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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MURALI SETHUMADHAVAN and DAVID C. SHERMAN

Appeal 2019-004900
Application 15/340,049
Technology Center 3700

Before JENNIFER D. BAHR, WILLIAM A. CAPP, and LISA M. GUIJT,
Administrative Patent Judges.

CAPP, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant¹ seeks our review under 35 U.S.C. § 134(a) of the final rejection of claims 1–16. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies Rogers Corporation as the Applicant and real party in interest. Appeal Br. 2.

THE INVENTION

Appellant's invention relates to protective headgear such as football helmets. Spec. ¶¶ 2–3. Claim 16, reproduced below, is illustrative of the subject matter on appeal.

16. A multilayer article comprising:
a first polymer foam layer;
a second polymer foam layer; and
a carbon layer located between the first polymer foam layer and the second polymer foam layer; wherein carbon layer has a thickness of 0.3 nm to 1 mm.

THE REJECTIONS

The Examiner relies upon the following as evidence in support of the rejections:

NAME	REFERENCE	DATE
Wayte	US 4,867,826	Sept. 19, 1989
Sawamoto	US 5,318,835	June 7, 1994
Cohen	US 2015/0223546 A1	Aug. 13, 2015
Guerra	US 2016/0088884 A1	Mar. 31, 2016

The following rejections are before us for review:

1. Claim 16 is rejected under 35 U.S.C. § 103 as being unpatentable over Cohen.
2. Claims 1–6 and 11–15 are rejected under 35 U.S.C. § 103 as being unpatentable over Cohen and Guerra.
3. Claims 7–9 are rejected under 35 U.S.C. § 103 as being unpatentable over Cohen, Guerra, and Wayte.
4. Claim 10 is rejected under 35 U.S.C. § 103 as being unpatentable over Cohen, Guerra, Wayte, and Sawamoto.

OPINION

*Unpatentability of Claim 16
over Cohen*

The Examiner finds that Cohen discloses the invention as claimed except for the carbon layer having a thickness of 0.3 nm to 1 mm. Final Action 5. The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time of the invention to arrive at the claimed thickness as a matter of routine experimentation. *Id.* According to the Examiner, a person of ordinary skill in the art would have done this to provide a lighter helmet. *Id.*

Appellant disagrees with the Examiner and argues that its discovery of successful impact performance with a thickness of only 0.3 nm to 1 mm is “surprising[.]” Appeal Br. 10. Appellant supports this contention by citing to paragraph 12 of the Specification. *Id.*

In response, the Examiner reiterates that it would have been obvious to reduce the thickness of the carbon layer to provide a lighter helmet. Ans. 7. The Examiner also finds that merely reducing the thickness of a layer entails no more than ordinary skill. *Id.*

In reply, Appellant repeats its argument that its discovery is “surprising.” Reply Br. 10. Appellant argues that a person of ordinary skill in the art would not have expected to achieve satisfactory structural integrity after reducing the thickness of Cohen’s hard inner layer from 1.5 mm to 1 mm. *Id.*

Appellant’s arguments are not persuasive. In the first instance, Appellant does not contest the Examiner’s point that reducing the thickness of the carbon layer would save weight and thereby make the helmet lighter. Further in that regard, Appellant does not challenge the Examiner’s point

that reducing overall helmet weight provides a sufficient motivation to make the proposed modification. Moreover, Appellant presents no evidence to rebut the Examiner's finding that arriving at the claimed thickness is no more than a matter of routine optimization.

Cohen discloses a football helmet with a multi-layered structure. Cohen ¶ 3, Fig. 1. Cohen's helmet features, among other things, cushioning outer shell 20, hard inner shell 40, and innermost cushioning pads 50. *Id.* ¶ 41, Fig. 1. Cohen teaches, by way of example and not by way of limitation, that hard inner shell 40 may be between 1.5 mm and 6.0 mm thick. *Id.* ¶ 50. However, Cohen explicitly contemplates that such shell may be thinner. *Id.* Thus, although Cohen teaches that shell 40 contributes to the structural integrity of the overall helmet, Cohen explicitly contemplates that a thickness of less than 1.5 mm may be used. *Id.* A person of ordinary skill in the art would thus readily understand that there is a relationship between material thickness and structural integrity. *See In re Applied Materials, Inc.*, 692 F.3d 1289, 1297 (Fed. Cir. 2012) (explaining that a recognition in the prior art that a property is affected by a variable is sufficient to find the variable result-effective). A person of ordinary skill in the art would also understand that thicknesses of less than 1.5 mm could be explored by routine experimentation to optimize variables such as helmet weight, material costs, and structural integrity. *Id.* at 1295 ("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").

