

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HISASHI YAMAGISHI, HIROSHI HIGUCHI, JUNJI HAYASHI
and AKIRA KAWATA

Appeal No. 2002-1031
Application 09/129,883

HEARD: February 13, 2003

Before COHEN, STAAB, and NASE, Administrative Patent Judges.
STAAB, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal from the examiner's final rejection of claims 3-16, all the claims currently pending in the application.

The Invention

Appellants' invention pertains to a multi-piece solid golf ball comprising a solid core and a cover consisting of inner and outer layers surrounding the core, with the outer cover layer

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having a surface formed with a plurality of dimples. According to appellants, the product of the Shore D hardnesses of the inner and outer cover layers (which is indicative of the spin rate of the ball) and certain particulars of the dimple pattern are selected to improve the flight distance performance of the ball. A further understanding of the invention can be derived from a reading of independent claims 4 and 16, respective copies of which appear in the appendix to appellants' main brief.

The Applied References

The references relied upon by the examiner as evidence of obviousness are:

Yamagishi et al. (Yamagishi '413)	5,695,413	Dec. 9, 1997
Yamagishi et al. (Yamagishi '563)	5,779,563	Jul. 14, 1998
Hayashi et al. (Hayashi)	5,816,942	Oct. 6, 1998

The Rejections

Claims 3-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi '413 in view of Yamagishi '563.

Claim 16 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Hayashi in view of Yamagishi '563.

Reference is made to appellants' main and reply briefs (Paper Nos. 20 and 23) and to the examiner's answer (Paper No. 21) for the respective positions of appellants and the examiner regarding the merits of these rejections.

Appealed Claims 4 and 16

Independent claim 4 is directed to a multi-piece solid golf ball comprising a solid core and a cover consisting of inner and outer layers surrounding the core, wherein the outer cover layer has a surface formed with a plurality of dimples. The solid core is required to have a distortion of 2.8 to 6.5 mm under an applied load of 100 kg. The claim calls for (a) the product of the Shore D hardness of the inner cover layer multiplied by the Shore D hardness of the outer cover layer (hereinafter, product of hardnesses) and (b) a proportion V_R (%) of the total of the volumes of dimple spaces each defined below a plane circumscribed by the dimple edge to the overall volume of a phantom sphere given on the assumption that the golf ball surface is free of dimples (hereinafter, V_R) to be such that they satisfy any one of the following combinations (1) to (5):

- (1) product of hardnesses: 1,500 to less than 2,000
 V_R : 0.8 to 0.93%
- (2) product of hardnesses: 2,000 to less than 2,500
 V_R : 0.75 to 1.05%
- (3) product of hardnesses: 2,500 to less than 3,000
 V_R : 0.7 to 1%
- (4) product of hardnesses: 3,000 to less than 3,500
 V_R : 0.65 to 0.95%

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- (5) product of hardnesses: 3,500 to 4,000
 V_R : 0.6 to 0.9%.

In addition, the dimples are required to include at least three types of dimples which are different in at least one of diameter, depth, and a value V_0 , where V_0 is defined as the volume of one dimple space defined below a plane circumscribed by the dimple edge divided by the volume of a cylinder whose bottom is the plane and whose height is the maximum depth of the dimple from the bottom.

Claim 16, the only other independent claim on appeal, is the same as claim 4 with two exceptions. First, the range of distortion of the solid core in claim 16 is narrower than in claim 4. Specifically, in claim 16 the solid core has a distortion of 2.8 to 3.0 mm under an applied load of 100 kg. Second, the range for V_R in combination (1) in claim 16 is broader than in claim 4. Specifically, in claim 16, combination (1) is as follows:

- (1) product of hardnesses: 1,500 to less than 2,000
 V_R : 0.8 to 1.1%

The Teachings of the Applied References

Yamagishi '413, the primary reference in the rejection of independent claim 4, is directed to a multi-piece solid golf ball comprising a solid core having a hardness distortion of at least

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3.5 mm under an applied load of 100 kg., a cover having a Shore D hardness of 50-63, preferably 55-60 (col. 2, lines 39-41), and, in the Figure 2 embodiment, an intermediate layer having a Shore D hardness of 20-70, preferably 25-60 (col. 2, lines 33-36). Yamagishi '413 is silent as to the dimple pattern on the ball.

