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Paper 27
Entered: February 21, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KRANOS CORPORATION
d/b/a Schutt Sports,
Petitioner,

v.

RIDDELL, INC.,
Patent Owner.

Case IPR2016-01650
Patent 8,938,818 B2

Before PHILLIP J. KAUFFMAN, BARRY L. GROSSMAN, and JAMES J. MAYBERRY, *Administrative Patent Judges.*

GROSSMAN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Kranos Corporation (d/b/a Schutt Sports) ("Petitioner") filed a Petition requesting an *inter partes* review of claims 1–3, 5–6, 8–12, 14–16, 18–19, 21–25, 27, 29–32, 34, 36–52, 56–58, and 60–65 of U.S. Patent No. 8,938,818 B2 ("the '818 patent"). Paper 1, 1 ("Pet."). Patent owner, Riddell, Inc. ("Patent Owner"), filed a Preliminary Response. Paper 8 ("Prelim. Resp.").

Petitioner raised thirteen separate and distinct challenges to patentability, including alternative combinations of the asserted references. We instituted review on the three grounds listed below:

1. Whether claims 41, 42, 49, 51, 56, 57, 62, 63, and 65 would have been obvious[1] based on Sears[2] and Halstead[3] *or* Rappleyea[4] and Halstead; and

2. Whether claims 58 and 64 would have been obvious based on Sears, Halstead, and Marietta[5]. Paper 10, 35 ("Dec. Inst.").

Patent Owner filed a Response to the Petition (Paper 15, "PO Resp."), and Petitioner filed a Reply (Paper 18, "Pet. Reply").

Petitioner submitted 34 exhibits, including demonstratives used at the hearing (Exs. 1001–1034). Petitioner relies, in part, on the Declaration testimony of its expert witness, Jamison Float (Ex. 1027).

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[1] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 296–07 (2011), took effect on September 16, 2012. Because the application for the patent at issue in this proceeding has an effective filing date before that date, we refer to the pre-AIA versions of the statute.
[2] Ex. 1016, Sears, "Wish Book for the 1971 Christmas Season" (1971).
[3] Ex. 1018, US 6,219,850 B1, April 24, 2001.
[4] Ex. 1017, US 3,729,744, May 1, 1973.
[5] Ex. 1023, US 3,122,752, March 3, 1964.

Patent Owner submitted seven exhibits (Exs. 2001–2003, 2005–2008), and also used demonstratives at the hearing (Paper 25). Patent Owner relies, in part, on the declaration testimony of its expert witness, Nicholas Shewchenko (Ex. 2005).

A hearing was held November 7, 2017. Paper 24 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. We enter this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Petitioner has the burden of proving unpatentability of a claim by a preponderance of the evidence. 35 U.S.C. § 316(e). Based on the findings and conclusions below, we determine that Petitioner has proven by a preponderance of the evidence that claims 41, 49, 51, 56, 57, 62, 63, and 65 would have been obvious. We also determine that Petitioner has not met its burden to prove claims 42, 58 and 64 unpatentable by a preponderance of the evidence.

A. Related Proceedings

The '818 patent is the subject of a suit captioned *Riddell, Inc. v. Kranos Corporation, d/b/a Schutt Sports.*, Civ. No. 1:16-cv-4496 (N.D. Ill.). Pet. 1; Paper 7, 2.

The patent application that matured into the '818 patent was a continuation application of the patent application that matured into U.S. Patent No. 8,528,118 (the "'118 patent"). Ex. 1001, 1. The '118 patent was the subject of a petition in IPR2016-01646 by Petitioner herein seeking an *inter partes* review of the '118 patent. Pet. 1; Paper 7, 3. A Final Written Decision was entered in the '118 IPR proceeding holding unpatentable some of the claims challenged based on the same Sears, Halstead, and Rappleyea references considered in the IPR proceeding now before us. *Kranos Corp. v. Riddell, Inc.*, IPR2016-01646, slip op. 83 (PTAB Feb. 5, 2018) (Paper 30).

Patent Owner also states that a related proceeding is *Riddell, Inc. v. Xenith, LLC*, Civ. No. 1:16-cv-04498 (N.D. Ill.). Paper 7, 2.

Additionally, Patent Owner identifies as related matters pending U.S. Patent Application Nos. 14/022,011, filed on September 9, 2013, and 14/605,765 filed on January 26, 2015, which "share, at least in part, common priority claims as the '818 Patent." *Id.* at 3.

We also note that the '818 patent was the subject of IPR2017-01317 (terminated) and IPR2017-01530 (denied).

B. The '818 Patent

The '818 patent relates generally to a sports helmet, such as a football helmet. Ex. 1001, 1:21–22[6]. The disclosed and claimed helmet includes the basic elements well-known for such helmets, such as a semi-rigid resinous shell provided with ear ports and with integral, downwardly depending jaw sections to cover the wearer's jaws. *See, e.g.*, Figure 1 from U.S. Patent No. 2,969,546, which is listed as a reference in the '818 patent, and is reproduced below.

Figure 1 from U.S. Pat. No. 2,969,546
is a perspective view of a prior art sports helmet.

[6] Citations to patent exhibits are in the form of "column:line," rather than to the page number of the exhibit, in order to provide more specific identification of the cited material.

The ’818 patent acknowledges “in general, the overall configuration and shape of a football helmet, has remained the same for many years.” Ex. 1001, 1:42–44.

The sports helmet disclosed in the ’818 patent is shown generally in Figures 1 and 19. Figure 1 is reproduced below.

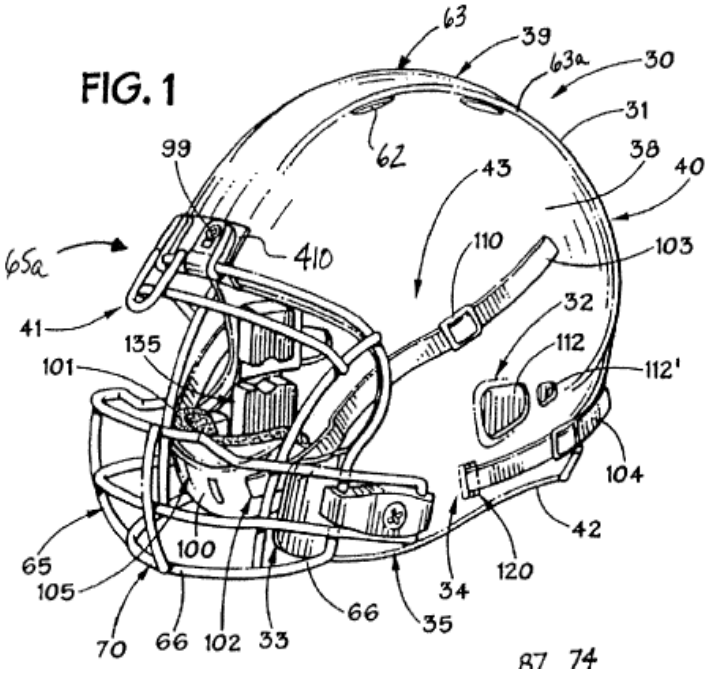

Figure 1 is a perspective view
of a sports helmet from the ’818 patent.

Shell 31 includes raised central band 63 integrally formed as part of the shell and extending across crown region 39 to rear region 40. Band 63 has a width defined by opposed sidewalls 63a that extend outward or transversely from the outer surface of the shell 31. *Id.* at 6:22–24. The width of band 63 preferably increases as it extends across crown region 39 to rear region 40. *Id.* at 6:24–26. Band 63 also has opposed lower side portions 63b, which extend from rear region 40 to a lower portion of ear flap 32 and terminates proximate ear opening 112 (*see* Figure 19). As shown in Figures 19 and 20, shell 31 includes vent openings 62 aligned along each side of raised central band 63. The vent openings provide ventilation for the wearer’s head. *Id.* at 6:10–14.

Regarding the function or purpose of central band 63, the written description of the ’818 patent states that an opening in raised central band 63 receives inflation valve 201 of inflatable crown shock absorbing pad 200. This “permits crown shock absorbing pad 200 to be inflated.” *Id.* at 14:3–10; Figs. 12, 13. Crown shock absorbing pad 200 may also include a positioning member 202, or snap member 203, or push-in-plug 204 “which is received within an opening 205 in shell 31, more specifically in the raised central band 63, to position and retain crown pad 200 within shell 31.” *Id.* at 14:10–14. Opening 205 is defined by and extends through raised central band 63. *Id.* at 14:18–19.

C. Representative Claim

Claims 41and 62 are independent claims. Claim 41, reproduced below, is representative of the claimed invention:

> 41. A football helmet comprising:
>
> a plastic shell configured to receive a head of a wearer of the helmet, the shell having:
>
> a front region,
>
> a crown region,
>
> a rear region,
>
> two side regions wherein each side region has an ear flap with an ear opening,
>
> a raised central band integrally formed as part of the shell and extending across the crown region to the rear region,
>
> a first plurality of elongated vent openings in the shell, wherein said first plurality of vent openings reside outside of the raised central band and are aligned along a first side of the raised central band;
>
> a second plurality of elongated vent openings in the shell, wherein said second plurality of vent openings reside outside of the raised central band and are aligned along a second side of the raised central band;

> a face guard secured to the shell by a plurality of connectors; and
>
> a chin strap assembly that releasably secures the helmet to the wearer.

Claims 41 and 62 are substantially identical. Claim 41 recites that the vent openings "reside outside" the central band; claim 62 recites that the vent openings are "positioned beyond" the central band. The parties have not directed us to persuasive evidence of a substantive difference in scope between these two claims. We determine that the different claim terms are a distinction without a substantive difference. Claims 41 and 62 are substantively identical.[7]

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 40.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc*., 504 F.3d 1249, 1257 (Fed. Cir. 2007). The correct inquiry in giving a claim term its broadest reasonable interpretation in light of the specification is "an interpretation that corresponds with what and how the inventor describes his invention in the specification, *i.e.*, an interpretation that is 'consistent with the specification.'" *In re Smith Int'l, Inc.*, 871 F.3d 1375, 1382–83 (Fed. Cir.

