[0008]

In a game hall such as a casino, chips as gaming chips are stacked in bulk and placed on a game table in a game hall such as a casino, but there is a problem that it is difficult to accurately read the total value with a reading device of an IC tag provided under the game table. Further, there is a problem that chips as gaming chips placed at different positions (win or lose depends on positions) are collectively measured if the sensitivity of the reading device is increased so that it is difficult to grasp the total value of chips as gaming chips for each position.

Embodiments of the present invention seek to provide a novel system to measure the total value of stacked chips in a game in a game hall.

MEANS FOR SOLVING THE PROBLEM

[0008a]

An aspect of the present invention provides a chip measurement system on a game table at an amusement center, comprising: an image recording device that records, as an image by means of a camera, stacked chips stacked for a game played on the game table, each chip having a predetermined thickness; a plurality of height measuring cameras that capture images of the stacked chips to be measured from different positions or angles; a chip counting device that obtains the height of the stacked chips based on a respective viewing angle to a horizontal or a vertical direction to the stacked chips to be measured obtained from the plurality of height measuring camera, and obtains the number of the chips to be measured;

and a management control device that controls the image recording device and the chip counting device, wherein the management control device determines a specific point on the stacked chips based on the shape or pattern of the stacked chip by image recognition from the captured image of the stacked chip acquired by the height measurement camera, and obtains the height of the stacked chips to be measured based on the respective viewing angles to the horizontal or vertical direction viewed from the plurality of height measuring to the determined specific point.

[0008b]

Another aspect of the present invention provides a chip measurement system on a game table in an amusement center, comprising: an image recording device that records, as an image by means of a camera, stacked chips stacked for a game played on the game table, each chip having a predetermined thickness; a plurality of height measuring cameras that capture images of the stacked chips to be measured from different positions or angles; a chip counting device that obtains the height of the stacked chips based on a respective viewing angle to a horizontal or a vertical direction to the stacked chips to be measured obtained from the plurality of height measuring camera, and obtains the number of the chips to be measured; a chip total amount measuring device obtains a total amount of the staked chips to be measured based on the number of the stacked chips obtained by the chip counting device and each type of the stacked chips recognized based on a result of image analysis by the image recording device;

and a management control device that controls the image recording device, the chip counting device, and the chip total amount measuring device, wherein the chip to be measured consists of at least a coloring layer and a white or light-colored layer laminated to form a laminated structure consisting of a plurality of plastic layers to form a stripe pattern in the lamination direction on the sides, and the coloring layer makes it possible to identify the type of chip, and furthermore, the upper and lower sides of the laminated structure have a printed layer representing the type of amusement substitute coin, and each layer is thermocompression bonded between the layers to form a layer structure, and the management control device determines a specific point on the stacked chips based on the shape or pattern of the stacked chip by image recognition from the captured image of the stacked chip acquired by the height measurement camera, and obtains the height of the stacked chips to be measured based on the respective viewing angles to the horizontal or vertical direction viewed from the plurality of height measuring to the determined specific point.

[0009]

A chip measurement system according to the present disclosure includes: an image recording device that records states of chips to be measured, which are stacked with a predetermined thickness in a game played on a game table, as an image using a camera; a plurality of height measurement cameras that obtain images of the stacked chips to be measured from different positions or angles;

a chip number measuring device that obtains a height of the chips to be measured from each viewing angle toward the chips to be measured with respect to a horizontal or vertical direction, obtained from the plurality of height measurement

grasps a total value of chips in the chip tray from the image obtained by the chip tray camera.

[0013]

The present disclosure also relates to the chip measurement system further including a win or lose result determination device that obtains a win or lose result of each game on the game table. It may be configured such that the management control device is capable of grasping a total value of chips bet by a losing player in the game from a position, a type and a number of the chips bet by the losing player based on information obtained by the win or lose result determination device.

[0014]

Further, the management control device may grasp the total value of the chips to be measured in the chip tray of the dealer of the game table, add or subtract an increased or decreased value of chips to be measured in the game, calculated based on the positions, types, and each number of chips to be measured bet by all the players in the game and the win or lose result of the game obtained by the win or lose result determination device to or from the total value of the chips to be measured in the chip tray as a measurement target before settlement of each game, compare a total value of chips to be measured that needs to be present in the chip tray as the measurement target after settlement when ending the game with an actual total value of chips to be measured in the chip tray as the measurement target when ending the game obtained using

the image recording device, and determine whether or not there is a difference between the total value that needs to be present and the actual total value.

