

EUROPEAN QUALIFYING EXAMINATION 2007

PAPER B ELECTRICITY / MECHANICS

This paper comprises:

- | | |
|----------------------------------|---------------------|
| * Description of the Application | 2007/B(E/M)/e/1-4 |
| * Claims | 2007/B(E/M)/e/5 |
| * Drawings of the Application | 2007/B(E/M)/e/6 |
| * Communication | 2007/B(E/M)/e/7-9 |
| * Document D1 | 2007/B(E/M)/e/10-11 |
| * Drawings Document D1 | 2007/B(E/M)/e/12 |
| * Document D2 | 2007/B(E/M)/e/13-14 |
| * Drawings Document D2 | 2007/B(E/M)/e/15 |
| * Client's Letter | 2007/B(E/M)/e/16 |

Description of the Application

[001] The present application relates to golf balls for playing in the dark or in conditions of poor visibility.

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[002] Since golf courses usually cover large areas, it is expensive to illuminate them. Therefore light emitting golf balls have been developed.

[003] A known light emitting golf ball is provided with a chemiluminescent light source.

10 This golf ball is shown in Fig. 1. It comprises a translucent spherical body 1 which is provided with a central spherical cavity. The cavity accommodates a translucent spherical container 2. The container 2 is divided into two chambers 3 and 4 that are separated from each other by a thin partition wall 5. Each chamber contains a liquid chemiluminescent component. When the golf ball is hit hard enough, the partition wall 5
15 breaks and the liquid chemiluminescent components mix. They then emit light for up to five hours. Once activated in this way, the light emitting golf ball is very visible in the dark. Because this light emitting golf ball and a conventional golf ball have similar mechanical properties, they behave similarly in flight. The light emitting golf ball is however complicated to manufacture. Furthermore, it can only be activated once.

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[004] The problem to be solved by the present invention is therefore to provide a light emitting golf ball which can be activated more than once and which is easy to make.

[005] This problem is solved by the subject-matter of the appended claims.

[006] Brief description of the drawings:

Fig. 1 is a perspective view of a golf ball according to the prior art with part cut away.

Fig. 2 is a perspective view of a golf ball according to a first embodiment of the invention before its assembly.

5 Fig. 3 is a cross sectional view of the golf ball of Fig. 2 after its assembly.

Fig. 4 is a perspective view of a golf ball according to a second embodiment of the invention before its assembly.

Fig. 5 is a cross sectional view of the golf ball of Fig. 4 after its assembly.

10 [007] Embodiments of the invention will now be described with reference to Figs. 2 to 5.

[008] The golf ball according to the invention comprises two main parts, namely a spherical golf ball body 6 and a chemiluminescent light source in the form of a lightstick 7.

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[009] The golf ball body 6 is made of translucent material. The golf ball body 6 has a diametric bore 8. A diametric bore is defined as a bore having its longitudinal axis extending along a diameter of the spherical golf ball body 6. The bore has to be diametric in order to minimise its influence on the mechanical properties and on the flight characteristics of the assembled golf ball. The diametric bore can be obtained in various ways such as by drilling or during moulding of the golf ball body. The diametric bore 8 ends with an opening 9 on the outer surface of golf ball body 6 so that the lightstick 7 can be inserted and removed through the opening 9.

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[010] The chemiluminescent lightstick 7 comprises a tube that is closed at both ends. The tube is made of flexible translucent plastic material. The tube contains a first liquid chemiluminescent component and a capsule 10. The capsule 10 contains a second liquid chemiluminescent component. To activate the lightstick 7, the capsule 10 must be broken. When the capsule breaks, the first and second components mix and start to emit light.

[011] The lightstick 7 may be activated by bending it before fitting it into the golf ball body 6. Alternatively, the lightstick 7 may be activated after having been fitted into the golf ball body 6, by striking the golf ball with a golf club.

