

Filed on behalf of Riddell, Inc.

By: Ronald H. Spuhler
Thomas J. Wimbiscus
Scott P. McBride
Christopher M. Scharff
McAndrews, Held & Malloy, Ltd.
500 W. Madison St., 34th Floor
Chicago, IL 60661
E-mail: rspuhler@mcandrews-ip.com

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 No. IPR2016-01646
Patent No. 8,528,118

PATENT OWNER'S NOTICE OF APPEAL

Mail Stop PATENT BOARD
U.S. Patent Trial & Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313

Pursuant to 35 U.S.C. §§ 141, 142, and 319, 37 C.F.R. §§ 90.2, 90.3, and 104.2, and Rule 4(a) of the Federal Rules of Appellate Procedure, Patent Owner Riddell, Inc. (“Patent Owner”) hereby appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision (Paper 30) entered by the Patent Trial and Appeal Board on February 5, 2018, and all rulings leading up to that decision.

In particular, and in accordance with 37 C.F.R. § 90.2(a)(3)(ii), Patent Owner identifies at least the following issues on appeal:

- The Board’s finding that Claims 1, 11, 12, 25, 28, 33-35 and 37 of U.S. Patent No. 8,528,118 are unpatentable under U.S.C. §103(a) over Sears and Halstead;
- The Board’s finding that Claims 1, 11, 12, 25, 28, 33-35 and 37 of U.S. Patent No. 8,528,118 are unpatentable under U.S.C. §103(a) over Rappleyea and Halstead;
- The Board’s finding that Claims 1, 11, 12, 25, 28, 33-35 and 37 of U.S. Patent No. 8,528,118 are unpatentable under U.S.C. §103(a) over Monica and Halstead; and

- Any Board finding, determination, judgment, or order supporting or related to the aforementioned issues as well as all other issues decided adversely to Patent Owner in any orders, decisions, ruling, and opinions.

Patent Owner is concurrently filing a copy of this Notice of Appeal with the Director of the United States Patent and Trademark Office and the Patent Trial and Appeal Board, and a copy of the same, along with the required fees, with the United States Court of Appeals for the Federal Circuit.

Dated: April 9, 2018

/Ronald H. Spuhler/

Ronald H. Spuhler
Registration No. 52,504
McANDREWS, HELD & MALLOY, LTD.
500 West Madison St., Suite 3400
Chicago, IL 60661
Telephone: (312) 775-8000

CERTIFICATE OF FILING

The undersigned hereby certifies that, in addition to being electronically filed through PTAB E2E, a true and correct copy of the above-captioned **NOTICE OF APPEAL** is being filed by hand with the Director on April 9, 2018, at the following address:

Director of the U.S. Patent & Trademark Office
c/o Office of the General Counsel, 10B20
Madison Building East
600 Dulany Street
Alexandria, VA 22314

The undersigned also hereby certifies that a true and correct copy of the above-captioned **NOTICE OF APPEAL** and the filing fee is being filed via CM/ECF with the Clerk's Office of the United States Court of Appeals for the Federal Circuit on April 9, 2018.

Dated: April 9, 2018

/Ronald H. Spuhler/

Ronald H. Spuhler
Registration No. 52,504
McANDREWS, HELD & MALLOY, LTD.
500 West Madison St., Suite 3400
Chicago, IL 60661
Telephone: (312) 775-8000

CERTIFICATE OF SERVICE

I hereby certify that the foregoing Patent Owner's Notice of Appeal was served on April 9, 2018 by electronic mail to the following:

Lead Counsel	Back-up Counsel
James J. Lukas, Jr. Greenberg Traurig, LLP 77 W. Wacker Dr., Suite 3100 Chicago, IL 60601 Telephone: (312) 456-8400 Fax: (312) 456-8435 lukasj@gtlaw.com	Richard D. Harris Howard Silverman Gary R. Jarosik Matthew J. Levinstein Benjamin P. Gilford Dennis P. Malloy Greenberg Traurig, LLP 77 W. Wacker Dr., Suite 3100 Chicago, IL 60601 Telephone: (312) 456-8400 Fax: (312) 456-8435 harrisr@gtlaw.com; silvermanh@gtlaw.com; jarosikg@gtlaw.com; levinsteinm@gtlaw.com; gilfordb@gtlaw.com; malloyd@gt.law.com

Dated: April 9, 2018

/Ronald H. Spuhler/

Ronald H. Spuhler
Registration No. 52,504
McANDREWS, HELD & MALLOY, LTD.
500 West Madison St., Suite 3400
Chicago, IL 60661
Telephone: (312) 775-8000
rspuhler@mcandrews-ip.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KRANOS CORPORATION,
Petitioner,

v.

RIDDELL, INC.,
Patent Owner.

Case IPR2016-01646
Patent 8,528,118 C1

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

MAYBERRY, *Administrative Patent Judge*.

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

I. INTRODUCTION

Petitioner, Kranos Corp.¹ (“Kranos”), filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–7, 11–13, 25–28, 30, and 32–37 of U.S. Patent No. 8,528,118 C1 (Ex. 1001, the “’118 patent”). Patent Owner, Riddell, Inc. (“Riddell”), filed a Preliminary Response (Paper 8, “Prelim. Resp.”) to the Petition. We instituted trial as to claims 1, 2, 5, 11, 12, 25, 27, 28, 30, 32–35, and 37 of the ’118 patent with respect to four grounds of unpatentability. Paper 10, 70–71 (“Dec. on Inst.”).²

After we instituted trial, Riddell filed a Patent Owner Response. Paper 18 (“PO Resp.”).³ Kranos filed a Reply to Riddell’s Patent Owner Response. Paper 19 (“Reply”). Oral hearing was conducted for this proceeding on November 7, 2017 and the record contains a transcript of the hearing. Paper 29 (“Tr.”).

Kranos relies on the Declaration testimony of Mr. Jamison Float. Ex. 1013. Riddell relies on the Declaration testimony of Mr. Nicholas Shewchenko. Ex. 2005.

The Board has jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. Kranos has shown, by a preponderance of the evidence, that claims 1, 11, 12, 25, 28, 33–35, and 37 of the ’118 patent are unpatentable. Kranos has

¹ Kranos indicates that it is doing business as Schutt Sports. Pet. 2.

² We denied Kranos’s Request for Rehearing as to certain claims and grounds for which we did not institute trial. Paper 14.

³ Paper 18 is a corrected version of Riddell’s Patent Owner Response, which was originally filed as Paper 17. In an email dated June 8, 2017, we authorized Riddell to file the corrected Patent Owner Response, to which Kranos did not object. *See* Exhibit 3001. In this Final Written Decision, we reference the corrected Patent Owner Response.

not shown, by a preponderance of the evidence, that claims 2, 5, 27, 30, and 32 are unpatentable.

A. Related Matters

The parties indicate that the '118 patent is related to two pending district court proceedings in the United States District Court for the Northern District of Illinois, one styled *Riddell, Inc. v. Kranos Corp.*, Case No. 1:16-cv-4496, and the other styled *Riddell, Inc. v. Xenith, LLC*, Case No. 1:16-cv-04498. Pet. 2; Paper 7, 2. Further, the parties indicate that related U.S. Patent No. 8,938,818 B2 is the subject of a petition for *inter partes* review with the Patent Trial and Appeal Board, IPR2016-01650. Pet. 2, Paper 7, 3. Riddell further indicates that U.S. Patent Application Nos. 14/022,011, filed on September 9, 2013, and 14/605,765, filed on January 26, 2015, are pending before the U.S. Patent Office and claim a common priority benefit with the '118 patent. Paper 7, 3.

B. The '118 Patent

The '118 patent, titled "Sports Helmet," issued September 10, 2013 with claims 1–29. Ex. 1001, (54), (45), 14:17–29. Following an *ex parte* reexamination, claims 1, 5, 13, 14, 17, 19–25, and 29 were determined to be patentable as amended in that proceeding, with claims 2–4, 6–12, 15, 16, 18, and 26–28 determined patentable as they depend from an amended claim. Ex. 1001, 24, 1:17–20.⁴ New claims 30–37 were added in the *ex parte* reexamination proceeding. *Id.* at 24, 1:21–22.

⁴ Exhibit 1001 provides the Reexamination Certificate for *ex parte* reexamination no. 90/012,985 at pages 23–25.

The '118 patent is generally directed to helmets for football, lacrosse, hockey, or baseball. Ex. 1001, 1:19–20. Figure 1 of the '118 patent, depicts an embodiment of the '118 patent and is reproduced below.

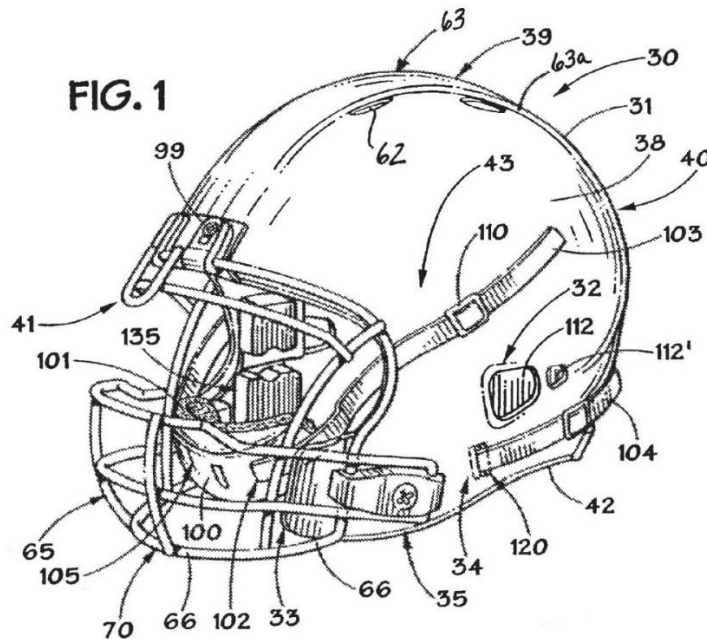
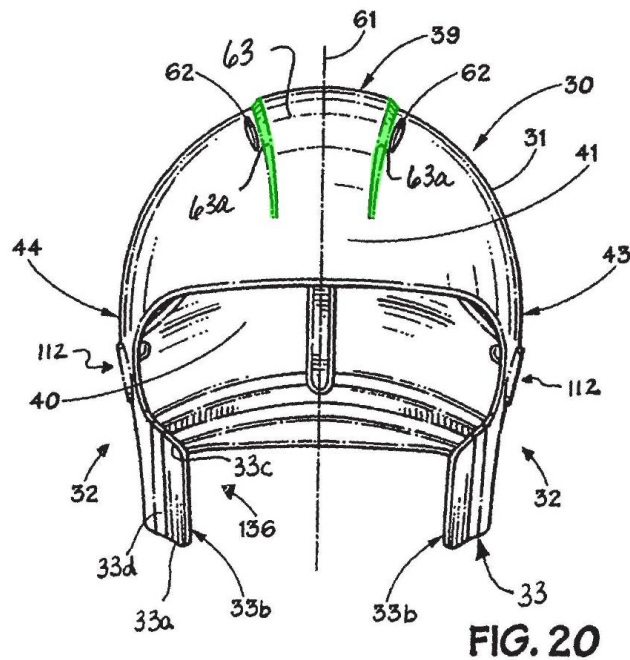
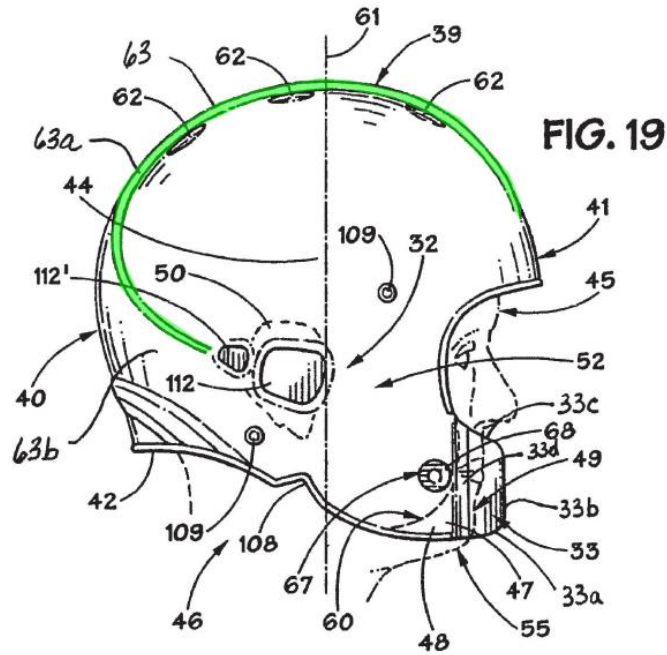


Figure 1 depicts “a perspective view of an embodiment of a sports helmet.” Ex. 1001, 3:64–65. Helmet 30 includes outer shell 31, which is preferably made of a plastic material, includes crown region 39, back or rear region 40, and front region 41. *Id.* at 4:59–64, 5:1–4. Helmet 30 includes side regions 43, 44 with ear flaps 32, with each ear flap 32 including ear opening 112. *Id.* at 5:15–20, 9:40–41. Connected to helmet 30 is face guard 65 and chin protector 100. *Id.* at 6:50–51, 9:4–6.

Helmet 30 also includes raised central band 63, defined by opposed side walls 63a. Ex. 1001, 6:16–21. Helmet 30 of Figure 1 includes two vent openings 62, positioned adjacent side wall 63a, which have an elongated shape. *Id.* at 6:8–11. In the embodiment of Figure 1, raised central band 63 does not include any vent openings.

Annotated versions of Figures 19 and 20 of the '118 patent are reproduced below.



Figures 19 and 20 present side and front views, respectively, of helmet 30 of Figure 1. Green highlighting emphasizes opposed side walls 63a of raised central band 63. As seen in annotated Figure 19, side wall 63a

has a curvilinear shape and one end terminates near ear flap 32. As seen in Figure 20, vent openings 62 are located on either side of raised central band 63. Also depicted in Figure 20, the front extent of side walls 63a, that is, the end of side walls 63a located in front region 41 of helmet 30, do not converge.

C. Instituted Claims

Of the claims for which we instituted trial, claims 1, 25, and 34 are independent and representative of the claimed subject matter. These claims are reproduced below:

1. 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 vent openings formed in the shell outside of the raised central band, wherein the first plurality of vent openings are aligned, and positioned along a first side of the raised central band; and
 - a chin strap assembly that releasably secures the helmet to the wearer.

Ex. 1001, 24, 1:24–40 (amendment notations omitted).

25. 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 and a face guard connector,
a raised central band integrally formed in the shell and extending between the crown region and the rear region, the raised central band having a width defined by a pair of opposed side walls that extend transversely from an outer surface of the shell,
a first plurality of vent openings formed in the shell beyond the raised central band, wherein the first plurality of vent openings are aligned, and reside along a first side wall of the raised central band;
a face guard secured to the shell by the face guard connector; and,
a chin strap assembly that releasably secures the helmet to the wearer.

Ex. 1001, 24, 2:34–54 (amendment notations omitted).

34. 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, the raised central band having a width defined by a pair of opposed side walls that extend transversely from an outer surface of the shell, wherein a front extent of the opposed side walls do not converge;
a first plurality of elongated vent openings formed in the shell outside of the raised central band, wherein the first plurality of elongated vent openings are aligned along a first side wall of the raised central band; and
a chin strap assembly that releasably secures the helmet to the wearer.

Ex. 1001, 25, 3:1–21 (amendment notations omitted).

D. The Prior Art

We instituted trial on four grounds of unpatentability involving the following four references. Dec. on Inst. 70.

Sears	Sears, “Wish Book for the 1971 Christmas Season”	1971	Ex. 1004
Rappleyea	US 3,729,744	May 1, 1973	Ex. 1006
Monica	US 5,732,414	Mar. 31, 1998	Ex. 1007
Halstead	US 6,219,850 B1	Apr. 24, 2001	Ex. 1008

E. Asserted Grounds of Unpatentability

We instituted trial on the following four grounds of unpatentability. Dec. on Inst. 70.

References	Basis⁵	Claims Challenged
Sears	35 U.S.C. § 102(b)	1, 2, 5, 11, 25, 27, 30, and 32
Sears and Halstead	35 U.S.C. § 103(a)	1, 11, 12, 25, 28, 33–35, and 37
Rappleyea and Halstead	35 U.S.C. § 103(a)	1, 11, 12, 25, 28, 33–35, and 37
Monica and Halstead	35 U.S.C. § 103(a)	1, 11, 12, 25, 28, 33–35, and 37

⁵ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 296–307 (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.

II. ANALYSIS

A. *Level of Ordinary Skill in the Art*

Kranos asserts that the level of ordinary skill in the art to which the '118 patent pertains is “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. 43 (citing Ex. 1013 (Decl. of Jamison Float) ¶ 72). Riddell does not expressly address the level of ordinary skill in the Patent Owner Response, but its declarant provides a definition.

Mr. Shewchenko declares that “a person having ordinary skill in the art would have a degree in a relevant technical, physics, or engineering field and at least two years of experience designing and engineering sports helmets.” Ex. 2005 ¶ 19. Mr. Shewchenko further declares that the level of ordinary skill would also include a person without a technical degree having at least five years of experience designing sports helmets. *Id.*

Factual indicators of the level of ordinary skill in the art include “the various prior art approaches employed, the types of problems encountered in the art, the rapidity with which innovations are made, the sophistication of the technology involved, and the educational background of those actively working in the field.” *Jacobson Bros. v. United States*, 512 F.2d 1065, 1071 (Ct. Cl. 1975); *see also Orthopedic Equip. Co. v. United States*, 702 F.2d 1005, 1011 (Fed. Cir. 1983) (quoting with approval *Jacobson Bros.*). We find that the technology of the '118 patent is not sophisticated, as it relates to sports helmets including features and materials known in the art. *Compare* Ex. 1001, 1:24–2:9 (describing features of prior art sports helmets) *with id.* at 23, 1:24–24, 3:32 (providing claims reciting these common features). We

also find that innovation is not rapid in the field. *See, e.g.*, Ex. 1001, 1:40–41 (“[I]n general, the overall configuration and shape of a football helmet[] has remained the same for many years.”); Ex. 1004, 7 (providing images dated 1971 that depict football helmets with claim features); Ex. 2003, 1 (including images of a protective sports helmet from 1965 with many of the claimed elements). We further find that the type of problems encountered in the field are related to the protection and comfort of the wearer and ensuring the integrity of the helmet. *See, e.g.*, Ex. 1006, 1:3–6 (indicating that Rappleyea provides a protective helmet that “offers a high degree of protection against all types of impact” and is “cool and comfortable to wear”); Ex. 1007, 1:5–10, 2:1–5 (indicating that Monica is directed to a removable protective layer that protects a helmet from damage, which could compromise the safety of the helmet); Ex. 2003, 1:38–43 (“It is therefore one of the principal objects of the present invention to provide an improved protective helmet which provides a greater cushioning for a wearer’s head than the present popular hard plastic and web suspension helmet now in vogue.”).