Hayashi, the primary reference in the rejection of independent claim 16, pertains to a wound golf ball comprising a two layer core 4-5, a layer 2 formed by winding thread rubber around the core layers, and an outer cover 3. In the background section of the specification (col. 1, lines 5-40), Hayashi describes the tradeoffs between solid core golf balls and wound golf balls. An objective of Hayashi is to provide a modified wound golf ball that retains the superior hitting feel and controllability of that type of ball while also having flight distance that is comparable to solid core golf balls. To this end, Hayashi proposes to provide a relatively large diameter center ball of two layer construction in order to (a) optimize the hardness of center ball layers and the hardness distribution of the center ball, (b) improve control and flight performance, and (c) give a soft pleasant hitting feel (col. 1, lines 46-55). In accordance with these objectives, the ball of Hayashi may have a center core having a distortion of 1-5 mm, preferably 1.8 to

4.8 mm, under an applied load of 100 kg. (col. 2, lines 32-34), an outer cover layer 3 having a Shore D hardness of 30-70, preferably 35-65 (col. 3, lines 62-64), and an enclosure layer surrounding the center core having a Shore D hardness of up to 54, preferably 33-53 (col, 3, lines 13-18).¹

Yamagishi '563, the secondary reference in each of the examiner's rejections, relates to a multi-piece solid golf ball comprising a solid core 1 and a cover consisting of inner and outer layers surrounding the core, with the outer cover layer 3 having a surface formed with a plurality of dimples. Of particular interest with respect to the obviousness issues raised in this appeal, Yamagishi '563 discloses in Table 3 several patterns for providing the dimples to the surface of the ball. Although Yamagishi '563 does not describes the dimple patterns of Table 3 in terms of appellants' dimple parameter V_R , appellants concede² that the Type I dimple pattern of Yamagishi '563 has a

¹In Figure 1 of Hayashi, the center core of the ball is denoted by reference number 5 and the enclosure layer surrounding the center core is denoted by reference number 4. In the specification, this numbering is reversed, that is, the center core is denoted by reference number 4 and the enclosure layer is denoted by reference number 5.

²See the "Remarks" section (pages 8-11) of the amendment filed March 8, 2000 (Paper No. 8) and the Table attached to that
(continued...)

V_R of 1.014, that the Type II dimple pattern of Yamagishi '563 has a V_R of 0.996, and that the Type III dimple pattern of Yamagishi '563 has a V_R of 0.670.

The Examiner's Rationale in Rejecting the Appealed Claims

Looking first at the standing rejection of independent claim 4 as being unpatentable over Yamagishi '413 in view of Yamagishi '563, the examiner finds (answer, page 4) that Yamagishi '413 discloses a golf ball comprising a core having a distortion of 3.5 mm under an applied load of 100 kg., an outer cover layer having a Shore D hardness in the range of 50-60, and an inner cover layer having a Shore D hardness in the range of 28-68. The examiner also finds that in Yamagishi '413 "[the] products of the Shore D hardness of an inner cover layer multiplied by the Shore D hardness of an outer cover layer . . . would be in a range of 1500-4000 (Fig. 2)" (answer, page 4)³. The examiner acknowledges that Yamagishi '413 does not teach the relationship between product of hardnesses and V_R called for by claim 4. The examiner

²(...continued)
paper. For the reader's convenience, a copy of that Table is included as an attachment to this decision.

³It is not immediately clear where Yamagishi '413 discloses Shore D hardness values for the inner and outer cover layers that would necessarily yield a product within the range of 1500-4000 as found by the examiner.

takes the position, however, that it would have been obvious to one of ordinary skill in the art at the time of appellants' invention to modify the ball of Yamagishi '413 such that the product of Shore D hardness of the inner and outer cover layers is in the range of 1500-3000, and such that dimples are provided on the ball arranged in the Type II dimple pattern taught Yamagishi '563. According to the examiner, a golf ball as taught by Yamagishi '413, modified in the manner set forth above, would have properties that fall within the parameters for a golf ball as set forth in claim 4, which is all that is required to establish the obviousness of the subject matter of that claim.