[012] In a first embodiment of the invention, shown in Figs. 2 and 3, the diameter of the lightstick 7 is very slightly larger than the diameter of the diametric bore 8. When pushed through the opening 9 into the diametric bore 8, the lightstick 7 is pressed against the wall of the diametric bore 8. The lightstick 7 is then retained in the diametric bore 8 by a press-fit. As shown in Figs. 2 and 3, the diametric bore 8 is cylindrical. The diametric bore can alternatively comprise a tapered portion (not shown in the figures) in order to achieve a press-fit. In both cases, the diametric bore 8 is a through bore in order to facilitate the removal of an exhausted lightstick 7. An exhausted lightstick 7 can be removed from the golf ball body 6 through the opening 9 by pushing it from the opposite opening of the diametric through bore 8, for example with the shaft of a golf tee.

[013] The invention also includes other possibilities than a press-fit for retaining the lightstick in the diametric bore. An example is shown in Figs. 4 and 5. In this second embodiment of the invention, the golf ball body 6 is provided with an inner thread 11 which extends along at least a portion of the diametric bore. The lightstick 7 has a corresponding outer thread 12. The lightstick 7 also has an engaging means 13 at one of its two ends which is configured to engage with means for rotating the lightstick 7. In the present example the engaging means is a slot 13. The slot 13 can be engaged by a screwdriver or a coin to screw or unscrew the lightstick 7. The lightstick 7 can thereby be inserted into and removed from the diametric bore through the opening 9. As shown in Fig. 5, the diametric bore is a blind bore. Alternatively, the diametric bore can be a through bore (not shown in the figures).

[014] Due to the corresponding shapes of the diametric bore 8 and the lightstick 7, the golf ball according to the invention has substantially the same physical properties as a conventional golf ball. Furthermore, dust and moisture are prevented from entering the golf ball.

[015] The assembled golf ball preferably has a weight of 45.93 g and a diameter of 42.67 mm in order to meet the rules of golf of the United States Golf Association and those of the Royal and Ancient Golf Club of St. Andrews relating to weight and dimensions.

Claims

1. Golf ball body (6) made of translucent material, comprising a cavity (8) and being configured to receive completely and to retain a chemiluminescent light source (7) in the cavity (8) such that the chemiluminescent light source (7) can be exchanged.
2. Golf ball body (6) according to claim 1, wherein the cavity is a diametric bore (8) and the chemiluminescent light source is a chemiluminescent lightstick (7).
3. Golf ball body (6) according to claim 2, wherein said diametric bore (8) is a through bore.
4. Golf ball body (6) according to claim 3, wherein said diametric bore (8) has a tapered portion.
5. Golf ball body (6) according to claim 2, wherein said diametric bore (8) is a blind bore.
6. Golf ball body (6) according to claim 3 or 5, wherein the golf ball body (6) is provided with an inner thread (11) which extends along at least a portion of the diametric bore (8).
7. Chemiluminescent lightstick (7) suitable for being received completely and for being retained in the diametric bore (8) of a golf ball body (6) according to any of claims 2 to 6 such that it can be exchanged.
8. Golf ball kit comprising a golf ball body (6) according to any of claims 2 to 6 and a chemiluminescent lightstick (7) according to claim 7.

