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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

THE BURTON CORPORATION,
Petitioner,

v.

SMITH SPORT OPTICS, INC. AND KOROYD SARL,
Patent Owners.

Case No. TBD
Patent No. 10,736,373

**PETITION FOR INTER PARTES REVIEW
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.1 et seq**

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APPENDIX LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,736,373 (“373 patent”)
1002	Prosecution History of U.S. Patent No. 10,736,373 (“373-FH”)
1003	Declaration of Steven Copeland (“Copeland”)
1004	Curriculum Vitae of Steven Copeland (“Copeland CV”)
1005	U.S. Publication No. 2004/0064873 (“Muskovitz”)
1006	U.S. Publication No. 2008/0307568 (“Sajic”)
1007	WO 2005/060778 (“Sajic-WO”)
1008	U.S. Publication No. 2014/0013492 (“Bottlang”)
1009	U.S. Patent No. 7,254,843 (“Talluri”)
1010	U.S. Patent No. 4,422,183 (“Landi”)
1011	U.S. Publication No. 2006/0059606 (“Ferrara”)
1012	U.S. Patent No. 5,950,244 (“Fournier”)
1013	U.S. Patent No. 8,087,101 (“Ferguson”)
1014	U.S. Patent No. 7,673,351 (“Copeland”)
1015	Fox MTB 2011 Collection – Product Catalog https://issuu.com/monzaimports/docs/fox_mtb_2011-catalog (“FOX-2011-Catalog”)
1016	U.S. Patent No. 8,069,498 (“Maddux”)
1017	U.S. Publication No. 2002/0124298 (“Muskovitz-Prior”)
1018	U.S. Provisional Application No. 60/274447 (“Muskovitz-Prior-Provisional”)
1019	U.S. Patent No. 4,434,514 (“Sundahl”)
1020	U.S. Patent No. 8,082,599 (“Sajic-599”)
1021	<i>Smith Sport Optics, Inc. et al. v. The Burton Corporation</i> , Case No. 1:21-cv-02112, Plaintiffs’ Motion for Preliminary Injunction (August 16, 2021)
1022	<i>Smith Sport Optics, Inc. et al. v. The Burton Corporation</i> , Case No. 1:21-cv-02112, Plaintiffs’ Reply in Support of Motion for Preliminary Injunction (September 29, 2021)
1023	<i>Smith Sport Optics, Inc. et al. v. The Burton Corporation</i> , Case No. 1:21-cv-02112, Defendant’s Opposition to Plaintiffs’ Motion for Preliminary Injunction (September 15, 2021)
1024	<i>Smith Sport Optics, Inc. et al. v. The Burton Corporation</i> , Case No. 1:21-cv-02112, Plaintiffs’ Opposition to Defendant’s Motion for Leave to File Sur-Reply In Opposition to Plaintiffs’ Motion for Preliminary Injunction (October 13, 2021)

Exhibit	Description
1025	<i>Smith Sport Optics, Inc. et al. v. The Burton Corporation</i> , Case No. 1:21-cv-02112, Scheduling Order
1026	Civil Practice Standards, Judge Christine M. Arguello, United States District Court District of Colorado
1027	<i>Smith Sport Optics, Inc. et al. v. The Burton Corporation</i> , Case No. 1:21-cv-02112, Complaint (August 4, 2021)
1028	Lex Machina Motion Metrics Report
1029	<i>Cellect LLC v Samsung Electronics Co Ltd</i> , Civil Action No. 19-cv-00438-CMA-MEH, Order Granting Defendant’s Motion to Stay
1030	<i>Sound View Innovations, LLC v. DISH Network LLC et al</i> Case No. 1-19-cv-03707, Order Granting Motion to Stay
1031	<i>Smith Sport Optics, Inc. et al. v. The Burton Corporation</i> , Case No. 1:21-cv-02112, Defendant’s Motion to Stay Pending <i>Inter Partes</i> Review
1032	Declaration of Marie A. McKiernan

MANDATORY NOTICES

A. Real Party-In-Interest

Petitioner The Burton Corporation is the Real Party-in-Interest.

B. Related Matters

1. United States Patent & Trademark Office

The following U.S. patent application claims the benefit of the priority of the filing date of U.S. Patent No. 10,736,373:

(i) U.S. Patent Application No. 16/989,695, filed August 8, 2020.

