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(54) **GOLF BALL**

(57) [Problem to be solved] To provide a golf ball with improved flight distance due to improvement in aerodynamic properties by means of contriving dimple designs.

[Means for solving the problem] A golf ball in which the surface of a sphere 101 is composed of dimples 102 and lands 103 excluding dimples 102, wherein said dimples 102 are formed by elliptical dimples 104 together

with circular dimples 105, wherein one said elliptical dimple 104 overlaps said circular dimples 105 at both end parts in its major axis direction 104a, 104b, said circular dimples 105 and said elliptical dimples 104 are connected with each other, and one said land 103 is formed between three said elliptical dimples 104, 104, 104.

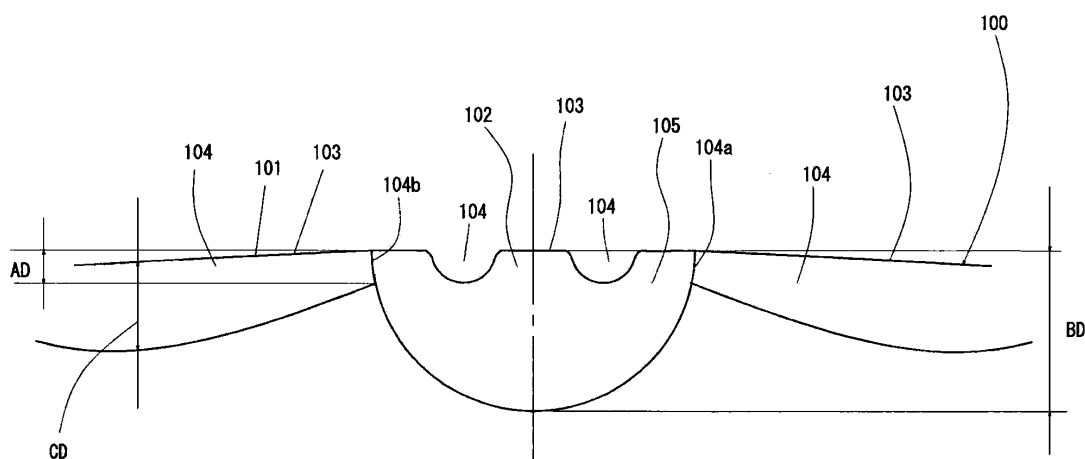


Fig. 2

**Description****TECHNICAL FIELD**

[0001] The present invention specifically relates to improving the configurations of dimples and lands on the surface of a sphere of a golf ball.

**BACKGROUND ART**

[0002] Conventionally, a golf ball has plurality of dimples arranged on the surface of a golf ball to increase the aerodynamic property (lift/drag) by reducing the drag and increasing the lift. For example, making the surface shape of dimples non-circular such as elliptical (Patent Document 1, 4), making dual dimples by providing convex portions or concave portions in dimples (Patent Document 2), and the configuration of connecting the dimples with grooves, and such (Patent Document 3, 5) have been proposed.

**[0003]**

Patent Document 1: Japanese Unexamined Patent Application Publication H08-191905

Patent Document 2: Japanese Unexamined Patent Application Publication H08-238336

Patent Document 3: Japanese Unexamined Patent Application Publication H08-276035

Patent Document 4: Japanese Utility Model Registration Publication 3157248

Patent Document 5: International Publication WO2010-143655

Patent Document 6: Japanese Unexamined Patent Application Publication 2000-317014

**DISCLOSURE OF THE INVENTION****PROBLEM TO BE SOLVED BY THE INVENTION**

[0004] The problem to be solved by the present invention is to provide a golf ball with improved flight distance due to improvement in aerodynamic properties by means of contriving dimple designs.

**MEANS FOR SOLVING THE PROBLEM**

[0005] In order to solve the problem described above, the present invention adopted a golf ball in which the surface of a sphere is composed of dimples and lands excluding dimples, wherein said dimples are formed by elliptical dimples together with circular dimples, wherein one said elliptical dimple overlaps said circular dimples at both end parts in its major axis direction, respectively,

said circular dimples and said elliptical dimples are connected with each other, and one said land is formed between three said elliptical dimples.

**EFFECT OF THE INVENTION**

[0006] Therefore, differently to the conventional golf ball with circular dimples formed, this golf ball has elliptical dimples together with circular dimples, and further has the composition wherein elliptical dimples overlap circular dimples, and elliptical dimples and circular dimples are connected with each other. Thus, increase in the amount of spin is restrained and the aerodynamic property (lift/drag) is increased, resulting in improving the flight distance.

