Meanwhile, different values are defined for each type of gaming chips, and a technology for detecting a value of a gaming chip has also been proposed to automate a table game. For example, JP 2008-246103 A discloses a method for determining authenticity by embedding a wireless tag, in which information on a type or a value of gaming chips is recorded in a gaming chip and reading the information with a reader.

[0005]

Embodiments of the present disclosure seek to provide a new gaming chip capable of determining authenticity based on an image obtained by photographing.

[0005a]

An aspect of the present invention provides a management system of a table game using a game table, comprising:

a recording device recording an image of a gaming chip; and

an inspection device determining a type and authenticity of the gaming chip using a recorded result of the recording device,

wherein the gaming chip has a multilayer structure in which a plurality of plastic layers are laminated by thermocompression bonding, the plurality of plastic layers includes a representation plastic layer, an outer side of the representation plastic layer is printed with a representation of the type of the gaming chip, a rear side of the representation plastic layer or a plastic layer on an inner side of the representation plastic layer is printed with an authenticity recognition mark by an infrared absorbing material,

the recording device is configured to be connected to a normal camera recording and discriminating the representation of the type of the gaming chip which is printed on the outer side of the representation plastic layer, and

an infrared camera recording and discriminating the authenticity recognition mark by the infrared absorbing material printed on the plastic layer on the rear side of the representation plastic layer or on the inner side of the representation plastic layer by irradiating infrared rays from a side on which the display representing the type of the gaming chip which is printed on the outer side of the representation plastic layer is printed, and

the inspection device is configured to determine the type and the authenticity of the gaming chip using the normal camera and the infrared camera.

[0005b]

Another aspect of the present invention provides a management system of a table game using a table game, comprising:

a recording device recording an image of a gaming chip; and

an inspection device determining a type and authenticity of the gaming chip using a recorded result of the recording device,

wherein the gaming chip has: a representation of the type of the gaming chip that is printed, and an authenticity recognition mark that is printed more inwardly than the printing of the representation of the type of the gaming chip by an infrared absorbing material,

the recording device is configured to be connected to a normal camera recording and discriminating the representation of the type of the gaming chip which is printed, and

an infrared camera recording and discriminating the authenticity recognition mark by the infrared absorbing material printed more inwardly than the printing of the representation of the type of the gaming chip by irradiating infrared rays from a side printed with the representation of the type of the gaming chip, and

the inspection device is configured to determine the type and the authenticity of the gaming chip using the normal camera and the infrared camera.

[0005c]

Another aspect of the present invention provides a gaming chip, wherein the gaming chip has a multilayer structure in which a plurality of plastic layers are laminated by thermocompression bonding, the plurality of plastic layers includes a representation plastic layer, an outer side of the representation plastic layer is printed with a representation of the type of the gaming chip, a rear side of the representation plastic layer or a plastic layer on an inner side of the representation plastic layer is printed with an authenticity recognition mark by an infrared absorbing material, and the authenticity recognition mark is irradiated with infrared rays from a side printed with the representation of the type of the gaming chip printed on the outer side of the representation plastic layer by an infrared camera to allow the infrared absorbing material printed on the rear side of the representation plastic layer or the plastic layer on

the inner side of the representation plastic layer to record and discriminate the authenticity recognition mark.

[0005d]

Another aspect of the present invention provides a gaming chip, wherein a representation of a type of the gaming chip is printed on a surface of the gaming chip, an authenticity recognition mark is printed on the surface of the gaming chip and printed more inwardly than the printing of the representation of the type of the gaming chip by an infrared absorbing material, and the authenticity recognition mark is irradiated with infrared rays from a side printed with the representation of the type of the gaming chip printed on the surface of the gaming chip by an infrared camera to allow an infrared absorbing material printed on the surface of the gaming chip and printed more inwardly than the printing of the representation of the type of the gaming chip to record and discriminate the authenticity recognition mark.

[0005e]

Another aspect of the present invention provides a gaming chip, comprising an internal printing inside the gaming chip, the internal printing printed with an infrared absorbing material, wherein an infrared image is indicated by the internal printing.

[0005f]

Another aspect of the present invention provides a management system of a table game using a gaming chip as described above, comprising:

an infrared camera generating an infrared image by photographing the infrared image indicated by the internal printing; and

an inspection device determining authenticity of the gaming chip based on the infrared image.