2. U.S. District Court for the District of Colorado

(i) *Smith Sport Optics, Inc. v. The Burton Corporation*, No. 1:21-cv-02112 (“Colorado Litigation”)

3. U.S. District Court for the District of Utah

(i) *Smith Sport Optics, Inc. v. The Burton Corporation*, No. 2:21-cv-00425

C. Counsel and Service Information - § 42.8(b)(3) and (4)

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A power of attorney is submitted with the Petition. Petitioner's counsel consents to service of all documents via email.

I. INTRODUCTION

The Burton Corporation (“Petitioner”) requests *inter partes* review and cancellation of claims 1-5, 7, 12-13 and 15-17 (the “Challenged Claims”) of U.S. Patent No. 10,736,373 (“373 patent”) (Ex. 1001).

II. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies that the 373 patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting *inter partes* review as to the challenged claims. 37 C.F.R. § 42.104(a).

III. GROUNDS FOR UNPATENTABILITY

The table below identifies the references, applicable claims, and basis for each ground of unpatentability. This Petition is supported by the Declaration of Steven Copeland, attached as Ex. 1003 (“Copeland”).

Ground Number and Reference(s)		Claims	Basis
1	Muskovitz and Sajic	1-5, 7, 12-13 and 15-17	103

IV. THE 373 PATENT

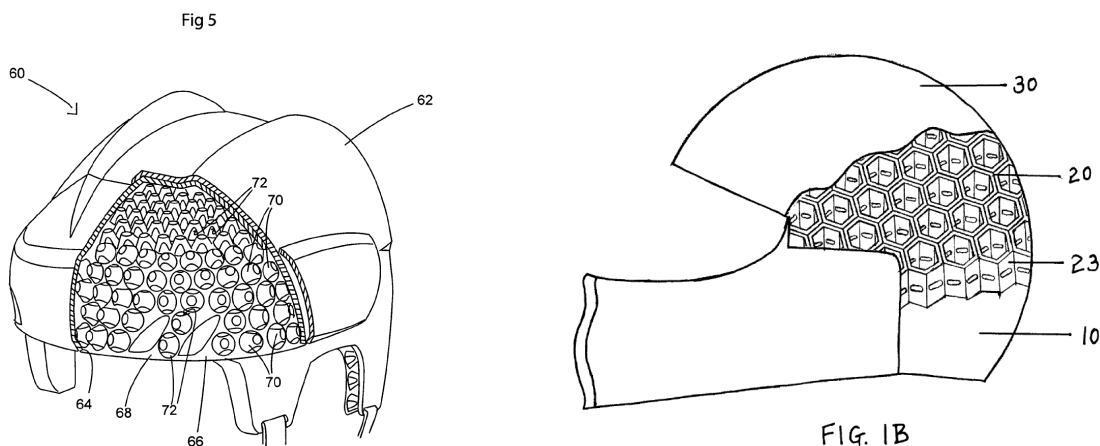
The 373 patent application was filed on August 13, 2013 and therefore the AIA’s provisions apply to every Challenged Claim, as each have an effective filing date after March 15, 2013. Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, § 3(n)(1), 125 Stat. 284, 293 (2011). Smith Optics, Inc., listed as the

Assignee on the face of the 373 patent¹, is referred to hereinafter as Patent Owner (“PO”).

A. Technology Background

The 373 patent’s background explains that “[h]elmets are used in many outdoor activities to protect the wearer from head injuries.” 373 patent (Ex. 1001), 1:6-7. Conventional protective helmets commonly employed a hard outer shell and an inner-liner formed of an impact-absorbing material bonded to the outer shell. Copeland, ¶ 27; Muskovitz (Ex. 1005), [0075], [0081]; 373 patent, [0005]-[0007].

Protective helmets employed a variety of impact-absorbing material for the inner-liner of the helmet, including a variety of plastic foam materials such as an expanded polystyrene (EPS) foam and honeycomb materials comprising arrays of hollow energy absorbing cells such as the example honeycomb materials used in Copeland (Ex. 1014) and Talluri (Ex. 1009) illustrated below. Copeland, ¶ 28.



¹ Koroyd KARL was added by Certificate of Correction. Ex. 1002, 1.

