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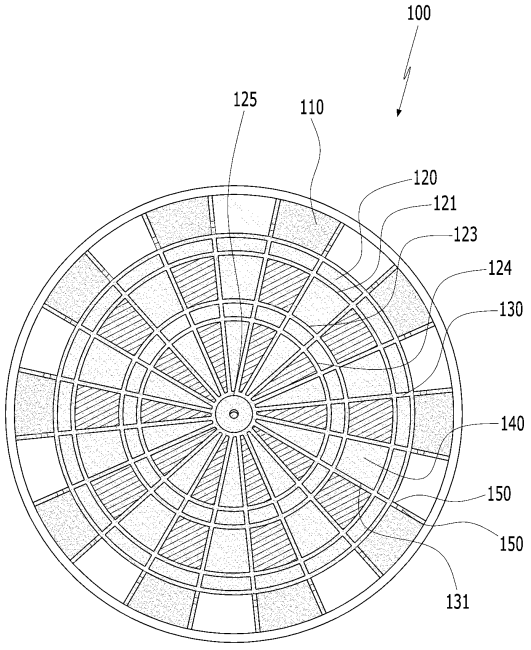
(54) DARTBOARD HAVING LIGHT SOURCE AND DARTBOARD CONTROLLING DEVICE

(57) Disclosed are a dart board equipped with a light source, and a device for controlling the dart board. The dart board equipped with the light source includes: a circular base plate; a plurality of ring-shaped parts which is provided with a predetermined height on an upper surface of the base plate, and is formed with a predetermined radius at a center of the base plate; a plurality of extended parts which are connected from an inner side of an outermost ring-shaped part among the ring-shaped parts to the center of the base plate in a radius direction of the base plate; a plurality of divided parts which are surrounded so as to be closed by the ring-shaped parts and the extended parts; a light guide unit of which one surface is in contact with an external side of the outermost ring-shaped part facing the inner side of the outermost ring-shaped part; and a light source unit which is in contact with the other surface of the light guide unit.

Fig.1



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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to and the benefit of Korean Patent Application No. 10-2004-0163486 filed in the Korean Intellectual Property Office on November 21, 2014, the entire contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to a dart board, and more particularly, to a dart board equipped with a light source and a device for controlling the dart board.

BACKGROUND ART

[0003] A dart game is a game in which a point is obtained by throwing an apparatus shaped like an arrowhead at a circular target marked with numbers, and is a game which any one can enjoy anytime and anywhere regardless of the place and season if there are a dart shaped like an arrowhead and a dart board, which the dart hits.

[0004] The dart board includes 20 divided segments shaped like fans, and the segments are set to points of 1 to 20, respectively. In general, the dart game is a game, in which a basic number of points, such as 301 points, 501 points, and 1,001 points, is set and a user who first reaches zero points by subtracting the points obtained by throwing a dart arrowhead from the total number of points, is a winner.

[0005] In order to increase an entertainment element of the dart game experienced by the user, there is a need for highlighting a visual and/or audible element for a dart game device.

[Related art literature]

[Patent Document]

[0006] (Patent Document 1) Korean Patent Application Laid-Open No. 10-1989-0700218

SUMMARY OF THE INVENTION

[0007] An object to be solved by an exemplary embodiment of the present disclosure is to provide a dart board equipped with a light source, in which the appropriate number of LEDs is used in order to achieve a lighting effect appropriate to a dart board to decrease energy consumption.

[0008] An exemplary embodiment of the present disclosure provides a dart board equipped with a light source, including: a circular base plate; a plurality of ring-shaped parts which is provided with a predetermined height on an upper surface of the base plate, and is formed with a predetermined radius at a center of the base plate; a plurality of extended parts which are connected from an inner side of an outermost ring-shaped part among the ring-shaped parts to the center of the base plate in a radius direction of the base plate; a plurality of divided parts which are surrounded so as to be closed by the ring-shaped parts and the extended parts; a light guide unit of which one surface is in contact with an external side of the outermost ring-shaped part facing the inner side of the outermost ring-shaped part; and a light source unit which is in contact with the other surface of the light guide unit.

[0009] The extended part may include a first extended surface and a second extended surface, and the extended part may be formed of a light transmissive material so as to enable a beam to pass through between a predetermined width from the first extended surface to the second extended surface.

[0010] The light transmissive material may include at least one of alumina ceramics, yttrium aluminum garnet (YAG), perovskite, and spinel.

[0011] The light guide unit may include: a first lens unit in which a first incident surface formed in a radiation direction of a center beam has a convex shape toward the light source unit so that the center beam radiated from the light source unit is incident; a second lens unit which has a second incident surface, into which peripheral beams radiated from the light source unit are incident, and a reflective surface totally reflecting incident light refracted from the second incident surface; and an emitting surface which emits the beams from the first incident surface of the first lens unit and the reflective surface of the second lens unit, and the second incident surface may be inclined from a direction vertical to the first incident surface to a direction away toward the light source unit, and the reflective surface may be curved so as to be gradually widened from the second incident surface to the emitting surface in order to reflect incident light which is radiated from the light source unit and is refracted through the second incident surface and is incident.

[0012] The reflective surface may satisfy a total reflection condition, the ring-shaped part and the extended part may be formed with the same height from the base plate, and when a corresponding event is generated, the light source unit may emit light with a predetermined color corresponding to the corresponding event.