[0006]

There is also disclosed a management system of a table game using a game table, including: a recording device recording an image of a gaming chip; and an inspection device determining a type and authenticity of the gaming chip using a recorded result of the recording device, wherein the gaming chip has a multilayer structure in which a plurality of plastic layers are laminated by thermocompression bonding, an outer layer of the plurality of plastic layers is provided with a representation plastic layer, an outer side of the representation plastic layer is printed with a representation of the type of the gaming chip, a rear side of the representation plastic layer or a plastic layer on an inner side of the representation plastic layer is printed with an authenticity recognition mark by an infrared absorbing material, the recording device is configured to be connected to a normal

CLAIMS

1. A management system of a table game using a game table, comprising:

a recording device recording an image of a gaming chip; and

an inspection device determining a type and authenticity of the gaming chip using a recorded result of the recording device,

wherein the gaming chip has a multilayer structure in which a plurality of plastic layers are laminated by thermocompression bonding, the plurality of plastic layers includes a representation plastic layer, an outer side of the representation plastic layer is printed with a representation of the type of the gaming chip, a rear side of the representation plastic layer or a plastic layer on an inner side of the representation plastic layer is printed with an authenticity recognition mark by an infrared absorbing material,

the recording device is configured to be connected to a normal camera recording and discriminating the representation of the type of the gaming chip which is printed on the outer side of the representation plastic layer, and

an infrared camera recording and discriminating the authenticity recognition mark by the infrared absorbing material printed on the plastic layer on the rear side of

the representation plastic layer or on the inner side of the representation plastic layer by irradiating infrared rays from a side on which the display representing the type of the gaming chip which is printed on the outer side of the representation plastic layer is printed, and

the inspection device is configured to determine the type and the authenticity of the gaming chip using the normal camera and the infrared camera.

2. A management system of a table game using a table game, comprising:

a recording device recording an image of a gaming chip; and

an inspection device determining a type and authenticity of the gaming chip using a recorded result of the recording device,

wherein the gaming chip has: a representation of the type of the gaming chip that is printed, and an authenticity recognition mark that is printed more inwardly than the printing of the representation of the type of the gaming chip by an infrared absorbing material,

the recording device is configured to be connected to a normal camera recording and discriminating the representation of the type of the gaming chip which is printed, and

an infrared camera recording and discriminating the authenticity recognition mark by the infrared absorbing

material printed more inwardly than the printing of the representation of the type of the gaming chip by irradiating infrared rays from a side printed with the representation of the type of the gaming chip, and

the inspection device is configured to determine the type and the authenticity of the gaming chip using the normal camera and the infrared camera.

3. The management system of a table game according to claim 1 or claim 2, wherein the authenticity recognition mark of the gaming chip is printed by a transparent or translucent infrared absorbing material.

4. The management system of a table game according to claim 1, wherein the gaming chip includes a colored layer provided at least in the middle of the gaming chip, and has the multilayer structure in which light color layers are laminated on both sides of the colored layer provided in the middle of the gaming chip so that a stripe pattern in a laminating direction is formed on a side surface of the gaming chip, and the inspection device has a configuration in which the type of the gaming chip is specified by the colored layer using the normal camera.

5. The management system of a table game according to claim 2, wherein the gaming chip includes a colored layer provided at least in the middle of the gaming chip, and has

a multilayer structure in which light color layers are laminated on both sides of the colored layer provided in the middle of the gaming chip so that a stripe pattern in a laminating direction is formed on a side surface of the gaming chip, and the inspection device has a configuration in which the type of the gaming chip is specified by the colored layer using the normal camera.

6. The management system of a table game according to claim 1 or claim 2, wherein the authenticity recognition mark of the gaming chip is a character or a pattern.

7. The management system of a table game according to claim 4 or claim 5, further comprising a database storing the authenticity recognition mark and the type of the gaming chip by associating the authenticity recognition mark and the type of the gaming chip with each other.

8. The management system of a table game according to claim 1 or claim 2, wherein an RF tag storing RF tag information is embedded in the gaming chip.

9. The management system of a table game according to claim 8, further comprising: a database storing the authenticity recognition mark and the RF tag information by associating the authenticity recognition mark and the RF tag information with each other.

10. The management system of a table game according to claim 7, wherein the inspection device inspects whether the authenticity recognition mark and the type of the gaming chip specified at least by the colored layer are associated with each other in the database.

11. The management system of a table game according to claim 9, wherein the inspection device inspects whether the authenticity recognition mark and the RF tag information are associated with each other in the database.

