detecting means for detecting fraud based on the image analysis result and the tag information read from the RF tag.

[0087]

With this configuration, the fraud can be detected based on the image analysis result and the read tag information.

[0088]

According to the present disclosure, a game token tray system includes: a double tray including a lower tray and an upper tray stacked on the lower tray to store a game token provided with an RF tag in which tag information is stored; image acquisition means for acquiring tray image data by imaging the game token stored in the upper tray; RFID reading means for reading the tag information from the RF tag of the game token stored in the lower tray; and fraud detecting means for detecting fraud about the upper tray based on the tray image data, and detecting fraud about the lower tray based on tag information read by the RFID reading means.

[0089]

With this configuration, as to the upper tray, the

of the game token, the image acquisition means may acquire table image data by imaging a table surface of the game table, the game token tray system may further include image analysis means for specifying an amount of a bill exchanged for the game token based on the table image data, and specifying a value based on an image of the side surface of the game token stored in the upper tray., and the fraud detecting means may determine whether the amount of the bill specified by the table image analysis means corresponds to the value of the game token exchanged for the bill.

[0103]

According to this configuration, whether the exchange is correctly and equivalently performed can be determined when the bill and the game token are exchanged on the game table.

[0104]

According to the present disclosure, a game token tray system includes: a double tray including a lower tray and an upper tray stacked on the lower tray to store a game token provided with an RF tag in which tag information is stored; tray image acquisition means for acquiring tray image data by imaging the game token stored in the upper tray; and RFID reading means for reading the tag information from the RF tag of the game token stored in

the lower tray, and not reading the tag information from the RF tag of the game token stored in the upper tray.

[0105]

With this configuration, the tray image data can be acquired for the game token in the upper tray, the RF tag is read for the game token in the lower tray, and the RF tag is not read for the game token in the upper tray, so that the game token stored in the lower tray can be grasped by reading the RF tag.

[0106]

According to the present disclosure, a game token tray system comprising: a double tray including a lower tray and an upper tray stacked on the lower tray to store a game token provided with an RF tag in which tag information is stored; RFID reading means for reading the tag information from the RF tag of the game token stored in the lower tray, and not reading the tag information from the RF tag of the game token stored in the upper tray; and fraud detecting means for detecting fraud movement of the game token based on the tag information read by the RFID reading means when the game token is moved between the upper tray and the lower tray.

[0107]

With this configuration, the tray image data can be acquired for the game token of the upper tray, and the RF

tag is read for the game token of the lower tray, so that the movement of the game token between the upper tray and the lower tray can be grasped, and the fraud such as pilfering of the game token in the movement can be detected.

[0108]

According to the present disclosure, a game token management method in a double tray including a lower tray and an upper tray stacked on the lower tray to store a game token provided with an RF tag in which tag information is stored, includes: a tray image acquisition step of acquiring tray image data by imaging the game token stored in the upper tray; an image analysis step of analyzing the game token stored in the upper tray by performing image analysis on the tray image data; a reading step of reading the tag information from the RF tag of the game token stored in the lower tray; and a fraud movement detecting step of detecting fraud movement of the game token by determining whether an increase or decrease of the game token in the upper tray based on the tray image data corresponds to an increase or decrease of the game token in the lower tray based on the tag information read in the reading step.

[0109]

With this configuration, the tray image data can be acquired for the game token of the upper tray, and the RF

[0113]

With this configuration, accuracy of the fraud detection can be improved.

Advantageous Effects of Invention

[0114]

According to the present disclosure, for the upper tray used to take in and out the game token during the settlement of the game, the position and movement of the game token can be recognized to detect the fraud by performing the imaging with the camera. For the lower tray in which the game token for replenishment is stored, the RF tag can be read even if the upper tray is stacked, and the RF tag is not read for the game token of the upper tray. Thus, the game token stored in the lower tray can be grasped by reading the RF tag. As described above, because the game token of the upper tray and the game token of the lower tray can be grasped, the movement of the game token between the upper tray and the lower tray can also be grasped, and the fraud can be detected in the movement of the game token. As to the upper tray, the game token in which the RF tag is broken or the game token that does not include the RF tag can also be detected.

Brief Description of Drawings

[0115]

CLAIMS

1. A management system configured to manage game tokens, each game token of the game tokens including a radio-frequency (RF) tag storing tag information and a side code associated with the tag information marked on a side of the game token, the management system comprising:

an image capturing device configured to capture an image of a plurality of the game tokens stored in a chip tray;

an image analyzer configured to, based on the image and for each game token of the plurality of the game tokens, obtain a position of the game token and the side code;

a reader configured to read, for each game token of the plurality of the game tokens stored in the chip tray, the RF tag of the game token to obtain the tag information of the game token; and

a fraud detection device configured to:

determine that a first game token of the plurality of the game tokens for which the side code obtained by the image analyzer does not correspond to the tag information of the plurality of the game tokens obtained by the reader, is a fraudulent game token or a potentially fraudulent game token, and

identify the position of the fraudulent game

token or the potentially fraudulent game token.

2. The management system according to claim 1, further comprising:

a database configured to store, for each game token of the game tokens, the tag information in association with the side code of the game token,

wherein, to determine the fraudulent game token or potentially fraudulent game token, the fraud detection device is further configured to:

refer to the database and determine whether the tag information corresponds to the side code the first game token, and

identify the position of the fraudulent game token or potentially fraudulent game token.

3. A management system according to claim 2, wherein the fraud detection device is further configured to record the position of the fraudulent game token or the potentially fraudulent game token and a time associated with detection of the fraudulent game token or the potentially fraudulent game token.

4. The management system according to claim 1, further comprising:

a database configured to store, for each game token of the plurality of the game tokens, the side code of the game token,

wherein the fraud detection device is further configured to determine, for each game token of the plurality of the game tokens, whether or not the side code identified by the image analyzer is stored in the database.

5. The management system according to claim 4, wherein the fraud detection device is further configured to determine that a second game token having a side code that is not stored in the database is the fraudulent game token or the potentially fraudulent game token.

6. The management system according to claim 1, wherein the fraud detection device is further configured to detect, when two or more game tokens of the plurality of the game tokens with the same side codes are obtained, that the two or more game tokens of the plurality of the game tokens are the fraudulent game token or the potentially fraudulent game token.

7. The management system according to claim 5, wherein the fraud detection device is further configured to identify the position of the fraudulent game token for

which the side code identified by the image analyzer is not stored in the database.

8. The management system according to claim 1, wherein:

the chip tray is located on a gaming table,

the image capturing device is further configured to capture a table surface of the gaming table to obtain table image data, and

the fraud detection device is further configured to identify where on the table surface the fraudulent game token or the potentially fraudulent game token was collected from based on the position of the fraudulent game token or the potentially fraudulent game token and the table image data.

9. The management system according to claim 1, wherein the fraud detection device is further configured to identify, for each game token of the plurality of the game token, a position of the side code of the game token.

10. The management system according to claim 1, wherein the fraud detection device is further configured to detect one or more game tokens of the plurality of the game tokens that has a damaged RF tag or does not have an RF tag.

11. The management system according to claim 6, wherein the fraud detection device is further configured to determine from which player or from which player position the first game token collected in the chip tray came from.