We note that both parties have comparable definitions of the level of ordinary skill in the art, differing to a small degree only. We find, based on our review of the complete record before us, that a person having ordinary skill in the art to which the ’118 patent pertains would have at least a Bachelor’s degree in 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. Additional experience (at least three years) may be substituted for a formal engineering degree. We find that the prior art of record reflects this level of

ordinary skill in the art. We further note that our patentability analysis presented below would reach the same findings and determinations under either party's definition of the level of ordinary skill in the art.

B. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Under the broadest reasonable construction standard, claim terms 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. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Also, we are careful not to read a particular embodiment appearing in the written description into the claim if the claim language is broader than the embodiment. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993) (“[L]imitations are not to be read into the claims from the specification.”).

In the Petition, Kranos provides no express constructions for any claim term, indicating that we should give each claim term its broadest reasonable interpretation. Pet. 10. Riddell offers an express construction for two claim terms: (1) “aligned along;” and (2) “integrally formed.” PO Resp. 5–13. We address each of these terms below.

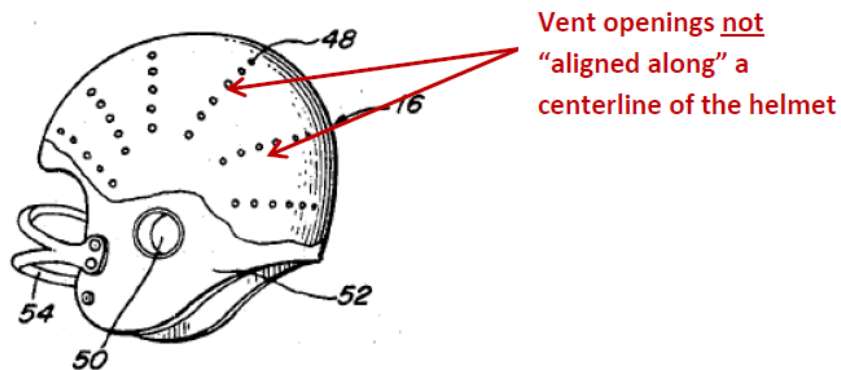
1. “aligned along” claim element

Independent claim 34 requires “a first plurality of elongated vent openings . . . , wherein the first plurality of elongated vent openings are *aligned along* a first side wall of the raised central band.” Ex. 1001, 25, 3:16–19 (amendment notation omitted) (emphasis added). Riddell contends that we should construe the “aligned along” claim element to mean “two or

more vent openings positioned in relation to and beside the first side [wall] of the raised central band.” PO Resp. 11.

Riddell contends that the prosecution history associated with the reexamination of the '118 patent supports its construction as the broadest reasonable interpretation of the term “aligned along.” PO Resp. 6–7. Riddell contends that the ordinary meaning, as evidenced by dictionary definitions of the words “align” and “along,” is consistent with its proffered construction. *Id.* at 7 (citing definitions provided in Ex. 2002). Riddell also contends that the Specification of the '118 patent is consistent with its construction. *Id.* at 8 (indicating that Figure 1 depicts “[v]ent openings positioned in relation to and beside the first side of the raised central band”).

Riddell further contends that, during the reexamination of the '118 patent, the examiner found that vent openings from a prior art reference (U.S. Pat. No. 3,186,004 to Carlini (Ex. 2003, “Carlini”) were not aligned along the centerline of its helmet. PO Resp. 9. To illustrate this point, we reproduce Riddell’s annotated version of Carlini’s Figure 2, below.



Carlini’s Figure 2 shows the side view of a protective helmet, with annotations pointing to vent openings in the helmet. *See* PO Resp. 9. Riddell emphasizes that, although the vent openings are aligned with each

other, the openings are not encompassed by the broadest reasonable interpretation of the “aligned along” claim element of claim 34. *See id.*

In its Reply, Kranos asserts that the term “aligned along” should be construed to mean that “two or more vent openings are aligned with respect to each other and beside the side wall of the raised central band.” Reply 4. Kranos argues that claim 34 does not recite that the vent openings are aligned with the first side wall of the raised central band. *Id.* at 5. That is, Kranos argues that Riddell’s construction seeks to improperly rewrite the plain language of claim 34 to require the plurality of vent openings to be aligned with the side wall of the raised central band. Kranos contends that we should construe the term “aligned along” in claim 34 to be consistent with our construction of similar terms in claims 1 and 25.⁶ *Id.*

Kranos also urges that we should not require the plurality of vent openings to be on, abut, or directly next to the side wall of the raised central band. Reply 5. Kranos does not offer any explanation for this position. Kranos also argues that we should not apply Riddell’s proffered construction to claims 1 and 25. *Id.* at 5–6.

⁶ Independent claim 1 requires “a first plurality of vent openings . . . , wherein the first plurality of vent openings are aligned, and positioned along a first side of the raised central band.” Ex. 1001, 24, 1:35–38 (amendment notations omitted). Similarly, independent claim 25 requires “a first plurality of vent openings . . . , wherein the first plurality of vent openings are aligned, and reside along a first side wall of the raised central band.” *Id.* at 24, 2:47–50. In our Decision on Institution, we construed these terms to require the plurality of vent openings to be aligned with each other and be positioned or reside along the first side of the raised central band. *See Dec. on Inst.* 25–26. We maintain this construction in this Final Written Decision.

As detailed below, we construe the claim term “wherein the first plurality of elongated vent openings are aligned along a first side wall of the raised central band” from claim 34 to mean “two or more elongated vent openings aligned with and close to the first side wall of the raised central band.” In so construing the term, we want to make 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. Further, this construction applies to claim 34 only and not claims 1 and 25.

First, the plain reading of claim 34 supports our construction. *See, e.g., Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc) (“[T]he context in which a term is used in the [claim at issue] can be highly instructive.”). Specifically, the plain meaning of the phrase “plurality of elongated vent openings” is two or more elongated vent openings. *See, e.g., Dayco Prod., Inc. v. Total Containment, Inc.*, 258 F.3d 1317, 1327–28 (Fed. Cir. 2001) (“[W]e have held that “plurality,” when used in a claim, refers to two or more items, absent some indication to the contrary.”).

The plain language of the claim further requires that the two or more elongated vent openings be aligned along the first side wall of the raised central band. We agree with the parties, in part, that the phrase “aligned along” requires the vent openings to be close to the first side wall, but not necessarily touching or up against the side wall of the raised central band. *See* PO Resp. 7–8; Reply 5. As Riddell indicates, the ordinary meaning of the word “along” consistent with how that word is used in claim 34 is “close to.” *See* PO Resp. 7; Ex. 2002, 5 (def. 2).

Second, the language of other claims also informs our construction. “Other claims of the patent in question . . . can also be valuable sources of enlightenment as to the meaning of a claim term.” *Phillips*, 415 F.3d at 1314. Claim 1 requires the “plurality of vent openings [be] aligned, and positioned along a first side of the raised central band” and claim 25 requires the “plurality of vent openings [be] aligned, and reside along a first side wall of the raised central band.” Ex. 1001, 24, 1:35–38, 2:47–50 (amendment notations omitted). As seen in these two claim elements, the claim drafter included a comma in the phrase, thus requiring the vent openings to be aligned with one another and also positioned or reside along the side or side wall of the raised central band. Claim 34 is not so drafted, supporting a determination that the claim term should be read to require the recited alignment to be with the first side wall and not just with the plurality of vent openings.⁷

Although the specification is usually “the single best guide to the meaning of a disputed term,” *Phillips*, 415 F.3d at 1315, the Specification of the ’118 patent does not provide an explicit definition of the term. Figure 1 of the ’118 patent depicts two vent openings 62 close to raised central band 63, Figure 19 depicts three vent openings 62 close to raised central band 63, and Figure 20 depicts a single vent opening 62 on either side of raised central band 63. *See* Ex. 1001, Figs. 1, 19, 20. The description of Figure 1, however, does not describe the alignment of the vent openings with respect

⁷ Although we find that the language of claims 1 and 25 and claim 34 results in a slightly different claim construction, Kranos’s proposed combinations are encompassed by both constructions, as will be evident from our analysis below.

to the raised central band and the description of Figures 19 and 20 merely mimic the claim language without further explanation. *See id.*, 6:8–32. Figures 1 and 19 depict two or more vent openings close to a side wall of the helmet’s raised central band and Figure 20 shows the forward-most vent opening close to the side wall. *See id.*, Figs. 19 and 20. Although these depictions are consistent with our construction, the Specification does not define or otherwise provide any disclosure that further informs our construction of the phrase “aligned along.”

We do not discern anything in the prosecution history that is contrary to our construction. *See PO Resp.* 6–7, 8–9.

2. “*integrally formed*”

Each independent claim of the ’118 patent requires a raised central band that is “integrally formed” in the plastic shell of the claimed helmet. *See Ex. 1001*, 24, 1:24–40, 2:34–54; 25, 3:1–21 (amendment notation omitted). The parties dispute the construction of this term. Riddell contends that the term “integrally formed” requires the raised central band to be formed as a single unit with the plastic shell. *PO Resp.* 11–13. Kranos contends that the term should be more broadly construed to encompass both central bands that are formed as a single unit with the helmet and central bands that are formed as a separate piece to the helmet and then fixed to the helmet. *See Reply* 6–8.

We determine that we need not expressly construe this term to resolve the parties’ ultimate dispute as we find that Sears, Rappleyea, and Monica, each disclose a raised central band formed as a single unit with the plastic helmet shell. Our findings are described in greater detail below, in

connection with our analysis of obviousness grounds directed to Sears, Rappleyea, and Monica.

C. Overview of the Asserted Prior Art

We instituted trial on four grounds of unpatentability relying on four prior art references—Sears, Rappleyea, Monica, and Halstead. We briefly discuss the relevant portions of these references, below.

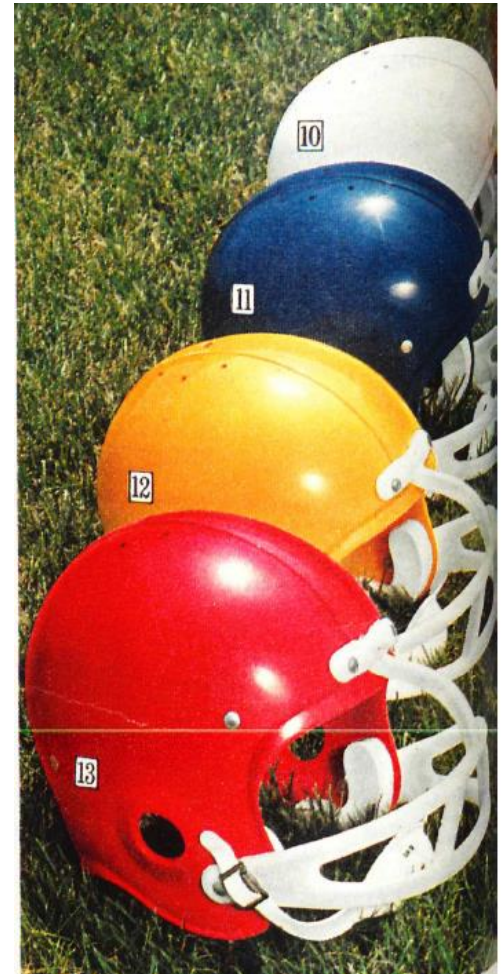
1. Sears

Sears is a page from a 1971 Sears catalog, depicting football helmets. The image from the catalog relied on by Kranos is reproduced on the right.

The image depicts four similar football helmets (differing in color only). *See* Ex. 1004, 7. In describing these helmets, the catalog states that helmets 10–13 are a “[c]ontour of one-piece, high-impact Kralastic®.” *Id.*

2. Rappleyea

Rappleyea, titled “Protective Helmet for Football or the Like,” issued May 1, 1973. Ex. 1006, (54), (45). 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:



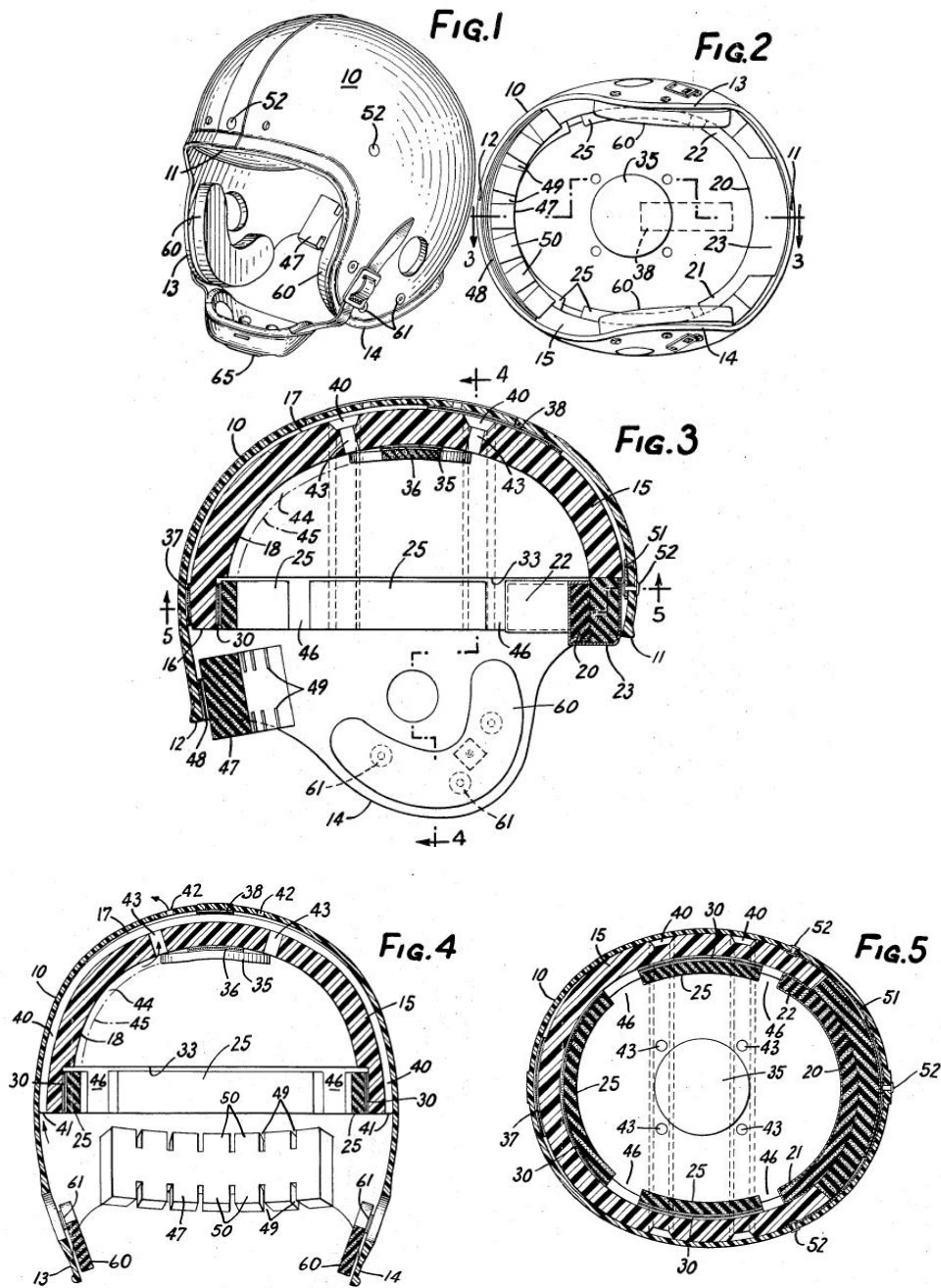


Figure 1 depicts an external view of an embodiment of the disclosed helmet. Ex. 1006, 1:19–20. Figure 2 shows a view of the helmet of Figure 1 from the bottom. *Id.* at 1:21–22. Figure 3 depicts a vertical section along

line 3–3, Figure 4 depicts a transverse section through line 4–4, and Figure 5 depicts a horizontal section through line 5–5. *Id.* at 1:24–32.

The helmet includes outer shell 10 and liner 15, recessed in the shell. Ex. 1006, 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. Rappleyea’s Figure 4 depicts two (2) openings 42, and Figure 5 depicts four (4) openings 43.

Relevant to our analysis here, Figures 3, 4, and 5 depict outer shell 10, including a raised central band, with cross hatching that indicates that the shell and central band form a single unit made of the same material. *See, e.g.*, Fig. 3 (showing the same cross hatching uninterrupted between outer shell 10 and the raised central band of the shell).

3. *Monica*

Monica, titled, “Helmet Having a Readily Removable and Replaceable Protective Layer,” issued March 31, 1998. Ex. 1007, (54), (45). *Monica* is generally directed to a helmet with a protective layer that protects the surface of the helmet from damage. *Id.* at 1:5–10. *Monica*’s Figure 1 is reproduced below.

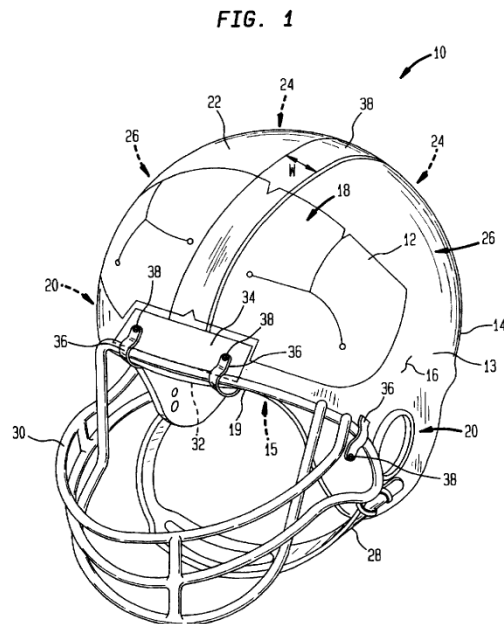


Figure 1 depicts a perspective view of Monica’s helmet 10. Ex. 1007, 4:14–16. Of relevance to our analysis, Monica discloses helmet body 14 with elongated raised portion 38 having a width W and formed integral with exterior surface 16 in the center of helmet body 14. *Id.* at 4:62–65. “[R]aised portion 38 extends the full length of . . . helmet body 14 from . . . front edge 19 to the furthest end (not shown) of the back portion.” *Id.* at 4:67–5:2. Additionally, helmet 10 includes ear covering portions 20, chin strap assembly 28, and face guard assembly 30. *Id.* at 5:3–6.