[0013] Another exemplary embodiment of the present disclosure provides a device for controlling a light source unit, the device including: a recognizing unit which recognizes a corresponding event; a search unit which searches for a light source profile corresponding to the corresponding event; and a control unit which controls a light source unit of a dart board based on the light source profile, in which the dart board includes: a circular base plate; a plurality of ring-shaped parts, which is provided with a predetermined height on an upper surface of the base plate, and is formed with a predetermined radius at a center of the base plate; a plurality of extended parts,

which are connected from an inner side of an outermost ring-shaped part among the ring-shaped parts to the center of the base plate in a radius direction of the base plate; a plurality of divided parts which are surrounded so as to be closed by the ring-shaped parts and the extended parts; a light guide unit of which one surface is in contact with an external side of the outermost ring-shaped part facing the inner side of the outermost ring-shaped part; and a light source unit which is in contact with the other surface of the light guide unit.

[0014] According to the exemplary embodiment of the present disclosure, the dart board equipped with a light source may decrease energy consumption by using the appropriate number of light source units.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is a diagram illustrating a dart board equipped with a light source according to an exemplary embodiment of the present disclosure.

FIG. 2 is a diagram illustrating a case where a light guide unit is in contact with an outermost ring-shaped part according to the exemplary embodiment of the present disclosure.

FIG. 3 is a diagram illustrating an internal structure of the light guide unit according to the exemplary embodiment of the present disclosure.

FIG. 4 is a schematic diagram illustrating a direction of beam progression in a light source unit according to the exemplary embodiment of the present disclosure.

FIG. 5A is a diagram illustrating a dart board, in which a light guide unit and a light source unit are not installed, and FIG. 5B is a diagram illustrating a dart board, in which a light guide unit and a light source unit are installed.

FIG. 6 is a block diagram of a device for controlling the light source unit according to the exemplary embodiment of the present disclosure.

DETAILED DESCRIPTION

[0016] Objects and effects of the present disclosure and technical configurations for achieving the objects and the effects will be clear with reference to exemplary embodiments described in detail below together with the accompanying drawings. In the following description of the present disclosure, a detailed description of known functions or configurations incorporated herein will be omitted when it is determined that the detailed description may make the subject matter of the present disclosure unnecessarily unclear. The terms which will be described below are terms defined in consideration of the functions in the present disclosure, and may be different according to users, intentions of the operators, or customs.

[0017] However, the present disclosure is not limited to the exemplary embodiments disclosed below and may be implemented in various different forms. However, the present exemplary embodiments are provided to complete the disclosure of the present disclosure and completely show the scope of the invention to those skilled in the art, and the present disclosure will only be defined by the scope of the claims. Therefore, the definitions should be made based on the entire contents of the present specification.

[0018] Hereinafter, exemplary embodiments of the present disclosure will be described in detail with reference to the accompanying drawings.

[0019] FIG. 1 is a diagram illustrating a dart board equipped with a light source according to an exemplary embodiment of the present disclosure.

[0020] Referring to FIG. 1, a dart board 100 equipped with a light source according to an exemplary embodiment of the present disclosure may include a base plate 110, ring-shaped parts 120, extended parts 130, divided parts 140, light guide units 150, and a light source unit 160.

[0021] The base plate 110 may be implemented in a circular shape. The ring-shaped part 120, the extended part 130, the divided part 140, the light guide unit 150, and the light source unit 160 may be positioned on an upper surface of the base plate 110. Various pictures and words may be printed on the base plate 110.

[0022] The ring-shaped part 120 may be provided with a predetermined height on the upper surface of the base plate 110. The ring-shaped part 120 may be formed in a cylindrical shape having a predetermined width. The ring-shaped part 120 may be formed with a predetermined radius at a center of the base plate 110.

[0023] In FIG. 1, for convenience, five ring-shaped parts 120, 121, 123, 124, and 125 are implemented with different radiuses, but the scope of the present disclosure is not limited to the specific number of ring-shaped parts 120, 121, 123, 124, and 125 or a specific radius, and the ring-shaped part may be variously implemented according to a size of the dart board 100 equipped with the light source and a setting of a user. The light source unit 160 needs to be installed in the outermost ring-shaped part 120, so that the radius of the ring-shaped part 120 may be implemented to be smaller than a radius of the base plate 110.

[0024] The extended part 130 may be connected from an inner side of the outermost ring-shaped part 120 among the ring-shaped parts 120, 121, 123, 124, and 125 to the center of the base plate 110 in a radius direction of the base plate 110. That is, the extended part 130 may be formed in a direction toward the center of the base plate 110.

[0025] One end of the extended part 130 may be connected to the inner side of the outermost ring-shaped part 120, and the other end of the extended part 130 may be connected to the center of the base plate 110. In another exemplary embodiment, the other end of the extended part 130 may be connected to the innermost ring-

shaped part 125.

[0026] When the extended part 130 is connected to the center of the base plate 110 and the inner side of the outermost ring-shaped part 120, the extended part 130 may be connected while crossing the ring-shaped parts 121, 123, and 124. In the present specification, the base plate 110, the ring-shaped part 120, and the extended part 130 are divided and described, but when a product is actually manufactured, the base plate 110, the ring-shaped part 120, and the extended part 130 may be implemented with the same material and a single process.