[0015]

Further, the chip measurement system may be configured such that a plurality of the image recording devices are provided, and the chip total value measuring device calculates the total value of chips to be measured using images of the stacked chips to be measured which are taken from different positions or angles of the respective image recording devices.

[0016]

In addition, the chips to be measured in this chip measurement system may have a configuration in which a laminated structural body including a plurality of plastic layers is configured by laminating at least a colored layer and a white layer or a light color layer and a stripe pattern in a laminating direction is formed on a side face so as to enable a type of a gaming chip to be specified by the colored layer, and have a layer structure obtained by forming a printed layer indicating a type of a gaming chip further on upper and lower faces of the laminated structural body and causing thermocompression bonding between the respective layers.

[0017]

A chip measurement system according to the present disclosure includes: an image recording device that records states of chips to be measured, which are stacked with a predetermined thickness

In addition, the chip to be measured may have a heavy layer containing metal powder for weight increase in the layer as at least one layer among the plurality of plastics layers. In addition, the chip to be measured may be configured such that a white layer or a light color layer is provided on both sides of the colored layer to be sandwiched therebetween such that thicknesses of an upper layer and a lower layer of the white layer or the light color layer provided to sandwich the colored layer are different from each other.

EFFECT OF THE INVENTION

[0019]

According to the measurement system of the present disclosure, it is understood whether or not collection and redemption of chips has been correctly performed according to a win or lose result of a game by measuring the number of chips placed in the stacked state and calculating a total value of bet chips.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

FIG. 1 is a view illustrating an overall outline of a measurement system of chips as gaming chips according to a first embodiment of the present invention;

FIG. 2 is a perspective view of chips as gaming chips illustrating an example of different overlapping states of the chips as the gaming chips grasped according to the first embodiment of the present invention;

CLAIMS:

1. A chip measurement system on a game table at an amusement center, comprising:

an image recording device that records, as an image by means of a camera, stacked chips stacked for a game played on the game table, each chip having a predetermined thickness;

a plurality of height measuring cameras that capture images of the stacked chips to be measured from different positions or angles;

a chip counting device that obtains the height of the stacked chips based on a respective viewing angle to a horizontal or a vertical direction to the stacked chips to be measured obtained from the plurality of height measuring camera, and obtains the number of the chips to be measured; and

a management control device that controls the image recording device and the chip counting device, wherein

the management control device determines a specific point on the stacked chips based on the shape or pattern of the stacked chip by image recognition from the captured image of the stacked chip acquired by the height measurement camera, and obtains the height of the stacked chips to be measured based on the respective viewing angles to the horizontal or vertical direction viewed from the plurality of height measuring to the determined specific point.

[Claim 2]

The chip measurement system according to claim 1, wherein the specific point on the stacked chip based on the shape or pattern of the stacked chips is obtained from the uppermost chip of the stacked chips in the captured image.

[Claim 3]

The chip measurement system according to claim 2, wherein the specific point of the stacked chips based on the shape or pattern of the stacked chip is the center of the contour of the uppermost chip in the captured image.

[Claim 4]

The chip measurement system according to any of claims 1 to 3, comprising:

chip total amount measuring device, which calculates a total amount of chips in the stacked chips based on the number of chips to be measured obtained from the chip counting device; and

a management control device that controls the chip total amount measuring device as well as the image recording device and the chip counting device.

[Claim 5]

The chip measurement system according to any of claims 1 to 3, comprising:

a chip total amount measuring device obtains a total amount of the staked chips to be measured based on the number of the stacked chips obtained by the chip counting device and each type of the stacked chips recognized based on a result of image analysis by the image recording device; and

a management control device that controls the chip total amount measuring device as well as the image recording device and the chip counting device.

[Claim 6]

The chip measurement system according to any of claims 1 to 5, wherein the management control device is configured to be able to determine position, type, and number of the stacked

chips to be measured wagered by each player via the image recording device, and to determine a total amount of all chips wagered by each player.