Fig. 5, Copeland (Left) and Fig. 1B, Talluri (Right)

Protective helmets also employed impact-absorbing inserts provided in the inner-liner of the helmet to improve impact absorption. Copeland, ¶ 29 (*citing*, Sajic (Ex. 1006), [0113]-[0123], Fournier (Ex. 1012), 4:17-36). Impacting-absorbing inserts were also constructed from both foam materials and honeycomb materials, as illustrated by foam inserts 19 in Fig. 4 of Fournier (below left) and inserts 130 (arrays of “energy absorbing tubes”) in Fig. 9 of Sajic (below right).

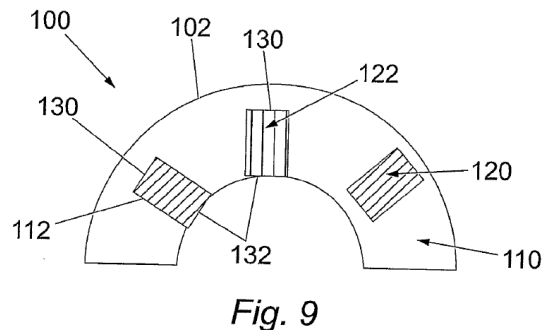
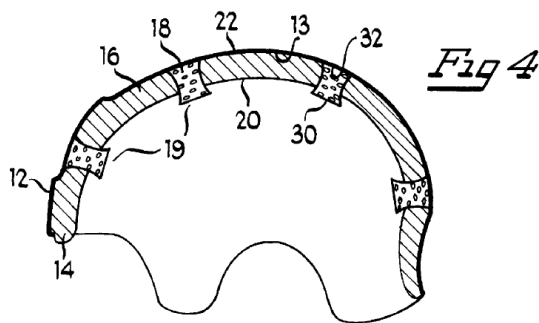
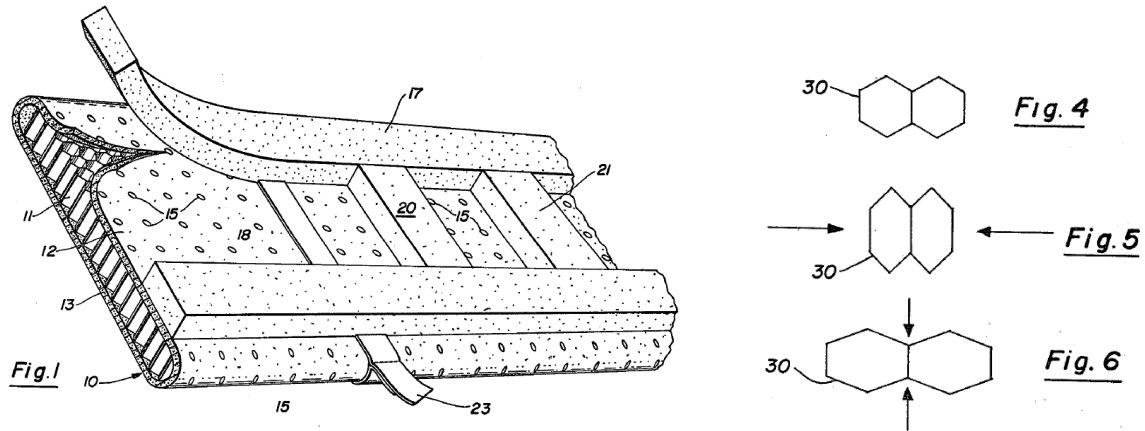