[0027] As illustrated in FIG. 1, the one end of the extended part 130 may be formed so as to be in contact with the inner side of the outermost ring-shaped part 120, and may cross the ring-shaped parts 121, 123, and 124 and meet the ring-shaped part 121 and the ring-shaped part 123 so as to form a normal line with the ring-shaped part 121 and the ring-shaped part 123 (hereinafter, the normal line means that two lines meet at a right angle). The extended part 130 may be extended to the center of the base plate 110 in the direction of the radius of the ring-shaped part 120. FIG. 1 illustrates 20 extended parts 130, but the 20 extended parts 130 or more or the 20 extended parts 130 or less may also be implemented according to a setting of a user.

[0028] The divided part 140 means a space surrounded to be closed by the ring-shaped parts 120, 121, 123, 124, and 125 and the extended part 130. The ring-shaped part 120 and the extended part 130 are formed with the predetermined heights on the upper surface of the base plate 110, so that a lower surface of the divided part 140 is surrounded by the base plate 110, and both lateral surfaces of the divided part 140 are surrounded by the ring-shaped part 120 or the extended part 130, so that the divided part 140 may become a predetermined space. Here, the predetermined space may be the divided part 140. When the divided part 140 is surrounded by the base plate 110, the ring-shaped parts 121 and 123, and the extended parts 130 and 131, the divided part 140 may be a half-closed space, of which an upper surface is opened.

[0029] When a cover part (not illustrated) is implemented so as to be in contact with the ring-shaped part 120 and the extended part 130, the divided part 140 may be a closed space. The cover part (not illustrated) may be implemented with a size, which does not hide the ring-shaped part 120 and the extended part 130, so that beams passing through the ring-shaped part 120 and the extended part 130 may be recognized from the outside. The divided part 140 may have a fan shape. Further, the divided part 140 may have a similar shape to a part of a fan shape.

[0030] The light guide unit 150 may be implemented so as to be in contact with an external side of the outermost ring-shaped part 120. One end of the extended part 130 may be in contact with one surface of the inner side of the outermost ring-shaped part 120, and the light guide unit 150 may be in contact with an external side of the outermost ring-shaped part 120 facing the inner side of the outermost ring-shaped part 120 with which the one end of the extended part 130 is in contact.

[0031] FIG. 2 is a diagram illustrating a case where the light guide unit 150 is in contact with the outermost ring-shaped part 120 according to the exemplary embodiment of the present disclosure.

[0032] Referring to FIG. 2, one surface 211 of the light guide unit 150 is in contact with an external side 212 of the outermost ring-shaped part 120, and an inner side 213 of the ring-shaped part 120 facing the external side 212 of the ring-shaped part 120 may be in contact with one end of the extended part 130.

[0033] When the one surface 211 of the light guide unit is implemented to be in contact with the external side 212 of the ring-shaped part 120, beams 220 radiated from the light guide unit 150 may pass through the ring-shaped part 120 and the extended part 130 and reach the center of the base plate 110. Further, the cover part (not illustrated) is implemented so as not to hide the ring-shaped part 120 and the extended part 130, so that a user may clearly recognize the situation where the beams 220 pass through the ring-shaped part 120 and the extended part 130.

[0034] This will be described in more detail. The extended part 130 may include a first extended surface 132 and a second extended surface 134. A predetermined width D may be formed from the first extended surface 132 to the second extended surface 134. The beam 220 may progress while crossing the width D between the first extended surface 132 to the second extended surface 134.

[0035] In order for the beam 220 to progress while crossing the extended part 130, it is necessary to use a light transmissive material. For example, the light transmissive material may include at least one of alumina ceramics, yttrium aluminum garnet (YAG), perovskite, and spinel.

[0036] Alumina ceramics has the chemical stability of alumina, so that it may replace silica or quartz materials which are used in the related art.

[0037] YAG (yttrium aluminum garnet) is a light transmissive ceramic material used in HID lamps and has a cubic crystal structure, so that light scattering by double refraction does not occur at a grain boundary and thus there is an advantage in that in-line transmittance is available. That is, light is not scattered and transparently pass through YAG, like a glass.

[0038] Perovskite is a light transmissive material, and has a structure of ABO_3. In this structure, Pb, Ba, Sr, and the like may be used as an atom of A, and Zr and Ti may be applied as an atom of B. Further, as another exemplary embodiment, a material of perovskite is $LaAlO_3$, $CeAlO_3$, $PrAlO_3$, and $AdAlO_3$, which have a high melting temperature and are chemically stable.

[0039] Spinel has high hardness and excellent mechanical strength, and has an excellent light transmissive property in a visible ray region, so that spinel may allow

light with various colors to pass through without discoloration.

[0040] In the exemplary embodiment, the ring-shaped part 120 and the extended part 130 may be formed with the same height from the base plate 110. When the ring-shaped part 120 and the extended part 130 are formed with the same height, the ring-shaped part 120 and the extended part 130 may be manufactured in one process. Further, when the cover part (not illustrated) is installed in the divided part 140, the beam passing through the extended part 130 may be more boldly stood out. That is, the parts except for the ring-shaped part 120 and the extended part 130 are made to be dark, so that the beam passing through the ring-shaped part 120 and the extended part 130 may be boldly stood out.

[0041] FIG. 3 is a diagram illustrating an internal structure of the light guide unit according to the exemplary embodiment of the present disclosure.

[0042] Referring to FIG. 3, the light guide unit 150 according to the exemplary embodiment of the present disclosure may include a first lens unit 151, a second lens unit 153, a reflective surface 155, and an emitting surface 157.