Drawings of the Application

1/1

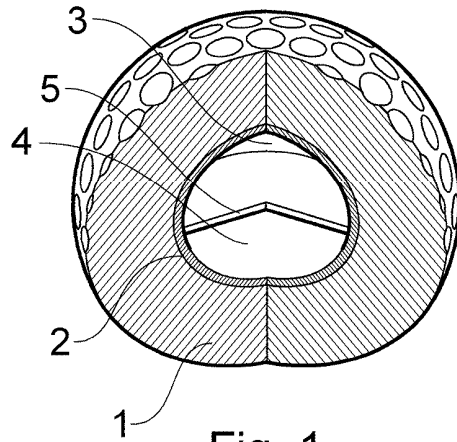
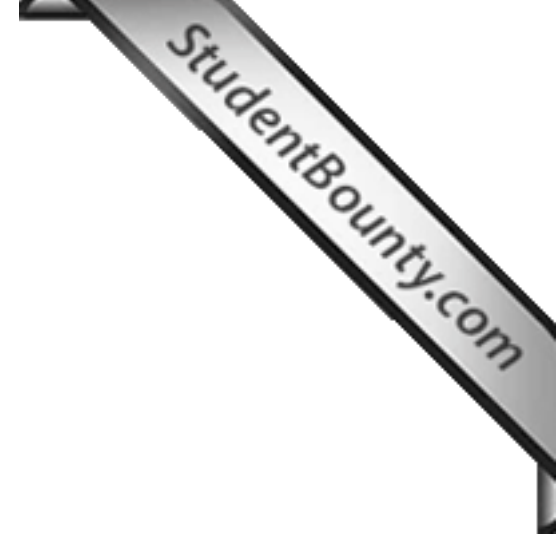