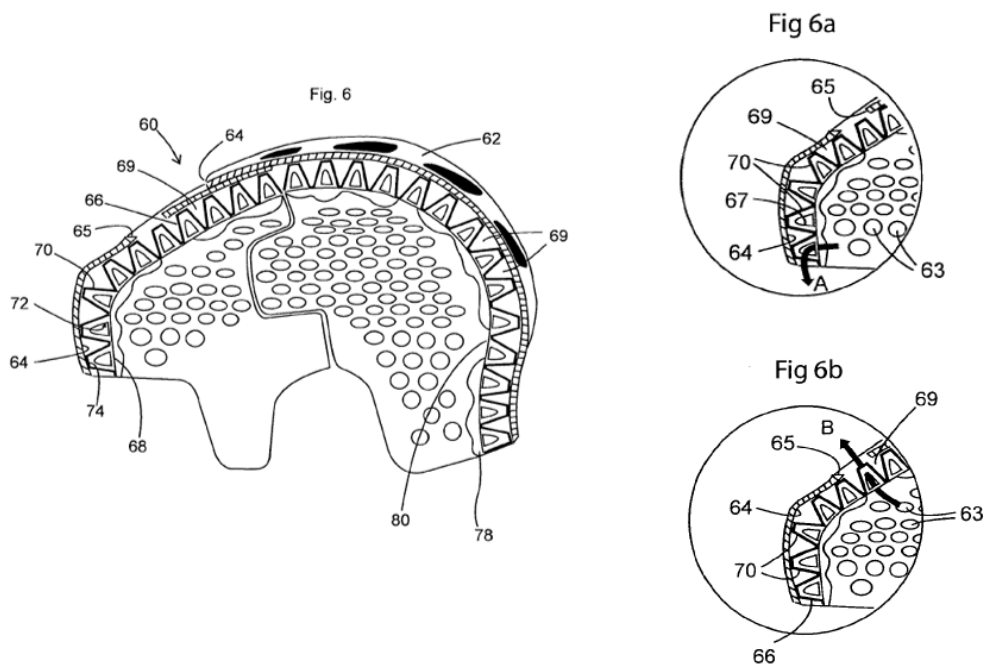
Fig. 4, Fournier (Left) and Fig. 9, Sajic (Right)

Honeycomb materials provided both impact absorption and ventilation via air flow through the material. Copeland, ¶ 30; Landi (Ex. 1010), 1:61-3:33; Copeland (Ex. 1014). For example, Landi used a hexagonal honeycomb structure for impact absorption and ventilation in protective body-wear. Copeland, ¶ 30; Landi, 1:61-3:33, 4:54-5:29.



Figs. 1 and 4-6, Landi

Copeland employed open-ended hollow conical structures for impact absorption in a protective helmet to provide both circulation of air through the conical structures themselves (Fig. 6a below) and air flow through openings provided in the outer shell (Fig. 6b below). Copeland, ¶ 31.



As another example, the Fox 2011 “Striker” helmet employed “Structural Honeycomb venting inserts” (like Landi’s hexagonal-core structure above) in the rear vents, as shown in the image below provided in the “Fox MTB 2011 Collection” catalog (Ex. 1015, 7). Copeland, ¶ 32.



The 373 patent discloses helmets employing the same known materials for the same purpose as the prior art helmets discussed above. Copeland, ¶ 33.

B. The 373 Patent Disclosure

The specification describes a protective helmet comprising an outer shell, a shock absorbing liner, and a shock absorbing insert positioned within a cavity formed in the liner, an example of which is illustrated in FIGS. 1 and 2, below. 373 patent, 1:6-34, 1:57-2:65; Copeland, ¶ 34.