4. Halstead

Halstead, titled “Helmet,” issued April 24, 2001. Ex. 1008, (54), (45). Halstead is generally directed to a helmet, such as a football helmet, with improved comfort characteristics. *Id.* at 1:10–18. Halstead’s Figures 1 and 2 are reproduced below.

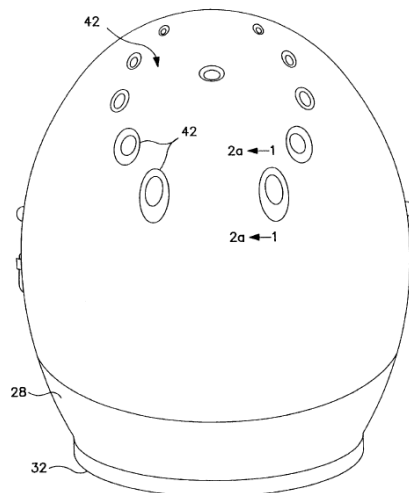
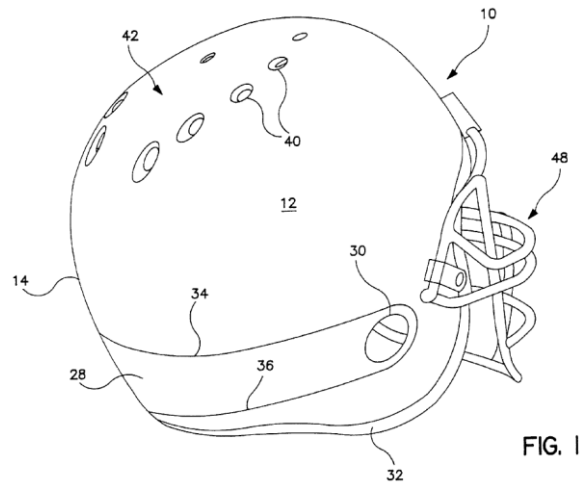


Figure 1 provides a side perspective view of Halstead’s helmet, and Figure 2 provides a rear perspective view of the helmet of Figure 1. Ex. 1008, 2:32–36. Of relevance to our analysis, helmet 10 includes shell 12 with apertures 40 that extend between the outer surface to the inner surface of shell 12. *Id.* at 3:46–49. Halstead discloses that “[e]ach 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, interior minor axis 44 is less than exterior major axis 46) and extend to the rear portion of shell 12. *Id.*

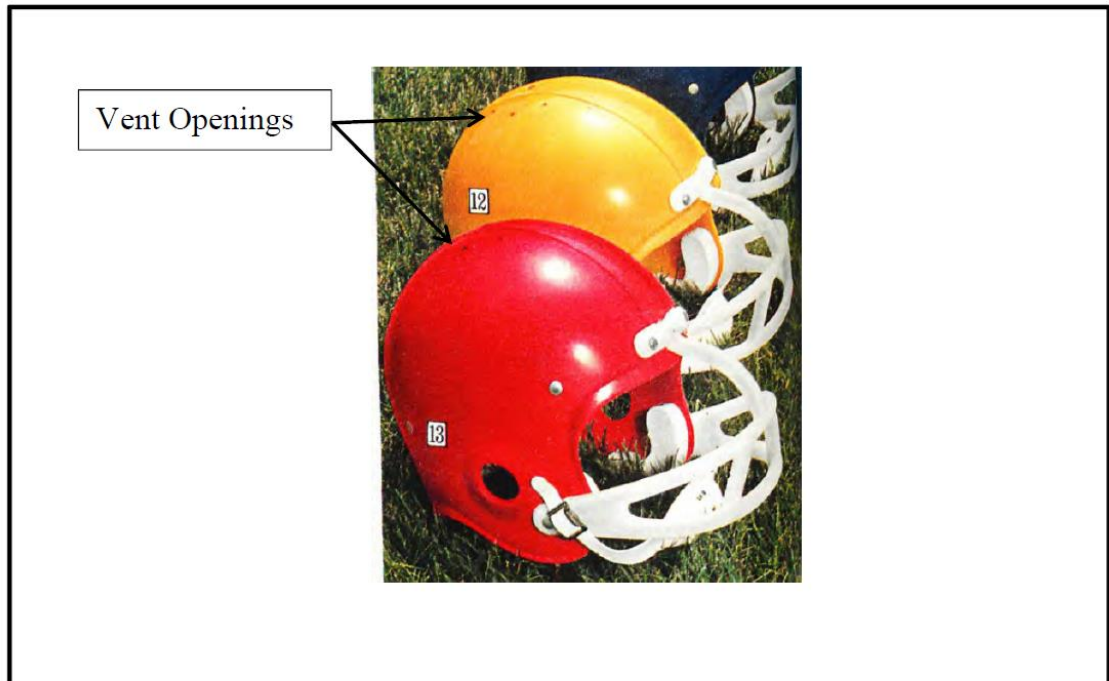
D. Analyzed Grounds of Unpatentability—Anticipation

We instituted trial on the ground that Sears anticipates claims 1, 2, 5, 11, 25, 27, 30, and 32. Dec. on Inst. 70. A “prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)). Also, a drawing from a prior art reference alone may disclose a claim element if the drawing clearly shows that element. *See In re Mraz*, 455 F.2d 1069, 1072 (CCPA 1972) (“[W]e did not mean that things patent drawings show clearly are to be *disregarded*. ‘Description for the purposes of anticipation can be by drawings alone as well as by words.’”); *see also PlaSmart, Inc. v. Kappos*, 482 Fed. Appx. 568, 572–73 (Fed. Cir. 2012) (“Our precedent has held that drawings can be used as prior art, without referring to the surrounding description, only if the prior art features are clearly disclosed by the drawing.”) (citing *In re Mraz*) (non-precedential).

1. Independent Claims 1 and 25 as Allegedly Anticipated by Sears

Independent claims 1 and 25 require, in relevant part, a plurality of vent holes formed in the shell outside the raised central band of the recited helmet. *See* Ex. 1001, 24, 1:35–36, 2:47–48 (the “vent openings” limitations of claims 1 and 25). Kranos contends that “Sears discloses the [v]ent [o]pening [l]imitation” of claims 1 and 25. Pet. 18.

To support Kranos’s contention, the Petition provides the follow annotated image:



This annotated image is from page 212 of Sears (which is page 7 of Ex. 1004), with annotation consisting of arrows pointing to the crown region of two depicted helmets and a label reading “Vent Openings.” Pet. 18. Apparently, Kranos contends that the dark spots in the crown region are the vent openings.

Mr. Float, Kranos’s declarant, states, “It is my opinion that Sears discloses the Vent Openings Limitation of [c]laims 1 and 25” and cites to

Ex. 1014.⁸ Ex. 1013 ¶ 39 (cited at Pet. Reply 10–11). With respect to the vent openings limitations of claims 1 and 25, Exhibit 1014 merely reproduces the above annotated image from the Petition. Mr. Float provides no additional explanation to support his opinion as to why a person having ordinary skill in the art would understand the dark spots in the crown region of Sears’s helmet are vent openings.

Riddell contends that Sears fails to adequately disclose vent openings in the shell of its helmet. PO Resp. 14. We agree. We find that Sears fails to *clearly disclose* that the dark spots in the crown region of Sear’s helmet are vent openings. Significant to our finding, Kranos fails to offer any explanation or supporting testimony as to why a person having ordinary skill in the art would understand that Sears clearly discloses vent openings. Without such a clear disclosure or any other supporting evidence for us to consider, we cannot find that Sears anticipates, by a preponderance of the evidence, the vent openings limitation of claims 1 and 25. *See In re Mraz*, 455 F.2d at 1072.

Although we agree with Riddell’s overall position, we do not rely on its specific arguments concerning inherent disclosure. We find that Kranos does not assert that Sears inherently discloses vent openings. Nowhere in the Petition or Mr. Float’s Declaration does Kranos assert that the dark

⁸ Mr. Float indicates that he considered the information in Exhibits 1014–1018, but nowhere does he indicate that he prepared these exhibits or that these exhibits are encompassed in his Declaration and the attestation that the information in his Declaration is “true and correct.” *See* Ex. 1013 ¶ 17; *id.* at p. 25. Although we question whether Exhibits 1014–1018 are admissible as evidence as they appear to represent attorney argument outside the Petition and Mr. Float’s Declaration, we need not reach that determination, as we do not rely on any information from those exhibits.

images in the crown region are *necessarily* vent openings. *See* Pet. 18. Instead, we interpret Kranos’s position to be that Sears expressly discloses vent openings through its image. We further find, however, to the extent that Kranos is making an inherency argument, that Kranos’s argument fails to satisfy the stringent standard of demonstrating that the dark spots are *necessarily* vent openings, as Kranos presents no evidence in the Petition or Mr. Float’s Declaration in support of an inherency position. *See In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (“To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.’”).

For the reasons above, we find that Kranos has failed to demonstrate, by a preponderance of the evidence, that Sears anticipates independent claims 1 and 25.

2. Dependent Claims 2, 5, 11, 27, 30, and 32 as Allegedly Anticipated by Sears

Dependent claims 2, 5, 11, 30 depend directly from independent claim 1. Ex. 1001, 14:32; 24, 1:41; 24, 2:60. Claims 27 and 32 depend directly from independent claim 25. *Id.* at 16:35; 24, 2:64. As we explained above in connection with our analysis of claims 1 and 25, we find that Kranos has failed to demonstrate, by a preponderance of the evidence, that Sears anticipates claims 1 and 25. Accordingly, we further find that Sears fails to anticipate dependent claims 2, 5, 11, 25, 27, 30, and 32 for the same reasons.

E. Analyzed Grounds of Unpatentability—Obviousness

We instituted trial with respect to claims 1, 11, 12, 25, 28, 33–35, and 37 on the following obviousness grounds: (1) over Sears and

Halstead; (2) over Rappleyea and Halstead; and (3) over Monica and Halstead. Dec. on Inst. 70.

Section 103(a) [of 35 U.S.C.] 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, secondary considerations, 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). We analyze these factual determinations with respect to the instituted obviousness grounds. We analyze the level of ordinary skill in the art in Section II.A.1, *supra*, and Riddell does not present any evidence of secondary considerations in response to Kranos’s obviousness assertions.⁹ Accordingly, as we have no evidence of secondary considerations to weigh

⁹ At oral hearing, counsel for Riddell seemed to suggest that the claimed configuration of a raised central band and vent openings provided unexpected results and these results represent an indicium of non-obviousness. *See* Tr. 73:12–74:9. We do not discern any argument or evidence of unexpected results or any other indicia of non-obviousness in Riddell’s Patent Owner Response or supporting Declaration nor does Riddell direct us to any argument or evidence of unexpected results or other secondary considerations.

in our ultimate determination of obviousness, our analysis applies the other three *Graham* factors.

1. Claims 1, 11, 12, 25, 28, 33–35, and 37 are allegedly obvious over Sears and Halstead

a. Independent claims 1 and 25

We instituted trial on the ground that independent claims 1 and 25 are obvious over Sears and Halstead, based on information in the Petition and supporting Declaration from Mr. Float. *See* Dec. on Inst. 36–43. We included these claims even though the Petition did not expressly identify these claims in its obviousness ground. *See id.* at 43.

As an initial matter, Riddell argues that, “with respect to at least claims 1 and 25, the Board should not find those claims unpatentable for obviousness for an additional reason—Petitioner did not present any obviousness argument with respect to those claims.” PO Resp. 38. First, Riddell contends that our rules require the Petition to identify the specific statutory grounds for challenging a claim. *Id.* at 39 (citing Rule 42.104(b)). Riddell fails to explain how Rule 42.104(b) or any other rule restricts us from adding claims to a ground in our institution decision. Rule 42.104 dictates the content of a petition—it does not limit our ability to modify a ground from a petition. *Cf. Genzyme Therapeutic Prods Ltd. v. Biomarin Pharm., Inc.*, 825 F.3d 1360, 1367 (Fed. Cir. 2016) (“The critical question for compliance with the [Administrative Procedure Act] and due process is whether [Patent Owner] received ‘adequate notice of the issues that would be considered, and ultimately resolved.’”) (internal citation omitted).

Next, Riddell argues that Federal Circuit precedent prevents us from considering grounds not in a petition. PO Resp. 39 (citing *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364 (Fed. Cir. 2016)). Riddell’s reliance on

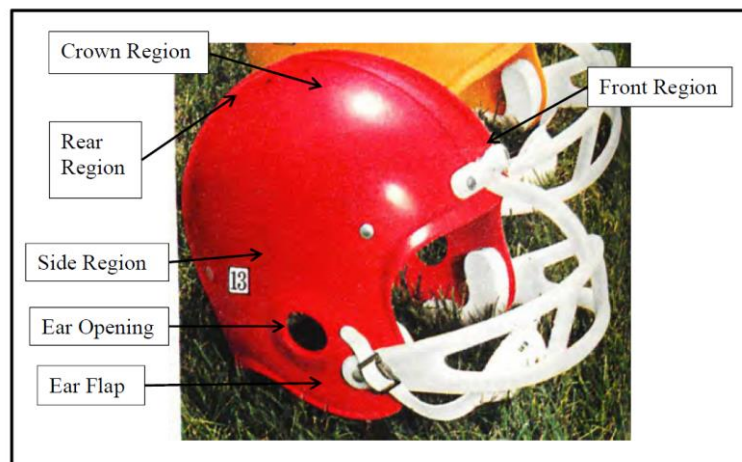
Magnum Oil is misplaced. In *Magnum Oil*, the Federal Circuit determined that the Board’s decision improperly provided new arguments not raised by the petitioner, but which the Board asserted could have been raised in a properly-drafted petition. *See Magnum Oil*, 829 F.3d at 1380. Specifically, the Federal Circuit faulted the Board for making an obviousness argument directed to the Lehr reference for which the petitioner never made but, instead, merely provided an unsupported conclusory statement. *See id.* In contrast, our Decision on Institution relied on evidence presented in the Petition and Mr. Float’s supporting Declaration for the obviousness theory with respect to claims 1 and 25. *See, e.g.*, Dec. on Inst. 36–46 (analyzing how Kranos demonstrates that that combination of Sears and Halstead disclose the subject matter of claims 1 and 25 and that there was a reason to combine the teachings of these references, with a rational underpinning, provided in the Petition and supporting Declaration). That is, because the dependent claims asserted to be obvious in the Petition include each and every claim limitation of the independent claims, the Petition includes evidence and advances arguments of how the references disclose the subject matter of claims 1 and 25 and provides a rationale for combining the references. Such were not the facts in *Magnum Oil*. Importantly, Riddell was put on notice and had a fair opportunity to respond to the obviousness positions with respect to claims 1 and 25 in its Patent Owner Response. *See Rovalma, S.A. v. Bohler-Edelstahl GmbH & Co. KG*, 856 F.3d 1019, 1027 (Fed. Cir. 2017) (“[In *Magnum Oil*, w]e . . . explained that ‘the Board must base its decision on arguments that were advanced by a party, and to which the opposing party was given a chance to respond.’”).

Finally, not including claims 1 and 25 could result in the anomalous situation of determining that a dependent claim was obvious, but not the independent claim from which it depends. Although Riddell directs us to Board decisions that allegedly undercut this reasoning (PO Resp. 40 (referencing IPR2016-00317, IPR2016-00066, and IPR2016-00041)), the proceedings relied on by Riddell are distinguishable from the current proceeding. In IPR2016-00317, independent claim 1, from which reviewed claims 2 and 9 depended, was not challenged in any ground of the subject petition as the petition asserts that certain *dependent* claims could not be antedated. *See Electra, Inc. v. Varian Med. Sys.*, IPR2016-00317, slip op. at 2 (PTAB June 7, 2016) (Paper 12); *see also* IPR2016-00317 Paper 2, 30–35 (discussing, in the petition, how certain dependent claims were not antedated). In IPR2016-00041, claim 5, from which reviewed claim 6 depended, was not asserted in any ground in the subject petition and trial was instituted based on the subject petition’s assertions with respect to claim 1 only. *See Costco Wholesale Corp. v. Robert Bosch LLC*, slip op. at 18 (PTAB Apr. 25, 2016) (Paper 20). In IPR2016-00066, claims 1–3, from which analyzed claim 6 depended, were disclaimed. *See Dukane Corp. v. Herrmann Ultraschalltechnik GmbH*, slip op. 2 (PTAB Apr. 29, 2016) (Paper 8); *see also Ormco Corp. v. Align Tech.*, 498 F.3d 1307, 1319 (Fed. Cir. 2007) (stating that when a dependent claim is “found to have been obvious, the broader claims . . . must also have been obvious”); *Garmin Int’l, Inc. v. Cuozzo Speed Techs. LLC*, IPR2012-00001, 2013 WL 5947691, slip op. 18–19 (PTAB Jan. 9, 2013), *aff’d In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1282 (Fed. Cir. 2015), *aff’d sub nom. Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131 (2016) (“We recognize that Petitioner did not

specifically articulate a ground of unpatentability against claims 10 and 14 based on Aumayer, Evans, and Wendt. However, we exercise discretion to recognize that the assertion was implicitly made by Petitioner’s alleging that claim 17 would have been obvious over Aumayer, Evans, and Wendt.”).

i. The Subject Matter of Claims 1 and 25

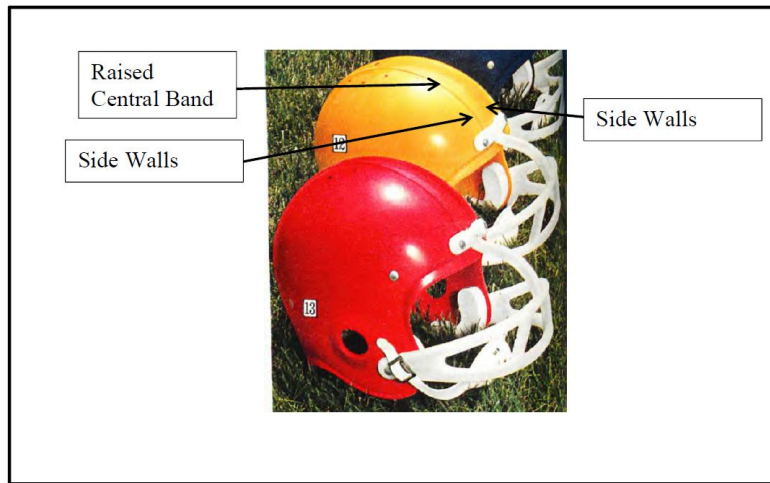
We now turn to our analysis of the elements of claims 1 and 25. Both independent claim 1 and independent claim 25 recite “[a] football helmet comprising: a plastic shell . . . having: a front region, a crown region, [and] a rear region. Ex. 1001, 24, 1:24–29, 2:34–39 (the “plastic shell” limitation of claims 1 and 25). Claim 1 further requires the plastic shell to have “two side regions wherein each side region has an ear flap with an ear opening.” *Id.* at 24, 1:30–31 (the “ear flap” limitation of claim 1). Similarly, claim 25 requires the plastic shell to have “two side regions wherein each side region has an ear flap with an ear opening and a face guard connector.” *Id.* at 24, 2:40–41 (the “ear flap” limitation of claim 25). In the Petition, Kranos annotates a portion of the image in Sears to support its contention that Sears discloses this recited subject matter. Pet. 16. That annotated figure is reproduced below.