[0043] A center beam radiated from the light source unit 160 may be incident into the first lens unit 151. The beam radiated from the light source unit 160 may be divided into center beams and peripheral beams.

[0044] In the present specification, the center beam means a beam progressing to a first incident surface 1512 of the first lens unit 151. In the present specification, the peripheral beam means a beam radiated from the light source unit 160 except for the center beam. That is, the peripheral beam means a beam incident into the second lens unit 153.

[0045] The first lens unit 151 may be provided to have a shape convex toward the light source unit 160. The peripheral beam radiated from the light source unit 160 may be incident into the second lens unit 153. Further, the second lens unit may further include a reflective surface 155 for totally reflecting incident light refracted from a second incident surface 1532. The peripheral beam passing through the second incident surface 1532 may be totally reflected from the reflective surface 155 and progress toward the emitting surface 157.

[0046] The emitting surface 157 may allow the beams radiated from the first incident surface 1512 of the first lens unit 151 and the reflective surface 155 of the second lens unit 153 to pass through. The beam passing through the emitting surface 157 has an in-line characteristic, and does not lose the light source energy.

[0047] The second incident surface 1532 is inclined from a direction vertical to the first incident surface 1512 in a direction away toward the light source unit 160. Herein, the inclination angle is not particularly limited, and if the inclination angle is implemented with 10° to 45°, the inclination angle is sufficient.

[0048] In order to reflect the incident light which is radiated from the light source unit 160 and is refracted and incident through the second incident surface 1532, the reflective surface 155 may be curved so as to be gradually widened from the second incident surface 1532 to the emitting surface 157.

[0049] When the first incident surface 1512 is inclined from a vertical direction in a direction away toward the light source unit 160, and the reflective surface 155 is gradually widened toward the emitting surface 157, and the beam radiated from the light source unit 160 may be radiated while having a right angle with the emitting surface 157.

[0050] FIG. 4 is a schematic diagram illustrating a direction of beam progression in the light source unit 160 according to the exemplary embodiment of the present disclosure.

[0051] Referring to FIG. 4, the center beams among the beams radiated from the light source unit 160 are indicated with beam 1, beam 2, and beam 3. First, the beam 2 will be described. The beam 2 passes through the center of the first incident surface 1512 and progresses toward the emitting surface 157. That is, the beam 2 passes through the center of the first lens unit 151, so that the beam 2 may progress straight without being refracted. The beam 1 progresses while maintaining the right angle with the emitting surface 157.

[0052] The beam 1 and the beam 3 pass through both end points of the first lens unit, and when the beams are reflected and are incident into the emitting surface 157, the beams may maintain the right angle with the emitting surface 157.

[0053] Herein, a focal distance and a curvature radius of the first lens unit 151 may be varied according to a setting of a user so that the beam 1 may maintain the right angle with the emitting surface 157 and the beam 1 and the beam 3 may maintain the right angle with the emitting surface 157 after passing through the first lens unit 151.

[0054] In the exemplary embodiment of the present disclosure, the beams radiated from the light source unit 160 have the right angles with the emitting surface 157, so that the beams are not scattered in the extended parts 130, but may progress straight, and thus the scope of the present disclosure is not limited to the first lens unit 151 having the specific focal distance and curvature radius.

[0055] The peripheral beams among the beams radiated from the light source unit 160 are indicated with beam 4, beam 5, beam 6, and beam 7.

[0056] The beam 4 may be incident into the second lens unit 153. Here, the reflective surface 155 of the second lens unit 153 has a total reflection characteristic. The beam 3 incident into the second incident surface 1532 of the second lens unit 153 may pass through the second lens unit 153 and progress to the reflective surface 155 without a loss of the quantity of energy of the beam.

[0057] The beam 3 incident into the reflective surface 155 may progress in a direction forming the right angle with the emitting surface 157 by a focal distance and a

curvature radius of the reflective surface 155.

[0058] Similar to the foregoing description, the focal distance and the curvature radius of the reflective surface 155 may be varied according to a setting of a user, and when the peripheral beams progress while forming the right angles with the emitting surface 157, the focal distance and the curvature radius of the reflective surface 155 are not particularly limited.

[0059] The beam 5, the beam 6, and the beam 7 progress while forming the right angles with the emitting surface 157 by the same method as the foregoing method, so that an overlapping description will be omitted.

[0060] FIG. 5A is a diagram illustrating a dart board, in which the light guide unit and the light source unit are not installed, and FIG. 5B is a diagram illustrating a dart board, in which the light guide unit and the light source unit are installed.

[0061] Referring to FIGS. 5A and 5B, it can be seen that when the light guide unit 150 and the light source unit 160 are provided, the beams radiated from the light source unit 160 reach the center of the base plate 110.

[0062] In the related art, the light source unit 160 is provided to surround each of the split plots to obtain the same effect as that of the present disclosure, but there is a disadvantage in that energy is unnecessarily consumed due to an excessive use of the light source unit 160. However, the present disclosure may obtain the same effect while considerably decreasing the number of light source units 160.

[0063] FIG. 6 is a block diagram of a device for controlling the light source unit according to the exemplary embodiment of the present disclosure.

[0064] Referring to FIG. 6, a device 600 for controlling the light source unit 160 according to the exemplary embodiment of the present disclosure may include a recognizing unit 610, a search unit 620, a control unit 630, and a storage unit 640.

[0065] The recognizing unit 610 may recognize various events generated in a dart game device 700.