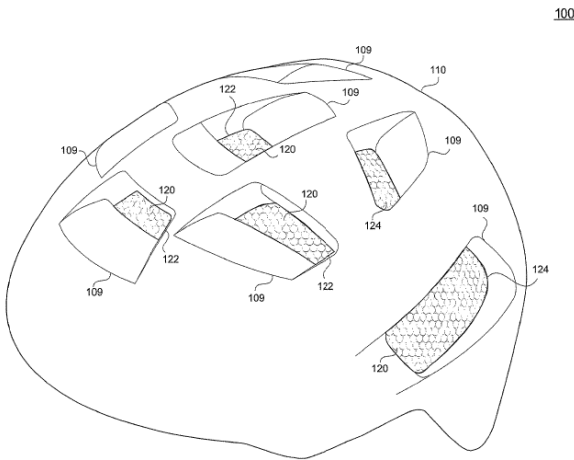


FIG. 1

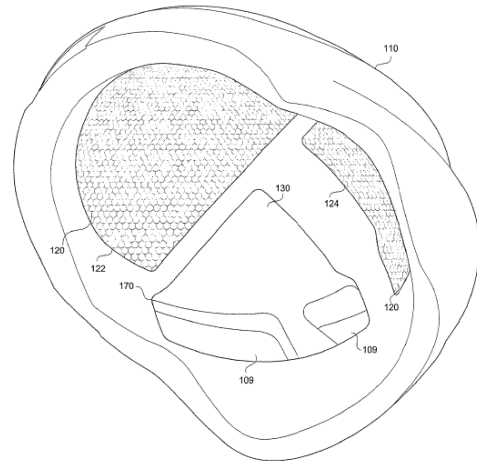


FIG. 2

Helmet 100 comprises outer shell 110 through which vents 109 are formed to provide ventilation to the head of a wearer. 373 patent, 2:10-14. A shock absorbing liner 130 attached to the interior of shell 110 comprises cavities into which shock absorbing inserts are positioned. 373 patent, 2:10-40; Copeland, ¶¶ 35-36. FIGS. 4 and 5 (below) illustrate different views of helmet 100.

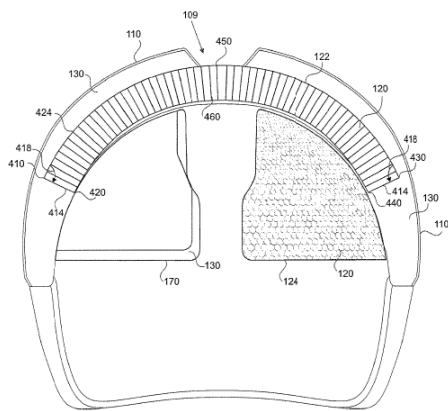


FIG. 4

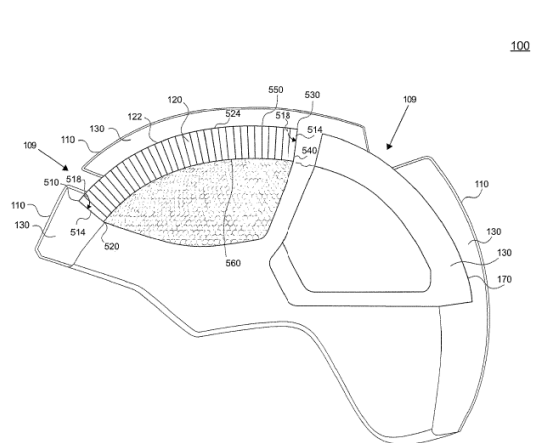


FIG. 5

The 373 patent discloses that the inserts may be made of a “honeycomb material” to “provide impact absorption and have tubes with open longitudinal

ends that allow air to freely flow” to the head of the wearer. ’373 patent, 2:15-23, 48-51; Copeland, ¶ 37.

C. Person of Ordinary Skill in the Art

A person of ordinary skill in the art (POSA) would have had a Bachelor’s degree in mechanical engineering, industrial design, or a similar such degree, and at least two years of experience with helmet design and would have had familiarity with the materials and manufacturing processes thereof. Additional education could have substituted for experience, and vice versa. Copeland, ¶¶ 22-25.

D. Overview of Challenged Claims

1. Independent Claim 1

Claim 1 recites a helmet comprising three components labeled [1A]-[1C] below.

[1PR] A helmet, comprising:

[1A] a shell comprising a plurality of vents including a first vent defining a first opening and a second vent defining a second opening;

[1B] a shock absorbing liner adjacent to and attached to the shell and comprising a cavity at least partially aligned with the plurality of vents; and

[1C] a shock absorbing insert positioned in and substantially filling the cavity...

These three helmet components are shown with coloring in the cross-section of helmet 100 illustrated in the ‘373 patent’s FIG. 5 reproduced below.