[Claim 7]

The chip measurement system according to any of claims 1 to 6, further comprising:

a camera for the chip tray that obtains images of the chip tray of the dealer of the game table; and

a chip measuring device for chip trays to determine the total amount of chips in the chip trays based on the images of the camera for the chip tray.

[Claim 8]

The chip measurement system according to any of claims 1 to 7, further comprising:

a win/loss result determination device that obtains the win/loss result of each game in the game table, wherein

the management control device can determine the total amount of the stacked chips wagered by a losing player in the game based on the position, type, and number of the stacked chips wagered by the losing player based on the the win/lose result obtained from the win/loss result determination device.

[Claim 9]

The chip measurement system according to claim 8, wherein the management control device determines the total amount of the stacked chips to be measured in the chip tray of the dealer of the game table, and

adds or subtracts the incremental amount or decremental amount of the chips to be measured in the game to the total amount of the chips in the chip tray to be measured before a settlement of each game, wherein the incremental amount or decremental

amount is calculated from the position, type, and number of the chips to be measured wagered by all player in the game and the win/loss result of the game obtained by the win/loss result determination device, and

the management control device compares the total amount of chips to be measured that should be in the chip tray to be measured after the settlement at the end of the game with the actual total amount of chips to be measured in the chip tray to be measured at the end of the game obtained by the image recording device, and determines whether there is a discrepancy between the total amount that should be and the actual total amount.

[Claim 10]

The chip measurement system according to claim 4 or 5, wherein

the chip measurement system has a plurality of the image recording devices, and

the chip total amount measuring device calculates the total amount of chips to be measured using images of the stacked chips to be measured captured from different positions or angles on each of the image recording devices.

[Claim 11]

The chip measurement system according to any of claims 1 to 10, wherein the chip to be measured consists of at least a coloring layer and a white or light-colored layer laminated to form a laminated structure consisting of a plurality of plastic layers to form a stripe pattern in the lamination direction on the sides, and the coloring layer makes it possible to identify the type of chip, and furthermore, the upper and lower sides of the laminated structure have a printed layer representing the type of amusement substitute coin, and each

layer is thermocompression bonded between the layers to form a layer structure.

[Claim 12]

A chip measurement system on a game table in an amusement center, comprising:

an image recording device that records, as an image by means of a camera, stacked chips stacked for a game played on the game table, each chip having a predetermined thickness;

a plurality of height measuring cameras that capture images of the stacked chips to be measured from different positions or angles;

a chip counting device that obtains the height of the stacked chips based on a respective viewing angle to a horizontal or a vertical direction to the stacked chips to be measured obtained from the plurality of height measuring camera, and obtains the number of the chips to be measured;

a chip total amount measuring device obtains a total amount of the staked chips to be measured based on the number of the stacked chips obtained by the chip counting device and each type of the stacked chips recognized based on a result of image analysis by the image recording device; and

a management control device that controls the image recording device, the chip counting device, and the chip total amount measuring device, wherein

the chip to be measured consists of at least a coloring layer and a white or light-colored layer laminated to form a laminated structure consisting of a plurality of plastic layers to form a stripe pattern in the lamination direction on the sides, and the coloring layer makes it possible to identify the type of chip, and furthermore, the upper and lower sides of the laminated structure have a printed layer representing the type of amusement substitute coin, and each layer is

thermocompression bonded between the layers to form a layer structure, and

the management control device determines a specific point on the stacked chips based on the shape or pattern of the stacked chip by image recognition from the captured image of the stacked chip acquired by the height measurement camera, and obtains the height of the stacked chips to be measured based on the respective viewing angles to the horizontal or vertical direction viewed from the plurality of height measuring to the determined specific point.

[Claim 13]

The chip measurement system according to claim 12, wherein at least one of the plurality of plastic layers is a heavy layer containing metal powder for weight gain in the layer.

[Claim 14]

The chip measurement system according to claim 12 or 13, wherein a white or light-colored layer is provided on both sides with the coloring layer in between, and the thicknesses of the layers above and below the white or light-colored layer provided with the coloring layer in between are different from each other.