[7] We also note that claims 41 and 62 are similar to claims 1, 13, 25 and 34 in its parent patent, U.S. 8,528,118 (the "'118 patent"), which is the subject of IPR2016-01646.

2017) (citations omitted). The broadest *reasonable* interpretation differs from the "broadest *possible* interpretation." *Id.*

Only terms that are in controversy need to be construed expressly, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc*., 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner did not propose any specific claim constructions in the Petition. Pet. 8.

In its Preliminary Response, Patent Owner proposed specific constructions for the phrase "aligned along" and the word "proximate." Prelim. Resp. 8, 10. We adopted Patent Owner's proposed construction for "aligned along" in our Decision to Institute. Dec. Inst. 12. We did not construe the word "proximate."

In its Response, Patent Owner proposes specific construction for the phrases "aligned along" (PO Resp. 7–10) and "integrally formed" (*id*. at 10–12).

In its Reply, Petitioner disagrees with the construction of "aligned along" in our Decision to Institute and proposes an alternate construction. Pet. Reply 7–8. Petitioner also disagrees with Patent Owner's proposed construction of the phrase "integrally formed." *Id.* at 8–11.

We address these claim construction issues below. Because claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure, we first consider the level of ordinary skill in the art as part of claim construction.

1. Level of Ordinary Skill

The level of skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

Factors pertinent to a determination of the level of ordinary skill in the art include: (1) educational level of the inventor; (2) type of problems encountered in the art: (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology, and (6) educational level of workers active in the field. *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed.Cir.1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.* Moreover, these factors are not exhaustive but are merely a guide to determining the level of ordinary skill in the art. *Daiichi Sankyo Co. Ltd, Inc. v. Apotex, Inc*., 501 F.3d 1254, 1256 (Fed. Cir. 2007).

In determining a level of ordinary skill, we also may look to the prior art, which may reflect an appropriate skill level. *Okajima*, 261 F.3d at 1355. Additionally, the Supreme Court informs us that "[a] person of ordinary skill is also a person of ordinary creativity, not an automaton." *KSR Int'l v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

Neither party presents a detailed evidentiary showing of factors typically considered in determining the level of ordinary skill.

Petitioner asserts that a person of ordinary skill in the relevant technology would have had would have a bachelor's degree in engineering *or* more than three years experience in the design of protective equipment, protective helmets, and/or plastic parts including the design of protective and/or structural plastic elements. Pet. 49–50 (citing Ex. 1027 ¶ 89). Mr. Float merely repeats Petitioner's conclusory assertion without any additional analysis, facts, or data on which the opinion is

based. As such, his testimony on this issue is entitled to little or no probative weight. 37 C.F.R. § 42.65(a).

Patent Owner does not address the level of ordinary skill in its Response. Patent Owner refers repeatedly to a person of ordinary skill in its Response but does not define or otherwise explain this term. *E.g.*, PO Response 27 ("A person of ordinary skill in the art would not regard vent openings in such a configuration as being 'along' (i.e., beside) the raised central band.").

We do not search through the record looking for evidence that may support a party's case. *DeSilva v. DiLeonardi*, 181 F.3d 865, 866–67 (7th Cir. 1999) ("A brief must make all arguments accessible to the judges, rather than ask them to play archeologist with the record."). We note, however, that Patent Owner's Declarant, Mr. Shewchenko, testifies and opines on the level of ordinary skill. Ex. 2005 ¶¶ 17–19. Patent Owner makes no specific argument referring to, or citing, Mr.Shewchenko's testimony concerning the level of ordinary skill. Thus, we give Mr.Shewchenko's testimony on this issue no consideration or evidentiary weight.[8]

We have not been directed to any evidence in the record concerning the educational level of the inventors of the '818 patent or the educational level of workers active in the field.

We find that the prior art has used many of the same solutions to the problems addressed by the claims in this proceeding. As stated in the '818 patent:

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[8] *See Fidelity Nat'l Info. Servs, Inc., v. Datatreasury Corp.* Case IPR2014-00489, slip. op. at 9, (PTAB Aug. 13, 2014) (Paper 9) ("We, therefore, decline to consider information presented in a supporting declaration, but not discussed sufficiently in a petition; among other reasons, doing so would permit the use of declarations to circumvent the page [or word] limits that apply to petitions."). This same logic applies to Patent Owner responses.

> Various types of helmets have been in use in the sport of football, ever since individuals began wearing helmets to attempt to protect their heads many years ago. Typically, these helmets have included: an outer shell, generally made of an appropriate plastic material, having the requisite strength and durability characteristics to enable them to be used in the sport of football; some type of shock absorbing liner within the shell; a face guard; and a chin protector, or chin strap, that fits snugly about the chin of the wear of the helmet, in order to secure the helmet to the wearer's head, as are all known in the art.

Ex. 1001, 1:30–40.

We also find that innovation is not rapid in this field. *Id.* at 1:41–44 ("Over the years, various improvements have been made to the various components of a football helmet; however, in general, the overall configuration and shape of a football helmet, has remained the same for many years.").

Based on the evidence before us, we determine that a person of ordinary skill in the art to which the '818 patent pertains would have had at least a Bachelor's degree in a relevant field of engineering or physics and at least one year of experience in designing protective equipment, protective helmets, or plastic parts including the design of protective or structural plastic elements. Three years of experience in designing protective equipment, protective helmets, or plastic parts including the design of protective or structural plastic elements may be substituted for a formal engineering or physics degree, resulting in a total of four years of experience. This level of ordinary skill in the art is consistent with the related case *Kranos v. Riddell*, IPR2016-01646, slip op. 10–11 (Paper 30).

2. "Aligned Along"

The claim construction inquiry "begins and ends in all cases with the actual words of the claim." *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998) (citations omitted). "[T]he resulting claim interpretation must, in the end, accord with the words chosen by the patentee to

stake out the boundary of the claimed property." *Id.* Thus, we begin with the words of the claims.

Independent claim 41 recites that the plastic shell has elongated vent openings that "*reside outside* of the raised central band" and are "aligned along" the sides of the raised central band. Ex. 1001, 18:28–35 (emphasis added).

Independent claim 62 is very similar to claim 41 and recites that the plastic shell has elongated vent openings "*positioned beyond* the raised central band" and are "aligned along" the sides of the raised central band. *Id.* at 20:25–32 (emphasis added).

The "aligned along" limitation was included in the claims originally filed in the application that matured into the '818 patent (*see* Ex. 1007, 488 (claim 1)). In an Office Action mailed March 10, 2014, the Examiner rejected claims 1–62 under 35 U.S.C. § 112(b) because the recitations that the vents are "residing outside" or are "positioned beyond" the raised central band "has no clear and definite meaning as to the location of the vents relative to the shell or central band." *Id.* at 55. The Examiner also objected to the Specification for "failing to provide antecedent basis" for this claimed subject matter. *Id.*

In response to the March 10, 2014, Office Action, the Applicant stated that, in a telephone interview, the Examiner and Applicant agreed that Figures 1, 1A. 19, and 20 "show the positional relationship of the helmet shell's raised central band and the vent openings." *Id.* at 40; *see also id.* at 41 ("The positional relationship of the raised central band and both the first and second plurality of vent openings is shown in a number of figures (e.g., Figs. l, 1 A, 19 and 20) in the present application."). Applicant also stated, based on the drawings, a person of ordinary skill would recognize that the vent openings "are located beyond or

external to the raised central band." *Id.* at 42. An annotated copy of Figure 20 is reproduced below.

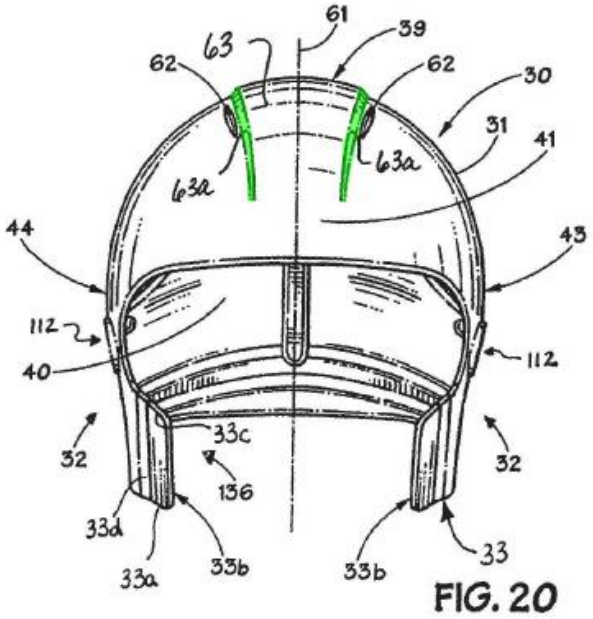


Fig. 20 from the '818 patent is a front view of helmet 30.
Green highlighting shows opposed sidewalls 63a of raised central band 63.

As shown in annotated Figure 20, vent openings 62 are located on either side of raised central band 63. Vent openings 62 are not *on* raised central band 63. Vent openings 62 are positioned close to, but beyond, raised central band 63.

As stated above, the parties have not directed us to persuasive evidence of a substantive difference in scope between independent claims 41 and 62. We determine that the claim terms "reside outside" and "positioned beyond" are a distinction without a substantive difference. Independent Claims 41 and 62 are substantively identical. We recognize the "presumption that each claim in a patent has a different scope." *Versa Corp. v. Ag–Bag Int'l Ltd.*, 392 F.3d 1325, 1330 (Fed.Cir.2004) (quoting *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed.Cir.1998)). Claim drafters, however, also can use different terms to define the exact same subject matter. *Curtiss-Wright Flow Control Corp. v. Velan,*

Inc., 438 F.3d 1374, 1380 (Fed. Cir. 2006). Two independent claims with different terminology can define the exact same subject matter. *Hormone Research Found. v. Genentech, Inc.*, 904 F.2d 1558, 1567 n. 15 (Fed.Cir.1990) ("It is not unusual that separate claims may define the invention using different terminology, especially where (as here) independent claims are involved.").