Fig. 1

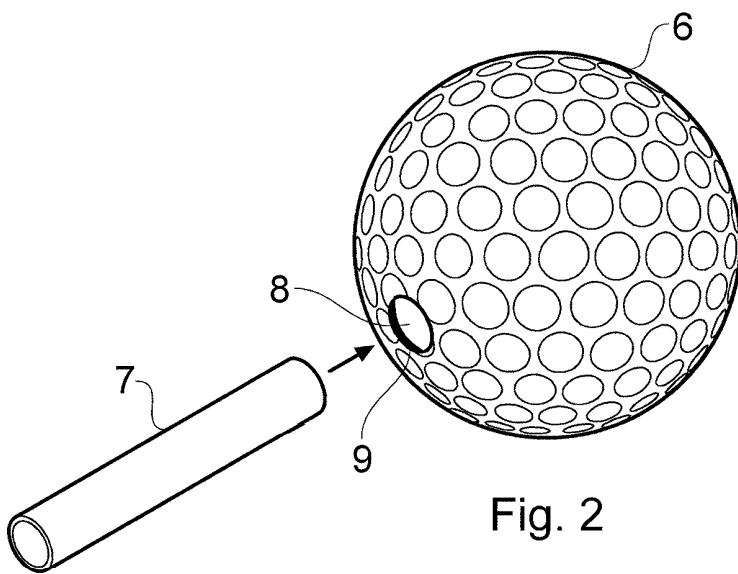


Fig. 2

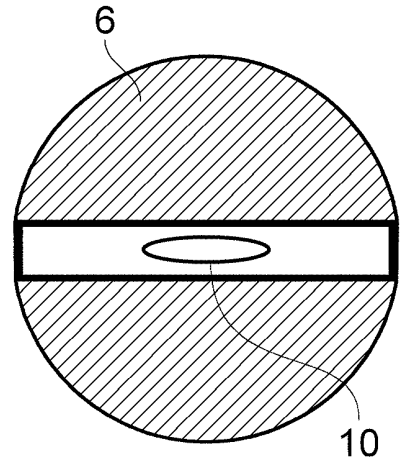


Fig. 3

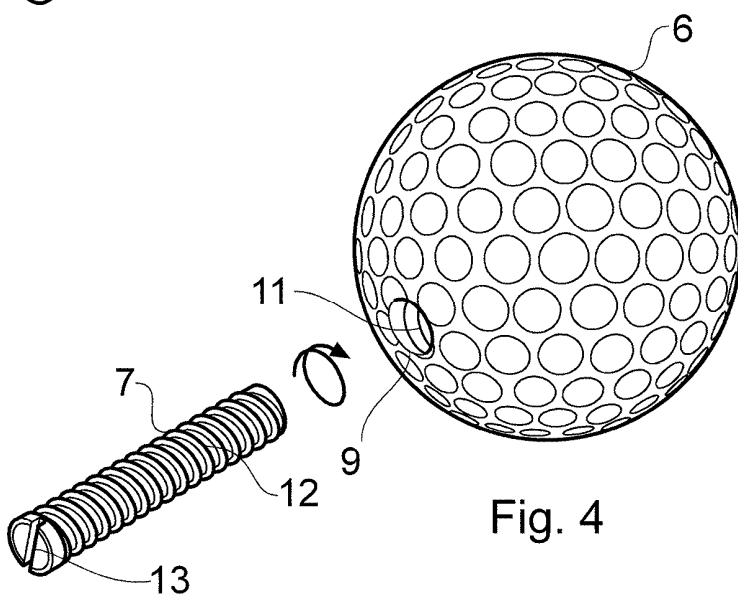


Fig. 4

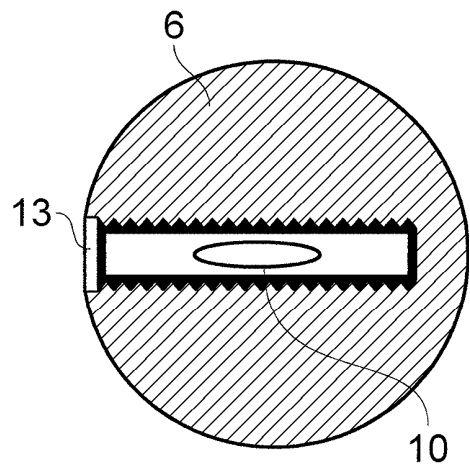


Fig. 5

Communication under Art. 96(2) EPC

1. In the present communication, reference is made to documents D1 and D2 which belong to the state of the art within the meaning of Article 54(2) EPC.

2. Claim 1 does not meet the requirements of Article 52(1) EPC since its subject-matter is not new within the meaning of Article 54(1) and (2) EPC.

D1 discloses (see D1, Fig. 2) a golf ball body made of translucent material (see D1, paragraph 5) and comprising a cavity (see D1, paragraph 8). The golf ball body is configured to receive completely and to retain a light source 112 in the cavity. The light source 112 has a length of 32 mm, a diameter of 8 mm and exactly fits in the cavity (see D1, paragraph 8). Because a known chemiluminescent light source has a length of 30 mm and a diameter of 5 mm (see D2, paragraph 2), the golf ball body of D1 is likewise clearly configured to receive completely and to retain such a chemiluminescent light source in the cavity. The golf ball body of D1 is furthermore configured such that the light source can be exchanged because it consists of two half shells 108 and 109 which are screwed together and which can therefore also be unscrewed (see D1, paragraphs 7 and 8).

Consequently, a golf ball body with all the features of claim 1 is already known from D1.

3. The subject-matter of dependent claim 2 is likewise not new, since the additional features of claim 2 are also known from D1.

When the golf ball body according to Fig. 2 of D1 is assembled, it has a diametric bore (see D1, paragraph 8). As explained above, the golf ball body is configured to receive completely and to retain the above mentioned chemiluminescent light source known from D2 in said diametric bore such that it can be exchanged. This chemiluminescent light source known from D2 is a chemiluminescent lightstick (see D2, paragraph 2).

4. Independent claim 7 does not meet the requirements of Articles 52(1) and 54 EPC since its subject-matter is not new with respect to D2.

D2 discloses a chemiluminescent lightstick which has a length of 30 mm and a diameter of 5 mm (see D2, paragraph 2). Said lightstick is therefore suitable for being received completely and for being retained in the diametric bore of the golf ball body of Fig. 2 of D1 such that it can be exchanged.

5. Dependent claim 8 does not meet the requirements of Articles 52(1) and 56 EPC since its subject-matter does not involve an inventive step.

The components of the golf ball kit defined in claim 8 differ from those of the golf ball shown in Fig. 2 of D1 in that the light source defined in claim 8 is a chemiluminescent lightstick whereas the cylindrical light source 112 of D1 comprises a light emitting electrical circuit 113.

The effect of this difference is that the light source of the golf ball kit is more resistant to impacts during play. The problem to be solved may therefore be considered as that of providing a golf ball kit comprising a light source which works more reliably during play.