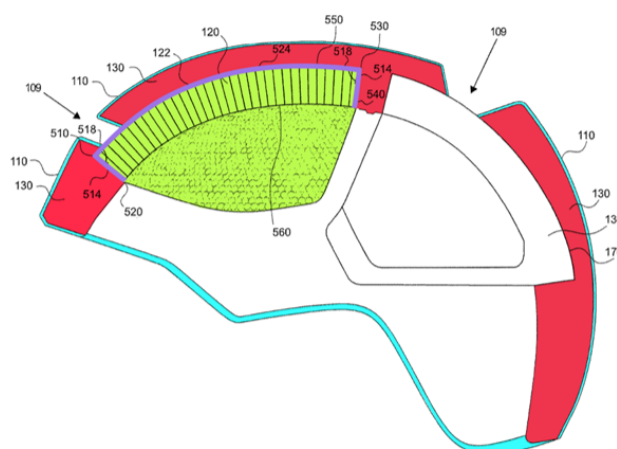
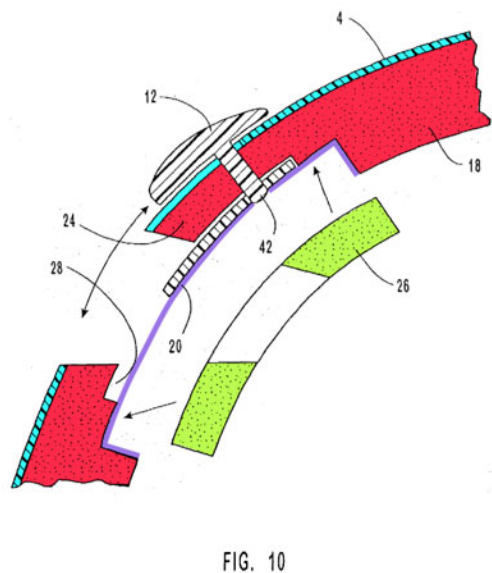
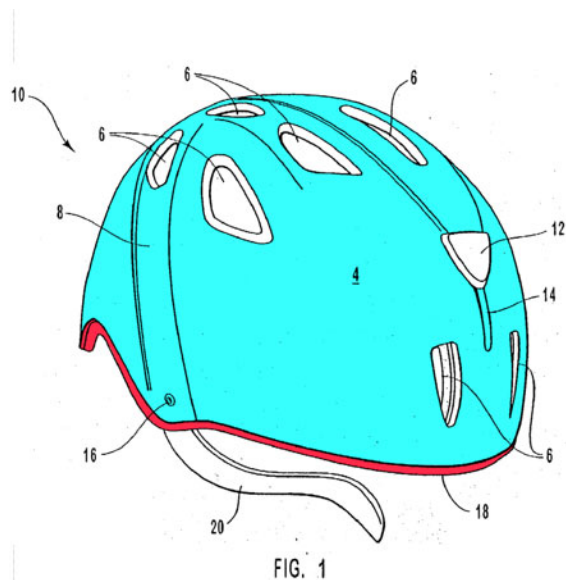


FIG. 5

(Annotated)

Helmet 100 is disclosed as comprising: “a shell 110 having vents 109” (aqua) (373 patent, 2:11-12), as recited in [1A]; a “shocking absorbing liner 130” (red) having “a cavity 170” (outlined in purple) formed therein (*id.* 2:41-43), as recited in [1B], and “an insert 126” (green) positioned in the cavity (*id.* 2:31-33), as recited in [1C]. Copeland, ¶¶ 39-40.

Muskovitz also discloses a protective helmet 10 comprising the *same* three components arranged in the *same* way recited in [1A]-[1C], as illustrated in FIGS. 1 and FIG. 10 of Muskovitz reproduced below using the same coloring as above.



Figs. 1 and 10, Muskovitz (Annotated)

Specifically, Muskovitz discloses that protective helmet 10 comprises: “an outer shell 4” (aqua) comprising “ventilation ports 6,” as recited in [1A]; “an impact-absorbing inner liner 18” (red) “joined (molded or bonded)” to outer shell 4 and comprising a cavity (outlined in purple) in liner 18 aligned with corresponding ventilation ports 6 (Muskovitz, [0023], [0076], [0087]), as recited in [1B]; and “an insert member” (green) comprising “impact absorbing material” positioned in and substantially filling the cavity (*id.*), as recited in [1C]. Copeland, ¶¶ 41-42.

Thus, Muskovitz discloses limitations [1A]-[1C] of claim 1. Copeland, ¶ 43; § VI.D.1 *infra*. The remaining limitations of claim 1 limit the structure of the “*shock absorbing insert*” and merely recite what results from using known “*honeycomb material*” for the shock absorbing insert arranged as recited in [1A]-[1C]. Copeland, ¶ 43.

Sajic discloses such honeycomb inserts provided in the impact-absorbing liner of a safety helmet for improved impact absorption. Sajic, [0113]-[0123]; Copeland, ¶ 45. The obvious and straightforward use of Sajic's inserts for Muskovitz's insert member 26 meets each of the limitations of claim 1, as demonstrated in § VI.D.1D.1 of Ground 1 below. Copeland, ¶ 46.