The adopted construction in our Decision to Institute for the phrase "aligned along," proposed by Patent Owner (Prelim. Resp. 8), was "two or more vent openings positioned in relation to and *beside* the first side wall of the raised central band." Dec. Inst. 12 (emphasis added).

In its Patent Owner response, Patent Owner states "the Board should maintain is prior construction of the claim limitation '*aligned along*.'" PO Resp. 9. Patent Owner, however, seeks to clarify that the word "'along' requires something to be 'close' or 'beside.'" *Id*. Because our construction included the word "beside," Patent Owner essentially seeks to clarify that the word "beside" means "close." According to Patent Owner, support for this clarification is found in Figure 1 of the '818 patent, which shows vents 62 positioned close to raised central band 63. *Id.* at 8. Patent Owner also relies on dictionary definitions of the words "aligned" and "along." *Id.* (citing Ex. 2003). The dictionary evidence provided by Patent Owner for the word "aligned" defines this word to mean "[t]o arrange in a line or so as to be parallel" Ex. 2003, 4[9]. The dictionary evidence provided by Patent Owner for the word "along" defines this word to mean "[o]n a line or course parallel and close to; continuously beside." *Id.* at 5.

Petitioner asserts that the claims do not require the vent holes to be aligned *with* the side walls of the raised central band. Pet. Reply 7–8. Petitioner also

[9] We cite to the exhibit page number (upper right corner) not the dictionary page number (centered).

asserts that the claimed relationship does not require the vents to be "on," "beside," "abutting," or "directly next to" the raised central band. *Id.* at 8. Petitioner does not cite any persuasive evidence to support these arguments.

The related *inter partes* review, IPR2016-01646, defined the phrase "aligned along," which was used in an identical clause in substantially similar claim 34 of the parent '118 patent[10], to mean "two or more elongated vent openings aligned with and close to the first side wall of the raised central band." *Kranos v. Riddell*, IPR2016-01646, slip op. 14 (Paper 30). In so construing the term, the Board made clear that the language "close to the first side wall" does not require the vent openings "to abut or touch the first side wall, that is, there may be some distance between the side wall and the vent opening." *Id.*

The parties spend far more words arguing the positional relationship of the vents to the raised central band than the Specification used in describing these elements. Other than Figures 1, 1A, 19, and 20 of the '818 patent, we have not been directed to any evidence in the Specification or prosecution history relating to the position of vents 62 relative to raised central band 63. The only function disclosed for vents 62 is simply for ventilation, to permit "the passage of air through shell 31" to thereby provide "greater comfort" to the wearer. Ex. 1001, 6:10–17. The written description of the '818 patent does not discuss the precise location of these vents or the significance of the precise location of these vents.

> Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct

[10] Mr. Shewchenko, Patent Owner's Declarant, testified that the "instituted claims of the '818 patent are very similar to the instituted claims of the '118 patent [in IPR2016-01646]." Ex. 2005 ¶ 61.

construction.

Renishaw, 158 F.3d at 1250 (citations omitted).

Based on the evidence of record, we adopt a construction consistent with the construction in the related IPR2016-01646. *See SightSound Techs., LLC v. Apple Inc.*, 809 F.3d 1307, 1316 (Fed. Cir. 2015) (citing *NTP Inc., v. Research in Motion, Ltd.*, 418 F.3d 1282, 1293 (Fed. Cir. 2005) (When construing claims in patents that derive from the same parent application and share common terms, "we must interpret the claims consistently across all asserted patents.")). The broadest reasonable construction of the phrases in independent claims 41 and 62 that a plurality of elongated vent openings are "aligned along a [first/second] side of the raised central band" is "two or more elongated vent openings aligned with and close to the [first/second] side wall of the raised central band." *See e.g.*, Ex. 1001, Fig. 20; Ex. 2003, 5. In so construing this term, we make clear that the language "close to the [first/second] side wall" does not require the vent openings to abut or touch the first/second side wall of the raised central band, that is, there may be some distance between the side wall and the vent opening. This construction stays true to the claim language and most naturally aligns with the only disclosure in the '818 patent of the positional relationship of the vents and the raised central band, which is in the figures of the patent. It also is consistent with the Applicant's statement during prosecution that the vent openings "are located beyond or external to the raised central band." *See* Ex. 1007, 42.

3. "Integrally Formed"

Independent claims 41 and 62 each recite "a raised central band integrally formed as part of the shell." Ex. 1001, 18:25–26; 20:23.

Patent Owner proposes a specific construction for the phrase "integrally formed." PO Resp. 10–12. According to Patent Owner, the Board should adopt[]

the ordinary meaning of this term, but clarify that 'integrally formed' does not encompass a separate element attached to the shell." PO Resp. 10. Patent Owner states that "the District Court in the [related] pending litigation agreed with this construction." *Id.* (citing Ex. 2007, 1720). When determining validity of a patent, district courts normally give claims their "ordinary meaning. . . as understood by a person of skill in the art." *Phillips* v. *AWH Corp.*, 415 F. 3d 1303, 1314 (Fed. Cir. 2005) (en banc)). When determining patentability in an *inter partes* review proceeding, however, we use the "broadest reasonable" claim interpretation. 37 C.F.R. § 100(b) ("A claim in an unexpired patent that will not expire before a final written decision is issued shall be given its broadest reasonable construction in light of the specification of the patent in which it appears."). They are not necessarily the same. *See PPC Broadband, Inc. v. Corning Optical Commc'ns RF, LLC*, 815 F.3d 734, 743 (Fed. Cir. 2016) ("[W]hile the Board's construction is not the correct construction under *Phillips*, it is the broadest reasonable interpretation of 'continuity member,' and because this is an IPR, under our binding precedent, we must uphold the Board's construction.").

Petitioner disagrees with Patent Owner's proposed construction and proposes that the broadest reasonable interpretation of the phrase "integrally formed" is "constructed or attached together as a single or integrated unit." Pet. Reply 8. Petitioner argues that there is "no intrinsic evidence" supporting Patent Owner's proposed construction. *Id.* Petitioner also argues that the proposed construction is "incompatible with Federal Circuit precedent." *Id.* at 8–9 (citing *inter alia In re Morris*, 127 F.3d 1048, 1055 (Fed. Cir. 1997) ("our predecessor court had on several prior occasions interpreted the term "integral" to cover more than a unitary construction")).

In describing the relationship of the raised central band and shell, the '818

patent uses the phrase "integrally formed" only in the Abstract ("The shell also includes a raised central band integrally formed as part of the shell") and claims. The Specification provides neither a specific definition of the phrase "integrally formed" nor any written description of the meaning or significance of this phrase to the claimed invention.

The related IPR2016-01646 decision determined that "integrally formed" did not require a specific construction to resolve the parties' ultimate dispute because the Sears and Rappleyea references each disclose a raised central band formed as a single unit with the plastic helmet shell. *Kranos v. Riddell*, IPR2016-01646, slip op. 16 (Paper 30). Because only terms that are in controversy need to be construed expressly, and then only to the extent necessary to resolve the controversy, we also determine that a specific construction is not required to resolve the issues in this proceeding. *See Vivid Techs. v. Am. Sci. & Eng'g*, 200 F.3d at 803.

B. Asserted Grounds of Unpatentability

1. Obviousness Based On Sears or Rappleyea Combined with Halstead Claims 41, 42, 49, 51, 56, 57, 62, 63, and 65

Section 103(a) forbids issuance of a patent when "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when available, evidence such as commercial success, long felt but unsolved needs, and failure of

others. *Graham v. John Deere Co*., 383 U.S. 1, 17–18 (1966); *see KSR*, 550 U.S. at 407 ("While the sequence of these questions might be reordered in any particular case, the [Graham] factors continue to define the inquiry that controls."). The Court in *Graham* explained that these factual inquiries promote "uniformity and definiteness," for "[w]hat is obvious is not a question upon which there is likely to be uniformity of thought in every given factual context." 383 U.S. at 18.

The Supreme Court made clear that we apply "an expansive and flexible approach" to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id*. at 417. To reach this conclusion, however, it is not enough to show merely that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc*., 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness additionally requires that a person of ordinary skill at the time of the invention "would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention." *Id*.

Moreover, in determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Litton Indus. Prods., Inc. v. Solid State Sys. Corp*., 755 F. 2d 158, 164 (Fed. Cir. 1985) ("It is elementary that the claimed invention must be considered as a whole in deciding the question of obviousness.") (citation omitted); *see also Stratoflex, Inc. v. Aeroquip Corp*., 713 F.2d 1530, 1537 (Fed. Cir. 1983) ("[T]he question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious. Consideration of differences,

like each of the findings set forth in *Graham*, is but an aid in reaching the ultimate determination of whether the claimed invention as a whole would have been obvious.") (citation omitted).

"A reference must be considered for everything it teaches by way of technology and is not limited to the particular invention it is describing and attempting to protect." *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985).

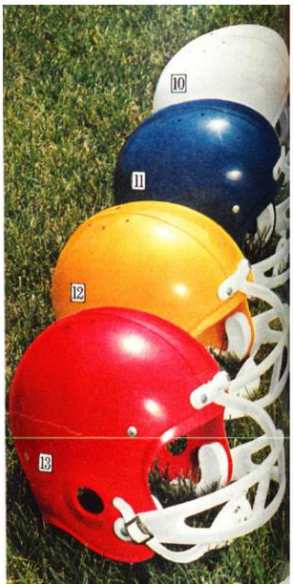
As a factfinder, we also must be aware "of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning." *KSR*, 550 U.S. at 421. This does not deny us, however, "recourse to common sense" or to that which the prior art teaches. *Id*.

Against this general background, we consider the references, other evidence, and arguments on which the parties rely.

a. General Overview of the Asserted Prior Art

i. Sears (Ex. 1016)

Sears is a page from a 1971 Sears catalog, depicting football helmets. Ex. 1016, 7. The image from the catalog relied on by Petitioner (e.g., Pet. 50) is reproduced below.