The skilled person, confronted with this problem, would consult D2, which relates to light sources for sports equipment. D2 teaches that a chemiluminescent lightstick works more reliably than an electric light source when subjected to hard impacts (see D2, paragraph 3). In order to solve the above problem the skilled person would therefore replace the cylindrical light source 112 of D1 with a chemiluminescent lightstick of the same dimensions and thereby directly arrive at the subject matter of claim 8 in an obvious way.

6. The applicant is invited to file an amended set of claims which takes into account the above objections. If the amended set of claims contains more than one independent claim, the applicant should provide arguments regarding the requirements of Article 82 and Rule 29(2) EPC.

Document D1 (Prior Art)

[001] The company Callagain sells two models of illuminated golf balls.

5 [002] The first model is shown in Fig. 1. It comprises a translucent plastic golf ball body 101 in which a light emitting electrical circuit is embedded. The circuit includes two light emitting diodes 103 and 104, a battery 105 and a spring contact 106. The body 101 has a diametric bore 107 for receiving and retaining a thin non-conductive needle 102.

10 [003] When there is no needle in the bore 107, the spring contact 106 contacts the battery 105 so that the circuit is closed and the ball is illuminated. In order to minimise the influence of the empty bore 107 on the mechanical properties of the ball during play, the bore 107 must have a very small diameter. The bore 107 therefore has a maximum diameter of 1.5 mm.

15 [004] When a player wishes to turn the ball off, he pushes the needle 102 into the bore 107. The spring contact 106 is then forced upwards by the needle 102 so that it is no longer in contact with the battery 105. The circuit is thus opened and the ball is no longer illuminated. When fitted in the ball body 101, the needle 102 must partly protrude
20 outside the ball body so that it can be gripped for extraction. Consequently the ball body 101 cannot be used for playing golf when the needle 102 is fitted.

[005] The second model is shown in Fig. 2. It comprises a golf ball body consisting of two half shells 108 and 109. The half shells 108 and 109 are made of translucent plastic.
25 Both have a semi-spherical outer surface, a ring shaped flat surface and a radial cavity.

[006] The first half shell 108 has a tubular extension 110 which extends from its flat surface. The radial cavity of the first half shell 108 has a single opening which is located at the end of the tubular extension.

[007] The radial cavity of the second half shell 109 has a single opening which is located on the flat surface of the second half shell 109. The radial cavity has a portion 111 which is adapted to receive the tubular extension 110. The tubular extension 110 and the portion 111 are provided with matching threads which enable the two half shells 108 and 5 109 to be screwed together.

[008] Once the two half shells 108 and 109 have been screwed together, their radial cavities form a cylindrical diametric bore for retaining a cylindrical light source 112. The cylindrical light source 112 has a length of 32 mm and a diameter of 8 mm. The 10 dimensions and shape of the diametric bore correspond to those of the light source 112 so that the light source 112 exactly fits in the diametric bore.

[009] A light emitting electrical circuit 113 is embedded in the cylindrical light source 112. The circuit 113 comprises two light emitting diodes, a battery, a control unit and an 15 impact switch. When the ball is hit, the impact switch activates the control unit. After activation, the control unit causes the diodes to emit light for a few minutes.

[010] In order to avoid damaging the ball body and/or the light source, a player should position the ball so that his club will not strike the ball at the junction of the two half 20 shells.