The Muskovitz-Sajic combination also renders obvious dependent claims 2-5 and 7 for the reasons discussed in detail in §§ VI.D.2-VI.D.6 below.

2. Independent Claim 12

Claim 12 recites a helmet similarly recited as in claim 1. The Muskovitz-Sajic combination renders obvious claim 12 and its dependent claims 13 and 15-17 for the reasons demonstrated below in §§ VI.D.7 and VI.D.8-VI.D.11, respectively.

V. CLAIM INTERPRETATION

Claim terms are construed herein using the standard used in civil actions under 35 U.S.C. § 282(b), in accordance with the ordinary and customary meaning as understood by a POSA and the patent's prosecution history. 37 C.F.R. § 42.100(b). The Board need only construe terms to the extent necessary to resolve disputes between the parties. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

A. “the plurality of vents” / “each of the plurality of vents”

Claim 1 recites “*a shell comprising a plurality of vents*” and further recites: (1) “*a cavity at least partially aligned with **the plurality of vents**,*” and (2) “*the shock absorbing insert is visible through and spans across at least a portion of **each of the plurality of vents.***”

PO has taken the position in the Colorado Litigation that the claimed plurality of vents “merely requires the shell to have at least two vents that meet [each] limitation” in claim 1. Ex. 1022, 2-3. The Board should adopt PO’s construction in this proceeding and PO should be held to it.² *See 10X Genomics v. Bio-Rad Labs.*, IPR2020-00086, Paper 8, 17-22 (Apr. 27, 2020).

However, if the Board agrees that the implementation of Muskovitz in view of Sajic discussed below in § VI.C.2.b would have been obvious, the Board need not adopt an exact outer boundary for “*the plurality of vents*” limitations because that implementation meets these limitations under any reasonable interpretation, as demonstrated in §§ VI.D.1.c.ii and VI.D.1.e below. 83 Fed. Reg. 51,340, at 51,353 (Oct. 11, 2018) (the Board need not “determine the exact boundary of claim scope”).

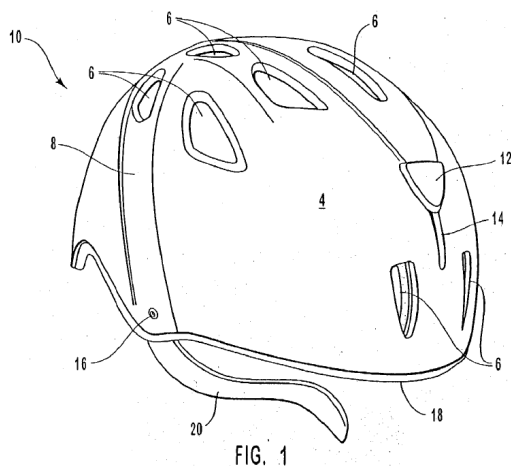
² Petitioner reserves the right to advocate for narrower constructions in the Colorado Litigation.

VI. GROUND 1: MUSKOVITZ IN VIEW OF SAJIC RENDERS OBVIOUS CLAIMS 1-3 AND 7

A. Muskovitz (Ex. 1005)

Muskovitz was filed on May 29, 2003 and published on April 8, 2004 and is therefore AIA-prior art under 35 U.S.C. § 102(a). Muskovitz was not cited during prosecution of the 373 patent. *See* § VII.B *infra*.

Muskovitz discloses a protective helmet comprising an outer shell and an inner liner with an active ventilation system integrated therein to allow the wearer to control air flow into and out of the helmet, an example of which is illustrated in FIG. 1 below. Muskovitz, [0075]-[0076]; Copeland, ¶¶ 51-52.