The annotated figure shows helmet 13 and indicates the front, crown, rear, and side regions of the helmet as well as the ear flap and ear opening. *See id.* We note that the left side region of helmet 13 and its ear flap and ear hole are visible in the image (albeit the inside surface of the left side region). Kranos further adds that Sears discloses that the helmets include a high impact Kralastic shell. *Id.*; *see* Ex. 1004, 7. We agree with Kranos’s characterizations of Sears as presented in the Petition with respect to the plastic shell and ear flap limitations of claims 1 and 25, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos’s characterizations of Sears.¹⁰

Claim 1 further requires “a raised central band integrally formed as part of the shell and extending across the crown region to the rear region.” Ex. 1001, 24, 1:32–34 (the “raised central band” limitation of claim 1). Similarly, claim 25 requires “a raised central band integrally formed in the shell and extending between the crown region and the rear region, the raised central band having a width defined by a pair of opposed side walls that extend transversely from an outer surface of the shell.” *Id.* at 24, 2:42–45 (amendment notations omitted) (the “raised central band” limitation of claim 25). In the Petition, Kranos annotates a portion of the image in Sears to support its contention that Sears discloses this recited subject matter. Pet. 17. That annotated figure is reproduced below.

¹⁰ We note that our Scheduling Order cautions Patent Owner “that any arguments for patentability not raised in the [Patent Owner’s Response] will be deemed waived.” *See* Paper 11, 7; *see also In re NuVasive, Inc.*, 842 F.3d 1376, 1380–81 (Fed. Cir. 2016) (determining that NuVasive waived an argument contained in its preliminary response but not made in its patent owner response).



The annotated figure shows helmets 12 and 13 and indicates the raised central band of helmet 12 and the side walls forming the raised central band. *See id.* Kranos further notes that Sears discloses that the subject helmets are “one-piece.” *See id.* at 16. Specifically, Sears states that the depicted football helmets are a “[c]ontour of one-piece, high-impact Kralastic® shell designed to deflect any blow.” Ex. 1004, 7. Mr. Float declares that a raised central band allows a helmet to withstand impact. Ex. 1013 ¶ 82.

Riddell contends that Kranos “does not point to any express disclosure in Sears stating or clearly showing a helmet shell having an “*integrally formed* raised central band” as required by claims 1 and 25. PO Resp. 21–24. Riddell argues that the image depicting a raised central band in Sears relied on by Kranos “could just as easily be something glued, snapped, or plastic welded in place.” *Id.* at 22. Riddell further argues that Kranos’s reliance on Sears’s express disclosure of a one-piece construction is consistent with a finding that the raised central band is a separate piece, similar to other features of the helmet, such as the face mask and chin strap. *Id.* at 23. Riddell also argues that the central band is a decorative feature, relying on testimony by its declarant, Mr. Shewchenko. *Id.* (referencing Ex.

2005 ¶ 44). Mr. Shewchenko states that “there was no scientific basis for having added shell strength along the central band.” Ex. 2005 ¶ 44.

Kranos replies that Riddell’s reasoning is flawed, as the face mask and chin strap are not part of a helmet shell and would not be formed as part of a one-piece shell, in contrast to a raised central band. Reply 10.

Weighing all of the evidence of record, we find that Kranos 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. 1004, 7. We further find that Sears clearly depicts the raised central band as integral to that helmet. 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. 1004, 6–8. The raised central bands depicted on page 7 of Ex. 1004 are the same color as the rest of the helmet shell. This fact weighs against Mr. Shewchenko’s testimony.

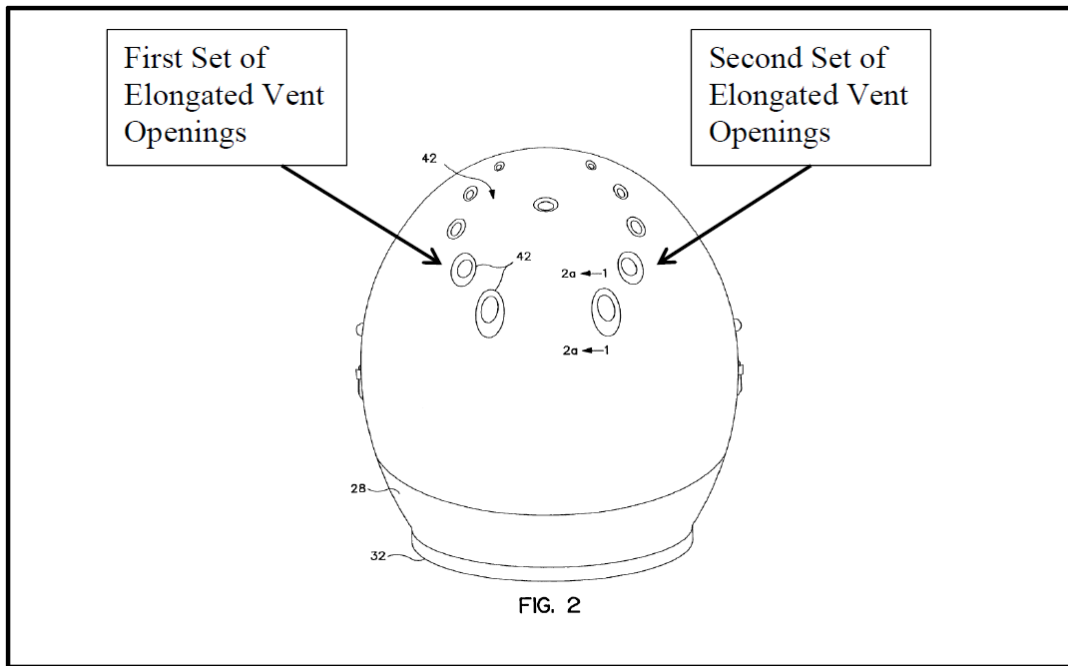
Additionally, we find, based on our review of the record, that the image of helmet 12 depicts side walls that extend transversely from the shell

surface and that the raised central band of helmet 12 extends to the rear region of the helmet.¹¹

Claim 1 further recites “a first plurality of vent openings formed in the shell outside of the raised central band, wherein the first plurality of vent openings are aligned, and positioned along a first side of the raised central band” and claim 25 recites “a first plurality of vent openings formed in the shell beyond the raised central band, wherein the first plurality of vent openings are aligned, and reside along a first side wall of the raised central band.” Ex. 1001, 24, 1:35–38, 2:47–50 (amendment notations omitted).

Kranos asserts that Halstead discloses vent openings formed in a shell. *See* Pet. 47–48 (presenting how Halstead discloses vent openings in the context of claim 34). We reproduce Kranos’s annotated Figure 2 from Halstead, below.

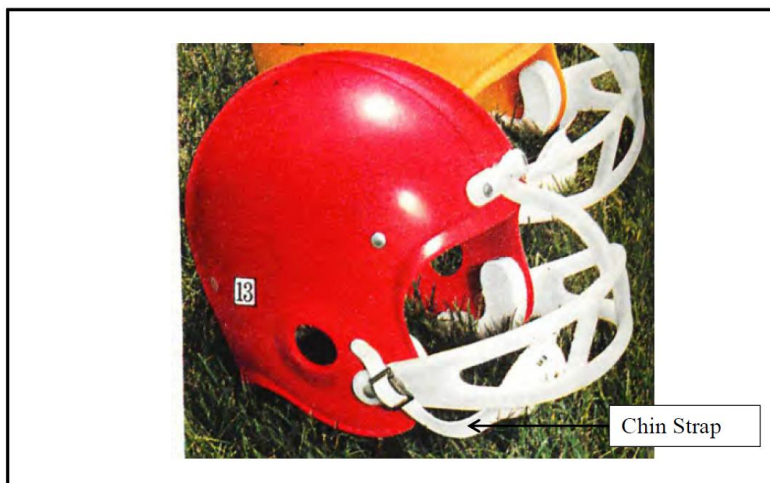
¹¹ We understand that, for the previous claim limitations, Kranos relied on helmet 13 and, for the raised central band limitation, Kranos relies on helmet 12. We find that Sears indicates that, except for the color, helmets 10–13 are identical. *See* Ex. 1004, 7 (indicating that its description applies to helmets “10 thru 13”). Accordingly, we treat the individual helmets 10–13 as interchangeable for the purposes of what their images disclose, rather than as distinct articles.



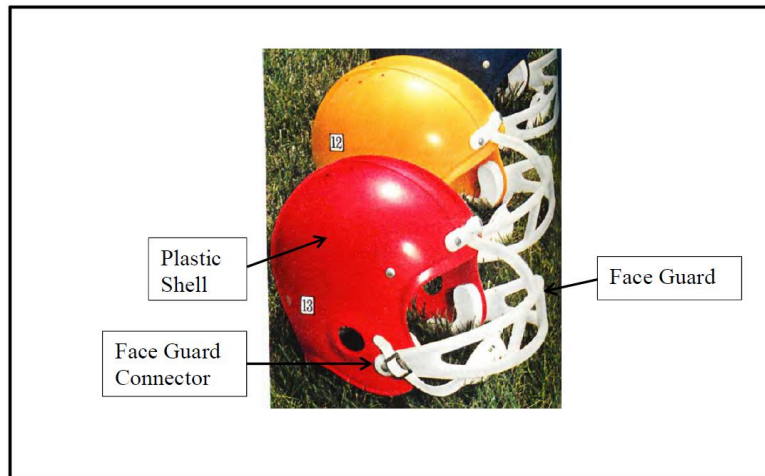
The annotated figure indicates a first and a second set of elongated vent openings depicted in Halstead’s Figure 2. *See* Pet. 48. We find that replacing Sears’s alleged vent openings (that is, the dark spots depicted in the shell of Sears’s helmets) with the five vent openings in the labeled “First Set of Elongated Vent Openings” 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)) and that would be positioned (or reside) along a first side of Sears’s raised central band. That is, when Sears’s helmet is modified with Halstead’s vent openings, at least two of the vent openings would be aligned and positioned close to the side wall of the raised central band. 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 Sears's raised central band is located. Riddell does not dispute this contention.¹²

Claims 1 and 25 also recite “a chin strap assembly that releasably secures the helmet to the wearer.” Ex. 1001, 24, 1:39–40, 2:53–54 (the “chin strap” limitation of claims 1 and 25). Claim 25 additionally requires “a face guard secured to the shell by the face guard connector [of the two side regions].” *Id.* at 24, 2:51–52 (the “face guard” limitation of claim 25). In the Petition, Kranos annotates portions of the image in Sears to support its contention that Sears discloses this recited subject matter. Pet. 19–20. Those annotated figures are reproduced below.

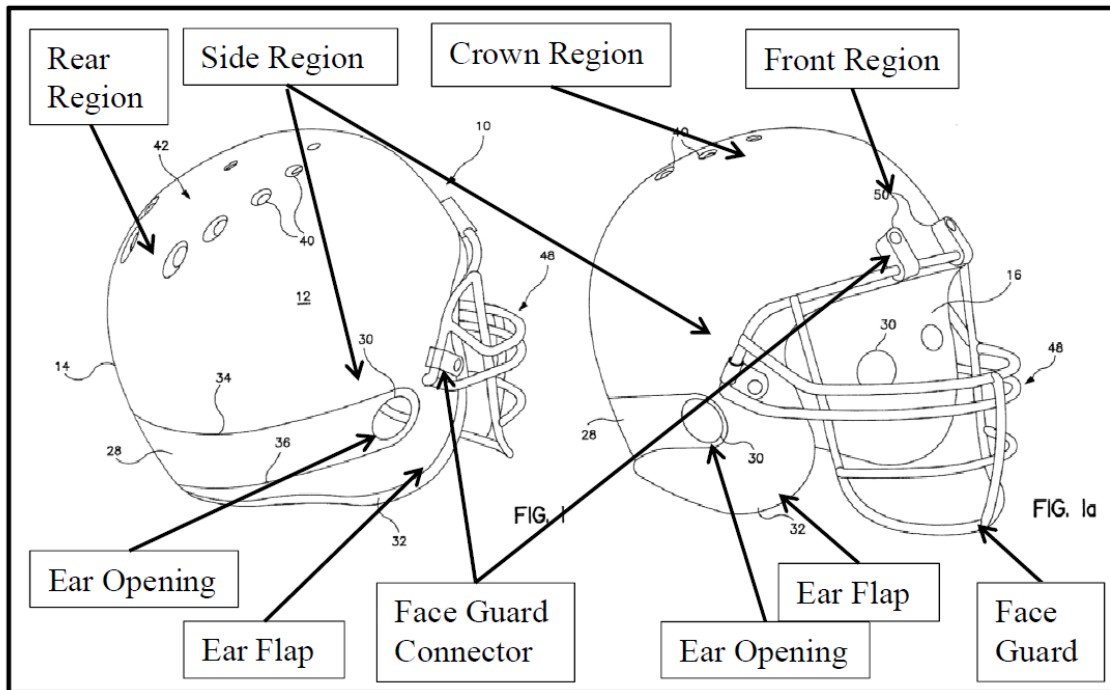


¹² We recognize that Riddell does dispute that there would be a reason to modify Sears with Halstead's teachings. We address that contention below. We also understand Riddell to argue that modifying Sears with Halstead's vent openings does not arrive at the vent openings limitation of claim 34 but we do not interpret this argument as applying to claims 1 and 25, as Riddell expressly distinguishes claim 34 from claims 1 and 25. *See* PO Resp. 28–33.



The annotated figures show helmets 12 and 13 and indicate the chin strap assembly, face guard, and face guard connector. Pet. 19–20; *see* Ex. 1004, 7. We agree with Kranos’s characterizations of Sears as presented in the Petition with respect to the chin strap and face guard limitations of claims 1 and 25, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos’s characterization of Sears disclosing these limitations.

Alternatively, Kranos asserts that Halstead discloses the subject matter of claims 1 and 25, except for the raised central band. *See* Pet. 46–48. The Petition presents the following annotated image of Halstead’s Figures 1 and 1a.



The annotated image depicts how Halstead discloses the plastic shell, ear flap, chin strap, and face guard limitations of claims 1 and 25. Further, the Petition cites to Halstead for disclosing that its helmet has a shell with a rear portion and opposite side portions (Ex. 1008, 1:53), that the shell is made of a polycarbonate alloy or polymeric material, that is, plastic (*id.* at 3:4–9), and that faceguard 48 is mounted to the shell with brackets 50 (*id.* at 3:58–60). As discussed above, the Petition also asserts that Halstead discloses, in the context of claim 34, the vent openings limitation. We agree with Kranos’s characterizations of Halstead as presented in the Petition with respect to how Halstead discloses the subject matter of claims 1 and 25 (with the exception of the raised central band), which are supported by the evidence of record, and we adopt them as our findings of fact. That is, we find that Halstead discloses the subject matter of the plastic shell, ear flap, chin strap, and face guard limitations of claims 1 and 25, as illustrated in the

annotated figure from Halstead and the disclosure from Halstead characterized above. As we discussed above, we find that Halsted discloses vent openings. Riddell does not dispute Kranos's characterization of Halstead disclosing these limitations.

Kranos contends that it would have been obvious to modify Halstead by adding Sears's raised central band. *See* Pet. 55. Consistent with Kranos's proposed modification, Sears's integrally-formed raised central band would extend from the front region of Halstead's helmet to the rear region of the helmet, between Halstead's two sets of vent openings. We credit Mr. Float's testimony that, at the time of the invention, injection molding was the preferred method for fabricating helmet shells, such that an added raised central band would be integrally formed in Halstead's helmet shell. *See* Ex. 1013 ¶ 81.

On the record before us, we conclude that Kranos has demonstrated, by a preponderance of the evidence, that the combination of Sears and Halstead discloses the subject matter of independent claims 1 and 25. We address Kranos's reasons for combining the teachings of Sears and Halstead, below.

ii. Reasons to Combine Sears and Halstead

Kranos contends that a person having ordinary skill in the art would have had reason to replace Sear's vent openings with Halstead's vent openings (or add vent openings to a helmet without openings). Kranos contends that vent hole features have been used "for their well-known purpose for decades." Pet. 53 (citing Ex. 1013 ¶¶ 81–84, 88–94). As Mr. Float declares, "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.” Ex. 1013 ¶ 89. Mr. Float further declares that vent openings, including vent openings at the rear of the helmet, allow for increased air flow in the helmet and heat to escape the helmet. *Id.* ¶¶ 89, 90. Mr. Float opines that:

First, one of ordinary skill in the art would look to Halstead because it discloses vent holes used to ventilate the helmet. Second, one of ordinary skill in the art would look to Halstead for a vent hole arrangement and placement that is intended to contribute to increased air flow and heat escapement. Third, one of ordinary skill in the art would look to Halstead for a vent hole arrangement and placement wherein the vent holes are not located in the central band region of the Sears . . . helmet[]. Fourth, one of ordinary skill in the art would look to Halstead for appropriately sized vent holes, including, for example, elongated vent holes, that will minimize the risk of finger injury.

Id. ¶ 93; *see also* Ex. 1008, 3:52–58 (“The exterior major axis 46 [of aperture 40] 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 when . . . exterior surface 14 of the shell comes into contact with a grassy or dirt playing surface.”). Kranos contends that the proposed combination is a combination of old elements that would predictably perform their ordinary function. Pet. 55–56.

With respect to adding Sears’s integrally-formed raised central band to Halstead, Mr. Float reasons that:

A raised central band has been a common design element in the field of football helmets since at least the mid-twentieth century. The central band region of a football helmet is the most frequently and intensely impacted region of the helmet. As the most frequently and intensely impacted region of the helmet, the central band region 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. 1013 ¶ 82. Mr. Float further declares that modifying Halstead to include an integrally-formed raised central band is a straight-forward design modification. *Id.* ¶ 83. That is, the combination of Sears’s raised central band and Halstead’s helmet would have a reasonable expectation of success. We credit Mr. Float’s testimony and adopt his reasoning as our own, as it is consistent with the evidence of record. For example, the prior art demonstrates that raised central bands were common helmet features. *See, e.g.,* Ex. 1004, 7; Ex. 1006, Fig. 4; Ex. 1007, Fig. 1. In light of our findings as to the level of ordinary skill in the art, we find that an artisan of ordinary skill would have a reasonable expectation of success in incorporating an integrated raised central band into a plastic shell of a helmet or adding vent openings to a helmet. *See Insite Vision Inc. v. Sandoz, Inc.*, 783 F.3d 853, 859 (Fed. Cir. 2015) (“The obviousness inquiry entails [not only] consideration of whether a person of ordinary skill in the art ‘would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, [but also] . . . would have had a reasonable expectation of success in doing so.’”) (text omitted in the original).

Riddell contends that Halstead teaches way from combining its teachings with Sears. PO Resp. 24–28. Riddell argues that Halstead

disparages such a combination, as it teaches away from increasing the weight of a helmet. *Id.* at 25 (referencing Ex. 1008, 1:14–18, 1:21–22). Riddell further argues that Kranos’s declarant admitted that Halstead is concerned with reducing helmet weight. *Id.* Riddell continues that a raised central band adds weight to a helmet. *Id.*

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference . . . would be led in a direction divergent from the path that was taken by the applicant.” *In re Haruna*, 249 F.3d 1327, 1335 (Fed. Cir. 2001) (quoting *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999)); *see, e.g., In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) (holding that, to teach away, the prior art must “criticize, discredit, or otherwise discourage the solution claimed”).

Halstead provides, in relevant part, “[t]he present invention relates to an improved helmet construction that provides a helmet suitable for use as a football helmet *and having reduced weight* and improved comfort characteristics as compared to conventional football helmets” and that “[a]nother object of the invention is to provide a helmet of the character described *that weighs less than conventional helmets.*” Ex. 1008, 1:14–18, 1:21–23 (emphasis added). It further provides that “[t]he invention advantageously enables the manufacture of helmets *that are of lighter weight than conventional helmets.* This enables reduced weight and use of materials and provides helmets that avoid many of the shortcomings of conventional helmets.” *Id.* at 2:20–24 (emphasis added). Halstead teaches that its offset 28 increases the flexor resistance of its helmet shell, allowing the helmet to be less thick (and, consequently, weigh less than a

conventional helmet). *See id.* at 3:17–29; *see also* Figs. 1, 1a, and 2 (depicting offset 28).

Riddell’s declarant states that “Halstead also in my opinion teaches away from a combination with a raised central band because it specifically instructs not to use one. Instead of using a raised central band, Halstead used light-weight ‘shock attenuating member[s].’” Ex. 2005 ¶ 49 (alteration in original). Mr. Shewchenko continues that “Halstead taught to use a helmet without any protrusions that would add weight, such as a raised central band.” *Id.*

Kranos replies that a person having ordinary skill in the art would understand that a raised central band could be added to Halstead’s helmet such that it was formed as an offset, such that the band would not add material, but instead include an offset in the interior of the helmet. Reply 23–26. We do not consider this argument as it represents a new obviousness position from Kranos. Nowhere in the Petition or supporting Declaration does Kranos assert that a person having ordinary skill in the art would have modified Halstead by adding an offset raised central band. Accordingly, this argument exceeds the scope of a proper reply. “A reply may only respond to arguments raised in the corresponding . . . patent owner response.”

37 C.F.R. § 42.23. Kranos’s argument goes beyond this requirement and proposes a new theory, a theory to which Riddell had no opportunity to respond. *See Genzyme Therapeutic Prods. LP v. Biomarin Pharm. Inc.*, 825 F.3d 1360, 1366–1367 (Fed. Cir. 2016) (determining that the Administrative Procedure Act and due process require notice to a party and the opportunity to submit facts and argument).

Based on the proper record, we find no credible evidence that Halstead teaches away from adding a raised central band to a helmet. 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 551, 553 (Fed. Cir. 1994) (“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, Riddell 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 Halstead discourages adding weight to its helmet by adding a raised central band, such a teaching would not teach away from Kranos's alternative modification—adding Halstead's vent openings to Sear'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. The modification would also improve comfort of Sears's helmet, another objective of Halstead. *See Ex. 1008, 1:14–18; see*

e.g., Ex. 1013 ¶ 90 (declaring that vent holes allow for heat to escape a helmet).¹³

Riddell also contends that our Decision on Institution relies on reasons for combining references that were not in the Petition but, instead, were taken from Mr. Float’s Declaration. PO Resp. 34–36. However, as Riddell recognizes, Kranos cites to Mr. Float’s reasoning in the Petition. *See id.* at 34. As such, this reasoning is based on information from the Petition. More importantly, Riddell was on notice of the reasoning and had a fair opportunity to respond to this reasoning in its Patent Owner Response. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015) (“A patent owner . . . is undoubtedly entitled to notice of and a fair opportunity to meet the grounds of rejection. ‘The indispensable ingredients of due process are notice and an opportunity to be heard by a disinterested decision-maker.’”) (quoting *Abbott Labs. v. Cordis Corp.*, 710 F.3d 1318, 1328 (Fed. Cir. 2013)). Indeed, the Patent Owner Response reproduces the reasoning. *See* PO Resp. 35. We do not agree that the Petition is deficient in this respect.

Riddell further argues that Mr. Float’s reasoning is conclusory and not backed up with any evidence or analysis. PO Resp. 39. Riddell seems to take exception to Mr. Float’s testimony that combining vent openings and a raised central bar as recited in the claims represents a straight forward design modification. *See id.* Riddell argues that Mr. Float’s approach considers

¹³ We note that Riddell’s focus on Halstead’s objective to reduce weight ignores Halstead’s other objectives. Indeed, Halstead’s over-arching objective is to form a protective helmet, not that the lesser the helmet weight, the more desirable the helmet.

vent openings and raised central bands individually, but the proper approach requires that these features be considered together as both features affect impact resistance, weight, and overall aesthetics. *Id.*

Mr. Shewchenko declares that “[d]ifferent helmets have different incompatible features, different pros and cons, and a different balancing of impact protection, weight, aesthetics, and comfort. You cannot just put various features from different football helmets together without changing those balances.” Ex. 2005 ¶ 82. Neither Riddell nor Mr. Shewchenko asserts that balancing the pros and cons of design changes is beyond the level of skill of a person having ordinary skill in the art nor do they assert that Kranos’s proposed modification would result in a helmet that is not suitable for its intended purpose. *Cf.* Ex. 1013 ¶ 91 (“One of ordinary skill in the art would take care not to design a football helmet having a resultant vent hole design that would compromise the structural integrity of the helmet.”).

We find that the proposed modifications are within the level of ordinary skill in the relevant art of the ’118 patent. In support of this finding, we note that the Specification of the ’118 patent does not disclose how to balance the design of a raised central band and vent openings. We understand that a patent specification is not required to disclose every aspect of how to make and use a patented invention, but a lack of disclosure is indicative of what the inventors considered to be within the level of ordinary skill and not necessary to disclose. As such, we find that a person having ordinary skill in the art would have known, with a reasonable expectation of success, how to incorporate an integrally-formed raised central band into a

helmet with vent openings or vent openings into a helmet with a raised central band.

Further, we find that Mr. Float’s reasoning is not merely conclusory. He provides supporting rationales for his conclusions that a person having ordinary skill in the art would have had reason to modify the helmets in Sears or Halstead: (1) vent openings increase air flow and allow heat to escape and Halstead’s elongated shape prevents fingers from being injured in the openings; and (2) raised central bands prevent damage to the helmet in the central region of the helmet, which is susceptible to impact damage. *See* Ex. 1013 ¶¶ 82, 93; *see also* Reply 17–18 (contending that the articulated reasons for Kranos’s proposed modifications are not in dispute).

iii. Conclusion

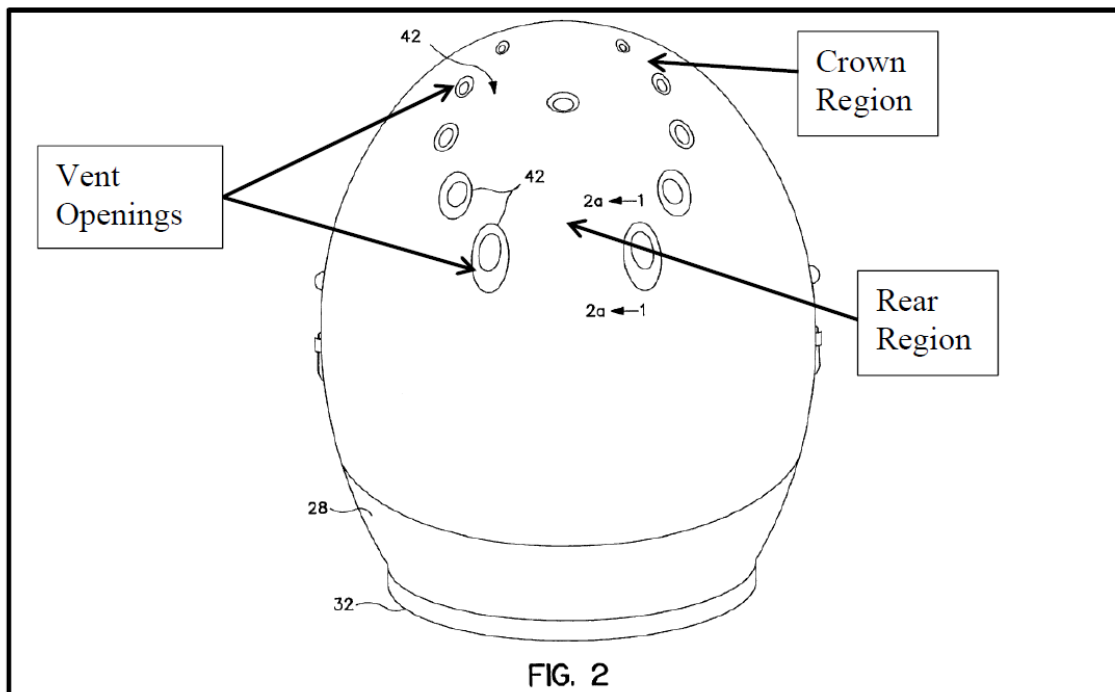
We determine that Kranos has demonstrated, by a preponderance of the evidence, that it would have been obvious to modify Sears by adding Halstead’s vent openings or modify Halstead by adding Sears’s integrally-formed raised central band to arrive at the claimed subject matter of claims 1 and 25. Kranos demonstrates how Sears and Halstead disclose the subject matter of claims 1 and 25 and also provides reasons, with rational underpinning, for the proposed modifications with a reasonable likelihood of success. Accordingly, we determine that claims 1 and 25 are unpatentable under 35 U.S.C. § 103 over Halstead and Sears.

b. Claims 11, 12 and 28

Claim 11 depends from claim 1 and further recites “wherein at least one vent opening in the first plurality of vent openings is positioned in the crown region of the shell.” Ex. 1001, 14:65–67. Claim 12 recites “[t]he football helmet of claim 11, wherein at least one vent opening in the first

plurality of vent openings is positioned in the rear region of the shell.” Ex. 1001, 15:1–3. Similarly, claim 28 recites “[t]he football helmet of claim 25, wherein at least one vent opening in the first plurality of vent openings is positioned in the rear region of the shell.” *Id.* at 16:38–40.

As we discussed above in connection with our analysis of the combination of Sears and Halstead rendering obvious claims 1 and 25, we find that Kranos adequately demonstrated that the combination of Sears and Halstead disclose the subject matter of claims 1 and 25. Kranos further contends that Halstead discloses at least one vent opening positioned in the crown region of the helmet shell and at least one vent opening in the rear region of the helmet shell as recited in claims 11, 12, and 28. Pet. 49. We reproduce Kranos’s annotated image below:



The image above presents Halstead’s Figure 2 with annotations indicating the crown and rear regions of Halstead’s helmet and at least one vent opening in each of these two regions. *See* Pet. 49; Ex. 1008, Fig. 2.

We agree with Kranos's characterizations of Halstead as presented in the Petition with respect to the limitations of claims 11, 12, and 28, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos's characterization of Halstead disclosing this subject matter.

As we discussed above in connection with our analysis of claims 1 and 25 as allegedly obvious over Sears and Halstead, we find that Kranos provides adequate reasoning, with rational underpinning, for modifying Halstead's helmet with Sears's integrally-formed raised central band or, alternatively, modifying Sears by adding Halstead's vent openings. This reasoning is equally applicable to claims 11, 12, and 28. Accordingly, we determine that Kranos has demonstrated sufficiently that claims 11, 12, and 28 are unpatentable under 35 U.S.C. § 103 over Halstead and Sears.

c. Claim 33

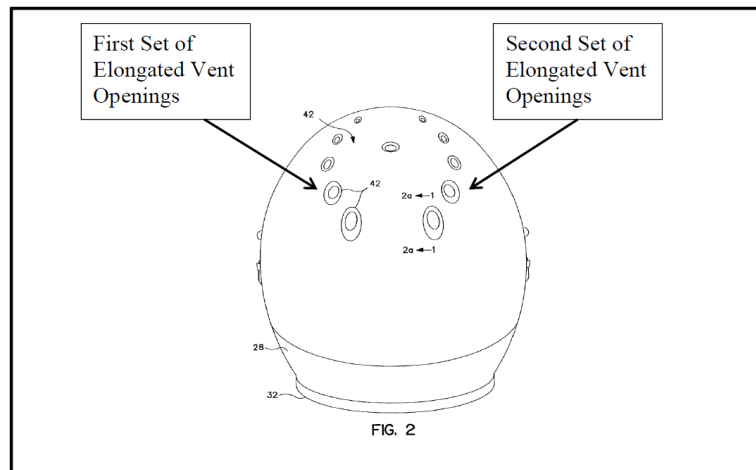
Claim 33 recites "[t]he football helmet of claim 1, wherein the first plurality of vent openings have an elongated configuration." Ex. 1001, 24, 2:66–67 (amendment notation omitted). Kranos contends that Halstead discloses elongated vent openings. Pet. 49–50 (including an annotation of Halstead's Figure 1, indicating the elongated openings); *see* Ex. 1008, Figs. 1, 2. We agree with Kranos's characterizations of Halstead as presented in the Petition with respect to the limitation of claim 33, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos's characterization of Halstead disclosing this limitation.

As we discussed above in connection with our analysis of claims 1 and 25 as allegedly obvious over Sears and Halstead, we find that Kranos

provides adequate reasoning, with rational underpinning, for modifying Halstead's helmet with Sears's integrally-formed raised central band or, alternatively, modifying Sears by adding Halstead's vent openings. This reasoning is equally applicable to claim 33. Accordingly, we determine that Kranos has demonstrated sufficiently that claim 33 is unpatentable under 35 U.S.C. § 103 over Halstead and Sears.

d. Independent claim 34

Independent claim 34 differs from independent claims 1 and 25, with respect to the raised central band limitation and vent openings limitation, in that it requires a front extent of the opposed side walls forming the raised central band to not converge and it also requires the first plurality of vent openings to be elongated and be aligned along a first side wall of the raised central band. Ex. 1001, 25, 3:9–19 (amendment notation omitted). As discussed above in connection with our analysis of claim 33, we find that Kranos has adequately demonstrated that Halstead discloses elongated vent openings. We find that modifying Sears's 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 Kranos's annotated version of Halstead's Figure 2, below (*see* Pet. 48).



This annotated figure indicates the first and second set of elongated vent openings in Halstead's helmet. We find that the front-most and rear-most vent openings of Halstead would align along Sears's raised central band (or an integrally-formed raised central band, as in Sears, added to Halstead's helmet), as these two vent openings are close to the center line extending from the front to rear of Halstead's helmet. That is, consistent with our claim construction of the vent openings limitation of claim 34, two elongated vent openings would be *aligned with* the first side wall of the raised central band and also be *close to* the first side wall of the raised central band.

We base this finding on the nature of Halstead's vent openings. As seen in the annotated version of Halstead's Figure 2, the first and second sets of elongated vent openings are arranged in an arc, with the forward-most and rear-most vent openings forming the ends of the arc close to the helmet centerline with the other three vent openings diverging from the centerline. As such, Halstead discloses two vent openings from each set of openings that would be positioned close to a raised central band. Further, as Sears's raised central band is formed with straight side walls (that is, the band is

constant width), the forward-most and rear-most vent openings would be aligned with the side wall. Indeed, as seen in Halstead's Figure 2, the major axis of front-most and rear-most vent openings of Halstead would be parallel to the side wall of a raised central band added at the centerline of the helmet.

Riddell contends that Kranos's proposed modifications results in vent openings that "would still be a distance away from the sides of the raised central band." PO Resp. 29–31. Riddell bases this contention on the assumption that Halstead's openings are three to six inches apart and that Sear's raised central band is between one and two inches wide. *See id.*

Riddell further contends that an artisan of ordinary skill would not consider the resulting arrangement of vent openings to be aligned with the raised central band. PO Resp. 31. Riddell argues that the openings "would be aligned in a curve with varying distances from the raised central band." *Id.* To support its position, Riddell provides an annotated version of Halstead's Figure 2, which we reproduce below.

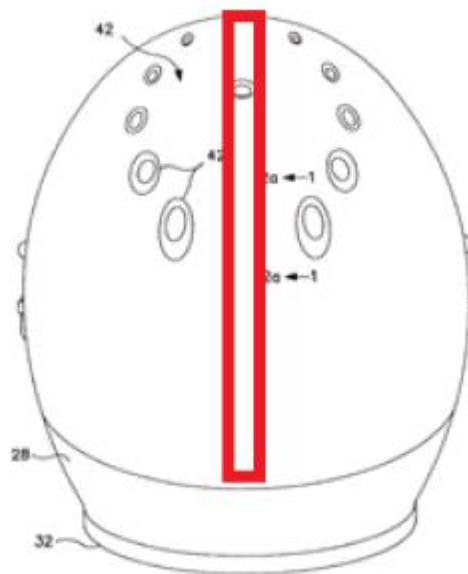
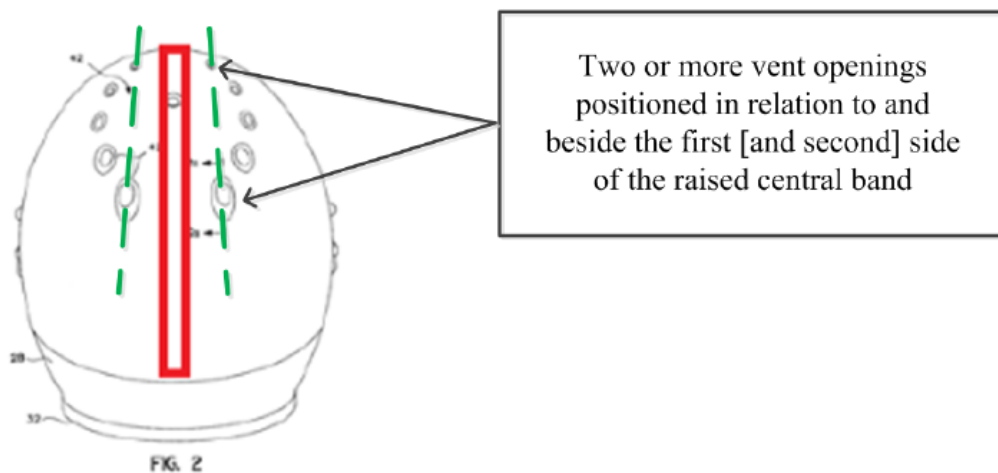


FIG. 2

The annotated image illustrates the position of an added narrow raised central band with respect to Halstead's vent openings. Riddell seems to argue that the curved nature of the arc arrangement of the five vent openings in each set of openings does not align with the red image of a raised central band. We note that Riddell does not separately address the alignment of the front-most and rear-most vent openings with respect to the central band. *Cf.* Dec. on Inst. 45 (putting Riddell on notice that our finding with respect to how Halstead's vent openings satisfy claim 34 is based on the front-most and rear-most vent openings).

Kranos replies that Halstead's front-most and rear-most vent openings with respect to the front and rear of the helmet shell would be positioned beside the raised central band of Sears based on Kranos's proposed modifications. Reply 15. To illustrate this point, Kranos provides a further annotation to Riddell's annotated version of Halstead's Figure 2, which we reproduce below.



Kranos's further annotation adds dashed green lines through the front-most and rear-most vent openings for both sets of vent openings and text indicating that these two openings are positioned beside the raised central

band. Reply 16. Kranos argues that the positioning of the middle three vent openings in each set are “largely irrelevant,” as claim 34 merely requires at least two vent openings to be positioned as claimed. *Id.* at 15. Riddell indicated at oral argument that the green dashed lines and red lines were not parallel, illustrating that the front-most and rear-most vent openings were not aligned with the raised central band. *See* Tr. 64.

We do not agree with Riddell’s position. As Kranos correctly argues, claim 34 requires at least two vent openings to be aligned with and close to a side wall of the raised central band, that not each and every vent opening meet that requirement. As we discussed above, we find that the front-most and rear-most vent openings would be close to and aligned with a raised central band as a result of Kranos’s proposed modification. The fact that some vent openings would be positioned farther away from the raised central band and that the overall configuration of the entire set of openings is an arc is not material to our analysis. To decide if the proposed modification results the vent openings limitation of claim 34, we need only consider the front-most and rear-most vent openings. Further, given that Halstead’s Figure 2 is a perspective view of the helmet, the fact that the green and red lines in the above annotation are not parallel does not demonstrate that the vent openings are not aligned with the side wall of a raised central band. *See* Ex. 1008, 2:34 (“F[igure] 2 is a rear perspective view of the helmet of F[igure] 1.”).

We find that Kranos has made the requisite showing that Halstead discloses vent openings with an elongated configuration arranged as recited in claim 34, as Kranos’s position is supported by the evidence of record. We also find that the front extent of the opposed side walls forming Sears’s

raised central band to not converge, based on our review of Ex. 1004 at page 7. As for the other elements of claim 34, we incorporate our findings with respect to claims 1 and 25, presented above in connection with our analysis of whether the combination of Sears and Halstead renders obvious claims 1 and 25. Accordingly, we find that Kranos has demonstrated that the combination of Sears and Halstead discloses the limitation of claim 34 by a preponderance of the evidence.

As we discussed above in connection with our analysis of claims 1 and 25 as allegedly obvious over Sears and Halstead, we find that Kranos provided adequate reasoning, with rational underpinning, for modifying Halstead's helmet with Sears's integrally-formed raised central band or, alternatively, modifying Sears by adding Halstead's vent openings. That reasoning applies equally to claim 34. Accordingly we determine that claim 34 is unpatentable under 35 U.S.C. § 103 over Sears and Halstead.

e. Claims 35 and 37

Claim 35 depends from claim 34 and additionally requires “a second plurality of elongated vent openings formed outside of the raised central band, wherein the second plurality of elongated vent openings are aligned along a second side wall of the raised central band.” Ex. 1001, 25, 3:22–26 (amendment notation omitted). Claim 37 depends from claim 34 and further recites “wherein the front region has at least one face guard connector and each ear flap has a face guard connector, and wherein a face guard is secured to the shell by the face guard connectors.” *Id.* at 25, 3:29–32 (amendment notation omitted).

Kranos contends that Halstead discloses a second plurality of elongated vent openings and, by replacing Sears's vent openings with

Halstead's openings or adding Sears's raised central band to Halstead's helmet, these second plurality of elongated vent openings would be aligned along the raised central band. *See* Pet. 50–51 (including an annotation of Halstead's Figure 2 showing the first and second set of vent openings). For the same reasons we find that Halstead's first plurality of elongated vent openings would align with one another and Sears's raised central band (or a raised central band as in Sears added to Halstead's helmet), we find that the front-most and rear-most openings of Halstead's second plurality of elongated vent openings would align along the raised central band. We also determine, for the reasons discussed above, that Kranos has made the requisite showing that a person having ordinary skill in the art would have had reason to modify Sears with Halstead's two sets of vent openings or modify Halstead with Sears's raised central band. Accordingly, we find that Kranos has demonstrated that the combination of Sears and Halstead discloses the limitation of claim 35 by a preponderance of the evidence.

With respect to claim 37, Kranos contends that both Sears and Halstead disclose the recited subject matter. *See* Pet. 51–52. Kranos's annotations of Halstead's Figures 1 and 1a (*see id.* at 47) and annotations of the image from Sears (*see id.* at 52) support this contention. We agree with Kranos's characterizations of Sears and Halstead as presented in the Petition with respect to the limitation of claim 37, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos's characterization of Sears and Halstead disclosing this limitation. Accordingly, we find that Kranos has demonstrated that the combination of Sears and Halstead discloses the limitation of claim 37 by a preponderance of the evidence.

As we discussed above in connection with our analysis of claims 1 and 25 as allegedly obvious over Sears and Halstead, we find that Kranos provided adequate reasoning, with rational underpinning, for modifying Halstead’s helmet with Sears’s integrally-formed raised central band or, alternatively, modifying Sears by adding Halstead’s vent openings. This reasoning is equally applicable to claims 35 and 37. Accordingly we determine that claims 35 and 37 are unpatentable under 35 U.S.C. § 103 over Halstead and Sears.

f. Conclusion

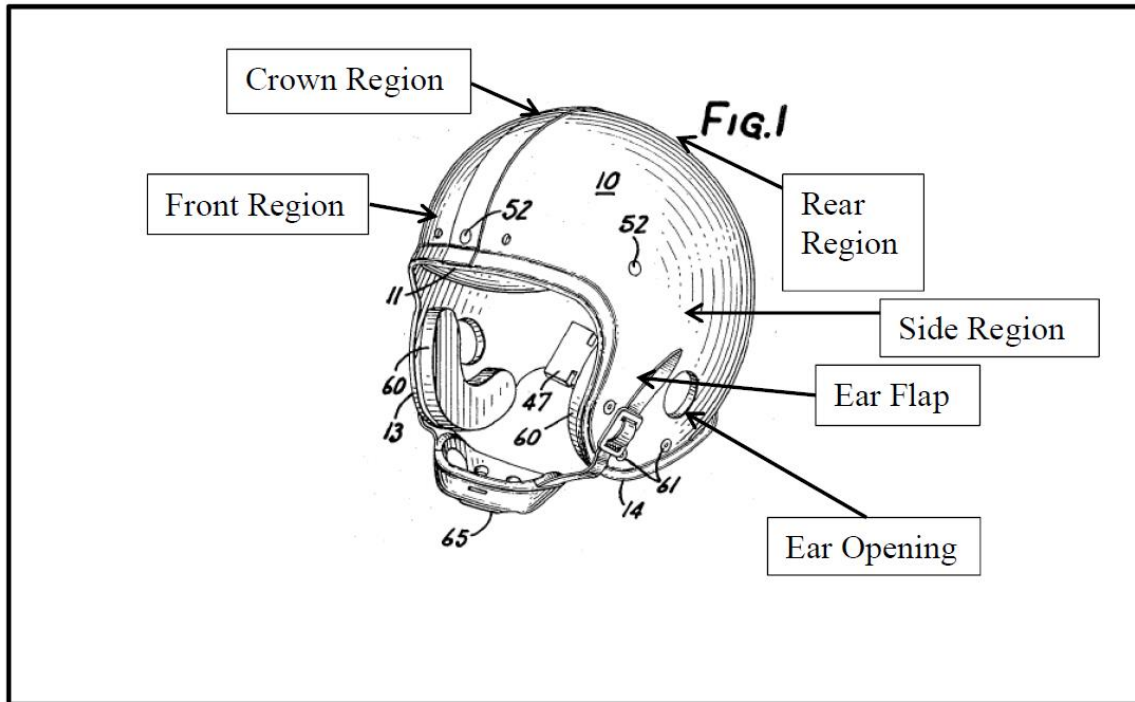
Upon review of the complete trial record, we conclude that Kranos has shown, by a preponderance of the evidence, that claims 1, 11, 12, 25, 28, 33–35, and 37 are unpatentable under 35 U.S.C. § 103 over Sears and Halstead.

2. Claims 1, 11, 12, 25, 28, 33–35, and 37 are allegedly obvious over Rappleyea and Halstead

a. Independent claims 1, 25, and 34

Independent claims 1, 25, and 34 recite “[a] football helmet comprising: a plastic shell . . . having: a front region, a crown region, [and] a rear region. Ex. 1001, 24, 1:24–29, 2:34–39 (the “plastic shell” limitation of claims 1, 25, and 34). Claims 1 and 34 further require the plastic shell to have “two side regions wherein each side region has an ear flap with an ear opening.” *Id.* at 24, 1:30–31 (the “ear flap” limitation of claims 1 and 34). Similarly, claim 25 requires the plastic shell to have “two side regions wherein each side region has an ear flap with an ear opening and a face guard connector.” *Id.* at 24, 2:40–41 (the “ear flap” limitation of claim 25). In the Petition, Kranos annotates a portion of the image in Rappleyea to

support its contention that Rappleyea discloses this recited subject matter.
Pet. 26. That annotated figure is reproduced below.

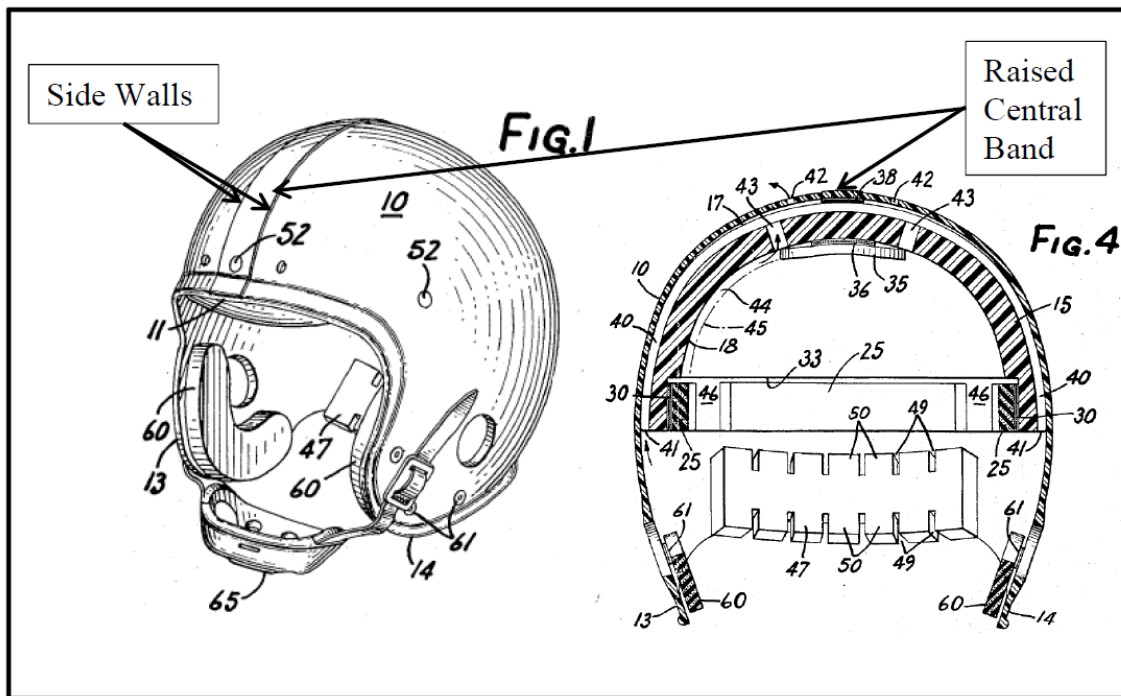


The annotated figure shows Rappleyea’s Figure 1 and indicates the front, crown, rear, and side regions of the helmet as well as the ear flap and ear opening. *See id.*; *see also* Ex. 1006, 1:48–55 (disclosing that the helmet shell is plastic). We agree with Kranos’s characterizations of Rappleyea as presented in the Petition with respect to the plastic shell and ear flap limitations of claims 1, 25, and 34, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos’s characterization of Rappleyea disclosing these limitations.

Claims 1 further requires “a raised central band integrally formed as part of the shell and extending across the crown region to the rear region.” Ex. 1001, 24, 1:32–34. Similarly, claim 25 requires “a raised central band integrally formed in the shell and extending between the crown region and the rear region, the raised central band having a width defined by a pair of

opposed side walls that extend transversely from an outer surface of the shell.” *Id.* at 24, 2:42–45 (amendment notations omitted). Claim 34 recites “a raised central band integrally formed as part of the shell and extending across the crown region to the rear region” and further requires “the raised central band [to have] a width defined by a pair of opposed side walls that extend transversely from an outer surface of the shell, wherein a front extent of the opposed side walls do not converge.” *Id.* at 25, 3:9–15 (the “raised central band” limitation of claim 34).

In the Petition, Kranos annotates a portion of the image in Rappleyea to support its contention that Rappleyea discloses this recited subject matter. Pet. 27. That annotated figure is reproduced below.



The annotated figure shows Rappleyea’s Figure 1 and indicates the raised central band of helmet and the side walls forming the raised central band. *See id.* We find that Rappleyea’s Figure 4 illustrates the raised central band with the same cross-hatching as the surrounding shell,

disclosing that the raised central band is integrally-formed with the shell. *See* Ex. 1004, Fig. 4. As seen in Rappleyea’s Figure 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, wherein a front extent of the opposed side walls do not converge. *See id.*

Riddell does not argue, in its Patent Owner Response, that Rappleyea fails to disclose an integrally-formed raised central band. At oral hearing, which was a combined hearing for three *inter partes* review proceedings, Riddell’s counsel argued that Rappleyea fails to disclose an integrally-formed raised central band. *See* Tr. 53–58.¹⁴ Riddell has not made it clear as to whether that argument was meant to apply to this proceeding, as the Patent Owner Response in this proceeding does not include that argument. Regardless, as stated above, we find that Rappleyea’s Figure 4, through its cross-hatching, clearly discloses that the raised central band is integrally-formed with the plastic shell. The cross-hatching shows a continuous structure extending along the shell to the raised central band, 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. 1004, Fig. 4.

Claim 1 further recites “a first plurality of vent openings formed in the shell outside of the raised central band, wherein the first plurality of vent openings are aligned, and positioned along a first side of the raised central band” and claim 25 recites “a first plurality of vent openings formed in the shell beyond the raised central band, wherein the first plurality of vent

¹⁴ The other two proceedings covered by the oral hearing are IPR2016-01649 (concerning US 8,813,269 B2) and IPR2016-01650 (concerning US 8,938,818 B2). *See* Tr. 1.

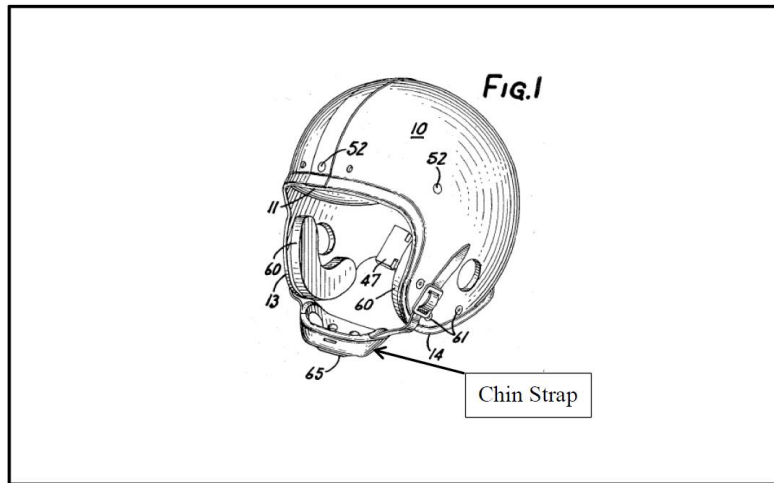
openings are aligned, and reside along a first side wall of the raised central band.” Ex. 1001, 24, 1:35–38, 2:47–50 (amendment notations omitted) (the “vent openings” limitation of claims 1 and 25). Claim 34 recites “a first plurality of elongated vent openings formed in the shell outside of the raised central band, wherein the first plurality of elongated vent openings are aligned along a first side wall of the raised central band.” *Id.* at 25. 3:16–19 (the “vent openings” limitation of claim 34). We found in our Decision on Institution that the Petition fails to adequately demonstrate that Kranos is likely to prevail in showing that Rappleyea discloses this limitation, such that Kranos must rely on a different prior art reference for disclosing this subject matter. *See* Dec. on Inst. 33.

As we discussed above in connection with our analysis of the combination of Sears and Halstead rendering claims 1, 25, and 34 obvious, Kranos asserts that Halstead discloses the vent openings limitation of claims 1, 25, and 34. *See* Pet. 47–48 (presenting how Halstead discloses vent openings in the context of claim 34). As in our analysis above with respect to Sears and Halstead and claims 1, 25, and 34, 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)) and that would be positioned (or reside or be aligned) along a first side of Rappleyea’s raised central band or that are aligned with and are close to the side wall of the 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 wall of the raised central band and aligned with each other (claims 1 and 25) or aligned along the side

wall (claim 34). 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 Kranos has demonstrated, by a preponderance of the evidence, that the combination of Halstead and Rappleyea discloses the vent openings limitation of claims 1, 25, and 34.

We addressed Riddell's contentions that Kranos's proposed modification does not result in the vent openings limitation of claim 34 in connection with our analysis of whether the combination of Halstead and Sears renders claim 34 obvious. That analysis is equally applicable here, as Riddell put forth the same contentions with respect to the combination of Halstead with Sears, Rappleyea, or Monica. *See* PO Resp. 28–33.

Claims 1, 25, and 34 also recite “a chin strap assembly that releasably secures the helmet to the wearer.” Ex. 1001, 24, 1:39–40, 2:53–54; 25, 3:20–21 (the “chin strap” limitation of claims 1, 25, and 34). Claim 25 additionally requires “a face guard secured to the shell by the face guard connector [of the two side regions].” *Id.* at 24, 2:51–52 (the “face guard” limitation of claim 25). In the Petition, Kranos annotates Rappleyea's Figure 1 to support its contention that Rappleyea discloses this recited subject matter. Pet. 29. This annotated figure is reproduced below.



The annotated figures show Rappleyea's helmet and indicates the chin strap. *See also* Ex. 1006, 4:30–32 (“[A]n adjustable chin strap 65 is provided having provisions for snapping the ends on the outer surface of portions 13, 14, of the helmet.”). We agree with Kranos's characterizations of Rappleyea as presented in the Petition with respect to the chin strap limitation of claims 1, 25, and 34, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos's characterization of Rappleyea disclosing this subject matter.

Kranos does not contend that Rappleyea discloses the face guard limitation of claim 25. Accordingly, we do not find that Rappleyea, as modified by adding Halstead's vent openings, discloses the subject matter of claim 25.

Alternatively, Kranos asserts that Halstead discloses the subject matter of claims 1, 25, and 34 except for the raised central band. *See* Pet. 46–48. As we discussed above in connection with our analysis of whether claims 1, 25, and 34 are obvious over Sears and Halstead, we find that Kranos has demonstrated, by a preponderance of the evidence, that Halstead

discloses the subject matter of claims 1, 25, and 34 with the exception of the raised central band limitation of these claims.

Kranos contends that it would have been obvious to modify Halstead by adding Rappleyea's raised central band. *See* Pet. 55. Based on this proposed modification, Rappleyea's integrally-formed raised central band would extend from the front region of Halstead's helmet to the rear region of the helmet, between Halstead's two sets of vent openings. We credit Mr. Float's testimony that, at the time of the invention, injection molding was the preferred method for fabricating helmet shells, such that an added raised central band would be integrally formed in Halstead's helmet shell. *See* Ex. 1013 ¶ 81.

On the record before us, we conclude that Kranos has demonstrated, by a preponderance of the evidence, that the combination of Rappleyea and Halstead discloses the subject matter of independent claims 1, 25,¹⁵ and 34.

We address Kranos's reasons for modifying Rappleyea with Halstead, and Riddell's arguments against the combination above, in connection with our analysis of the combination of Sears and Halstead, as Kranos's rationale and Riddell's contentions are the same for the combination of Sears and Halstead and Rappleyea and Halstead.

¹⁵ The combination of Rappleyea and Halstead discloses the subject matter of claim 25 by modifying Halstead with Rappleyea's raised central band only. That is, because we find that Kranos fails to demonstrate adequately that Rappleyea discloses the face guard limitation of claim 25, a proposed modification of Rappleyea with Halstead's vent openings fails to demonstrate that the combination discloses all of the subject matter of claim 25.

We determine that Kranos has demonstrated, by a preponderance of the evidence, that it would have been obvious to modify Rappleyea by adding Halstead's vent openings to arrive at the claimed subject matter of claims 1 and 34. We further determine that Kranos has demonstrated, by a preponderance of the evidence, that it would have been obvious to modify Halstead by adding Rappleyea's integrally-formed raised central band to arrive at the claimed subject matter of claims 1, 25, and 34. Kranos has demonstrated how the combination of Rappleyea and Halstead discloses the subject matter of claims 1, 25, and 34 and also provides reasons, with rational underpinning, for the proposed modifications with a reasonable likelihood of success. Accordingly, we determine that claims 1, 25, and 34 are unpatentable under 35 U.S.C. § 103 over Rappleyea and Halstead.

b. Claims 11, 12, and 28

Claim 11 depends from claim 1 and further recites "wherein at least one vent opening in the first plurality of vent openings is positioned in the crown region of the shell." Ex. 1001, 14:65–67. Claim 12 depends from independent claim 1 through dependent claim 11 and further recites "wherein at least one vent opening in the first plurality of vent openings is positioned in the rear region of the shell." *Id.* at 15:1–3. Similarly, claim 28 recites "[t]he football helmet of claim 25, wherein at least one vent opening in the first plurality of vent openings is positioned in the rear region of the shell." *Id.* at 16:38–40. Kranos contends that Halstead discloses at least one vent opening positioned in the crown region and at least one vent opening positioned in the rear region of its helmet shell. Pet. 49, *see* Ex. 1008, Fig. 2. We agree with Kranos's characterizations of Halstead as presented in the Petition with respect to the limitations of claims 11, 12, and 28, which are

supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos's characterization of Halstead disclosing this limitation.

Kranos proposes to modify Rappleyea by replacing Rappleyea's vent openings with Halstead's vent openings. Similar to our discussion above, in connection with our analysis of claims 11, 12, and 25 as allegedly obvious over Sears and Halstead, we find that, by replacing Rappleyea's vent openings with Halstead's vent openings, Rappleyea's helmet would include a plurality of vent openings aligned and positioned (or residing) along one side of Rappleyea's raised central band. We also find that at least one vent opening in the first plurality of vent openings is positioned in the crown region of the shell (the front-most opening), as required by claim 11, on which claim 12 directly depends. *See* Halstead Figs. 1, 1a (depicting the front-most opening in the crown region of helmet 10). We further find, with respect to claim 12, that at least one of these plurality of vent openings (the rear-most opening) is positioned in the rear region of the shell.

Claim 28 depends from claim 25 and, as we discussed above, Rappleyea, as modified by adding Halstead's vent openings, does not disclose the subject matter of claim 25 and, consequently, does not disclose the subject matter of claim 28.

Alternatively, Kranos contends that it would have been obvious to modify Halstead by adding Rappleyea's central band to arrive at the subject matter of claims 11, 12, and 28. First, Kranos contends that Halstead discloses the subject matter of claims 1 and 25, except for the raised central band. Pet. 55. As we discussed above in connection with our analysis of claims 1, 25, and 34, we find that Kranos has adequately demonstrated that

Halstead discloses the subject matter of claims 1 and 25 except for the raised central band limitation.

Further, as we discussed above, we find that Rappleyea's Figure 4 illustrates the raised central band with the same cross-hatching as the surrounding shell, indicating, by a preponderance of the evidence, that the raised central band is integrally-formed with the shell. We further find that adding Rappleyea's integrally-formed raised central band to Halstead's helmet would result in the subject matter of claims 1, 25, and 34. The integrally-formed raised central band would extend from the front region of Halstead's helmet to the rear region of the helmet, between Halstead's two sets of vent openings.

We also find that Kranos's reasons for combining the teachings of Halstead and Rappleyea apply to its proposed combination for claims 11, 12, and 28.

We determine that Kranos has demonstrated, by a preponderance of the evidence, that it would have been obvious to modify Rappleyea by adding Halstead's vent openings to arrive at the claimed subject matter of claims 11 and 12. We further determine that Kranos has demonstrated, by a preponderance of the evidence, that it would have been obvious to modify Halstead by adding Rappleyea's integrally-formed raised central band to arrive at the claimed subject matter of claims 11, 12, and 28. Kranos has demonstrated how the combination of Rappleyea and Halstead discloses the limitations of claims 11, 12, and 28 and also provides reasons, with rational underpinning, for the proposed modifications with a reasonable likelihood of

success. Accordingly, we determine that claims 11, 12, and 28 are unpatentable under 35 U.S.C. § 103 over Halstead and Rappleyea.

c. Claim 33

Claim 33 recites “[t]he football helmet of claim 1, wherein the first plurality of vent openings have an elongated configuration.” Ex. 1001, 24, 2:66–67 (amendment notation omitted). Kranos contends that Halstead discloses elongated vent openings. Pet. 49–50 (including an annotation of Halstead’s Figure 1, indicating the elongated openings). We agree with Kranos’s characterizations of Halstead as presented in the Petition with respect to the limitation of claim 33, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos’s characterization of Halstead disclosing this limitation.

As discussed above in connection with our analysis of claims 1, 25, and 34 over Rappleyea and Halstead, we find that the combination discloses the subject matter of independent claim 1, on which claim 33 depends.

Also as discussed above, Kranos contends that a person having ordinary skill in the art would have had reason to modify a helmet with Halstead’s elongated vent openings to minimize the risk of finger injury. *See* Ex. 1013 ¶ 93. Alternatively, Kranos contends that an artisan of ordinary skill would have had reason to modify Halstead to add an integrally-formed raised central band. *See id.* ¶ 82. As we discussed above, we find this reasoning sufficient. Accordingly, we conclude that Kranos has shown, by a preponderance of the evidence, that claim 33 is unpatentable under 35 U.S.C. § 103 over Rappleyea and Halstead.

d. Claims 35 and 37

Claim 35 depends from claim 34 and additionally requires “a second plurality of elongated vent openings formed outside of the raised central band, wherein the second plurality of elongated vent openings are aligned along a second side wall of the raised central band.” Ex. 1001, 25, 3:22–26 (amendment notation omitted). Claim 37 depends from claim 34 and further recites “wherein the front region has at least one face guard connector and each ear flap has a face guard connector, and wherein a face guard is secured to the shell by the face guard connectors.” *Id.* at 25, 3:29–32 (amendment notation omitted).

Kranos contends that Halstead discloses a second plurality of elongated vent openings and, by replacing Rappleyea’s vent openings with Halstead’s openings or adding Rappleyea’s raised central band to Halstead’s helmet, the second plurality of elongated vent openings would be aligned along the raised central band. *See* Pet. 50–51. For the same reasons we find that Halstead’s first plurality of elongated vent openings would align with one another and Rappleyea’s raised central band (or a raised central band as in Rappleyea added to Halstead’s helmet), we find that the front-most and rear-most openings of Halstead’s second plurality of elongated vent openings would align with one another and align along the raised central band. We also determine, for the reasons discussed above in connection with our analysis of claims 1, 25, and 34, that Kranos has made the requisite showing that a person having ordinary skill in the art would have had reason to modify Rappleyea with Halstead’s two sets of vent openings or modify Halstead with Rappleyea’s raised central band. Upon review of the complete record, we conclude that Kranos has shown, by a preponderance of

the evidence, that claim 35 is unpatentable under 35 U.S.C. § 103 over Rappleyea and Halstead.

With respect to claim 37, Kranos does not contend that Rappleyea discloses the limitation of claim 37, but does allege that Halstead discloses the recited subject matter. *See* Pet. 46–47, 51. Accordingly, for the reasons discussed above in connection with our analysis of claim 37 over Sears and Halstead, we find that Kranos demonstrates, by a preponderance of the evidence, that modifying Halstead’s helmet by adding Rappleyea’s raised central band would arrive at the subject matter of claim 37. We also determine, for the reasons discussed above, that Kranos has made the requisite showing, based on the complete record, that a person having ordinary skill in the art would have had reason to modify Halstead with Rappleyea’s raised central band. Upon review of the record before us, we conclude that Kranos has shown, by a preponderance of the evidence, that claim 37 is unpatentable under 35 U.S.C. § 103 over Rappleyea and Halstead.

e. Conclusion

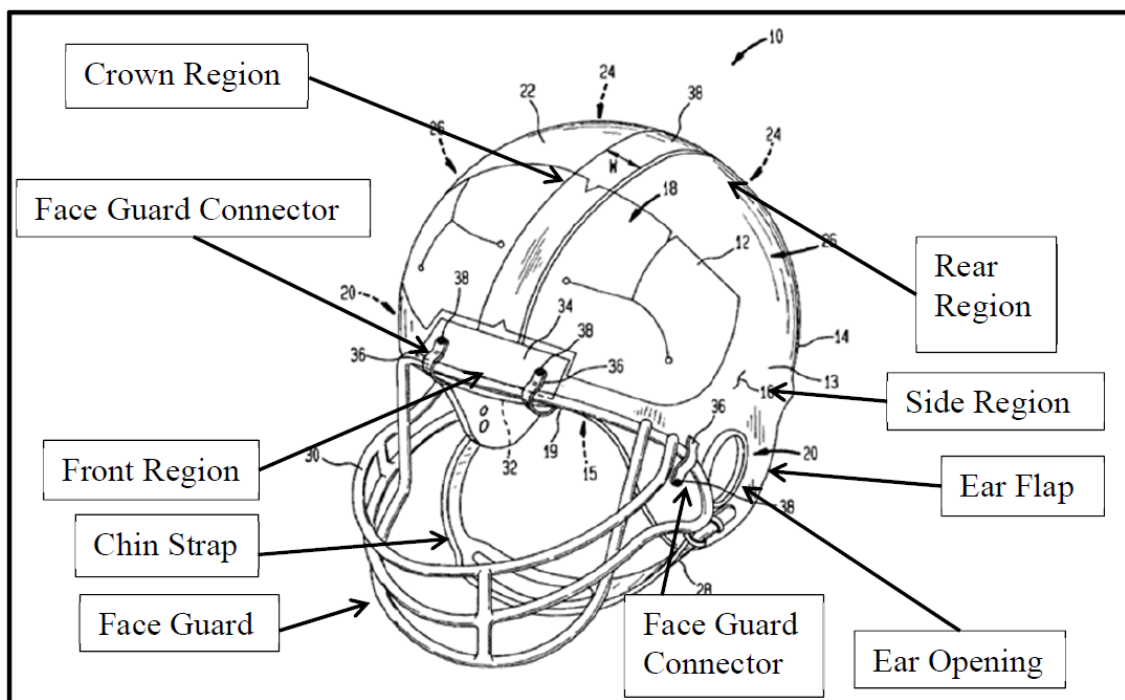
Upon review of the complete record, we conclude that Kranos has demonstrated, by a preponderance of the evidence, that claims 1, 11, 12, 25, 28, 33–35, and 37 are unpatentable under 35 § U.S.C. 103 over Rappleyea and Halstead.

3. Claims 1, 11, 12, 25, 28, 33–35, and 37 are allegedly obvious over Monica and Halstead

a. Independent claims 1, 25, and 34

Independent claims 1, 25, and 34 recite “[a] football helmet comprising: a plastic shell . . . having: a front region, a crown region, [and] a rear region. Ex. 1001, 24, 1:24–29, 2:34–39. Claims 1 and 34 further

require the plastic shell to have “two side regions wherein each side region has an ear flap with an ear opening.” *Id.* at 24, 1:30–31. Similarly, claim 25 requires the plastic shell to have “two side regions wherein each side region has an ear flap with an ear opening and a face guard connector.” *Id.* at 24, 2:40–41. In the Petition, Kranos annotates a portion of the image in Monica to support its contention that Monica discloses this recited subject matter. Pet. 44–45. That annotated figure is reproduced below.

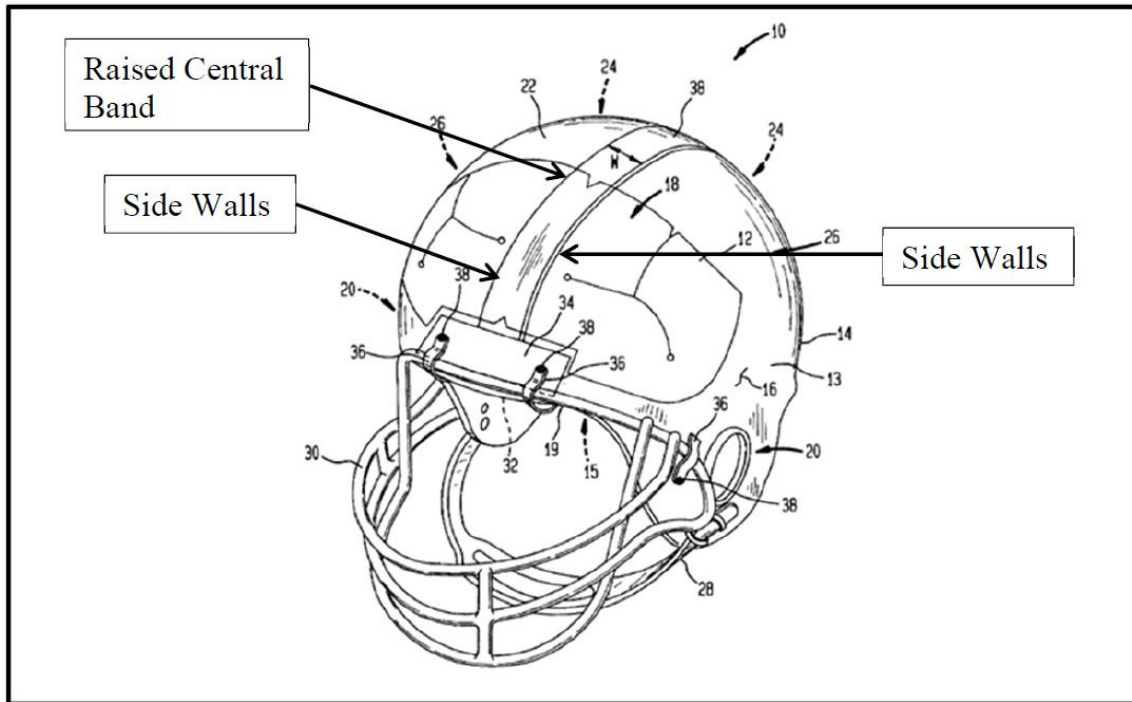


The annotated figure shows Monica’s Figure 1 and indicates the front, crown, rear, and side regions of the helmet as well as the ear flap and ear opening. *See id.*; *see also* Ex. 1007, 4:34–37 (disclosing that the helmet shell is made from a polymeric material). We agree with Kranos’s characterizations of Monica as presented in the Petition with respect to the plastic shell and ear flap limitations of claims 1, 25, and 34, which are supported by the evidence of record, and we adopt them as our findings of

fact. Riddell does not dispute Kranos's characterization of Monica disclosing this subject matter.

