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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* KAZUYA KAMINO, HIDETAKA INOUE,  
and KOHEI MIMURA

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Appeal 2019-002676  
Application 15/490,285  
Technology Center 3700

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BEFORE JOHN C. KERINS, MICHAEL J. FITZPATRICK, and  
LISA M. GUIJT, *Administrative Patent Judges*.

GUIJT, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant<sup>1</sup> appeals from the Examiner's decision to reject claims 1–10. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as SUMITOMO RUBBER INDUSTRIES, LTD. Br. 1.

CLAIMED SUBJECT MATTER

The claims are directed to golf balls. Spec. 1:11. Claim 1, reproduced as the sole independent claim on appeal, is illustrative of the claimed subject matter:

1. A golf ball comprising a core, a mid layer positioned outside the core, and a cover positioned outside the mid layer, wherein

a thickness  $T_m$  (mm) and a Shore D hardness  $H_m$  of the mid layer, a thickness  $T_c$  (mm) and a shore D hardness  $H_c$  of the cover, and an amount of compressive deformation  $S_b$  (mm) of the golf ball meet the following mathematical formula (2),

$$((S_b * T_c) / (H_c * H_m * T_m)) * 1000 \geq 0.77 \quad (2),$$

the golf ball has a plurality of dimples on a surface thereof,

$S_o$  is a ratio of a sum of areas of the dimples relative to a surface area of a phantom sphere of the golf ball, expressed as a percentage, and is equal to or greater than 81.0%,

$R_s$  is a ratio of a number of the dimples each having a diameter of equal to or greater than 9.60% but equal to or less than 10.37%, of a diameter of the golf ball, relative to a total number of the dimples, expressed as a percentage, and is equal to or greater than 50%,

a dimple pattern of each hemisphere of the phantom sphere includes three units that are rotationally symmetrical to each other,

a dimple pattern of each unit includes two small units that are mirror-symmetrical to each other, and

the golf ball meets the following mathematical formula (3):

$$R_s \geq -2.5 * S_o + 273 \quad (3).$$

## REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Kasashima	US 2009/0209368 A1	Aug. 20, 2009
Okabe	US 2010/0167841 A1	July 1, 2010
Tachibana	US 2013/0095954 A1	Apr. 18, 2013

## REJECTION<sup>2</sup>

Claims 1–10 stand rejected under 35 U.S.C. § 103 as unpatentable over Tachibana, Kasashima, and Okabe.

## OPINION

Appellant argues claims 1–10 as a group. Br. 6–9. We select claim 1 as representative, and claims 2–10 stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Regarding independent claim 1, the Examiner finds, *inter alia*, that Tachibana teaches a golf ball with the following parameters: (i) a mid layer with a thickness ( $T_m$ ) of 1.0 mm and a hardness ( $H_m$ ) of 65 Shore D; (ii) a cover with a thickness ( $T_c$ ) of 0.5 and a hardness ( $H_c$ ) of 30 Shore D; and (iii) a compressive deformation ( $S_b$ ) of 2.8 mm. Final Act. 4 (citing Tachibana ¶ 96, Table 8, Example 1). The Examiner performs the following calculation, in accordance with formula (2), as claimed:

$$((2.8 * 0.5) / (30 * 65 * 1.0)) * 1000 = 0.72.$$

The Examiner recognizes that claim 1 requires an outcome of *greater or equal to 0.77*, and that 0.72 is less than 0.77.

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<sup>2</sup> The Examiner's rejection of claims 1–10, and separately of claims 7 and 8, under 35 U.S.C. § 112(b) have been withdrawn. Ans. 3; Final Act. 2–3.

Notwithstanding, the Examiner determines that any value greater than 3.0 mm for the compressive deformation in formula (2), while maintaining the other parameters as disclosed *supra*, meets the claim requirements. Final Act. 4; Ans. 3. Thus, the Examiner relies on Tachibana's disclosure of a range of values for compressive deformation (Sb), namely, from 2.0 to 3.3 mm, and selects a value of 3.1 mm from the disclosed range to demonstrate that the following calculation results in a value of 0.79, which is equal to or greater than 0.77, as required by claim 1:

$$((3.1 * 0.5) / (30 * 65 * 1.0)) * 1000 = 0.79.$$

Final Act. 4 (citing Tachibana ¶ 112); Ans. 3.

The Examiner reasons that Tachibana discloses the general conditions of claim 1, and also evidences that compressive deformation is recognized in the prior art as a result-effective variable. Final Act. 4 (citing *In re Aller*, 220 F.2d 454, 456 (CCPA 1955) (“where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation”); Ans. 3; *see also In re Antonie*, 559 F.2d 618, 620 (CCPA 1977) (explaining that this rule is limited to cases in which the optimized variable is a “result-effective variable”).

Indeed, we agree with the Examiner that Tachibana is evidence that the compressive deformation of a golf ball was recognized as a result-effective variable, because Tachibana discloses, for example, that “[by] causing the compression deformation amount to be 2.0 mm or more, desirable shot feeling is obtained,” and “[by] causing the compression deformation amount to be 3.3 mm or less, desirable repulsion is obtained.” Tachibana ¶ 112; *see* Ans. 3 (“the compressive deformation of the ball is a result effective variable affecting shot feel and repulsion and providing for

compressive deformation in the range of 2.0 to 3.3”) (citing Tachibana ¶ 112).