[0066] Herein, the event may include an identification of a user, a dart target hit of a dart, a change of a user, a game end, a selection of the kind of game, and the like. In the case of the dart target hit of the dart, various flickering methods and a pattern for a color change may be determined according to a part of the dart board hit by the dart.

[0067] The pattern may also be executed according to a selection of the kind of game, such as a cricket and a 01 game. For example, in a case of the cricket, since only the number equal to or larger than 15 is used, when cricket is selected, a predetermined pattern may be set so that the predetermined pattern is executed, and then only the numbers used in cricket are lighted on. Further, for example, a pattern for congratulating a user when the user hits a high point may also be set.

[0068] For example, in a specific game, hitting a desired number, not hitting a large number, may be good, so that in this case, a pattern for congratulating the hitting of the desired number may also be set.

[0069] For example, a pattern notifying a winner after a game termination, a pattern for congratulating a winner, and the like may also be set. The aforementioned event is simply illustrative, and the event may include all of the events generable during the play of the dart game.

[0070] The search unit 620 may search for the same event which is stored as a corresponding event recognized by the recognizing unit 610. The user may set various events in advance, and write a profile capable of controlling the light source unit 160 in advance, and the written profile may be stored in the storage unit 640. That is, the flickering method and the pattern for the color change of the light source unit 160 may be stored in the storage unit 640 of the device 600 for controlling the light source unit in advance.

[0071] The control unit 630 may control the light source unit 160 based on the profile. On/off and various colors of the light source unit 160 may be controlled by using a publicly known technology, so that a description of the publicly known technology will be omitted.

[0072] In the exemplary embodiment, the dart game device 700 and the device 600 for controlling the light source unit may be connected through a communication network 800. When the plurality of dart game devices 700 is operated, the plurality of dart game devices 700 may be controlled by the device 600 for controlling the light source unit.

[0073] In another exemplary embodiment, the device 600 for controlling the light source unit may be integrally formed with the dart game device 700. When the device 600 for controlling the light source unit is not separately operated, there is an advantage in that it is possible to decrease costs for operating the device 600 for controlling the light source unit.

[0074] The present disclosure has been described with reference to the exemplary embodiments, but those skilled in the art may understand that the present disclosure may be variously modified and changed within the scope without departing from the spirit and the area of the present disclosure described in the accompanying claims.

Claims

1. A dart board, comprising:

a circular base plate;

a plurality of ring-shaped parts which is provided with a predetermined height on an upper surface of the base plate, and is formed with a predetermined radius at a center of the base plate;

a plurality of extended parts which is connected from an inner side of an outermost ring-shaped part among the ring-shaped parts to the center of the base plate in a radius direction of the base plate;

a plurality of divided parts which are surrounded so as to be closed by the ring-shaped parts and the extended parts;
a light guide unit of which one surface is in contact with an external side of the outermost ring-shaped part facing the inner side of the outermost ring-shaped part; and
a light source unit which is in contact with the other surface of the light guide unit.

2. The dart board of claim 1, wherein the extended part includes a first extended surface and a second extended surface, and
the extended part is formed of a light transmissive material so as to enable a beam to pass through between a predetermined width from the first extended surface to the second extended surface.

3. The dart board of claim 2, wherein the light transmissive material includes at least one of alumina ceramics, yttrium aluminum garnet (YAG), perovskite, and spinel.

4. The dart board of claim 1, wherein the light guide unit includes:

a first lens unit in which a first incident surface formed in a radiation direction of a center beam has a convex shape toward the light source unit so that the center beam radiated from the light source unit is incident;
a second lens unit which has a second incident surface, into which peripheral beams radiated from the light source unit are incident, and a reflective surface totally reflecting incident light refracted from the second incident surface; and
an emitting surface which emits the beams from the first incident surface of the first lens unit and the reflective surface of the second lens unit,
the second incident surface is inclined from a direction vertical to the first incident surface to a direction away toward the light source unit, and the reflective surface is curved so as to be gradually widened from the second incident surface to the emitting surface in order to reflect incident light which is radiated from the light source unit and is refracted through the second incident surface and is incident.

5. The dart board of claim 4, wherein the reflective surface satisfies a total reflection condition.

6. The dart board of claim 1, wherein the ring-shaped part and the extended part are formed with the same height from the base plate.

7. The dart board of claim 1, wherein when a corresponding event is generated, the light source unit emits light with a predetermined color corresponding to the corresponding event.

8. The dart board of claim 1, further comprising:

a cover part which is in contact with the extended part and the ring-shaped part and closes the divided part,
wherein the cover part makes a beam passing through the extended part stand out boldly.

9. A device for controlling a light source unit, the device comprising:

a recognizing unit which recognizes a corresponding event;
a search unit which searches for a light source profile corresponding to the corresponding event; and
a control unit which controls a light source unit of a dart board based on the light source profile, wherein the dart board includes:

a circular base plate;
a plurality of ring-shaped parts, which are provided with a predetermined height on an upper surface of the base plate, and is formed with a predetermined radius at a center of the base plate;
a plurality of extended parts, which are connected from an inner side of an outermost ring-shaped part among the ring-shaped parts to the center of the base plate in a radius direction of the base plate;
a plurality of divided parts which are surrounded so as to be closed by the ring-shaped parts and the extended parts;
a light guide unit of which one surface is in contact with an external side of the outermost ring-shaped part facing the inner side of the outermost ring-shaped part; and
a light source unit which is in contact with the other surface of the light guide unit.