Claims 1 further requires "a raised central band integrally formed as part of the shell and extending across the crown region to the rear region." Ex. 1001, 24, 1:32–34. Similarly, claim 25 requires "a raised central band integrally formed in the shell and extending between the crown region and the rear region, the raised central band having a width defined by a pair of opposed side walls that extend transversely from an outer surface of the shell." *Id.* at 24, 2:42–45 (amendment notations omitted). Claim 34 recites "a raised central band integrally formed as part of the shell and extending across the crown region to the rear region" and further requires "the raised central band [to have] a width defined by a pair of opposed side walls that extend transversely from an outer surface of the shell, wherein a front extent of the opposed side walls do not converge." *Id.* at 25, 3:9–15.

In the Petition, Kranos annotates a portion of the image in Monica to support its contention that Rappleyea discloses this recited subject matter. Pet. 46. That annotated figure is reproduced below.



The annotated figure shows Monica's Figure 8 and indicates the raised central band of helmet and the side walls forming the raised central band. Pet. 46. In the Petition, Kranos contends that Monica further states: "The helmet body 14 further includes *an elongated raised portion 38 having a certain width W, integral with the exterior surface 16 and in the center of the helmet body 14* separating the left and right side hemispheres of the helmet body 14 from the front edge 19 to the furthest end (not shown) of the back portion." *Id.* at 45 (referencing Ex. 1007, 4:63–5:2) (emphasis in original). That is, Monica expressly discloses that its raised central band is integral with the shell. As seen from Monica's Figure 8, reproduced above, the raised central band has a width defined by a pair of opposed side walls that extend transversely from an outer surface of the shell, wherein a front extent of the opposed side walls do not converge as required by claim 34. We agree with Kranos's characterizations of Monica as presented in the

Petition with respect to the raised central band limitation of claims 1, 25, and 34, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos's characterization of Monica disclosing this subject matter.

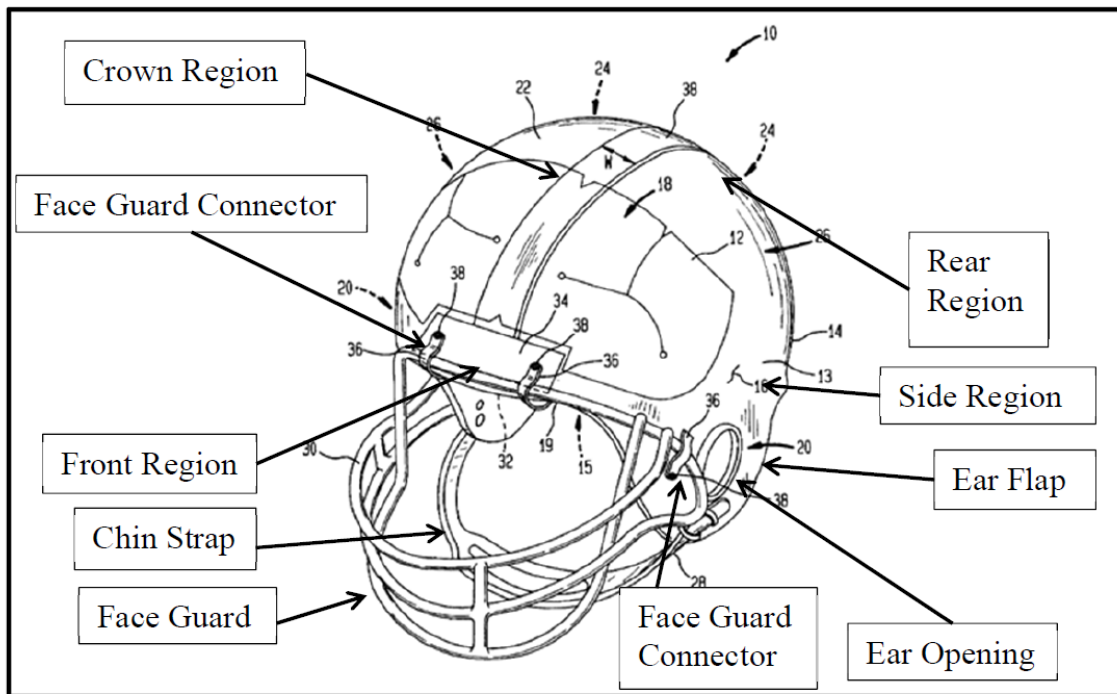
Claim 1 further recites "a first plurality of vent openings formed in the shell outside of the raised central band, wherein the first plurality of vent openings are aligned, and positioned along a first side of the raised central band" and claim 25 recites "a first plurality of vent openings formed in the shell beyond the raised central band, wherein the first plurality of vent openings are aligned, and reside along a first side wall of the raised central band." Ex. 1001, 24, 1:35–38, 2:47–50 (amendment notations omitted). Claim 34 recites "a first plurality of elongated vent openings formed in the shell outside of the raised central band, wherein the first plurality of elongated vent openings are aligned along a first side wall of the raised central band." *Id.* at 25. 3:16–19. Monica does not disclose this limitation.

As we discussed above in connection with our analysis of whether the combination of Sears and Halstead renders claims 1, 25, and 34, obvious, Kranos asserts that Halstead discloses the vent openings limitation of claims 1, 25, and 34. *See* Pet. 47–48 (presenting how Halstead discloses vent openings in the context of claim 34). As we indicated in our analysis above with respect to Sears and Halstead and claims 1, 25, and 34, we find that adding the five vent openings disclosed in Halstead's Figure 2 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)) and that would be positioned (or reside or be aligned) along a first side of Monica's raised central band or that are aligned with and are close to the side wall of

the raised central band. That is, when Monica’s helmet is modified with Halstead’s vent openings, at least two of the vent openings would be positioned close to the side wall of the raised central band and aligned with each other (claims 1 and 25) or aligned along the side wall (claim 34). 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 Monica’s raised central band is located. Accordingly, we find that Kranos has demonstrated, by a preponderance of the evidence, that the combination of Halstead and Monica discloses the vent openings limitation of claims 1, 25, and 34.

We addressed Riddell’s contentions that Kranos’s proposed modification does not result in the vent openings limitation of claim 34 in connection with our analysis of whether the combination of Halstead and Sears renders claim 34 obvious. That analysis is equally applicable here, as Riddell put forth the same contentions with respect to the combination of Halstead with Sears, Rappleyea, or Monica. *See* PO Resp. 28–33.

Claims 1, 25, and 34 also recite “a chin strap assembly that releasably secures the helmet to the wearer.” Ex. 1001, 24, 1:39–40, 2:53–54; 25, 3:20–21 (the “chin strap” limitation of claims 1, 25, and 34). Claim 25 additionally requires “a face guard secured to the shell by the face guard connector [of the two side regions].” *Id.* at 24, 2:51–52 (the “face guard” limitation of claim 25). In the Petition, Kranos annotates Monica’s Figure 1 to support its contention that Monica discloses this recited subject matter. Pet. 45. This annotated figure is reproduced below.



The annotated figure shows Monica's helmet and indicates the chin strap and face guard and face guard connector. *See* Pet. 45; Ex. 1007, Fig. 1. We agree with Kranos's characterizations of Monica as presented in the Petition with respect to the chin strap and face guard limitations of claims 1, 25, and 34, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos's characterization of Monica disclosing this subject matter.

Alternatively, Kranos asserts that Halstead discloses the subject matter of claims 1, 25, and 34 except for the raised central band. *See* Pet. 46–48. As we discussed above in connection with our analysis of whether claims 1, 25, and 34 are obvious over Halstead and Sears or Halstead and Rappleyea, we find that Kranos demonstrates, by a preponderance of the evidence, that Halstead discloses the subject matter of claims 1, 25, and 34 with the exception of the raised central band limitation of claims 1, 25, and 34.

Kranos contends that it would have been obvious to modify Halstead by adding Monica's raised central band. *See* Pet. 55. In accordance with this proposed modification, Monica's integrally-formed raised central band would extend from the front region of Halstead's helmet to the rear region of the helmet, between Halstead's two sets of vent openings. We credit Mr. Float's testimony that, at the time of the invention, injection molding was the preferred method for fabricating helmet shells, such that an added raised central band would be integrally formed in Halstead's helmet shell. *See* Ex. 1013 ¶ 81.

On the record before us, we conclude that Kranos has demonstrated, by a preponderance of the evidence, that the combination of Monica and Halstead discloses the subject matter of independent claims 1, 25, and 34.

We address Kranos's reasons for modifying Monica with Halstead, and Riddell's arguments against the combination above, in connection with our analysis of the combination of Sears and Halstead, as Kranos's rationale and Riddell's contentions are the same for the combination of Sears and Halstead and Monica and Halstead.

We determine that Kranos has demonstrated, by a preponderance of the evidence, that it would have been obvious to modify Monica by adding Halstead's vent openings or modify Halstead by adding Monica's integrally-formed raised central band to arrive at the claimed subject matter of claims 1, 25, and 34. Kranos demonstrated how Monica and Halstead disclose the subject matter of claims 1, 25, and 34 and also provides reasons, with rational underpinning, for the proposed modifications with a reasonable

likelihood of success. Accordingly, we determine that claims 1, 25, and 34 are unpatentable under 35 U.S.C. § 103 over Monica and Halstead.

b. Claims 11, 12, and 28

Claim 11 depends from claim 1 and further recite “wherein at least one vent opening in the first plurality of vent openings is positioned in the crown region of the shell.” Ex. 1001, 14:65–67. Claim 12 depends from independent claim 1 through dependent claim 11 and further recites “wherein at least one vent opening in the first plurality of vent openings is positioned in the rear region of the shell.” *Id.* at 15:1–3. Similarly, claim 28 recites “[t]he football helmet of claim 25, wherein at least one vent opening in the first plurality of vent openings is positioned in the rear region of the shell.” *Id.* at 16:38–40. Kranos contends that Halstead discloses at least one vent opening positioned in the crown region and at least one vent opening positioned in the rear region of its helmet shell. Pet. 49; *see* Ex. 1008, Fig. 2. We agree with Kranos’s characterizations of Halstead as presented in the Petition with respect to the limitations of claims 11, 12, and 28, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos’s characterization of Halstead disclosing this subject matter.

As we have similarly discussed with respect to Sears and Rappleyea, we find that, by modifying Monica’s helmet to add Halstead’s vent openings, Monica’s helmet would include a plurality of vent openings aligned and positioned (or residing) along or aligned along one side of Monica’s raised central band.

Alternatively, Kranos contends that it would have been obvious to modify Halstead by adding Monica’s central band to arrive at the subject

matter of claims 11, 12, and 28. As we discussed above in connection with our analysis of claims 11, 12, and 28 over Sears and Halstead, we find that Kranos has adequately demonstrated that Halstead discloses the subject matter of claims 1, 25, and 34 except for the raised central band limitation.

We find, based on our review of the complete record, that Kranos has adequately demonstrated that Monica discloses an integrally-formed raised central band. We find that Monica's Figure 1 illustrates the raised central band and that Monica expressly discloses that the raised central band is integrally-formed with the shell. *See* Pet. 45; Ex. 1007, 4:63–5:2. We further find that adding Monica's integrally-formed raised central band to Halstead's helmet would result in the subject matter of claims 1, 25, and 34. The integrally-formed raised central band would extend from the front region of Halstead's helmet to the rear region of the helmet, between Halstead's two sets of vent openings.

We also find that Kranos's reasons for combining the teachings of Halstead and Monica analyzed for claims 1, 25, and 34 equally apply to its proposed combination for claims 11, 12, and 28.

We determine that Kranos has demonstrated, by a preponderance of the evidence, that it would have been obvious to modify Monica by adding Halstead's vent openings or modify Halstead by adding Monica's integrally-formed raised central band to arrive at the claimed subject matter of claims 11, 12, and 28. We further determine that Kranos demonstrates, by a preponderance of the evidence, that it would have been obvious to modify Halstead by adding Monica's integrally-formed raised central band to arrive at the claimed subject matter of claims 11, 12, and 28. Kranos demonstrated how Monica and Halstead disclose the subject matter of claims 11, 12, and

28 and also provides reasons, with rational underpinning, for the proposed modifications with a reasonable likelihood of success. Accordingly, we determine that claims 11, 12, and 28 are unpatentable under 35 U.S.C. § 103 over Monica and Halstead.

c. Claim 33

Claim 33 recites “[t]he football helmet of claim 1, wherein the first plurality of vent openings have an elongated configuration.” Ex. 1001, 24, 2:66–67 (amendment notation omitted). Kranos contends that Halstead discloses elongated vent openings. Pet. 49–50 (including an annotation of Halstead’s Figure 1, indicating the elongated openings); *see* Ex. 1008, Figs. 1, 2. We agree with Kranos’s characterizations of Halstead as presented in the Petition with respect to the limitation of claim 33, which are supported by the evidence of record, and we adopt them as our findings of fact. Riddell does not dispute Kranos’s characterization of Halstead disclosing this limitation.

As discussed above in connection with our analysis of claims 1, 25, and 34 over Halstead and Monica, we find that the combination discloses the subject matter of independent claim 1, on which claim 33 depends. We further find, based on the current record, that Kranos has made the requisite showing that Halstead discloses vent openings with an elongated configuration. *See* Pet. 50.

As we discussed above in connection with our analysis of claims 1, 25, and 34, over Halstead and Monica, we find Kranos’s reasoning for combining the teachings of these two references supports a determination of obviousness. This reasoning is equally applicable for claim 33. Accordingly, upon review of the complete record, we conclude that Kranos

has shown, by a preponderance of the evidence, that claim 33 is unpatentable under 35 U.S.C. § 103 over Monica and Halstead.

d. Claims 35 and 37

Claim 35 depends from claim 34 and additionally requires “a second plurality of elongated vent openings formed outside of the raised central band, wherein the second plurality of elongated vent openings are aligned along a second side wall of the raised central band.” Ex. 1001, 25, 3:22–26 (amendment notation omitted). Claim 37 depends from claim 34 and further recites “wherein the front region has at least one face guard connector and each ear flap has a face guard connector, and wherein a face guard is secured to the shell by the face guard connectors.” *Id.* at 25, 3:29–32 (amendment notation omitted).

Kranos contends that Halstead discloses a second plurality of elongated vent openings and, by adding Halstead’s openings to Monica’s helmet or adding Monica’s raised central band to Halstead’s helmet, these second plurality of elongated vent openings would be aligned along the raised central band. *See* Pet. 50–51. For the same reasons we find that Halstead’s first plurality of elongated vent openings would align with one another and Monica’s raised central band (or a raised central band as in Monica added to Halstead’s helmet), we find that the front-most and rear-most openings of Halstead’s second plurality of elongated vent openings would align with one another and align along the raised central band. We also determine, for the reasons discussed above, that Kranos has made the requisite showing that a person having ordinary skill in the art would have had reason to modify Monica with Halstead’s two sets of vent openings or modify Halstead with Monica’s raised central band. Upon review of the

complete record, we conclude that Kranos has shown, by a preponderance of the evidence, that claim 35 is unpatentable under 35 U.S.C. § 103 over Monica and Halstead.

With respect to claim 37, Kranos contends that Monica and Halstead disclose the limitation of claim 37. *See* Pet. 45, 47, 51. On the complete record before us, we find that Kranos has made the requisite showing that Monica and Halstead disclose the additional subject matter of claim 37, based on information in the Petition that Monica and Halstead include the recited face guard and face guard connector. That is, the Petition, at page 45, shows face guard connectors in the front region of the helmet and adjacent the ear openings with the face guard secured to the connectors. A similar showing is made for Halstead. *See* Pet. 47.

For the reasons above, we find that Kranos has made the requisite showing that modifying Monica's helmet by adding Halstead's elongated vent openings would arrive at the subject matter of claim 37. Similarly, for the reasons above, we find that Kranos has made the requisite showing that modifying Halstead's helmet by adding Monica's raised central band would arrive at the subject matter of claim 37. We also determine, for the reasons discussed in connection with our analysis of claims 1, 25, and 34, that Kranos has made the requisite showing, that a person having ordinary skill in the art would have had reason to modify Monica's helmet with Halstead's elongated vent openings or would have had reason to modify Halstead with Monica's raised central band. Upon review of the complete record, we conclude that Kranos has shown, by a preponderance of the evidence, that claim 37 is unpatentable under 35 U.S.C. § 103 over Monica and Halstead.

e. Conclusion

Upon review of the complete record, we conclude that Kranos has shown, by a preponderance of the evidence, that claims 1, 11, 12, 25, 28, 33–35, and 37 are unpatentable under 35 U.S.C. § 103 over Monica and Halstead.

III. CONCLUSION

For the foregoing reasons, we conclude that Kranos has established, by a preponderance of the evidence, that claims 1, 11, 12, 25, 28, 30, 33–35, and 37 of the '118 patent are unpatentable. We further conclude that Kranos *has not* established, by a preponderance of the evidence, that claims 2, 5, 27, 30, and 32 of the '118 patent are unpatentable.

IV. ORDER

After due consideration of the record before us, it is:

ORDERED that claims 1, 2, 5, 11, 25, 27, 30, and 32 are *not* unpatentable under 35 U.S.C. § 102 as anticipated by Sears;

FURTHER ORDERED that claims 1, 11, 12, 25, 28, 33–35, and 37 are unpatentable under 35 U.S.C. §103(a) over Sears and Halstead;

FURTHER ORDERED that claims 1, 11, 12, 25, 28, 33–35, and 37 are unpatentable under 35 U.S.C. §103(a) over Rappleyea and Halstead;

FURTHER ORDERED that claims 1, 11, 12, 25, 28, 33–35, and 37 are unpatentable under 35 U.S.C. §103(a) over Monica and Halstead; and

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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For PETITIONER:

James J. Lukas, Jr.
Richard D. Harris
Howard E. Silverman
Matthew J. Levinstein
Benjamin P. Gilford
Dennis P. Malloy
GREENBERG TRAURIG, LLP
lukasj@gtlaw.com
harrisr@gtlaw.com
silvermanh@gtlaw.com
levinsteinm@gtlaw.com
gilfordb@gtlaw.com
malloyd@gtlaw.com

For PATENT OWNER:

Ronald H. Spuhler
Thomas J. Wimbiscus
Scott P. McBride
Christopher M. Scharff
Ryan J. Pianetto
MCANDREWS, HELD & MALLOY, LTD.
rspuhler@mcandrews-ip.com
twimbiscus@mcandrews-ip.com
smcbride@mcandrews-ip.com
cscharff@mcandrews-ip.com
rpianetto@mcandrews-ip.com