The Examiner further determines that

[i]t is understood by those of ordinary skill in the art that varying the hardness profile of the *core* affects the compressive deformation of the ball and that the *core hardness* may be altered without altering the thickness or hardness of the mid layer and the cover, such that Tachibana suggests a ball satisfying inequality expression (2).

Ans. 4 (emphasis added). This position is supported by recognition that formula (2) includes as variables the hardness values for a mid layer and a cover, but no variable for a core hardness). Thus, the Examiner determines that it would have been obvious “to alter [Tachibana’s golf ball’s] compressive deformation to any extent necessary to meet the claim, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.” Final Act. 4.

Alternatively, the Examiner determines that reducing the hardness of Tachibana’s *cover* (Hc) from 30 to 27 Shore D, according to the teachings of Tachibana, results in a golf ball with a compression deformation that meets the requirements of formula (2). Adv. Act. 2; *see* Tachibana ¶ 110 (disclosing “Shore D hardness of the cover composition is preferably 45 or less” and that “[b]y causing the slab hardness H7 of the cover composition to be 45 or less, the spin rate upon an approach shot with a short iron is enhanced” and also that “to ensure a sufficient spin rate upon an approach shot, the slab hardness H7 in Shore D hardness of the cover composition is preferably 20 or more”). Indeed, selecting a value of 27 for Hc in the following calculation, in accordance with formula (2), as claimed, results in

a value of 0.80, which is equal to or greater than 0.77, as required by claim 1:

$$((2.8 * 0.5) / (27 * 65 * 1.0)) * 1000 = 0.80.$$

First, Appellant argues that “[i]f the compressive deformation of the ball of Example 1 is changed to 3.3 mm, this change will also affect  $T_m$ ,  $H_m$ ,  $T_c$ , and  $H_c$ ,” because “a single property of the ball, and in particular the compressive deformation  $S_b$  of the whole golf ball, cannot be changed without affecting the other properties (the layers making up the golf ball).” Br. 6–7. However, Appellant’s argument does not address the Examiner’s determination, as set forth *supra*, that it was within the knowledge of a person of ordinary skill in the art to modify the Shore D hardness of the *core* (i.e., center 31 as depicted in Tachibana’s Figure 1)—without modifying variables relative to the thickness and hardness of the mid layer and cover—to predictably arrive at a compressive deformation for a three-piece golf ball that meets formula (2), as claimed. *See* Tachibana ¶ 101 (recognizing that parameters relative to the *center only* may be modified, i.e., the compression deformation of the center may be modified within a range of 2.0 mm or more and 3.8 mm or less); *id.* ¶ 102 (disclosing modifications to the *center* surface hardness). Appellant’s argument *supra* also does not address the Examiner’s finding that Tachibana itself discloses modifying the hardness of the *cover* within a known range to achieve the results of formula (2), as claimed.

Appellant also argues that the Examiner’s rejection lacks a rationale for modifying Tachibana’s golf ball to result in the claimed invention. Br. 7–9. We disagree, in that the Examiner’s determination that the compression deformation of the golf ball was recognized in the prior art as a result-effective variable, when presented with the same general conditions as

claimed, supports the Examiner’s rationale that it is not inventive to discover the optimum or workable ranges by routine experimentation.

Appellant relies on “inventive Example 7” as compared to “Comparative Examples 6 and 8” of the Specification as “evidence of secondary considerations”, and concludes that “the golf ball having a value equal to or more than 0.77 achieved unexpectedly superior result in terms of feel at impact.” Br. 7–8. Appellant provides the following support from the Specification:

	Example 7	Comparative Example 8	Example 1 of Tachibana et al. '954	Comparative Example 6
$((Sb * Tc) / (Hc * Hm * Tm)) * 1000$	0.77	0.74	0.72	0.69
Feel at impact	B	C	C	C

*Id.* at 7; *see* Spec. 37:33–38:1 (disclosing that “[t]he evaluation was categorized . . . on the basis of the number of golf players who answered, ‘the feel at impact was favorable’”, wherein “B: 20 to 24 persons” and “C: 15 to 19 persons”).

Appellant has not provided sufficient evidence that the results relied upon *supra* for Example 7 are obtained by anything other than routine experimentation, in view of the prior art’s recognition that the parameters of formula (2) are result-effective variables. In other words, Appellant’s conclusory statement that these results are *unexpectedly* superior lacks factual support.

Accordingly, we sustain the Examiner’s rejection of claim 1, and claims 2–10 fall therewith.

## CONCLUSION

The Examiner’s rejection of claims 1–10 under 35 U.S.C. § 103 as unpatentable over Tachibana, Kasashima, and Okabe is AFFIRMED.

DECISION SUMMARY

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1-10	103	Tachibana, Kasashima, Okabe	1-10	
<b>Overall Outcome</b>			1-10	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED