AUSTRALIA 672880

PATENTS ACT 1990

PATENT REQUEST : STANDARD PATENT

I/We being the person(s) identified below as the Applicant(s), request the grant of a patent to the person(s) identified below as the Nominated Person(s), for an invention described in the accompanying standard complete specification.

Full application details follow:

[71/70] Applicant(s)/Nominated Person(s):

Sumitomo Rubber Industries, Ltd.

of

1-1, Tsutsui-cho 1-chome, Chuo-ku, Kobe-shi, Hyogo-ken, Japan

[54] Invention Title:

Coated golf ball

[72] Name(s) of actual inventor(s):

Kuniyasu HORIUCHI
Kiyoto MARUOKA

[74] Address for service in Australia:

DAVIES COLLISON CAVE, Patent Attorneys, 1 Little Collins Street, Melbourne, Victoria, Australia. Attorney Code: DM

Basic Convention Application(s) Details:

[31] Application Number	[33] Country	Code	[32] Date of Application
95781/1993	Japan	JP	22 April 1993

DATED this TWENTY SECOND day of APRIL 1994

M055300 20494

JO 20494

.....
a member of the firm of
DAVIES COLLISON CAVE for
and on behalf of the
applicant(s)

AUSTRALIA

PATENTS ACT 1990

NOTICE OF ENTITLEMENT

We, **Sumitomo Rubber Industries, Ltd.**, the applicant/Nominated Person named in the accompanying Patent Request state the following:-

The Nominated Person is entitled to the grant of the patent because the Nominated Person derives title to the invention from the inventors by assignment.

The Nominated Person is entitled to claim priority from the basic application listed on the patent request because the Nominated Person made the basic application, and because that application was the first application made in a Convention country in respect of the invention.

DATED this TWENTY SECOND day of APRIL 1994

a member of the firm of
DAVIES COLLISON
CAVE for and on behalf
of the applicant(s)

(DCC ref: 1662841)

AU9460626

(12) PATENT ABRIDGMENT (11) Document No. AU-B-60626/94
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 672880

(54) Title
COATED GOLF BALL

(51)[5] International Patent Classification(s)
A63B 037/12

(21) Application No. : **60626/94** (22) Application Date : **22.04.94**

(30) Priority Data

(31) Number	(32) Date	(33) Country
5-95781	**22.04.93**	**JP JAPAN**

(43) Publication Date : **27.10.94**

(44) Publication Date of Accepted Application : **17.10.96**

(71) Applicant(s)
SUMITOMO RUBBER INDUSTRIES, LTD.

(72) Inventor(s)
KUNIYASU HORIUCHI; KIYOTO MARUOKA

(74) Attorney or Agent
DAVIES COLLISON CAVE , 1 Little Collins Street, MELBOURNE VIC 3000

(56) Prior Art Documents
US 5029870
AU 57507/94 A63B 37/12
AU 659924 35485/93 A63B 37/12

(57) Claim

1. A coated golf ball comprising a core, a cover layer covering said core and a white paint layer coated on said cover wherein said cover is mainly composed of trans-polyisoprene, said paint layer comprises one or more white coating layers and clear coating layers, a white paint for forming said white paint layer contains 20 to 70% by weight of a white pigment and 0.005 to 0.10% by weight of a blue pigment based on a solid content of the white paint, and said blue pigment is selected from the group consisting of ε-phthalocyanine blue and indanthrone blue.

AUSTRALIA

PATENTS ACT 1990

COMPLETE SPECIFICATION

NAME OF APPLICANT(S):

Sumitomo Rubber Industries, Ltd.

ADDRESS FOR SERVICE:

DAVIES COLLISON CAVE
Patent Attorneys
1 Little Collins Street, Melbourne, 3000.

INVENTION TITLE:

Coated golf ball

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

FIELD OF THE INVENTION

The present invention relates to a golf ball of which surface is coated with a paint, i.e. coated golf ball. More particularly, it relates to a coated golf ball of which color tone is stabilized and weathering properties are improved.

BACKGROUND OF THE INVENTION

A golf ball covered with a balata cover is still popular because of its superior performance. The golf ball with a balata cover has poor whiteness in comparison with a golf ball covered with an ionomer resin cover, because the balata cover itself has dark and dull color and even if coated with a white paint, its whiteness is insufficient.

In order to improve whiteness of the golf ball with a balata cover, Japanese Kokai Publication Hei 4(1992)-500295 suggests to formulate a suitable amount of blue and violet pigments in a white paint. However, when two kinds of coloring pigments are formulated, it is necessary to control the amount of each pigment delicately. When the amount of one pigment becomes larger than that of the other one, color tone of the resulting golf ball varies greatly, which results in variability of products. Further, since two kinds of pigments are formulated, it takes a lot of time to disperse each pigment during a mixing process. Also, there is a problem that the balata cover is discolored due to weathering discoloration of the cover and paint.