The Sears image depicts four similar football helmets (differing in color only). *See* Ex. 1016, 7. In describing these helmets, the catalog states that helmets 10–13 are a "[c]ontour of one-piece, high-impact Kralastic®." *Id*.

ii. Rappleyea (Ex. 1017)

Rappleyea, titled "Protective Helmet for Football or the Like," issued May 1, 1973. Ex. 1017. Rappleyea is generally directed to "[a] protective helmet having an outer durable shell and an inner replaceable liner of expanded, closed cell, plastic material of a type which is capable of absorbing energy by taking a permanent set." *Id.*, Abstract. Rappleyea's Figures 1–5 are reproduced below:

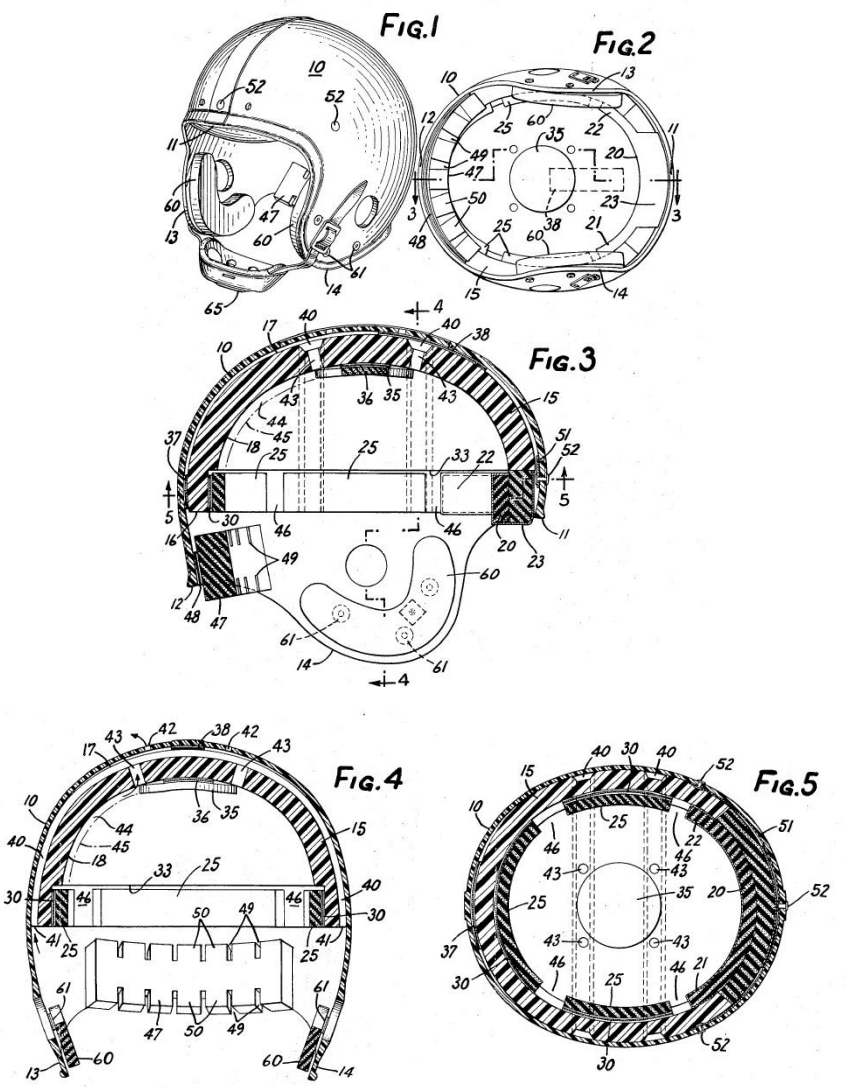


Figure 1 depicts an external view of an embodiment of the disclosed helmet. Ex. 1017, 1:19–20. Figure 2 shows a view of the helmet of Figure 1 from the bottom. *Id.* at 1:21–22. Figure 3 depicts a vertical section along line 3–3. Figure 4 depicts a transverse section through line 4–4. Figure 5 depicts a horizontal section through line 5–5. *Id.* at 1:24–32.

Helmet 10 includes an outer shell and liner 15, recessed in the shell. Ex. 1017, 1:40–47. As depicted in Rappleyea's Figures 4 and 5, "vertically extending grooves 40 are integrally molded in the liner defining inlet openings 41 at the lower edge of the liner and communicating with registering vent openings

42." *Id.* at 3:37–40. "Openings 43 perforating the crown portion of the liner permit escape of air from [ ] region 44." *Id.* at 3:40–42. Rappleyea discloses that "the helmet is doubly vented, with air flow passages being provided both on the outside surface and on the inside surface of the liner for common venting through vent holes at the top of the shell." *Id.* at 3:45–49. Figure 4 depicts two (2) openings 42 and Figure 5 depicts four (4) openings 43.

iii. Halstead (Ex. 1018)

Halstead, titled "Helmet," issued April 24, 2001. Ex. 1018. Halstead discloses a helmet, such as a football helmet, with improved comfort characteristics. *Id.* at 10–18. Halstead's Figures 1 and 2 are reproduced below.

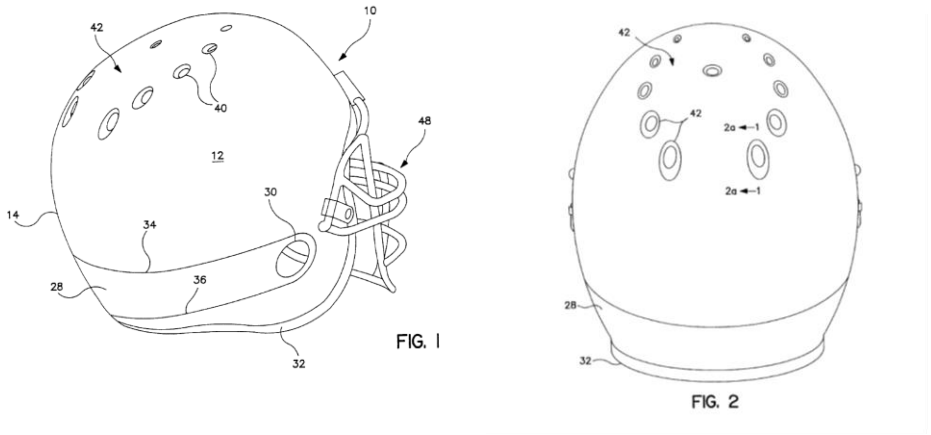


Figure 1 provides a side perspective view of Halstead's helmet, and Figure 2 provides a rear perspective view of the helmet of Figure 1. Ex. 1018, 2:32–36. Helmet 10 includes shell 12 with apertures 40 that extend between the outer surface to the inner surface of shell 12. *Id.* at 3:46–49. Halstead discloses that each aperture 40 has interior major axis 44 adjacent interior surface 16 of shell 12 that is less than its exterior major axis 46 adjacent exterior surface 14 of the shell. *Id.* at 3:49–52; *see id.*, Fig. 2a (depicting the configuration of aperture 40). Halstead further discloses that "major axis 46 is selected to be sufficiently small as

to inhibit insertion of a human finger therein yet sufficiently large so as to avoid plugging with soil or turf." *Id.* at 3:52–55. As seen in Figure 2, apertures 40 are elongated in shape (that is, they have a minor axis that is less than major axis 46) and extend to the rear portion of shell 12.

b. Discussion based on Sears and Halstead or Rappleyea and Halstead.

Petitioner presents numerous labeled figures from the references asserting where, in Petitioner's view, the references disclose the claimed elements. Pet. 50–68. Petitioner concludes from its analysis of the references that "[t]he combination of Sears and Halstead and/or Rappleyea and Halstead teaches each and every limitation of Contested Claims 41-42, 49, 51, 56-57, 62-63, and 65." *Id.* at 68. Petitioner also asserts "there are not any differences" between the prior art and the contested claims. Petitioner then concludes that it would have been "obvious to try adding the raised central band, vent hole, and plastic shell features well-known in the art and as disclosed in Sears, Rappleyea, and/or Halsted to achieve the alleged invention" in the contested claims. *Id.* at 69–70.

Patent Owner asserts:

(1) The references do not disclose a raised central band integrally formed as part of the shell (PO Resp. 13–19);

(2) The references do not disclose vent openings aligned along the sides of the raised central band (*id.* at 19–30);

(3) With respect to claim 65, the references do not disclose a shell having a substantially uniform thickness along a lateral cross-section including the two side regions and the crown region (*id.* at 30–33;

(4) Halstead "teaches away" from a combination with Sears or Rappleyea (*id.* at 33–37); and

(5) Petitioner's obviousness rationales are conclusory and insufficient (*id.* at 37–39).

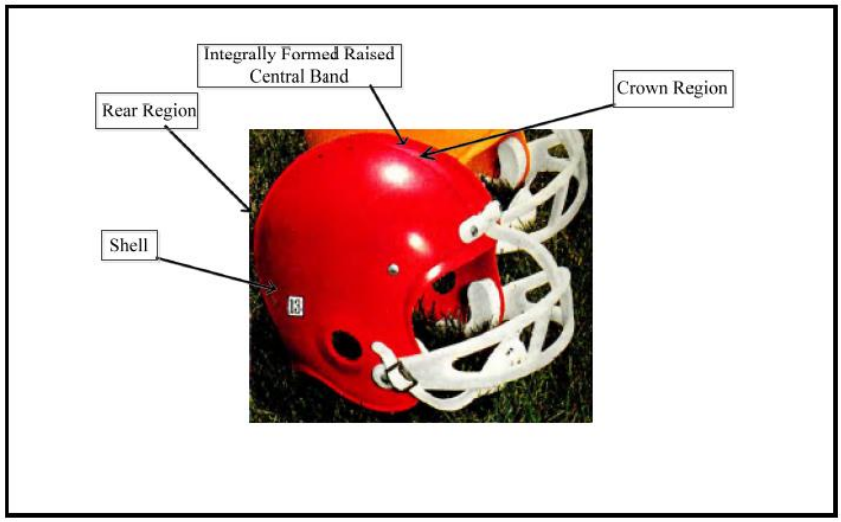
We address these issues below.