As to the rejection of claim 16 as being unpatentable over Hayashi in view of Yamagishi '563, the examiner finds (answer, page 5) that Hayashi discloses a golf ball comprising a core having a distortion of 2.8 to 3.0 mm under an applied load of 100 kg., an outer cover layer having a Shore D hardness in a range of 30-70, and an inner cover layer having a Shore D hardness in a range of 33-53⁴. The examiner also finds that in Hayashi "[the] products of the Shore D hardness of an inner cover layer

⁴It appears that the examiner finds correspondence between the enclosure layer of Hayashi surrounding the center core of the ball and the "inner cover layer" of claim 16.

multiplied by the Shore D hardness of an outer cover layer . . . would be in a range of 1500-3700" (answer, page 5)⁵. The examiner acknowledges that Hayashi does not teach the relationship between product of hardnesses and V_R called for by claim 16. In this instance, the examiner takes the position that it would have been obvious to one of ordinary skill in the art to modify the ball of Hayashi such that the product of Shore D hardness of an inner and outer cover layers is in the range of 2000-3000, and such that dimples are provided on the ball arranged in the Type II dimple pattern taught Yamagishi '563. As set was the case with respect to claim 4, the examiner takes the position that a golf ball as taught by Hayashi, modified in the manner set forth above, would have properties that fall within the parameters for a golf ball as set forth in claim 16, which is all that is required to establish the obviousness of the subject matter of that claim.

⁵It is not immediately clear where Hayashi discloses Shore D hardness values for the inner and outer cover layers that would necessarily yield a product within the range of 1500-3700 as found by the examiner.

Opinion

Like the examiner (answer, paragraph spanning pages 12-13), we consider that a golf ball that satisfies *any one* of the combinations (1) to (5) for product of hardnesses and V_R set forth in independent claims 4 and 16 would meet the product of hardnesses and V_R relationship requirements of these claims. Notwithstanding this circumstance, the standing rejections under 35 U.S.C. § 103(a) cannot be sustained. This is so because, even if we accept the examiner's findings of fact and conclusions of obviousness as restated above, the claimed subject matter of claims 4 and 16 would not *necessarily* result.

Concerning independent claim 4, we understand the examiner's rejection as concluding that it would have been obvious to modify the golf ball of Yamagishi '413 such that the product of hardnesses is *somewhere* within the range of 1500-3000, and such that the ball has dimples arranged in the Type II dimple pattern of Yamagishi '563 (resulting in $V_R = 0.996$). These modification, however, *may or may not* result in one of the combinations (1) to (5) for product of hardnesses and V_R set forth in claim 4. More particularly, the product of hardnesses range of 1500-3000 set forth in the rejection covers combinations (1), (2) and (3) of claim 4. Considering the examiner's position in more detail, if

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the product of hardnesses is in the range of 2,000 to less than 2,500 and $V_R = 0.996$, combination (2) is satisfied. Likewise, if the product of hardnesses is in the range of 2,500 to less than 3,000 and $V_R = 0.996$, combination (3) is satisfied. However, if the product of hardnesses is in the range of 1,500 to less than 2,000 and $V_R = 0.996$, combination (1), which covers this range of product of hardnesses, is *not* satisfied. Accordingly, even when looking at the standing rejection of claim 4 in a light most favorable to the examiner, the examiner has not established that it would have been obvious to provide a golf ball having a combination of product of hardnesses and V_R that *necessarily* satisfies one of the combinations (1) to (5) set forth in independent claim 4. Thus, in accordance with the examiner's stated position, one of the claimed combinations (1) to (5) required by claim 4 may *or may not* result. For this reason, the standing rejection of claim 4, as well as claims 3 and 5-15 that depend therefrom, as being unpatentable over Yamagishi '413 in view of Yamagishi '563, cannot be sustained.

As to independent claim 16, the examiner's rejection of this claim as being unpatentable over Hayashi in view of Yamagishi '563 is not sustainable because the examiner has not established that the claimed subject matter *as a whole* would have been

obvious. More particularly, even if we accept that it would have been obvious to modify the *wound* golf ball of Hayashi such that the product of hardnesses is somewhere within the range of 2000-3000, and such that the ball has dimples arranged in the Type II dimple pattern of Yamagishi '563 (resulting in $V_R = 0.996$), the resulting ball would still include *wound* rubber thread layer 2, such that the modified golf ball of Hayashi would *not* satisfy the requirement of claim 16, line 1, calling for a multi-piece *solid* golf ball. Accordingly, we must agree with appellants' argument on page 16 of the main brief to the effect that the examiner's rejection is fundamentally defective in this regard.

