[0009]

Embodiments of ~~T~~the present invention ~~has been made in view of the above problems, and an object of the present invention is~~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 ~~an aspect of~~ the present ~~invention~~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 ~~an aspect of~~ the present ~~invention~~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 ~~an aspect of~~ the present ~~invention~~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 ~~an aspect of~~ the present ~~invention~~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 ~~an aspect of~~ the present ~~invention~~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 ~~an aspect of~~ the present ~~invention~~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 ~~an aspect of~~ the present ~~invention~~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 ~~an aspect of~~ the present ~~invention~~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 ~~an aspect of~~ the present ~~invention~~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]

~~In~~ According to the present ~~invention~~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 game token tray provided on a game table and holding a game token, the game token tray comprising:

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,

wherein 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 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

~~the RFID reading device does not read the RF tag of the game token placed on the upper tray while the upper tray and the lower tray are overlapped.~~

~~2. The game token tray according to claim 1, wherein a position of the side code of each game token in the upper tray can be specified by specifying the side code.~~

~~3. The game token tray according to claim 1 or 2, wherein the side code of the game token is printed using ink that is invisible by visible light.~~

~~4. The game token tray according to any one of claims 1 to 3, wherein the side code is printed by ink absorbing infrared light.~~

~~5. The game token tray according to any one of claims 1 to 4, wherein the side code is provided in a plurality of lines on the side surface.~~

~~6. The game token tray according to any one of claims 1 to 5, further comprising a database in which the side code in each of the plurality of game tokens is associated with tag information stored in the RF tag.~~

~~7. The game token tray according to any one of claims 1 to 6, wherein the game token has a configuration in which light color layers are provided on both sides of the specific color layer.~~

~~8. A management system for a table game that uses a game table, the management system comprising:~~

~~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, 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;~~

~~a camera that images and records 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 type 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,~~

~~wherein 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 below the upper tray and storing the game token for replenishment to the upper tray,~~

~~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~~

~~an upper portion of the upper tray is open such that the game token placed on the upper tray can be imaged by the camera, and the RF tag of each game token placed on the lower tray can be read by the RFID reading device.~~

~~9. The management system according to claim 8, wherein the management control device can specify a position of the side code of each game token in the upper tray by specifying the side code.~~

~~10. The management system according to claim 8 or 9, wherein the RFID reading device does not read the RF tag of the game token placed on the upper tray while the upper tray and the lower tray are overlapped.~~

~~11. The management system according to any one of claims 8 to 10, further comprising a database in which the side code in each of the plurality of game tokens and the RFID are associated with each other.~~

~~12. The management system according to any one of claims 8 to 11, wherein the side code is printed by ink that is invisible by visible light.~~

~~13. The management system according to any one of claims 8 to 12, wherein the side code is printed by ink absorbing infrared light.~~

~~14. The management system according to any one of claims 8 to 13, wherein the side code is provided in a plurality of lines on the side surface.~~

~~15. The management system according to any one of claims 8 to 14, wherein the game token has a configuration in which light color layers are provided on both sides of the specific color layer.~~

~~16. The management system according to any one of claims 8 to 15, wherein the management control device can determine a fraud game token when the side code is different from a previously-registered side code.~~

~~17. The management system according to claim 16, wherein the management control device outputs a determination result when determining the fraud game token in the upper tray collected by a game table dealer, and can reproduce imaging recording of the fraud game token using the camera.~~

~~18. The management system according to any one of claims 8 to 17, wherein the management control device can use the camera to determine a location from which the game token collected by the game table dealer and placed on the upper tray comes, and reproduce the imaging recording of movement of the game token using the camera.~~

~~19. The management system according to any one of claims 8 to 18, wherein the camera can also image a bill exchanged for the game token, and the management control device can~~

~~specify the type and the number of the game token on the upper tray to be decreased by the exchange between the game token on the game token tray and the bill using an imaging result of the bill, and perform comparison and measurement with an actual total amount of the game tokens on the game token tray.~~