i. Sears and Halstead

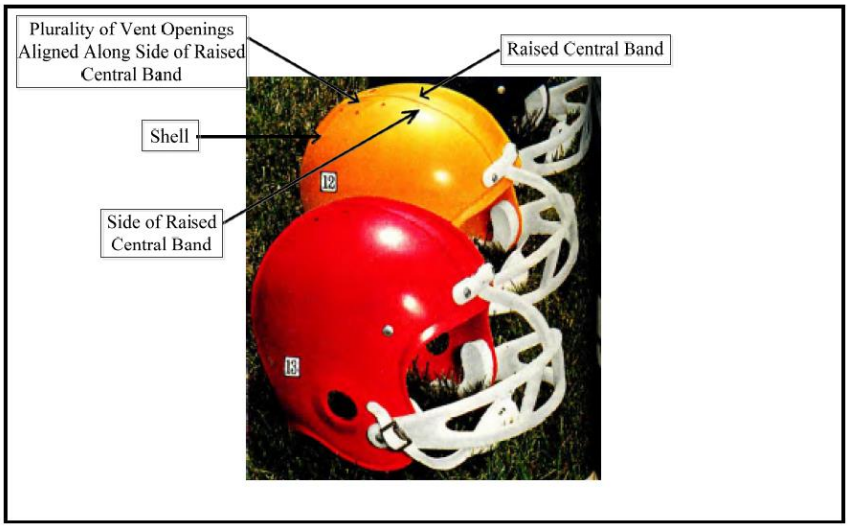
a) Raised Central Band Integrally Formed As Part of the Shell

Patent Owner asserts that Sears (PO Resp. 13–14) does not disclose or suggest a raised central band that is integrally formed as part of the shell.

In the Petition, Petitioner presents two different annotated excerpts of the image in Sears (each reproduced below) to support its contention that Sears discloses a raised central band that is integrally formed as part of the shell. Pet. 53, 55.



Annotated excerpt of a helmet from Sears. Pet. 53.



Annotated excerpt of a helmet from Sears. Pet. 55.

The annotated figures show helmets with labels pointing to structural features that Petitioner contends disclose an "Integrally Formed Raised Central Band" (*id.* at 53) and the "Side of Raised Central Band" (*id.* at 55). Petitioner cites no other evidence in the Petition to support its argument. In its Reply, as evidence of a raised central band that is integrally formed as part of the shell, Petitioner cites specifically to Sears' disclosure that the helmets shown are a "[c]ontour of one-piece, high-impact Kralastic®." Pet. Reply 12–13 (citing Ex. 1016, 7).

It is beyond reasonable dispute that Sears discloses a raised central band. The issue between the parties is whether the raised central band is integrally formed as part of the shell.

Patent Owner asserts that "[t]here is nothing about the photograph, however, that indicates that the alleged raised central band is necessarily 'integrally formed.'" PO Resp. 13 (citing Ex. 2005 ¶¶ 41-42). Mr. Shewchenko testifies that neither the Sears image nor the disclosure that the illustrated helmet is a "[c]ontour of one-piece, high-impact Kralastic®" "establishes that Sears 'necessarily' has an integrally formed raised central band." Ex. 2005 ¶ 41. Mr. Shewchenko also testifies that "nothing in [the Sears image] shows whether Sears' band is 'integrally

formed' with the rest of the shell, as opposed to being glued, snapped, or plastic welded in place." *Id.* at ¶ 42.

Patent Owner also speculates that the raised central band shown in Sears is a decorative feature, similar to painted stripes or bands on other helmets. PO Resp. 14 (citing Ex. 2005 ¶ 44).

Patent Owner cites deposition testimony from Petitioner's declarant, Mr. Float, for the proposition that that you can have features that are attached to the shell while still having a one-piece shell. PO Resp. 13–14 (citing Ex. 2006). In the cited testimony, Mr. Float testifies that it is "hypothetically possible" to have a football helmet that has a raised central band that is glued onto it. Ex. 2006, 24:6–9. This hypothetical possibility does not diminish the disclosure of Sears. Moreover, the fact that ancillary components like a face shield and chin strap can be attached to a one-piece shell (*see id.* at 27:22–28:11) also does not diminish the disclosure that the Sears helmet has a "[c]ontour of one-piece, high-impact Kralastic®." The word "contour" is defined as "an outline especially of a curving or irregular figure" or "the general form or structure of something." *See* Ex. 3001 (definition of "contour from https://www.merriam-webster.com/dictionary/contour, searched on February 15, 2018). Thus, we find that Sears discloses that the irregular outline or structure of the Sears helmet, including the raised central band, is one-piece, which we determine means that the raised central band of Sears is integrally formed with the shell.

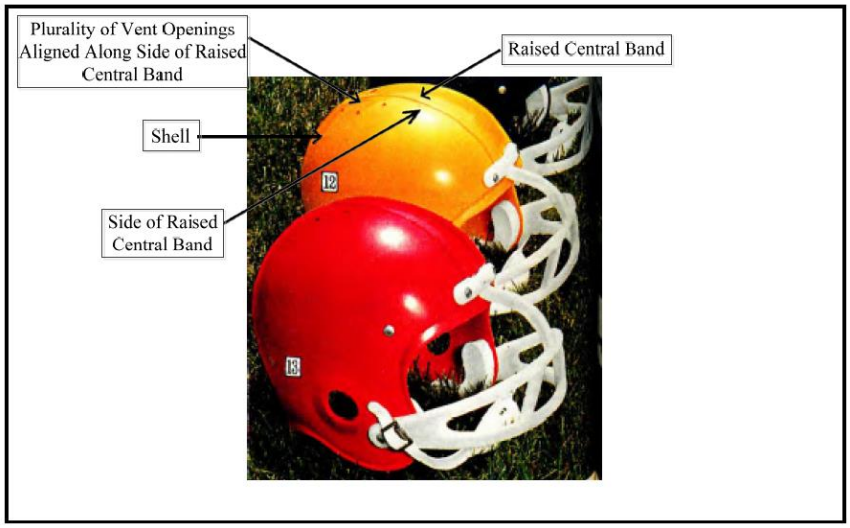
Weighing all of the evidence of record, we find that Petitioner has demonstrated, by a preponderance of the evidence, that Sears discloses an integrally formed raised central band, where that raised central band is part of a one-piece construction of the helmet shell. We find that Sears expressly discloses that its shell is one-piece. *See* Ex. 1016, 7. We further find that Sears depicts the

raised central band as integral to that helmet. *Id.* The evidence that Sears' raised central band is, in fact, integrally formed as part of the shell, is not extensive. It consists of an image and a single sentence of text. Nonetheless, when we weigh the evidence on this issue, a preponderance of the evidence favors the finding that Sears' raised central band is, in fact, integrally formed as part of the shell.

We give little if any probative weight to Patent Owner's arguments and evidence that speculate about hypothetical possibilities, such as Mr. Shewchenko's testimony that the raised central band in Sears could be "plastic welded in place." *See* Ex. 2005 ¶ 42. There is no analysis, data, or facts based on the image or text of the Sears reference to support this opinion. We give little weight to Mr. Shewchenko's testimony that the raised central band is an added, decorative feature, as he provides no basis for the opinion other than Sears disclosing other decorative features. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."). We attribute little weight to this testimony, in part, because all of the other decorative features in helmets disclosed in Sears are of contrasting color. *See* Ex. 1016, 6–8. The raised central bands depicted on page 7 of Ex. 1016 are the same color as the rest of the helmet shell. This fact weighs against Mr. Shewchenko's testimony.

b) Vent Openings Aligned Along the Sides of the Raised Central Band

Based on an annotated image from Sears, reproduced below, Petitioner asserts that Sears discloses vent openings aligned along the sides of the raised central band, as recited in independent claims 41 and 62. Pet. 55.



Annotated excerpt of a helmet from Sears. Pet. 55.[11]

Petitioner cites no other evidence to support its assertion that the labelled spots in Sears are vent openings.

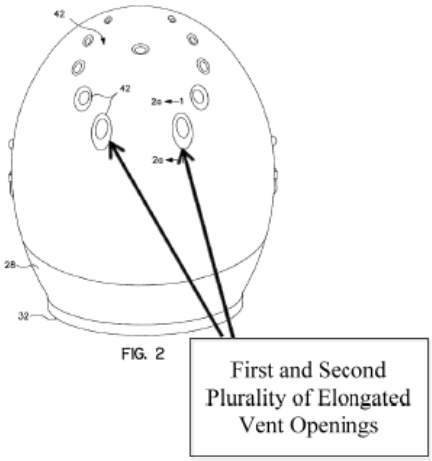
In its Reply, Petitioner asserts that the combination of Sears and Halstead disclose the claimed elongated vent openings aligned along the sides of the raised central band. Pet. Reply 14–15. Petitioner does not assert in its Reply, however, that it is relying on Sears for the disclosure of elongated openings aligned along the raised central band.

Our Decision to Institute did not resolve whether Sears does or does not disclose vent openings. To fully address the issues raised in the Petition on the three grounds on which we instituted the trial, we find that Sears fails to disclose that the dark spots in the crown region of Sears' helmet are vent openings. Significant to our finding, Petitioner fails to offer any explanation, supporting testimony, or other evidence as to why a person having ordinary skill in the art

[11] This is the same annotated image reproduced in our discussion of the raised central band. As is evident, Petitioner identifies both the raised central band and the vent openings in this annotated image. It is reproduced again for convenient reference.

would understand that Sears discloses vent openings. A labelled drawing with an arrow pointing to unidentified dark spots is attorney argument. It is not persuasive evidence. Without persuasive evidence, we cannot find that Sears discloses the vent openings limitation of claims 41 and 62. Moreover, Mr. Shewchenko testifies that the dark spots in Sears do not necessarily show vent openings. Ex. 2005 ¶ 34. Mr. Shewchenko further testifies that these spots could be rivets or snap-in points for connecting a padded crown liner or other support liner to the interior top of the helmet. *Id.*; *id.* at 35–36; *see also* Ex. 1001, 14:3–19 (with reference to Fig. 12, disclosing an opening 205 in shell 31 to position and retain crown pad 200). Unlike the integrally formed raised central band issue discussed above, here we do not have any text explaining the structure illustrated. We find that the image alone is inconclusive as to what is being shown.