12. A gaming chip, wherein the gaming chip has a multilayer structure in which a plurality of plastic layers are laminated by thermocompression bonding, the plurality of plastic layers includes a representation plastic layer, an outer side of the representation plastic layer is printed with a representation of the type of the gaming chip, a rear side of the representation plastic layer or a plastic layer on an inner side of the representation plastic layer is printed with an authenticity recognition mark by an infrared absorbing material, and the authenticity recognition mark is irradiated with infrared rays from a side printed with the representation of the type of the gaming chip printed on the outer side of the representation plastic layer by an infrared camera to allow the infrared absorbing material printed on the rear side of

the representation plastic layer or the plastic layer on the inner side of the representation plastic layer to record and discriminate the authenticity recognition mark.

13. A gaming chip, wherein a representation of a type of the gaming chip is printed on a surface of the gaming chip, an authenticity recognition mark is printed on the surface of the gaming chip and printed more inwardly than the printing of the representation of the type of the gaming chip by an infrared absorbing material, and the authenticity recognition mark is irradiated with infrared rays from a side printed with the representation of the type of the gaming chip printed on the surface of the gaming chip by an infrared camera to allow an infrared absorbing material printed on the surface of the gaming chip and printed more inwardly than the printing of the representation of the type of the gaming chip to record and discriminate the authenticity recognition mark.

14. The gaming chip according to claim 12 or claim 13, wherein the authenticity recognition mark of the gaming chip is discriminated by irradiating infrared rays and an association between the authenticity recognition mark and the representation of the type of the gaming chip read by a normal camera is determined.

15. The gaming chip according to claim 12 or claim 13,

wherein the authenticity recognition mark of the gaming chip is printed by a transparent or translucent infrared absorbing material.

16. The gaming chip according to claim 12, wherein the gaming chip includes a colored layer provided at least in the middle of the gaming chip, and has the multilayer structure in which light color layers are laminated on both sides of the colored layer provided in the middle of the gaming chip so that a stripe pattern in a laminating direction is formed on a side surface of the gaming chip.

17. The gaming chip according to claim 13, wherein the gaming chip includes a colored layer provided at least in the middle of the gaming chip, and has a multilayer structure in which light color layers are laminated on both sides of the colored layer provided in the middle of the gaming chip so that a stripe pattern in a laminating direction is formed on a side surface of the gaming chip.

18. The gaming chip according to claim 12 or claim 13, wherein the authenticity recognition mark of the gaming chip is a character or a pattern.

19. The gaming chip according to claim 15, wherein the authenticity recognition mark is associated with the type of the gaming chip, which is specified at least by the

colored layer, in a database.

20. The gaming chip according to claim 12 or claim 13, wherein an RF tag storing RF tag information is embedded in the gaming chip.

21. The gaming chip according to claim 20, wherein the authenticity recognition mark is associated with at least the RF tag information in the database.

22. The gaming chip according to claim 16 or claim 17, wherein an ID mark is provided on an outer circumferential surface of the light color layer in UV ink or carbon black ink.

23. The gaming chip according to claim 22, wherein the authenticity recognition mark is associated with at least the ID mark in a database.

24. A gaming chip comprising an internal printing inside the gaming chip, the internal printing printed with an infrared absorbing material, wherein an infrared image is indicated by the internal printing.

25. The gaming chip according to claim 24, further comprising a surface printing on an outer surface of the gaming chip, the surface printing indicating a visible

light image.

26. The gaming chip according to claim 25, wherein the internal printing is located beneath the surface printing.

27. The gaming chip according to claim 24, wherein the gaming chip is configured of a plurality of layers, and the internal printing is located on a surface of any one of the plurality of layers.

28. A management system of a table game using a gaming chip according to claim 24, comprising:

an infrared camera generating an infrared image by photographing the infrared image indicated by the internal printing; and

an inspection device determining authenticity of the gaming chip based on the infrared image.

29. The management system according to claim 28, further comprising a visible light camera generating a visible light image obtained by photographing the visible light image of the gaming chip, wherein the inspection device determines the authenticity of the gaming chip based on the visible light image.

30. The management system according to claim 29, wherein the inspection device recognizes contents of the surface

printing by performing image recognition on the visible light image, and recognizes contents of the internal printing by performing an image recognition on the infrared image.

31. The management system according to claim 30, wherein the inspection device determines that the gaming chip is a forgery when the recognized contents of the internal printing do not correspond to the contents of the surface printing.