~~20. The management system according to any one of claims 8 to 19, wherein the management control device can compare and determine whether a total amount of the game token grasped in the game token tray corresponds to an increase or decrease according to an amount paid of the game token corresponding to the exchanged bill after the exchange between the bill and the game token and an increase or decrease of the game token calculated from an amount of the game token betted by all players and a victory or defeat result of the game.~~

~~21. The management system according to any one of claims 8 to 20, wherein the management control device is an artificial intelligence utilizing type or a deep learning structure that can obtain information about the type and the number of the game token even if a part or a whole is hidden due to a blind angle of the camera in measuring and determining the type and the number of the game token.~~

~~22. The management system according to any one of claims 8 to 21, wherein the side code is attached to at least~~

three points spaced apart in a rotational direction in the light color layer of the side surface of the game token, the type and manufacturing information of the game token can be specified by reading the side code using the camera, and the specified information and a predetermined database can be collated and managed.

23. The management system according to any one of claims 8 to 22, further comprising a camera that images and records the game token on the game table, wherein the camera is configured to image the game token using a single camera or a plurality of cameras having different heights arranged at predetermined positions.

24. A game token tray provided on a game table and holding game token, the game token tray comprising:

an upper tray used for taking in and out the game token at 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,

wherein the game token has a plastic layer, a specific color capable of specifying a type of the game token is at least partially provided in the game token, and 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,

the upper portion of the upper tray is opened 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,

an upper tray and the lower tray can take two modes of a state in which the upper tray and the lower tray overlap each other, and an open state in which the game token on the lower tray can be taken in and out,

the RFID reading device does not read the RFID of the game token placed on the upper tray in a state in which the upper tray and the lower tray are overlapped.

25. The game token tray according to claim 24, wherein a number of the game tokens at each position in the upper tray can be specified by specifying a value of the game token.

26. A management system for a table game that uses a game table, the management system comprising:

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 being able to be 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,~~

~~wherein 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 below the upper tray and storing the game token for replenishment to the upper tray,~~

~~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~~

~~an upper portion of the upper tray is open such that the game token placed on the upper tray can be imaged by the camera, and an RFID of each game token placed on the lower tray can be read by the RFID reading device.~~

~~27. The management system according to claim 26, wherein the management control device can specify the value and a~~

~~position of each game token in the upper tray using the camera.~~

~~28. The management system according to claim 26 or 27, wherein the management control device can determine whether the game token in the upper tray is a predetermined game token using the camera.~~

~~29. 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;~~

~~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.~~

~~30. The game token tray system according to claim 29,~~

~~wherein the image acquisition means is configured not to image the game token stored in the lower tray,~~

~~the RFID reading means is configured not to read the tag information about the game token stored in the upper~~

~~tray, and~~

~~the recording means does not record the tag information about the game token stored in the upper tray, and does not record either the tray image data of the game token stored in the lower tray or the image analysis result of the tray image data.~~

~~31. The game token tray system according to claim 29,~~

~~wherein the lower tray is installed at a position where the game token stored in the lower tray is not imaged by the image acquisition means,~~

~~the RFID reading means is configured not to read the tag information about the game token stored in the upper tray, and~~

~~the recording means does not record the tag information about the game token stored in the upper tray, and does not record either the tray image data of the game token stored in the lower tray or the image analysis result of the tray image data.~~

~~32. The game token tray system according to any one of claims 29 to 31, further comprising~~

~~image analysis means for specifying the position of the game token stored in the upper tray based on the tray image data,~~

~~wherein the recording means records information about the position of the game token as the image analysis~~

~~result.~~

~~33. The game token tray system according to any one of claims 29 to 31,~~

~~wherein the color indicating the value of the game token is given to the side surface of the game token,~~

~~the game token tray system further comprises image analysis means for specifying a value indicated by a color of the side surface of the game token stored in the upper tray based on the tray image data, and~~

~~the recording means records information about the value specified by the image analysis means as the image analysis result.~~

~~34. The game token tray system according to any one of claims 29 to 31,~~

~~wherein the identification information about the game token is written in the side surface of the game token,~~

~~the game token tray system further comprises image analysis means for specifying identification information about the game token stored in the upper tray based on the tray image data, and~~

~~the recording means records the identification information specified by the image analysis means as the image analysis result.~~

~~35. The game token tray system according to claim 34, further comprising a database in which the identification~~