Fig.1

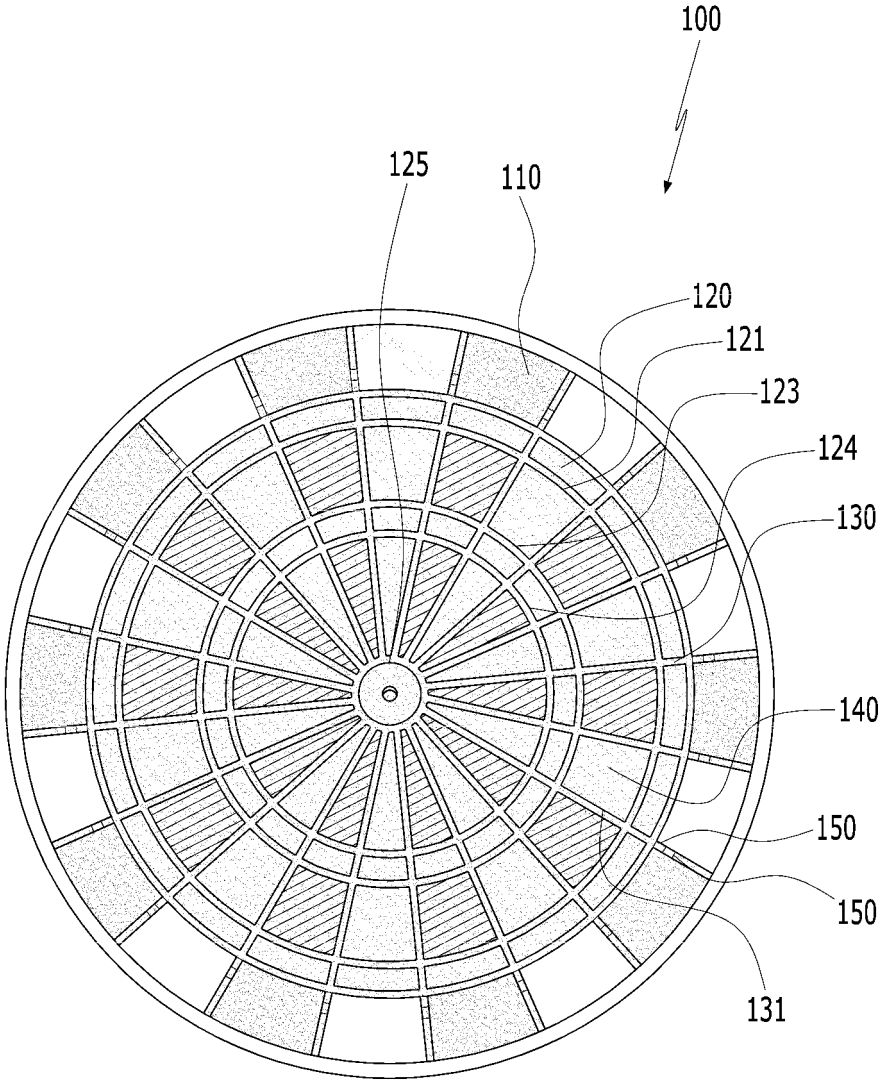


Fig. 2

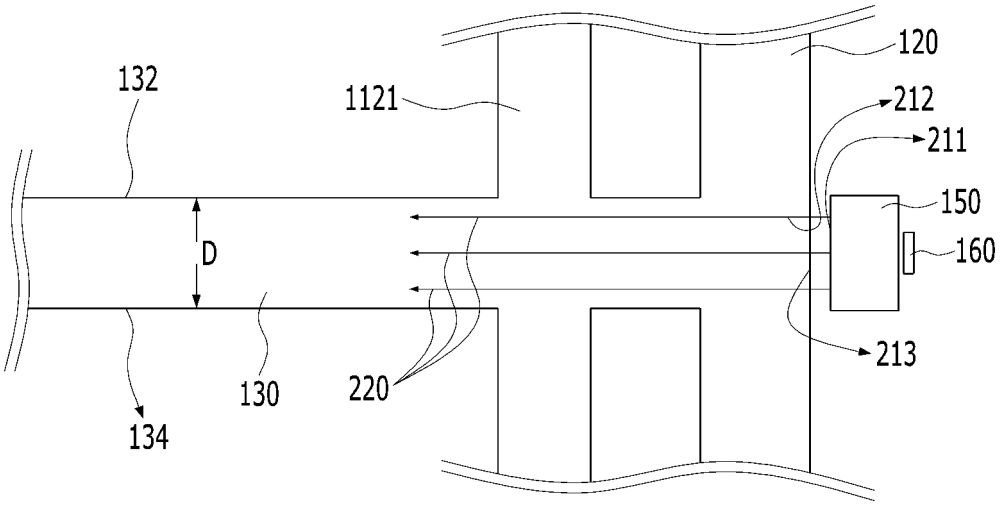


Fig. 3

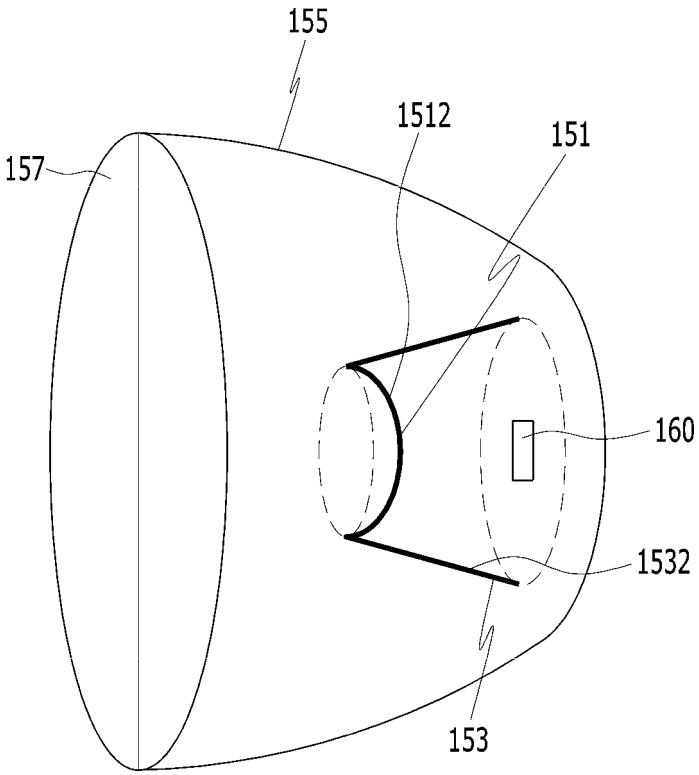
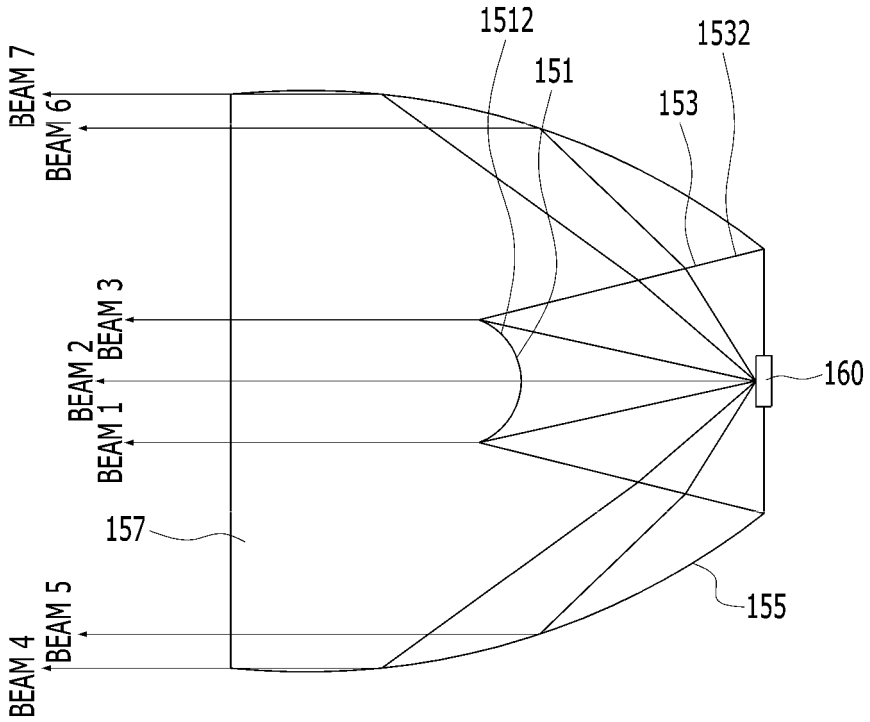


Fig. 4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1532
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153
BEAM 7
BEAM 6
BEAM 3
BEAM 2
BEAM 1
160
157
155
BEAM 5
BEAM 4