**BRIEF DESCRIPTION OF DRAWINGS****[0007]**

[FIG.1] A schematic front view showing a first embodiment of the present invention.

[FIG.2] An enlarged cross sectional view of a main part along line a-a in FIG.1.

[FIG.3] A schematic front view showing a second embodiment of the present invention.

[FIG.4] An enlarged cross sectional view of a main part along line b-b in FIG.3.

[FIG.5] A schematic front view showing a third embodiment of the present invention.

[FIG.6] An enlarged cross sectional view of a main part along line c-c in FIG.5.

**EXPLANATION OF REFERENCES****[0008]**

- 100 golf ball
- 101 surface of a sphere
- 102 dimples
- 103 land
- 104 elliptical dimples
- 105 circular dimples
- 115 circular dimples
- 125 circular dimples

- AD the maximum depth of the overlapping portion of circular dimples and elliptical dimples
- BD the maximum depth of the central portion of circular dimples
- CD the maximum depth of the central portion of elliptical dimples

#### **BEST MODE FOR CARRYING OUT THE INVENTION**

[0009] In FIG.1 and FIG.2, 100 is a golf ball and its surface of a sphere 101 is composed of dimples 102 and lands 103 excluding dimples 102, wherein said dimples 102 are formed by elliptical dimples 104 together with circular dimples 105.

[0010] As for dimples 102, one said elliptical dimple 104 overlaps said circular dimples 105 at both end parts in its major axis direction 104a, 104b, respectively, and said circular dimples 105 and said elliptical dimples 104 are connected with each other.

[0011] Meanwhile, as for said land 103, one land 103 is formed between three said elliptical dimples 104, 104, 104. Therefore, one land 103 is surrounded by the peripheral edges of elliptical dimples 104, 104, 104 excluding both end parts in the major axis direction of elliptical dimples 104, 104, 104.

[0012] Therefore, differently to the conventional golf ball with circular dimples formed, this golf ball 100 is a golf ball with said dimples and said land formed repeatedly in a definite relation, has elliptical dimples 105 together with circular dimples 104, and further has the composition wherein elliptical dimples 104 overlap circular dimples 105, and elliptical dimples 104 and circular dimples 105 are connected with each other. Thus, increase in the amount of spin when this golf ball 100 is struck is restrained and the aerodynamic property (lift/drag) is increased.

[0013] Further, FIG.3 and FIG.4 show a golf ball which differs in the point having circular dimples 115 formed in a conical shape with a hexagonal surface as an alternative to said circular dimples 105. Moreover, FIG.5 and FIG.6 show circular dimples 125 in which the tip portion of the land 103 is cut diagonally 107 as an alternative to said circular dimples 105.

[0014] And now, the maximum depth of the overlapping portion of said circular dimples and said elliptical dimples is preferably 0.1 to 0.15 mm, the maximum depth of the central portion of said circular dimples is preferably 0.23 to 0.28 mm, and the maximum depth of the central portion of said elliptical dimples is preferably 0.33 to 0.38 mm.

[0015] Differently to the conventional golf ball with circular dimples formed, both of these golf balls have elliptical dimples together with circular dimples, and further have the composition wherein elliptical dimples overlap circular dimples, and elliptical dimples and circular dimples are connected with each other. Thus, increase in

the amount of spin is restrained and the aerodynamic property (lift/drag) is increased, resulting in improving the flight distance.

#### **INDUSTRIAL APPLICABILITY**

[0016] The golf ball of the present invention may be used by golfers of from beginners to professionals.

#### **Claims**

1. A golf ball in which the surface of a sphere is composed of dimples and lands excluding dimples, wherein said dimples are formed by elliptical dimples together with circular dimples, wherein one said elliptical dimple overlaps said circular dimples at both end parts in its major axis direction, respectively, said circular dimples and said elliptical dimples are connected with each other, and one said land is formed between three said elliptical dimples.
2. The golf ball according to the scope of claim 1 wherein the maximum depth of the overlapping portion of said circular dimples and said elliptical dimples is 0.1 to 0.15 mm, the maximum depth of the central portion of said circular dimples is 0.23 to 0.28 mm, and the maximum depth of the central portion of said elliptical dimples is 0.33 to 0.38 mm.