In the Petition, Petitioner asserts that to the extent Sears does *not* disclose "elongated" vent openings, Halstead discloses this element. Pet. 57. We reproduce below Petitioner's annotated Figure 2 from Halstead.



Petitioner's annotated Fig. 2 from Halstead. Pet. 57.

Petitioner also cites to the disclosure of Halstead. *Id*. (citing Ex. 1018, 3:46–58). The cited disclosure discloses that shell 12 preferably includes a plurality of apertures 40 located along an upper portion 42 of the shell 12 and extending between exterior surface 14 and interior surface 16 "for ventilation purposes." Ex. 1018, 3:46–49. The shape of each aperture is shown in Figure 2a, reproduced below.

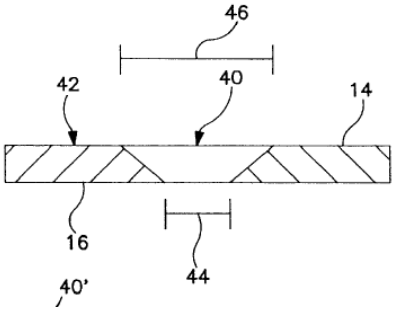


Fig. 2a from Halstead is an enlarged cross-sectional view of one of apertures 40

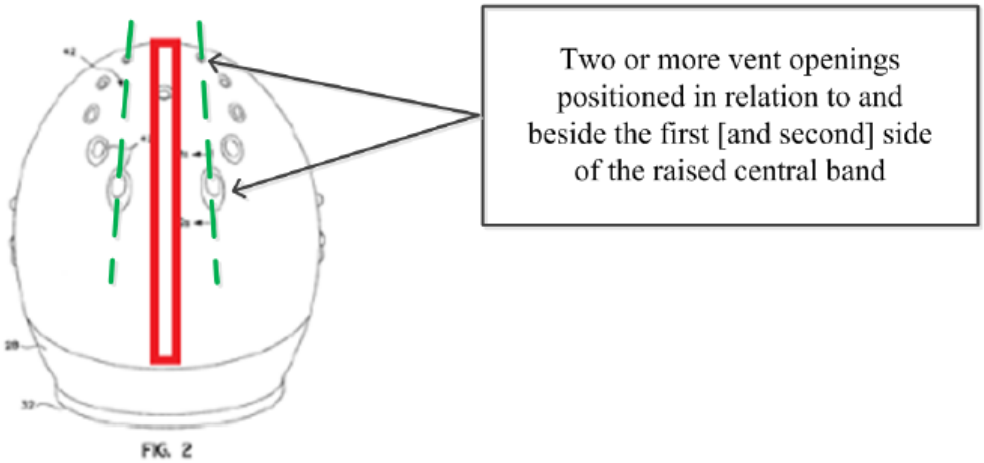
As shown in Figure 2a, each aperture 40 has interior major axis 44 adjacent interior surface 16 of shell 12 that is less than its exterior major axis 46 adjacent exterior surface 14 of the shell. *Id.* at 3:49–52. Exterior major axis 46 is selected to be sufficiently small as to inhibit insertion of a human finger yet sufficiently large so as to avoid plugging with soil or turf. *Id.* at 3:52–55. We find that apertures 40 clearly are elongated.

Petitioner asserts it would have been obvious to modify Sears by adding the elongated apertures of Halstead to the Sears helmet. Pet. 70. Petitioner also asserts it would have been obvious to modify Halstead by adding the raised central band of Sears to the Halstead helmet. *Id.*

Patent Owner asserts that if one combined the narrow raised central bands of Sears with the widely-spaced apart vent openings of Halstead, the vent openings "would still be a meaningful distance away from the sides of the raised central

band, and would be aligned in a curve rather than with respect to the raised central band (which is straight)." PO Resp. 27 (citing Ex. 2005 ¶ 55). We disagree.

We also find that modifying Sears' helmet with Halstead's vent openings or modifying Halstead with Sears's integrally-formed raised central band would result in the front-most and rear-most vent openings of Halstead to be align with and close to the side wall of the integrally-formed raised central band. To illustrate this point, we reproduce below Petitioner's annotated version of Halstead's Figure 2. Pet. Reply 15.

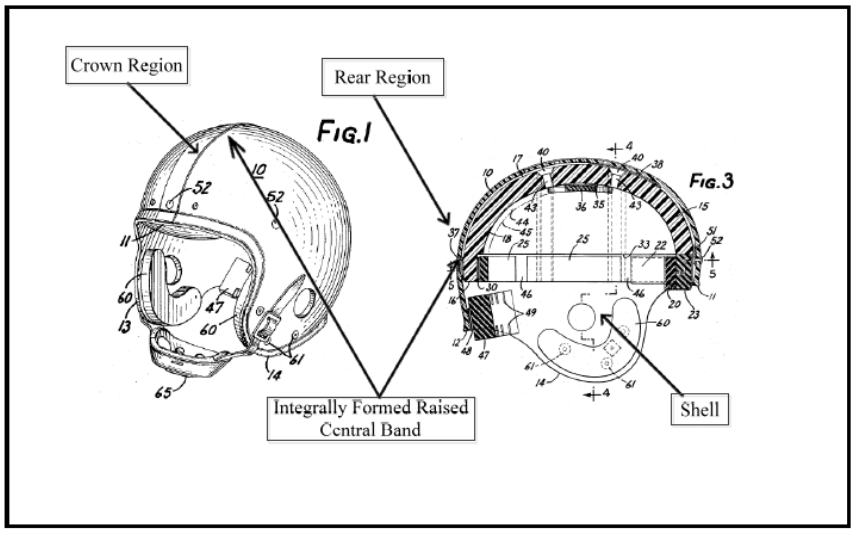


Petitioner's annotated Fig. 2 from Halstead showing elongated vent openings aligned along a raised central band. Pet. Reply 15.

As shown in Petitioner's annotated Figure 2, the front-most and rear-most vent openings of Halstead modified with Sears, or Sears modified with Halstead, have two or more elongated vent openings aligned with and close to the [first/second] side wall of the raised central band. This meets the limitations in independent claims 41 and 62 that a plurality of elongated vent openings are "aligned along a [first/second] side of the raised central band" as we have construed this limitation.

ii. Rappleyea and Halstead

Petitioner provides an annotated figure for Rappleyea, reproduced below, for the asserted disclosure of an integrally formed raised central band.



Annotated Figures 1 and 3 from Rappleyea. Pet. 54.

The annotated figures show Rappleyea's Figure 1 and indicates the raised central band of helmet and the side walls forming the raised central band. Rappleyea's Figure 3, as shown above, and also Rappleyea's Figure 4 illustrate the raised central band with the same cross-hatching as the surrounding shell, thereby disclosing that the raised central band is integrally-formed with the shell. As seen in Rappleyea's Figures 1 and 4, its raised central band has a width defined by a pair of opposed side walls that extend transversely from an outer surface of the shell.

We find that Rappleyea's Figures 3 and 4, through the cross-sectional cross-hatching of the shell and raised central band, indicate that the shell and band are made from the same material and thus indicate that the raised central band is integrally-formed with the plastic shell. The cross-hatching shows a continuous structure, thereby indicating to a person having ordinary skill in the art that the shell and raised central band are the same structure and made of the same material. *See* Ex. 1018, Figs. 3, 4.

As we discussed above in connection with our analysis of the combination of Sears and Halstead, Petitioner asserts that Halstead discloses the vent openings

limitation of claims 41 and 62. *See* Pet. 57 ("To the extent Sears or Rappleyea do not disclose "elongated" vent openings, Halstead does). As in our analysis above with respect to Sears and Halstead, we find that adding the five vent openings disclosed in Halstead's Figure 2 to Rappleyea's helmet with a raised central band results in at least two vent openings that are aligned (the front-most and rear-most openings (with respect to the front and rear of the helmet shell)). The vent openings of the combined structure would be positioned (or reside or be aligned) along the sides of Rappleyea's raised central band. That is, when Rappleyea's helmet is modified with Halstead's vent openings, at least two of the vent openings would be positioned close to the side walls of the raised central band and aligned along the side walls. We base our finding on the clear disclosure in Halstead's Figure 2, which shows the five vent openings formed in an arc, with the front-most and rear-most openings (with respect to the front and rear of the helmet shell) positioned close to the centerline of the helmet, where Rappleyea's raised central band is located. Accordingly, we find that Petitioner has demonstrated, by a preponderance of the evidence, that the combination of Halstead and Rappleyea discloses the vent openings limitation and raised central bar limitation of independent claims 41and 62.

2. Teaches Away

Patent Owner asserts that Halstead "teaches away" from a combination with Sears or Rappleyea. PO Resp. 33–37. Patent Owner asserts that Halstead "teaches away from increased helmet weight." *Id.* at 34 (citing Ex. 1018, 1:14–18, 21–22). Petitioner asserts that adding a raised central band to Halstead, such as those disclosed in Sears and Rappleyea, would add weight to the helmet. *Id.* at 35. Patent Owner points out that Halstead discloses a shell with a substantially continuous exterior surface spaced apart from a substantially continuous interior

surface, i.e., according to Patent Owner, a helmet without a raised central band. *Id*. at 36 (citing Ex. 1018, 1:34–38. We disagree that Halstead teaches away from a combination with Sears or Rappleyea.

Patent Owner's assertion is based on a mischaracterization of Halstead. We agree with Petitioner that Halstead discloses that reduced weight is desireable and that an offset band would reduce the weight of the helmet. *See* Pet. Reply 23–24; Ex. 1018, 3:22–27, 5:2–12. Thus, Halstead's teachings support the proposed modification.

Even if the proposed modification adds weight, for the reasons that follow, Halstead still does not teach away from the proposed modification.