Remand

This case is remanded to the examiner for consideration of the following matters.

As made clear upon inspection of the Table attached to the amendment filed March 8, 2000 (Paper No. 8)⁶, Comparative Example 3 (CE3) of Yamagishi '563 comprises a multi-piece solid golf ball having a solid core having a distortion of 4.00 under a load of 100 kg., a product of hardnesses of 2600 (inner cover layer Shore D hardness of 40 multiplied by outer cover layer Shore D hardness

⁶See footnote 2.

of 65) and a Type I dimple pattern ($V_R = 1.014$). Thus, CE3 meets the solid core distortion requirement of claim 4, and $V_R = 1.014$ is only slightly above the range of V_R of .7 to 1 called for in combination (3) of claim 4. Yamagishi '563 does not seem to favor any one of the dimple patterns of Table 3 over another. The examiner should determine whether it would have been obvious to one of ordinary skill in the art at the time of appellants' invention to provide CE3 of Yamagishi '563 with a Type II dimple pattern ($V_R = 0.996$), which modification would result in a golf ball having parameters that appear to satisfy all the requirements of claim 4, as well as several claims that depend therefrom.

US Patent 5,439,227 to Egashira et al. (Egashira) (copy attached) pertains to a multi-piece solid golf ball having a core inner layer 1, a core outer layer 2, and a cover 4. Egashira indicates (col. 1, lines 17-18) that the cover of the golf ball includes dimples, but is silent as the pattern in which they are arranged. Egashira discloses a number of examples for golf balls in accordance with the invention thereof. Table 1 shows that the core outer layers of Examples 3 and 4 are made of an elastomer having a Shore D hardness of 40 (see footnote 2 of Table 1) and Table 2 shows that covers 4 of Examples 3 and 4 are made of a

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material having a Shore D hardness of 63, which hardnesses yields a product of 2520. In addition, Table 2 shows that the cores of Examples 3 and 4 have distortions under a load of 100 kg. of 3.77 to 3.76, respectively. The examiner should determine whether it would have been obvious to one of ordinary skill in the art at the time of appellants' invention to provide the Examples 3 and 4 golf balls of Egashira with the Type II dimple pattern of Yamagishi '563 ($V_R = 0.996$), it being noted that this modification would result in golf balls having parameters that appear to satisfy all the requirements of claim 4, as well as several claims that depend therefrom.

US Patent 5,702,311 to Higuchi et al. (Higuchi) (copy attached) pertains to a multi-piece solid golf ball having an innermost core 1, an intermediate layer 2, and a cover 3. Higuchi states (col. 4, lines 32-37) that the ball include a multiplicity of dimples that may be arranged in a number of ways. As with Egashira, Higuchi discloses a number of examples for golf balls in accordance with the invention thereof. Table 2 shows that the intermediate layers 2 of Examples E1, E3 and E4 have a Shore D hardness of 40 and that the covers 3 of E1, E3 and E4 have Shore D hardnesses of 65, 60 and 65, which hardnesses yield products of hardnesses of 2600, 2400 and 2600, respectively. In

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addition, Table 2 shows that the cores of E1, E3 and E4 have distortions under a load of 100 kg. of 4.02, 3.53 and 3.99, respectively. The examiner should determine whether it would have been obvious to one of ordinary skill in the art to provide the E1 and/or E4 golf balls of Higuchi with the Type II dimple pattern of Yamagishi '563 ($V_R = 0.996$), and/or whether it would have been obvious to one of ordinary skill in the art to provide the E3 golf ball of Higuchi with either the Type I ($V_R = 1.014$) or Type II ($V_R = 0.996$) dimple pattern of Yamagishi '563, it being noted that these modifications would result in golf balls having parameters that appear to satisfy all the requirements of claim 4, as well as several claims that depend therefrom.

Consistent with the determinations made by the examiner in the above matters, the examiner should take whatever action is deemed appropriate with respect to the appealed claims.

Summary

The standing rejection of claims 3-15 as being unpatentable over Yamagishi '413 in view of Yamagishi '563 is reversed.

The standing rejection of claim 16 as being unpatentable over Hayashi in view of Yamagishi '563 is reversed.

This case is remanded to the examiner for action in the

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matters noted above.

REVERSED AND REMANDED

IRWIN CHARLES COHEN)	
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