SUMMARY OF THE INVENTION

Under these circumstances, in order to solve the above problem on the formulation of two kinds of pigments, the present inventors have intensively studied. As a result, the present invention has been completed. The main object of the present invention is to provide a coated golf ball of which color tone is stabilized and weathering properties are improved.

This object as well as other objects and advantages of the present invention will become apparent to those skilled in the art from the following description. That is, the present invention provides a coated golf ball comprising a core, a cover layer covering the core and a white paint layer coated on the cover wherein the cover is mainly composed of trans - polyisoprene, the paint layer comprises one or more white coating layers and clear coating layers, a white paint for forming the white paint layer contains 20 to 70% by weight of a white pigment and 0.005 to 0.10% by weight of a blue pigment based on a solid content of the white paint, and the blue pigment is selected from the group consisting of ε-phthalocyanine blue and indanthrone blue.

Particularly, the present invention provides the improvement of a golf ball covered with a balata cover.

DETAILED DESCRIPTION OF THE INVENTION

The golf ball of the present invention comprises a core and a cover covering the core. The core may be any one which has been used for golf balls, but generally a thread wound core made by winding rubber thread on a liquid center or a solid center. The cover of the present invention is mainly composed

of trans-polyisoprene, i.e. so-called "balata cover" which has been used for golf balls.

The white paint for coating the golf ball of the present invention generally comprises a main resin and a white pigment. The main resin can be anyone which has been used for golf balls, but generally includes epoxy resin, acrylic resin or urethane resin. Preferred main resin is urethane resin. An amount of the main resin preferably is within the range of 20 to 80 % by weight, based on a solid content of the white paint. The term "solid content" means an amount of solid components in the white paint from which liquid components is excluded.

The white paint contains a white pigment in an amount of 20 to 70% by weight based on a solid content of the white paint. The white pigment may be those which have hitherto been used for the golf ball, and titanium oxide and barium sulfate are suitably used. When the amount of the white pigment is smaller than 20% by weight, coating hiding power becomes inferior and, therefore, preferable white color can not be obtained. When the amount exceeds 70% by weight, physical properties of the coating become inferior. The amount is preferably 30 to 60% by weight.

In addition to the above components, various additives, curing catalysts and diluents are contained in the white paint. Examples of the additive include ultraviolet inhibitors, fluid agents, sealing pigments, fluorescent agents, fluorescent brighteners and the like. The amount of these additives is 0.1 to 10% by weight based on the solid content of

the paint.

As the fluorescent agent or fluorescent brightener contained in the white paint, for example, there are those which are normally known and are used for the golf ball. Examples thereof include 2,5-bis[5'-t-butylbenzoxazolyl (2)]thiophene (commercially available from Japan Ciba Geigy Co. as Ubitex OB), 7-(2h-naphthol(1,2-d)-triazol-2-Y1)-3-phenyl-cusline (commercially available from Sandz Co. as Leucopure EGM), biazoline derivative (commercially available from Morbey Chemical Corporation as Phorwhite K-2002), oxazoles (commercially available from Sumitomo Chemical Co., Ltd. as Whitefullar HCS, PCS, B), fluorescent brighteners (commercially available from Hoechst Japan Co. as Hostalux KCB) and the like. The amount thereof is 0.005 to 1.0% by weight based on a solid content of the paint.

Examples of the diluent formulated in the white paint include ketones such as acetone, methyl ethyl ketone, etc.; aromatic hydrocarbons such as toluene, xylene, etc.; esters such as ethyl acetate, etc. The amount of the diluent is not specifically limited, but preferably 30 to 80% by weight based on a solid content of the white paint

As the blue pigment which is a feature of the present invention, for example, ε-phthalocyanine blue and indanthrone blue or a mixture thereof can be suitably used. The amount of the blue pigment is 0.005 to 0.1% by weight, preferably 0.01 to 0.07% by weight, based on a solid content of the white paint.

When the above specific blue pigment (i.e. ε-

phthalocyanine blue or indanthrone blue) is used, a golf ball wherein an L* value, an a* value and a b* value representing color tone are respectively 85 to 95, 0 to -2.5 and -5 to -9.5, and Wcie is 100 to 120 can be obtained using Lab and Wcie. When these values are not within the above range, the resulting golf ball with a balata cover lacks whiteness.

In the production of the coated golf ball of the present invention, the white paint containing the above blue pigment is applied on the body of the golf ball one or more times, and then a clear paint is applied thereon. The clear paint can be epoxy type, acrylic type or urethane type, but does not contain pigment. The clear paint is always known as to the production of the golf ball.

According to the present invention, color tone of the golf ball after coating of paint can be controlled easily, and preferable whiteness can be obtained even by using the golf ball covered with a balata cover. Further, an excellent golf ball having little weathering discoloration can be obtained.