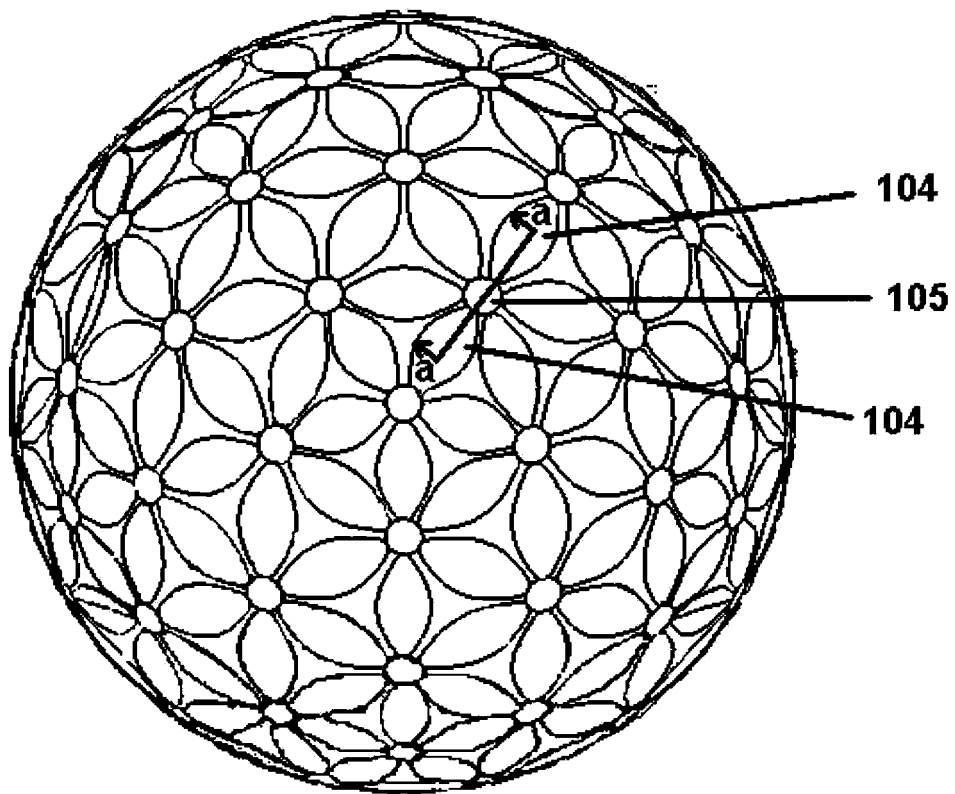


Fig. 1

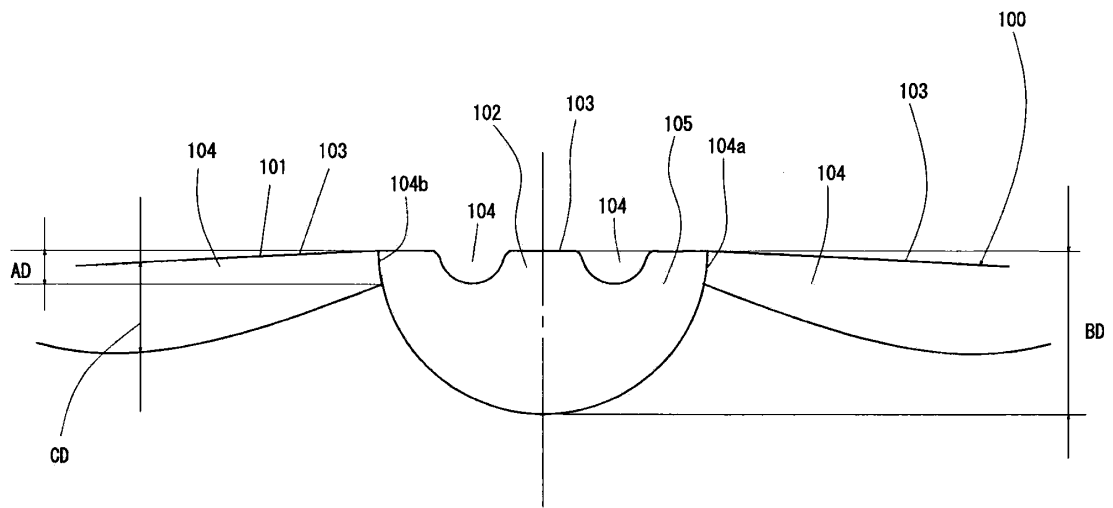


Fig. 2

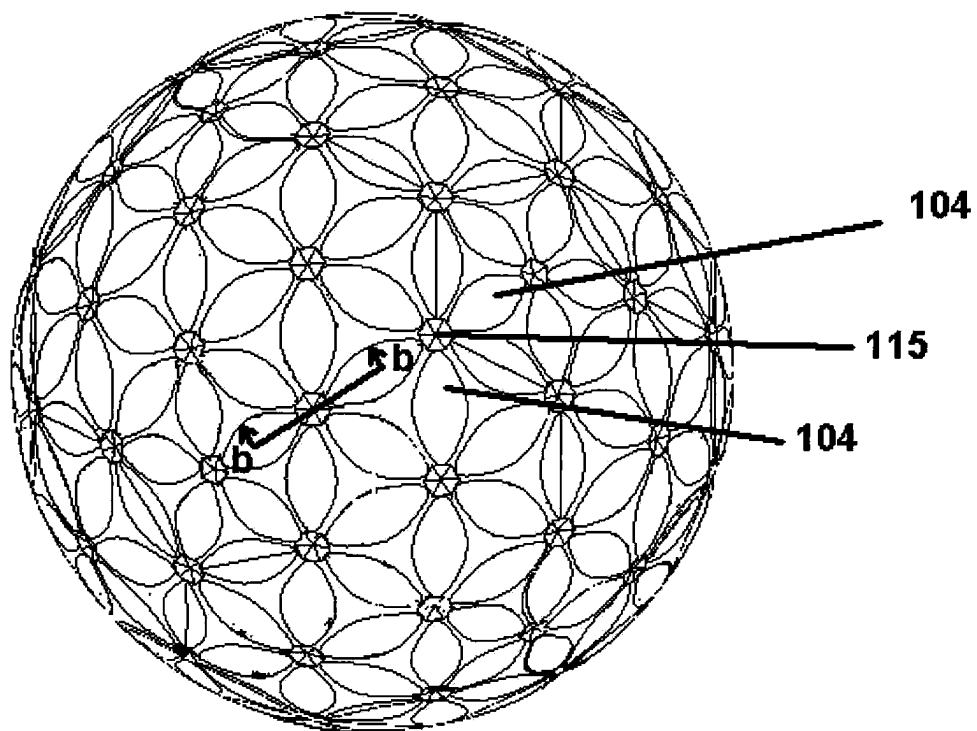


Fig. 3

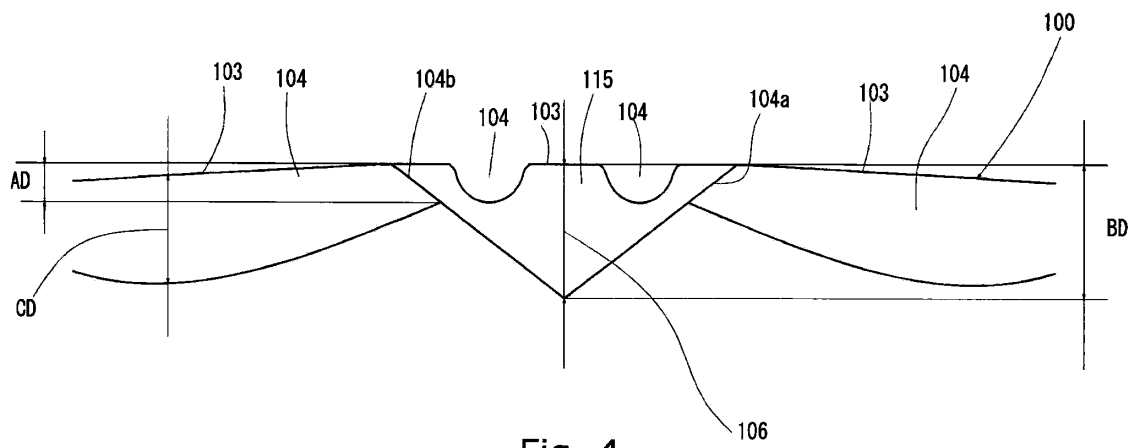


Fig. 4

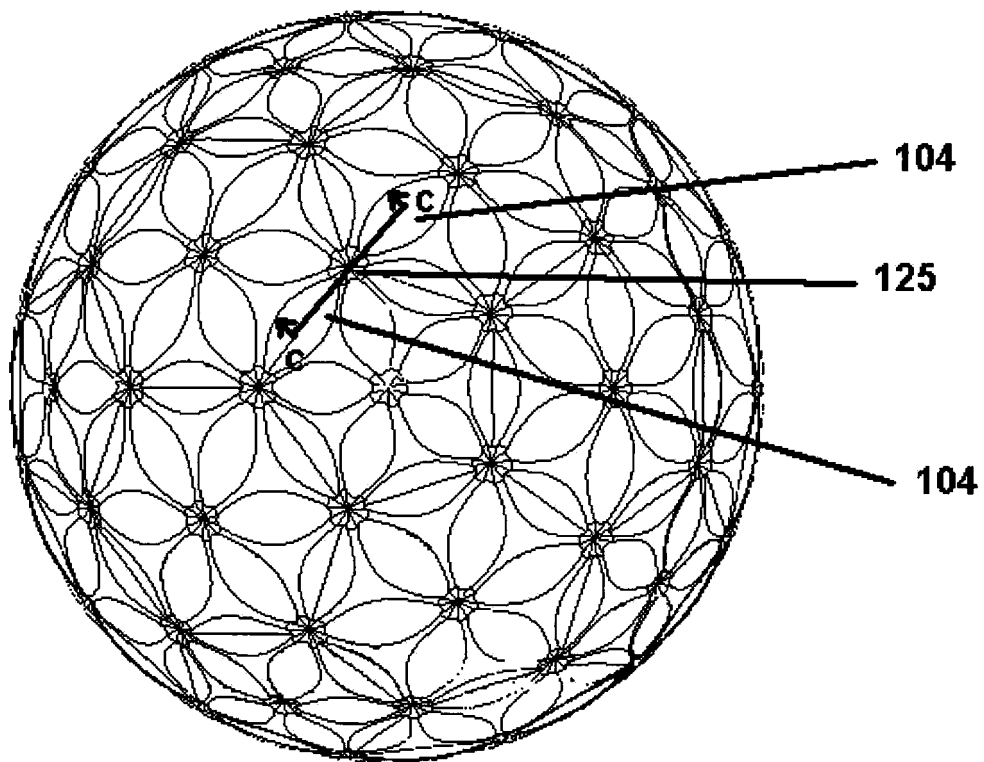


Fig. 5



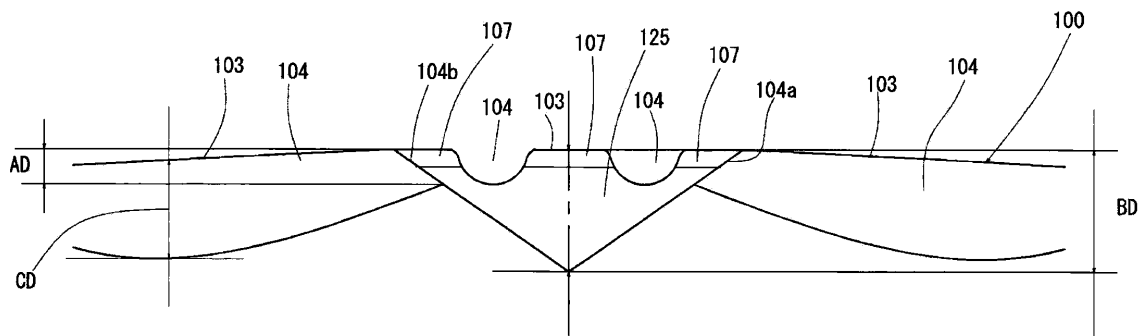


Fig. 6

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2012/051341

## A. CLASSIFICATION OF SUBJECT MATTER

A63B37/00 (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)

A63B37/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2012  
 Kokai Jitsuyo Shinan Koho 1971-2012 Toroku Jitsuyo Shinan Koho 1994-2012

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 10-108921 A (Ilya Co., Ltd.), 28 April 1998 (28.04.1998), paragraph [0006]; fig. 4 & US 5879245 A & KR 10-0187788 B1	1-2
Y	WO 2010/143655 A1 (Tomohiko SATO), 16 December 2010 (16.12.2010), paragraphs [0015] to [0016]; fig. 10 (Family: none)	1-2

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

\* Special categories of cited documents:

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&amp;" document member of the same patent family

Date of the actual completion of the international search  
06 February, 2012 (06.02.12)Date of mailing of the international search report  
14 February, 2012 (14.02.12)Name and mailing address of the ISA/  
Japanese Patent Office

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**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- JP H08191905 B [0003]
- JP H08238336 B [0003]
- JP H08276035 B [0003]
- JP 3157248 B [0003]
- WO 2010143655 A [0003]
- JP 2000317014 A [0003]