D1

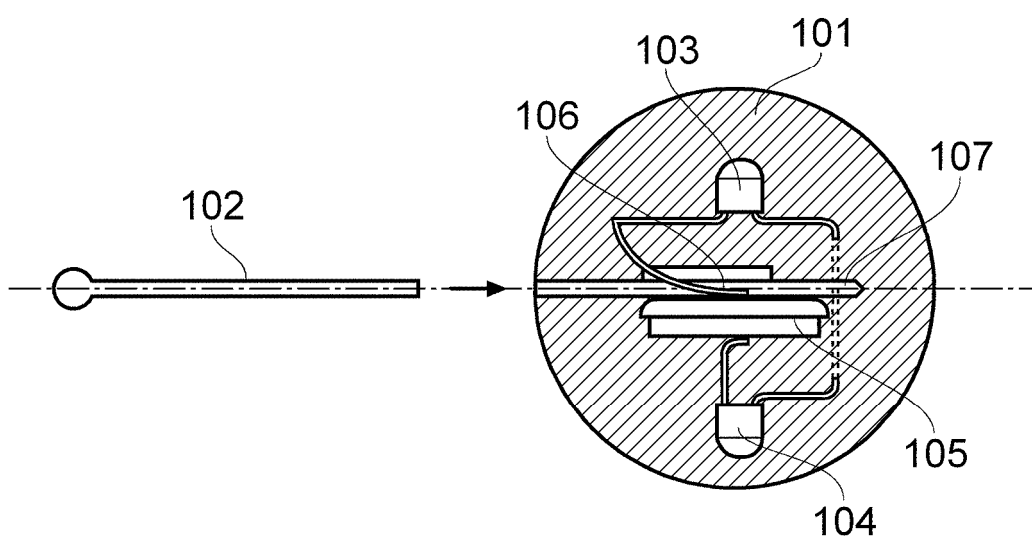


Fig. 1

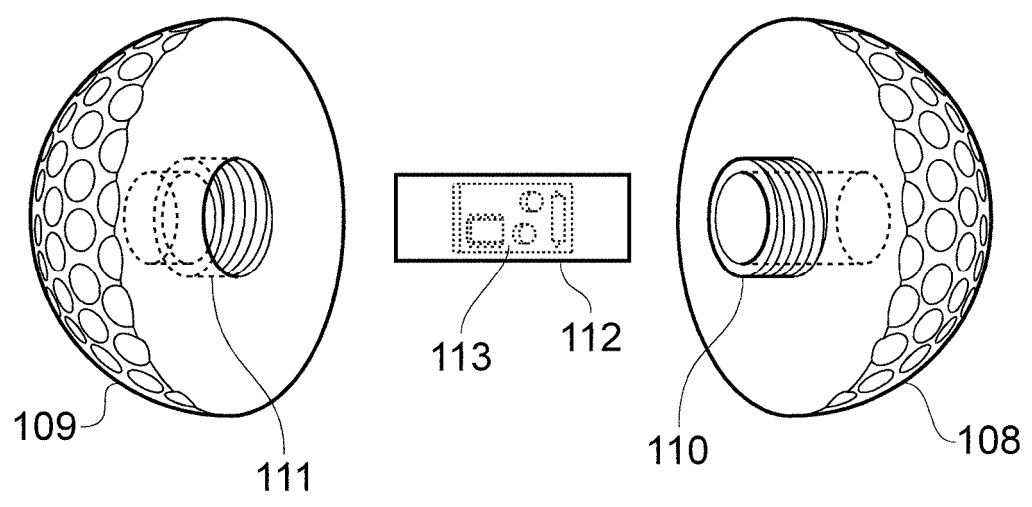


Fig. 2

Document D2 (Prior Art)

Luminight Newsletter

5 [001] Our company, Luminight, manufactures and sells chemiluminescent lightsticks, for example as shown in Fig. 1. The chemiluminescent lightstick 201 comprises a tube that is closed at both ends. The tube is made of flexible translucent plastic material. The tube contains a first liquid chemiluminescent component and a capsule 202. The capsule 202 contains a second liquid chemiluminescent component. When the lightstick 201 is
10 deformed or subjected to an impact, the capsule 202 breaks. The first and second components then mix and start to emit light.

[002] The smallest lightstick that we make has a length of 30 mm and a diameter of 5 mm. Due to technical reasons, it is impossible to make thinner lightsticks. However we
15 can supply lightsticks in all dimensions ranging from 30 mm to 250 mm in length and from 5 mm to 15 mm in diameter.