EXAMPLES

The following Examples and Comparative Examples further illustrate the present invention in detail but are not to be construed to limit the scope thereof.

Examples 1 to 5 and Comparative Examples 1 to 3

Paints A to G (Examples) and paints E to G (Comparative Examples) were prepared by mixing the components shown in Table 1 according to a conventional method.

Table 1

	Example No.				Comparative Example No.		
	A	B	C	D	E	F	G
[Formulation] Resin to be used is urethane in all Examples and Comparative Examples (Amount: weight % based on the solids content of the coat)							
White pigment (titanium oxide)	40	50	55	40	50	15	40
Blue pigment (ε-Phthalocyanine blue)	0.05	0.015				0.05	
Blue pigment (Indanthron blue)			0.06	0.04			
Blue pigment (α-Phthalocyanine blue)					0.05		0.05
Violet pigment (Dioxazine)					0.025		

On the golf ball covered with a balata cover obtained by a conventional method, a white coat of two layers was formed using the above paint. Thereafter, color tone, feature of visual appearance, weathering discoloration, degree of visual discoloration, workability and variability of color tone were evaluated. The kind of the paint used and test results are shown in Table 2 below.

Table 2

	Example No.					Comparative Example No.		
	1	2	3	4	5	1	2	3
First layer	A	B	C	D	B	E	F	G
Second layer	A	B	C	D	C	E	F	G
(Color tone)								
L	88	91	88	89	90	89	84	86
a	-1.8	-1.0	-2.0	-1.8	-1.5	-2.0	-2.0	-3.0
b	-6.9	-6.1	-7.3	-6.7	-6.5	-7.0	-6.8	-7.5
Wcie	111	107	117	110	109	112	90	113
Feature of visual appearance	Good	Good	Good	Good	Good	Good	Dark and subdued whiteness	Dark and subdued whiteness
Weathering discoloration test (ΔE)	◎	◎	◎	◎	◎	×	×	×
After 120 hours	3.5	3.5	3.4	3.5	3.6	5.0	5.2	4.0
Degree of visual discoloration	Medium	Medium	Medium	Medium	Medium	Large	Large	Medium to Large
Workability	Good	Good	Good	Good	Good	Long time is required for dispersion	Good	Good
Variability of color tone	Good	Good	Good	Good	Good	Variability is liable to be arisen	Good	Good

Test method

(1) Measurement of color tone

Colorimeter CR221 manufactured by Minolta Co. (visual field of 2, 3 mmϕ, light source D_{65}), according to Y x y measurement

The formula of whiteness degree of CIE•ISO:

$Wcie = Y + 800 (X_0 - X) + 1700 (Y_0 - Y)$

wherein X_0 and Y_0 are respectively chromaticity coordinate of perfect diffuser of D_{65} lighting, X_0 is 0.3127 and Y_0 is 0.3291.

(2) Discoloration after weathering

After treating with a sunshine weather-o-meter for 120 hours, an L* value, an a* value and a b* value before and after treatment were measured by a colorimeter to determine ΔL^*, Δa^*, Δb^* and ΔE. Evaluation was conducted according to the obtained data and visual observation.

(3) Workability

After mixing with a homomixer for one hour, the obtained mixture was allowed to stand for twenty-four hours. Thereafter, a dispersion state of the pigment was confirmed by visual observation.

Good: There is no problem about pigment dispersion.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A coated golf ball comprising a core, a cover layer covering said core and a white paint layer coated on said cover wherein said cover is mainly composed of trans-polyisoprene, said paint layer comprises one or more white coating layers and clear coating layers, a white paint for forming said white paint layer contains 20 to 70% by weight of a white pigment and 0.005 to 0.10% by weight of a blue pigment based on a solid content of the white paint, and said blue pigment is selected from the group consisting of ε-phthalocyanine blue and indanthrone blue.

2. The coated golf ball according to claim 1, wherein an L* value, an a* value and a b* value representing color tone are respectively 85 to 95, 0 to -2.5 and -5 to -9.5, and Wcie representing whiteness is 100 to 120.

3. A coated golf ball according to claim 1, substantially as hereinbefore described with reference to the examples.

DATED this 20th day of August 1996
Sumitomo Rubber Industries, Ltd.
by DAVIES COLLISON CAVE
Patent Attorneys for the applicant(s)

Abstract of the disclosure:

A coated golf ball comprising a core, a cover layer covering said core and a white paint layer coated on said cover wherein said cover is mainly composed of trans-polyisoprene, said paint layer comprises one or more white coating layers and clear coating layers, a white paint for forming said white paint layer contains 20 to 70% by weight of a white pigment and 0.005 to 0.10% by weight of a blue pigment based on a solid content of the white paint, and said blue pigment is selected from the group consisting of ε-phthalocyanine blue and indanthrone blue.