Notwithstanding, the outcome of optimizing a result-effective variable may still be patentable if the claimed ranges are "critical" and "produce a new and unexpected result which is different in kind and not merely in

degree from the results of the prior art.” *Id.* Accordingly, we explore Appellant’s contention that they “surprisingly discovered” that the claimed thickness yielded satisfactory impact strength. Appeal Br. 10, Reply Br. 9. The sole support in the record relied on by Appellant is a naked assertion set forth in the Specification:

The inventors hereof *surprisingly discovered* that a multilayer article comprising a first polymer foam layer, a second polymer foam layer, and a carbon layer located in between the first polymer foam layer and the second polymer foam layer has increased impact strength compared to a solitary foam layer or carbon layer.

Spec. ¶ 12 (emphasis added). The arguments advanced in Appellant’s briefs and the foregoing statement from Appellant’s Specification are not sufficient to carry Appellant’s burden of establishing criticality and/or unexpected results. “It is well settled that unexpected results must be established by factual evidence. Mere argument or conclusory statements in the specification does not suffice.” *In re De Blauwe*, 736 F.2d 699, 705 (Fed.Cir. 1984); *see also In re Wood*, 582 F.2d 638, 642 (CCPA 1978) (“Mere lawyer's arguments and conclusory statements in the specification, unsupported by objective evidence, are insufficient to establish unexpected results”).

In view of the foregoing discussion, we sustain the Examiner’s unpatentability rejection of claim 16.

*Unpatentability of Claims 1–6 and 11–15
over Cohen and Guerra*

Claim 1

Claim 1 is an independent claim that is substantially similar in scope to claim 16 except that the carbon layer comprises a graphene layer, a

plurality of carbon nanotubes, or a combination comprising at least one of the foregoing. Claims App. The Examiner relies on Guerra as disclosing a helmet layer comprised of graphene. Final Action 2. The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time of the invention to use graphene in the carbon layer of Cohen. *Id.* According to the Examiner, a person of ordinary skill in the art would have done this to provide improved protection. *Id.*

Appellant traverses the rejection by arguing that a person of ordinary skill in the art would not use the graphene material of Guerra in shell 40 of Cohen because Guerra uses graphene in tensile sheet 30 that is deformed on impact. Appeal Br. 7. In Appellant's own words:

Why would one of skill in the art replace the hard inner structure 40 of Cohen that lends to the structural integrity of the helmet with a tensile sheet that is deformable on impact?

Id.

In response, the Examiner states that the proposed combination merely substitutes the graphene material from Guerra for the carbon material used in shell 40 of Cohen. Ans. 3. Thus, the rejection is not predicated on incorporating the entire structure of Guerra's tensile sheet 30 into Cohen.

Id.

In reply, Appellant essentially just repeats and rephrases the contentions from the Appeal Brief that Guerra's tensile sheet 30 has a different structure and purpose than shell 40 of Cohen. Reply Br. 2–5. Appellant argues that merely because a material is known does not provide motivation to exchange it with another material. *Id.* 4.

Appellant's arguments are not persuasive. A person of ordinary skill in the art would have readily understood, at the time of the invention, that

graphene is an extremely strong material with a wide variety of uses and commercial applications. In particular, a person of ordinary skill in the art would have understood, contrary to Appellant's arguments, that the use of graphene is not limited to tensile sheets in the particular helmet structural configuration of Guerra. In that regard, an artisan must be presumed to know something about the art apart from what the references disclose. *See In re Jacoby*, 309 F.2d 513, 516 (CCPA 1962).

The Examiner's findings of fact are supported by a preponderance of the evidence and that the Examiner's legal conclusion of unpatentability is well-founded and, accordingly, we sustain the Examiner's unpatentability rejection of claim 1.