[003] Our lightsticks have recently found interesting applications in illuminated sports equipment. For example, one of our customers, the Per Hockey company, uses our
20 lightsticks to produce illuminated ice hockey pucks for playing in the dark or in fog. Per Hockey previously used electric light sources in pucks but found that the electric light sources often failed when the pucks were subjected to hard impacts. We are proud to say that pucks fitted with our lightsticks stay illuminated even when they are subjected to very hard knocks during an ice hockey game.

- [004] Figs. 2 and 3 show one of Per Hockey's latest pucks 205. First and second symmetrical half bodies 203 and 204 are moulded from translucent plastic. Each half body 203, 204 has a hole in it. A lightstick 201 is placed in the hole of the first half body 203 as shown in Fig. 2 in cross section. The second half body 204 is then
- 5 positioned so that its hole receives the lightstick 201 protruding from the first half body 203. Finally the two half bodies 203 and 204 are welded or glued together such that the light stick 201 is enclosed in a sealed diametric bore of the puck 205, as shown in Fig. 3.
- 10 [005] The puck 205 is activated by throwing it onto the ice pitch or by striking it with an ice hockey stick, whereby the lightstick 201 is subjected to an impact and starts to emit light. Normally, the puck 205 stays illuminated for up to five hours. Since the lightstick 201 is embedded in the puck 205, the puck 205 can only be activated once.
- 15 [006] The Per Hockey company have informed us that they have also developed an illuminated hockey ball for playing field hockey made in the same way as the puck.

Drawings Document D2

D2

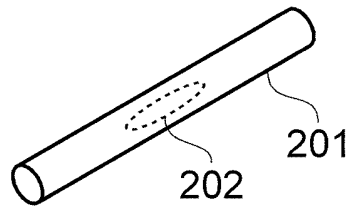


Fig. 1

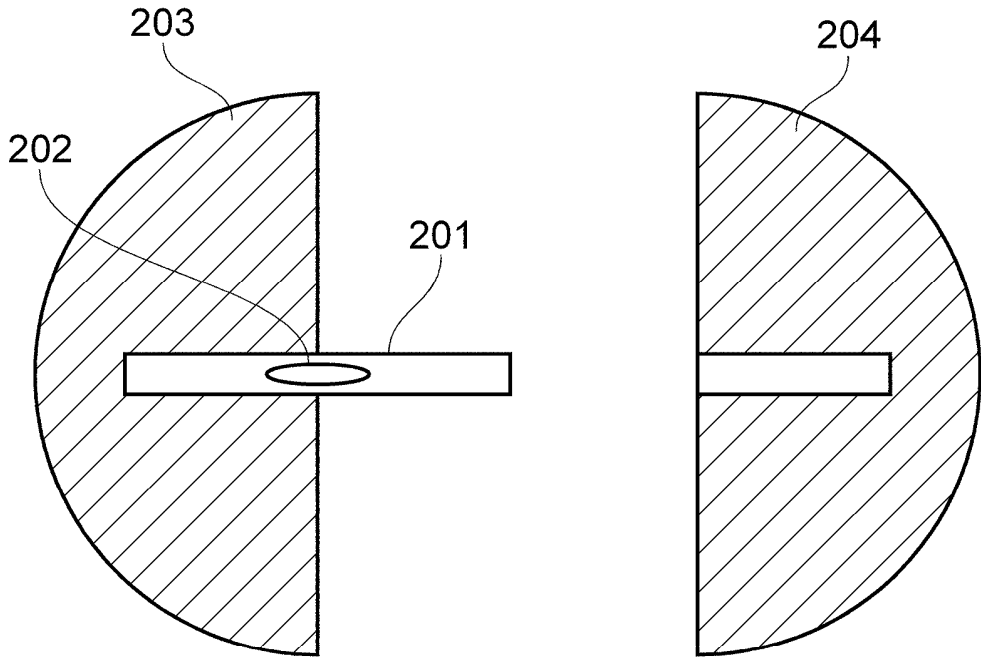


Fig. 2

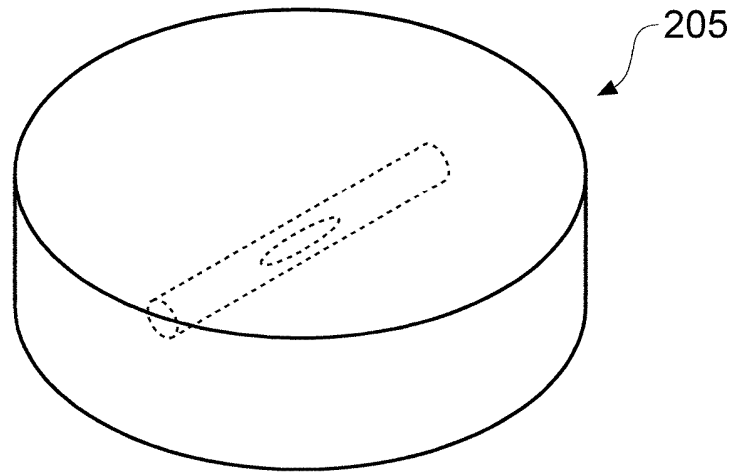
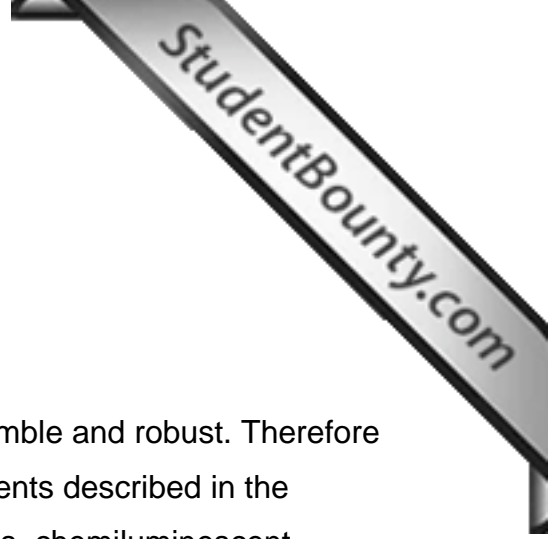


Fig. 3



Client's letter

Dear Mr Mulligan,

Tests of our new golf balls showed that they are easy to assemble and robust. Therefore we intend to sell various products based on the two embodiments described in the application. These products include translucent golf ball bodies, chemiluminescent lightsticks for translucent golf ball bodies as well as golf ball kits which each comprise a translucent golf ball body and a chemiluminescent lightstick. Please provide the best possible protection for these various products in the light of the prior art.

Kind Regards,

Andy Cap

Working copy (for cutting and pasting)

Claims

1. Golf ball body (6) made of translucent material, comprising a cavity (8) and being configured to receive completely and to retain a chemiluminescent light source (7) in the cavity (8) such that the chemiluminescent light source (7) can be exchanged.
2. Golf ball body (6) according to claim 1, wherein the cavity is a diametric bore (8) and the chemiluminescent light source is a chemiluminescent lightstick (7).
3. Golf ball body (6) according to claim 2, wherein said diametric bore (8) is a through bore.
4. Golf ball body (6) according to claim 3, wherein said diametric bore (8) has a tapered portion.
5. Golf ball body (6) according to claim 2, wherein said diametric bore (8) is a blind bore.
6. Golf ball body (6) according to claim 3 or 5, wherein the golf ball body (6) is provided with an inner thread (11) which extends along at least a portion of the diametric bore (8).
7. Chemiluminescent lightstick (7) suitable for being received completely and for being retained in the diametric bore (8) of a golf ball body (6) according to any of claims 2 to 6 such that it can be exchanged.
8. Golf ball kit comprising a golf ball body (6) according to any of claims 2 to 6 and a chemiluminescent lightstick (7) according to claim 7.