The general rule to determine whether a reference "teaches away" is when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). The Court in *Gurley*, however, further explained that the degree of teaching away will of course depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is *unlikely to be productive* of the result sought by the applicant. *Id.*

Although Halstead teaches that a lighter helmet is preferred, it fails to criticize, discredit, or otherwise discourage adding weight. Instead, it teaches that its offset 28 can be used to reduce weight as compared to a conventional helmet and adding Sears's raised central band to Halstead's helmet would not prevent the helmet from having offset 28. Further, the fact that Halstead teaches an alternative to a raised central band (shock attenuating members) does not amount to a teaching away of a raised central band. *Cf. In re Gurley*, 27 F.3d at 553 ("A known or

obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use."). Significantly, Halstead never mentions a raised central band in any way. As such, Halstead does not "specifically instruct" a person having ordinary skill in the art not to employ a raised central band as Mr. Shewchenko, declares. *See* Ex. 2005 ¶ 49. Because an objective of Halstead is to reduce weight, Patent Owner and its declarant read into Halstead that a raised central band is discouraged. Merely teaching that reduced weight is an objective does not teach away from every feature that would add weight.

"Even if a reference is not found to teach away, its statements regarding preferences are relevant to a finding regarding whether a skilled artisan would be motivated to combine that reference with another reference." *Polaris Indus., Inc. v. Arctic Cat, Inc.*, Nos. 2016-1807, 2016-2280, slip op. at 21 (Fed. Cir. Feb. 9, 2018). Thus, even if Halstead discourages adding weight to its helmet by adding a raised central band, such a teaching would not teach away from Petitioner's other modification—adding Halstead's vent openings to Sears' or Rappleyea's plastic shell. We find that such a modification would reduce weight (by eliminating shell material in favor of a vent opening), which is consistent with an objective of Halstead. Because vent holes allow for the escape of heat from the helmet, the proposed modification also would improve comfort of Sears's helmet, another objective of Halstead. *See* Ex. 1018, 1:14–18. On balance, the evidence establishes that the benefits of the proposed combination outweigh the detriments and provide a motivation to obtain increased strength, reduced weight, and increased comfort, as we discuss below.

3. Rationale

Patent Owner asserts that Petitioner's obviousness rationales are conclusory and insufficient (*id.* at 37–39). Petitioner asserts that the reason why a person of ordinary skill would have combined the cited references is because "the raised central band, vent hole, and plastic shell features disclosed in Sears, Rappleyea, and/or Halstead have been used in protective and sports helmets for their well-known purposes for decades. Pet. 69 (citing Ex. 1027 ¶¶ 96–106). Mr. Float testifies that "[s]ince at least the 1950s" injection molding has been "the preferred method to fabricate football helmet shells. One benefit from fabricating football helmet shells using an injection molding process is the low unit cost and flexibility of helmet shell shape and features. Such common features include integrally formed raised central bands and vent holes." Ex. 1027 ¶ 98.

Mr. Float further testifies, "[a] raised central band has been a common design element in the field of football helmets since at least the mid-twentieth century." *Id.* at ¶ 99. Its function is to strengthen the helmet to withstand impacts without adding weight. *Id.* Regarding vent holes, Mr. Float testifies that "vent holes of varying size, shape, placement, and quantity have been a common, if not the most common, design element in the field of protective sports helmets since at least the early twentieth century." *Id.* at ¶ 100. Mr. Float also testifies "[t]he initial intent of vent holes was to increase user comfort by increasing air flow and/or to allow heat to escape the helmet." *Id.*

Thus, based on the references and Mr. Float's testimony, the rationale for why to combine the references as proposed by Petitioner is to achieve a desired balance of strength, weight, and comfort provided by these well-known structural elements performing their well-known functions. The balance of factors selected for a child's helmet likely would be different from the balance of factors selected

for a helmet used by professional football players. The balance of these factors, however, is nothing more "than the predictable use of prior art elements according to their established functions." *See KSR*, 550 U.S. 417 ("[A] court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions."). We determine that a preponderance of the evidence discussed above establishes why it would have been obvious to a person of ordinary skill – such as a degreed engineer with relevant experience – to select the proper combination of size, shape, and placement of vent openings and raised reinforcing structures to perform the task at hand.

Accordingly, we determine that independent claims 41 and 62 would have been obvious based on Sears and Halstead or Rappleyea and Halstead.

4. Dependent Claims 42, 49, 51, 56, 57, 63, and 65

The only dependent claim specifically argued by Patent Owner is claim 65. PO Resp. 30–33. Patent Owner does not specifically address the challenge to claims 42, 49, 51, 56, 57, and 63. Nonetheless, it is Petitioner's burden to establish patentability by a preponderance of the evidence. 35 U.S.C. § 316(e). Accordingly, we consider the evidence asserted against all the dependent claims involved in this trial.

Claim 42, dependent from claim 41, recites that the raised central band lacks any vent opening. Petitioner asserts that Sears and Rappleyea each have raised central bands that lack any vent openings. Pet. 62–63. The only evidence cited by Petitioner in support of its argument that claim 42 would have been obvious based on either Sears or Rappleyea combined with Halstead is figures from Sears and Rappleyea annotated by Petitioner with a label merely stating that the raised central bands in Sears and Rappleyea each lack any vent openings. *Id.* This one

fact is true, but it does not fully address the basis for the asserted unpatentability of claim 42, which is based on either Sears or Rappleyea combined with Halstead.

As discussed above in our analysis of independent claim 41, Petitioner relies on Halstead for the disclosure of the claimed vent openings. Pet. 57 ("To the extent Sears or Rappleyea do not disclose "elongated" vent openings, Halstead does"). Figure 2 of Halstead is reproduced below.

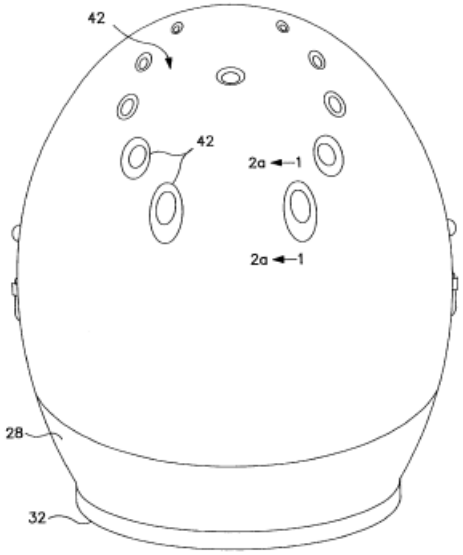
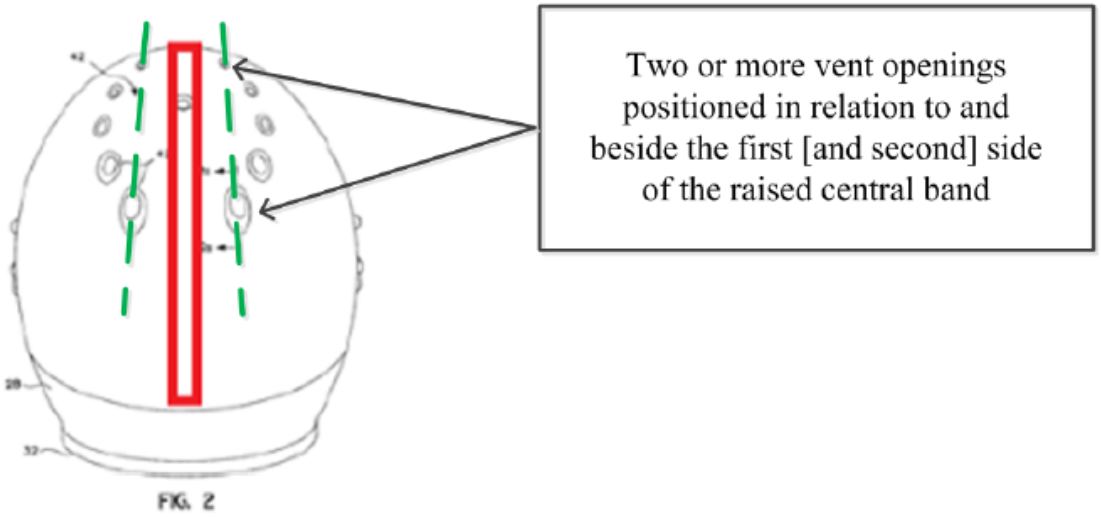


FIG. 2

Figure 2 from Halstead is a rear perspective view of a helmet showing vent holes, including a vent hole positioned in the center of the crown region

As shown in Figure 2 of Halstead, Halstead clearly discloses a helmet with a vent opening in the crown region of its helmet along the centerline from front to rear of the helmet. Thus, using the vent openings disclosed in Halstead, this central vent opening would reside within the raised central band based on Petitioner's proposed modifications. In fact, this is exactly how *Petitioner* illustrated the proposed combination of Sears and Halstead, although in the context of addressing whether Halstead's vents are aligned, as required by claims 41 and 62. *See* Pet. Reply 15.

Petitioner's annotated Figure 2 from Halstead, shown below, showing elongated vent openings aligned along a raised central band (shown in red), clearly shows the central vent of Halstead within the raised central band. *See* Pet. Reply 15. This figure shows Halstead modified with the raised central band from Sears. A similar construction results from modifying Sears with the vent openings of Halstead, or from combining the disclosures of Rappleyea and Halstead.



Petitioner's annotated Fig. 2 from Halstead showing elongated vent openings aligned along a raised central band. Pet. Reply 15.

Petitioner fails to explain why its proposed modification of Sears or Rappleyea with Halstead's vent openings or Halstead with the raised central band from Sears or Rappleyea would eliminate this central vent opening in Halstead, yet retain the other openings.

Accordingly, there is no persuasive evidence that Petitioner's proposed modifications disclose the subject matter of claim 42, or that eliminating Halstead's central vent would have been an obvious modification. Indeed, the evidence is to the contrary, based on Petitioner's annotated Figure 2 of Halstead shown immediately above. Petitioner has not met its burden of proving that claim 42 is not patentable.