~~information is recorded.~~

~~36. The game token tray system according to any one of claims 32 to 35, wherein the image analysis means performs image recognition based on machine learning on the tray image data.~~

~~37. The game token tray system according to any one of claims 29 to 31, further comprising fraud detecting means for detecting fraud based on the image analysis result.~~

~~38. The game token tray system according to any one of claims 29 to 31, further comprising fraud detecting means for detecting fraud based on the image analysis result and the tag information read from the RF tag.~~

~~39. 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;~~

~~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.~~

~~40. The game token tray system according to any one of claims 37 to 39,~~

~~wherein the color indicating the value of the game token is given to the side surface of the game token,~~

~~information indicating the value of the game token is stored as the tag information in the RF tag,~~

~~the game token tray system further comprises image analysis means for specifying a value indicated by a color of a side surface of the game token stored in the upper tray based on the tray image data, and~~

~~the fraud detecting means detects the fraud by determining whether the value increased or decreased in the upper tray corresponds to the value increased or decreased in the lower tray based on the value specified by the image analysis means and the value read by the RFID reading means when the game token is moved between the upper tray and the lower tray.~~

~~41. The game token tray system according to any one of claims 37 to 39,~~

~~wherein the color indicating the value of the game token is given to the side surface of the game token,~~

~~the game token tray system further comprises image analysis means for specifying a value indicated by the color of the side surface of the game token stored in the upper tray based on the tray image data, and~~

the fraud detecting means detects the fraud by determining whether an adjusted amount corresponds to the value increased or decreased in the upper tray before and after settlement based on the value specified by the image analysis means and the adjusted amount based on a game result and a bet amount of a player.

42. The game token tray system according to any one of claims 37 to 39,

wherein identification information about the game token is stored as the tag information in the RF tag of the game token,

the identification information about the game token is written in the side surface of the game token,

the game token tray system further comprises image analysis means for specifying identification information about the game token stored in the upper tray based on the tray image data, and

the fraud detecting means detects the fraud by determining whether the identification information read by the RFID reading means corresponds to the identification information specified based on the tray image data when the game token is moved between the upper tray and the lower tray.

43. The game token tray system according to any one of claims 37 to 39,

wherein the identification information about the game token is written in the side surface of the game token,

the game token tray system further comprises:

image analysis means for specifying identification information about the game token stored in the upper tray based on the tray image data; and

a database in which a plurality of pieces of the identification information are stored, and

the fraud detecting means detects the fraud by determining whether the identification information specified by the image analysis means is stored in the database.

44. The game token tray system according to claim 43, wherein the fraud detecting means specifies a position of a fraud game token in which the identification information specified by the image analysis means is not stored in the database.

45. The game token tray system according to claim 44,

wherein the double tray is installed on a game table,

the image acquisition means further acquires a table image data by imaging a table surface of the game table, and

the fraud detecting means specifies a location, from which the fraud game token is collected, on the table surface based on the position of the fraud game token and

~~the table image data.~~

~~46. The game token tray system according to any one of claims 37 to 39,~~

~~wherein the double tray is installed on a game table,~~

~~information indicating the value of the game token is written in the side surface of the game token,~~

~~the image acquisition means acquires table image data by imaging a table surface of the game table,~~

~~the game token tray system further comprises 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 determines 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.~~

~~47. 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;~~

~~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.~~

~~48. 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.~~

~~49. 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, the game token management method comprising:~~

~~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.~~

~~50. The game token management method according to claim 49,~~

~~wherein the value of the game token is written in the side surface of the game token,~~

~~in the image analysis step, image analysis is performed on the tray image data to specify the value of the game token stored in the upper tray,~~

~~the game token management method further comprises: an adjusted amount calculation step of calculating an adjusted amount of the game token based on a game result and a bet amount of a player; and~~

~~a fraud settlement detecting step of detecting fraud settlement by determining whether the adjusted amount calculated in the adjusted amount calculation step corresponds to a value increased or decreased in the upper tray,.~~

~~51. The game token management method according to claim 49 or 50, wherein the image analysis in the tray image analysis step is image recognition based on machine learning.~~

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.