Fig. 5a

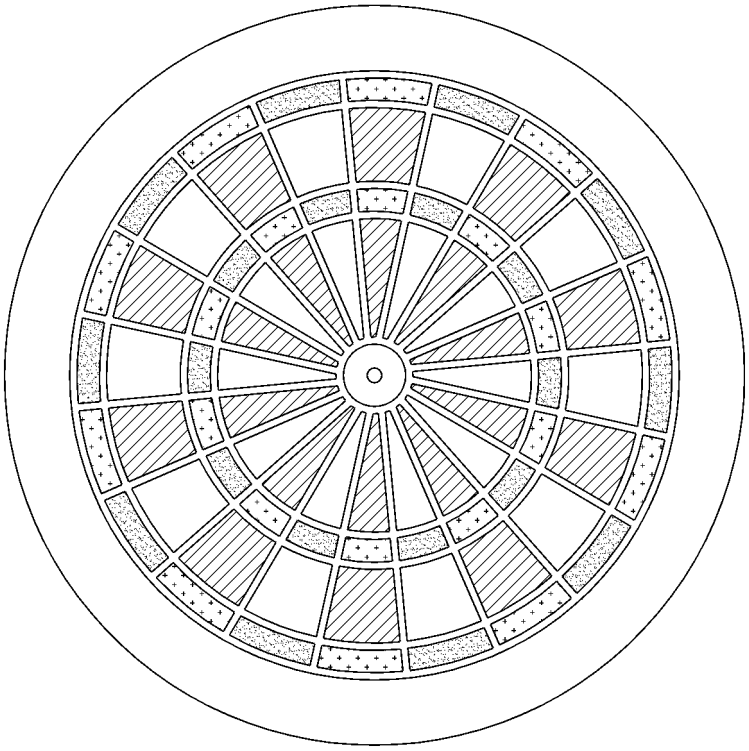


Fig. 5b

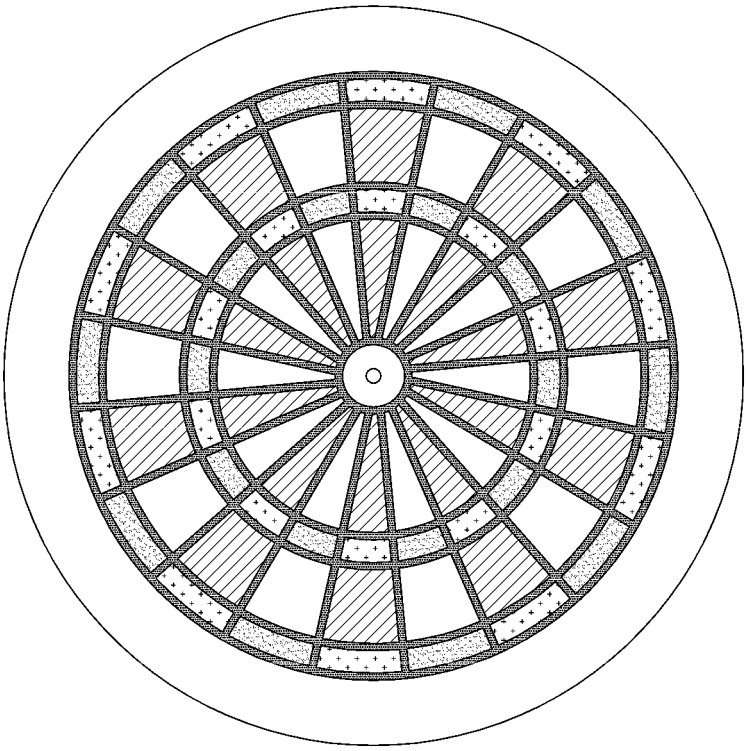
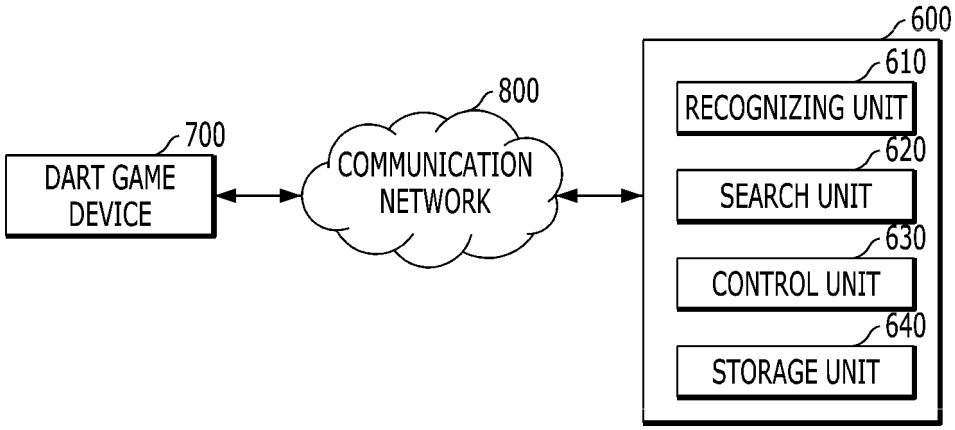


Fig. 6


600
610
RECOGNIZING UNIT
620
SEARCH UNIT
630
CONTROL UNIT
640
STORAGE UNIT
800
COMMUNICATION NETWORK
700
DART GAME DEVICE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2015/012605

A. CLASSIFICATION OF SUBJECT MATTER

F41J 3/02(2006.01)i, A63B 65/02(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F41J 3/02; F41J 1/01; G02B 27/00; F21V 7/04; A63F 9/02; A63B 65/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS (KIPO internal) & Keywords: dartboard, base plate, light source, light guide unit, lens, recognition unit, search unit, control unit

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2012-0037635 A (KIM, Yong Cheol) 20 April 2012 See paragraphs [0049]-[0056] and figures 3, 15.	1,6,7,9
A		2-5,8
Y	KR 10-2006-0071033 A (LG ELECTRONICS INC.) 26 June 2006 See pages 3-4 and figure 3a.	1,6,7,9
Y	KR 20-2013-0002368 U (HONG INTERNATIONAL CORP.) 19 April 2013 See paragraphs [0019]-[0033], claims 1-2 and figure 1.	7,9
A	KR 20-2011-0006016 U (KIM, Sung Ho) 16 June 2011 See abstract, claim 1 and figure 1.	1-9
A	KR 10-1032331 B1 (KIM, Yong Cheol) 06 May 2011 See abstract, claim 1 and figures 1-2.	1-9

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 FEBRUARY 2016 (24.02.2016)	**24 FEBRUARY 2016 (24.02.2016)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2015/012605

Patent document cited in search report	Publication date	Patent family member	Publication date
KR 10-2012-0037635 A	20/04/2012	NONE	
KR 10-2006-0071033 A	26/06/2006	KR 10-1063269 B1	07/09/2011
KR 20-2013-0002368 U	19/04/2013	KR 20-0469523 Y1	29/10/2013
KR 20-2011-0006016 U	16/06/2011	NONE	
KR 10-1032331 B1	06/05/2011	US 2012-0248702 A1	04/10/2012
		US 8979092 B2	17/03/2015
		WO 2011-071274 A2	16/06/2011
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REFERENCES CITED IN THE DESCRIPTION

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- KR 1020040163486 **[0001]**
- KR 1019890700218 **[0006]**