Claim 3

Claim 3 depends from claim 1 and adds the limitation: wherein the carbon layer comprises a graphene layer. Claims App. Contrary to our rules, Appellant fails to argue this claim under a separate heading or sub-heading. *See* 37 C.F.R. § 41.37(c)(1)(iv) ("any claims(s) argued separately or as a subgroup shall be argued under a separate subheading that identifies the claim(s) by number"). Appellant provides no explanation or excuse for failing to comply with our rules. *Id.* As best understood, Appellant argues claim 3 in a single paragraph on page 7 of the Appeal Brief.

In traversing the rejection, Appellant relies solely on arguments that we fully considered and found unpersuasive with respect to claim 1 and find equally unpersuasive here. Appeal Br. 7. We sustain the rejection of claim 3.

Claim 6

Claim 6 depends from claim 1 and adds the limitation: “wherein the carbon layer has a thickness of 0.3 nm to 2 mm.” Claims App. Once again, Appellant fails to argue this claim under a separate sub-heading in accordance with our rules. 37 C.F.R. § 41.37(c)(1)(iv). As best understood, Appellant argues claim 6 in a single paragraph on page 7 of the Appeal Brief.

Appellant argues that the prior art fails to disclose the aforementioned thickness limitation. Appeal Br. 7. In response, the Examiner points out that Cohen teaches a structure within the claimed thickness range. Ans. 4.

The Examiner has the correct version of the facts. Cohen discloses that its hard inner structure 40 is made of carbon fiber. Cohen ¶ 50. Such structure is between 1.5 mm and 6.0 mm thick, although Cohen explicitly discloses that it may be thinner or thicker. Thus, Cohen’s thickness falls within the claimed range.

We sustain the Examiner’s unpatentability rejection of claim 6.

Claims 11

Claim 11 depends from claim 1 and adds a functional/product performance limitation regarding compressive force deflection. Claims App. The Examiner finds that, inasmuch as Cohen discloses the claimed structure, it could be expected to achieve the claimed performance parameter. Final Action 3. Once again, Appellant fails, without justification, to argue this claim under a separate sub-heading in accordance with our rules. 37 C.F.R. § 41.37(c)(1)(iv). As best understood, Appellant argues claim 11 in a single paragraph on page 8 of the Appeal Brief.

Appellant argues that Cohen fails to disclose or suggest “the presently claimed article.” Appeal Br. 8. This argument is not persuasive for the reasons articulated above in connection with the rejection of claim 1. With respect to the claimed performance parameter, the Examiner’s findings of fact demonstrate a sound basis for believing that the prior art helmet and Appellant’s helmet are the same. This is sufficient to shift the burden to Appellant to demonstrate otherwise. *In re Spada*, 911 F.2d 705, 708 (Fed.Cir.1990) (“when the PTO shows sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not.”). Appellant provides neither evidence nor persuasive technical reasoning sufficient to carry its burden.

We sustain the Examiner’s unpatentability rejection of claim 11.

Claim 15

Claim 15 is an independent claim that is substantially similar in scope to claim 11 except that it adds a thickness limitation to the carbon/graphene layer and adds functional/product performance limitations as to each of the first and second polymer foam layers. Claims App. Once again, Appellant fails, without justification, to argue this claim under a separate sub-heading in accordance with our rules. 37 C.F.R. § 41.37(c)(1)(iv). As best understood, Appellant argues claim 15 on page 8 of the Appeal Brief.

Appellant argues that the thickness limitation achieves a “surprising” result. Appeal Br. 8. Appellant further argues that the prior art fails to disclose the multilayer structure of claim 15. *Id.*

Appellant’s arguments amount to a recapitulation of arguments that we fully considered and found unpersuasive with respect to claims 1, 3, 11,

and 16 and find equally unpersuasive here. We sustain the rejection of claim 15.

Claims 2, 4, 5, and 12–14

Claims 2, 4, 5, and 12–14 depend, directly or indirectly, from claim 1 and are not separately argued. Claims App., Appeal Br. 4–8. They fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv) (failure to separately argue claims constitutes a waiver of arguments for separate patentability).