Claim 49, dependent from claim 41, recites that at least one vent opening in each of the first and second plurality of vent openings is positioned in the rear region of the shell. The rear region of the shell is shown in Figure 1 of the ’818 patent, designated by reference numeral 40. Ex. 1001, Fig. 1; 5:4–5 (“Shell 31 further includes a crown region 39, a back (or rear) region 40, a front region 41”). As shown in Petitioner’s annotated Figure 2 from Halstead, reproduced above, at least one vent opening, the rearmost vent opening, is in the area of the helmet that the ’818 patent identifies as the rear region of the shell. *See also* Pet. 64 (identifying Halstead’s vent openings in the rear region.

Claim 51, dependent from claim 41, and claim 63, dependent from claim 62, each recite that the ear flaps and a frontal edge of the front region define a frontal opening in the shell, and the raised central band commences a distance from the frontal edge. Petitioner relies on an annotated image from Sears as showing the claimed structure. Pet. 65. We agree, and find that Sears discloses the limitations recited in claims 51 and 63. Ex. 1016, 7.

Claim 56, dependent from claim 41, recites that the raised central band has a width defined by a pair of opposed sidewalls that extend outwardly from an outer surface of the shell; the shell includes three vent openings in each of the first and second plurality of vent openings; and a major axis of the second vent opening is substantially parallel to an extent of one of the sidewalls. Petitioner relies on an annotated image from Halstead as showing the claimed structure. Pet. 66. We agree, and find that Halstead discloses the limitations recited in claim 56. *E.g.*, *see* Ex. 1018, Fig. 1, illustrating a helmet shell that includes three vent openings on each side of the raised central band.

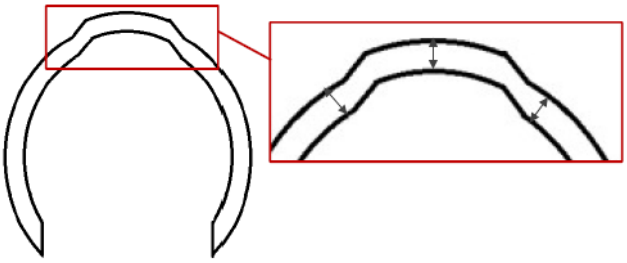
Claim 57, dependent from claim 56, recites that the third vent openings are positioned rearward of the second vent openings, and a major axis of the third vent

opening is substantially parallel to an extent of one of the sidewalls. Petitioner relies on an annotated image from Halstead as showing the claimed structure. Pet. 67. We agree, and find that Halstead discloses the limitations recited in claim 57. *E.g.*, *see* Ex. 1018, Fig. 1.

Claim 65, dependent from claim 62, recites that the shell has a substantially uniform thickness along a lateral cross-section including the two side regions and the crown region. Because claim 65 depends from claim 62, it also includes the raised central band extending across the crown region to the rear region, recited in claim 62. Thus, claim 65 requires both a shell with a substantially uniform thickness *and* a raised central band.

Petitioner asserts that Halstead discloses a helmet with the claimed structure. Pet. 67–68 (citing Ex. 1018, 1:60-2:2;. 2:57-61; 3:14-16). The cited text in Halstead discloses that the shell in Halstead has a substantially uniform thickness, defined between exterior surface 14 and interior surface 16, and includes offset 28 on the rear of the helmet, with the thickness of the offset substantially the same as the thickness of the shell. Offset 28 is offset *below* exterior surface 14. Ex. 1018, 3:12–16 ("The offset 28 preferably is from about 0.125 to about 0.375 inches *below* the [exterior] surface 14" (emphasis added)).

Patent Owner asserts that in order to satisfy claim 65's "uniform thickness" requirement, a helmet shell having a raised central band "would have to have a corresponding depression space in the inner surface." PO Resp. 31. Patent Owner refers to illustrations in Mr. Shewchenko's Declaration that show this concept. *Id.* The illustrations from Mr. Shewchenko's Declaration are reproduced below.



Cross-section of a raised central band maintaining a uniform thickness with the helmet shell. Ex. 2005 ¶ 77.

Petitioner replies by pointing out "Halstead teaches substantially even thickness in its offset band offset feature [28] and that teaching would be applied to a raised central band offset feature." Pet. Reply 25. In Mr. Float's Declaration testimony, cited and discussed above in the context of a rationale for adding a raised central band to Halstead, Mr. Float testifies:

> As the most frequently and intensely impacted region of the helmet, the central band is particularly susceptible to damage and breakage. Accordingly, those of ordinary skill in the art take special care to ensure that the central band region of the football helmet is designed to withstand such impacts. One such strategy is to increase the thickness of the entire shell. This is not a desirable solution because it needlessly increases the total weight and cost of the football helmet. Alternatively, *those of ordinary skill in the art would know to add a raised central band of increased thickness without increasing the thickness of the entire shell. In this way, the helmet has increased stiffness in the central band region without adding weight to the remaining portions of the helmet*.

Ex. 1027 ¶ 99 (emphasis added).

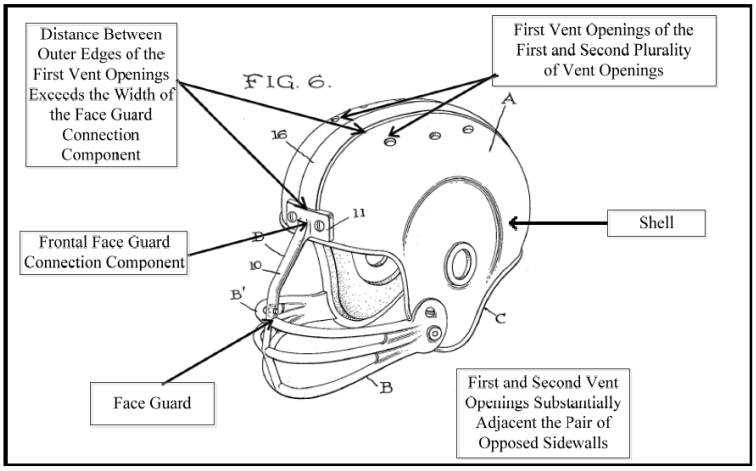
Halstead discloses a rear, *inwardly* offset portion 28 maintaining a uniform thickness with the helmet shell. Mr. Float's testimonial evidence, cited above, indicates it would have been obvious to a person of ordinary skill and creativity, a degreed engineer with relevant experience in the field, to add the raised central band of Sears or Rappleyea as a central *outwardly* offset band that maintains a

uniform thickness with the helmet shell. The rationale for why it would have been obvious is that the modified helmet would have increased stiffness in the central band region without adding weight to the remaining portions of the helmet. Based on this evidence, we determine that claim 65 would have been obvious.

5. Obviousness Based On Sears, Halstead, Marietta Claims 58 and 64

Claim 58, dependent from claim 41, and claim 64, dependent from claim 62, each recite that the shell has a frontal face guard connection component and wherein the distance between an outer edge of the first vent openings exceeds a width of the frontal face guard connection component.

Petitioner relies on Marietta (Ex. 1023) for the disclosure of the claimed face guard component, as shown in Petitioner's annotated Figure 6 from Marietta, reproduced below. Pet. 118–119.



Petitioner's annotated Fig. 6 from Marietta. Pet. 119.

Sears and Halstead apply as discussed above. Petitioner asserts that it would have been obvious to add the Marietta face guard geometry to the Sears/Halstead helmet. Pet. 120 (emphasis added). We also note that Sears (Ex. 1016, 7) and Halstead (Ex. 1018, Fig. 1a) each also disclose frontal face guards. Petitioner also

relies on the Declaration testimony of Mr. Float. Pet. 120 (citing Ex. 1027 ¶¶ 151–154). Pet. 119–120. Mr. Float testifies:

> One of ordinary skill in the art would *combine the helmets disclosed in Sears and Halstead with the vent hole positioning disclosed in Marietta* for one or more of the following reasons: (a) the ornamental design associated with Marietta's chosen vent hole positioning; (b) to increase the air circulation in the helmet (see e.g. Halstead, Ex. 1018, 3:46-49); and/or (c) to ensure that the vent holes are not covered by any internal crown padding.

Ex. 1027 ¶ 152 (emphasis added). Mr. Float's testimony is different from Petitioner's argument. Petitioner argues it would have been "obvious to try to add the frontal face guard geometry well-known in the art and as disclosed in Sears and/or Marietta to achieve the alleged invention of Contested Claims 58 and 64." Pet. 120. Petitioner *does not* mention or advocate adding the vent hole positioning disclosed in Marietta. The evidence on which Petitioner relies for support, Mr. Float's testimony, proposes a completely different combination of elements. Mr. Float opines about combining the helmets disclosed in Sears and Halstead "*with the vent hole positioning disclosed in Marietta*." Ex. 1027 ¶ 152 (emphasis added). Mr. Float does not mention the Marrietta or Sears "frontal face guard geometry" in his testimony on this issue. *See* Ex. 1027 ¶¶ 149–154. Petitioner argues for using the "frontal face guard geometry" of Marietta. Pet. 120. Mr. Float argues for using the vent hole positioning in Marietta. Ex. 1027 ¶ 152. Thus, the evidence does not support Petitioner's argument. Patent Owner makes this argument in its Response. PO Response 41–43.

Accordingly, we determine that Petitioner has not met its burden to prove claims 58 and 64 unpatentable by a preponderance of the evidence.

III. CONCLUSION

Based on the arguments, evidence, and analysis discussed above, we determine that Petitioner has proven by a preponderance of the evidence that claims 41, 49, 51, 56, 57, 62, 63, and 65 would have been obvious based on Sears and Halstead *or* Rappleyea and Halstead. We also determine that Petitioner has *not* met its burden to prove claims 42, 58 and 64 unpatentable by a preponderance of the evidence.

IV. ORDER

In consideration of the foregoing, it is hereby

ORDERED that claims 41, 49, 51, 56, 57, 62, 63, and 65 are unpatentable under 35 U.S.C. §103(a) based on Sears and Halstead or Rappleyea and Halstead;

FURTHER ORDERED that claim 42 is *not* unpatentable under 35 U.S.C. §103(a) based on Sears and Halstead or Rappleyea and Halstead;

FURTHER ORDERED that claims 58 and 64 are *not* unpatentable under 35 U.S.C. §103(a) based on Sears, Halstead, and Marietta; and

FURTHER ORDERED that FURTHER ORDERED because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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