*Unpatentability of Claims 7–9
over Cohen, Guerra, and Wayte*

Appellant argues claims 7–9 under a separate heading. *See* Appeal Br. 8–9. We select claim 7 as representative. 37 C.F.R. § 41.37(c)(1)(iv). To the extent that claims 8 and 9 are mentioned separately, such mention fails to rise to the level of a separate argument for patentability. 37 C.F.R. § 41.37(c)(1)(iv) (“A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim”); *see also In re Lovin*, 652 F.3d 1349, 1357 (Fed. Cir. 2011) (Rule 41.37 requires more than recitation of the claim elements and a naked assertion that the elements are not found in the prior art).

Claim 7 depends from claim 1 and adds the limitation:

further comprising one or both of a first adhesive layer located in between the first polymer foam layer and the carbon layer, and a second adhesive layer located in between the second polymer foam layer and the carbon layer.

Claims App. The Examiner finds that Wayte teaches the bonding limitation. Final Action 4. The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use adhesive between the layers of Cohen. *Id.* According to the Examiner, a

person of ordinary skill in the art would have done this to provide a secure bond between the foam and carbon layers. *Id.*

Appellant argues that Wayte's adhesive is used for a purpose other than adhering a polymer foam layer to a carbon layer. Appeal Br. 9. In response, the Examiner observes that it is well known in the art to use adhesives to provide a secure structure. *Id.*

Appellant's argument is not persuasive. It is not necessary for the prior art to serve the same purpose as that disclosed in Appellant's Specification in order to support the conclusion that the claimed subject matter would have been obvious. *See In re Lintner*, 458 F.2d 1013, 1016 (CCPA 1972). "A reference may be read for all that it teaches, including uses beyond its primary purpose." *In re Mouttet*, 686 F.3d 1322, 1331 (Fed. Cir. 2012), citing *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-21 (2007). A person of ordinary skill in the art would understand that adhesives are used in a broad range of product applications to adhere one component to another. Appellant presents no evidence that its use of adhesive produces unexpected results or requires more than ordinary skill. In our opinion, a person of ordinary skill in the art would have had a reasonable expectation of success in using an adhesive, as taught by Wayte, to bond the carbon layer to the foam layers of Cohen. "For obviousness under § 103, all that is required is a reasonable expectation of success." *In re O'Farrell*, 853 F.2d 894, 904 (Fed. Cir. 1988); *see also Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1364 (Fed. Cir. 2007) ("the expectation of success need only be reasonable, not absolute").

We sustain the Examiner's unpatentability rejection of claims 7-9.

*Unpatentability of Claim 10
over Cohen, Guerra, Wayte, and Sawamoto*

Claim 10 depends from claim 7 and adds the limitation: “wherein the first adhesive layer and the second adhesive layer can each independently comprise a tackifier.” Claims App. The Examiner finds that Sawamoto teaches the tackifier limitation. Final Action 5. The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the tackifier of Sawamoto in the proposed combination. *Id.* According to the Examiner, a person of ordinary skill in the art would have done this to provide improved adhesion of the components. *Id.*

Appellant argues that a person of ordinary skill in the art would not have used Sawamoto’s tackifier in the proposed combination because there is no indication of success. Appeal Br. 9. In response, the Examiner observes that it is well known in the art to use a tackifier to provide improved adhesion. *Id.*

Appellant’s “no indication of success” argument is not persuasive. A person of ordinary skill in the art would understand that tackifiers are used in a broad range of product applications to adhere one component to another. *Jacoby*, 309 F.2d at 516 (explaining that an artisan must be presumed to know something about the art apart from what the references disclose). Such artisan would have used a tackifier in the circumstance proposed by the Examiner with a reasonable expectation of success. *O’Farrell*, 853 F.2d at 894; *Pfizer*, 480 F.3d at 1364.

In view of the foregoing discussion, we determine the Examiner’s findings of fact are supported by a preponderance of the evidence and that

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the Examiner's legal conclusion of unpatentability is well-founded. We sustain the Examiner's unpatentability rejection of claim 10.

CONCLUSION

In summary:

Claims Rejected	§	Reference(s)	Aff'd	Rev'd
1-6, 11-15	103	Cohen, Guerra	1-6, 11-15	
7-9	103	Cohen, Guerra, Wayte	7-10	
10	103	Cohen, Guerra, Wayte, Sawamoto	10	
16	103	Cohen	16	
Overall Outcome			1-16	

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

AFFIRMED