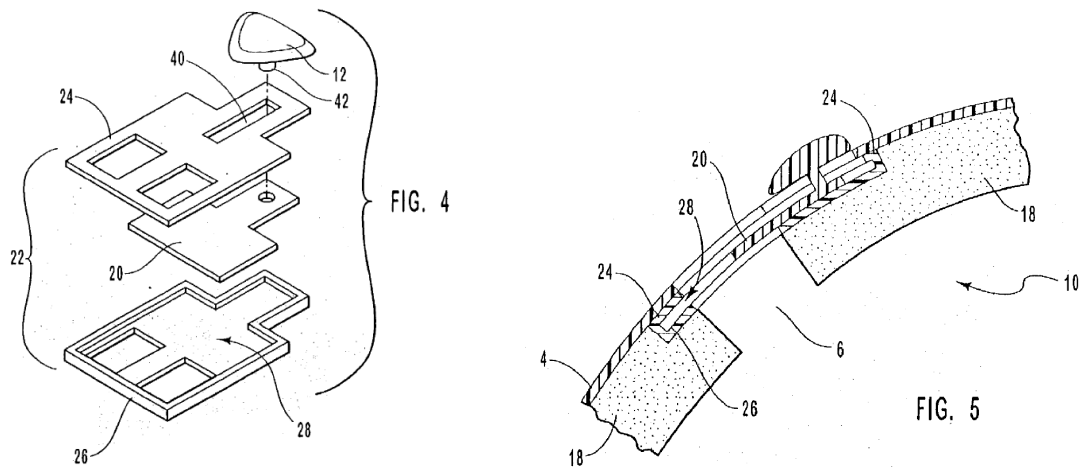
Protective helmet 10 comprises an outer shell 4 and inner liner 18 through which ventilation ports 6 are provided to allow ambient air to flow into the interior of the helmet. Muskovitz, [0075]-[0076]. Air flow through the front two vents 106 is controlled by actuator 12 that a wearer can slide along slotted portion 14 to raise and lower a vent shield to block or unblock the vents. *Id.*; Copeland, ¶ 53. Vents

having an associated actuator-controlled vent shield are referred to as “active vents” ([0023]) due to active air flow adjustability. Muskovitz, [0023], [0032], [0098]; Copeland, ¶¶ 53-55.

Muskovitz discloses various techniques for creating a vent space that houses the vent shield and allows it to be raised and lowered to control air flow.

Muskovitz, [0069]-[0074]; Copeland, ¶ 56. In FIGS. 4 and 5 reproduced below, the vent space is produced by “an independently created vent box” ([0071]).

Muskovitz, [0071], [0078]-[0082]; Copeland, ¶ 56.



Vent box 22 comprises an upper member 24 and a lower member 26 that together form vent space 28 (“a volume of space 28,” [0081]) that houses vent shield 20 and allows the vent shield to be displaced via actuator 12 to control air flow through apertures in the upper and lower members that align with corresponding ventilation ports. Muskovitz, [0079]-[0081]; Copeland, ¶ 57.

In other embodiments, component parts of the helmet create the vent space, eliminating the need for “a separate and independently created vent box” ([0089]). Muskovitz, [0069]-[0070]. For example, in the embodiment illustrated in FIG. 10 (below), the upper boundary 24 of vent space 28 is formed by inner liner 18 and the lower boundary is formed by insert member 26, respectively, rather than creating a separate vent box to define the vent space. Muskovitz, [0087]-[0089]. Copeland, ¶ 58.

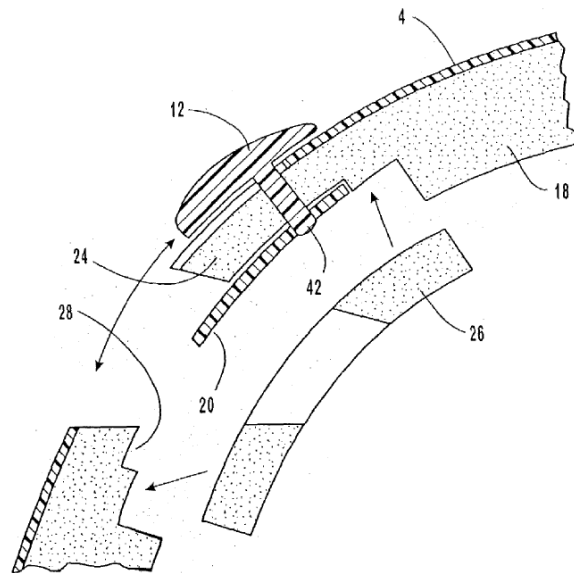


FIG. 10

Specifically, a portion of liner 18 aligned with one or more vent ports is removed to form a stair-stepped recess that creates vent space 28 and a space into which removable insert member 26 is inserted to form the lower boundary of vent space 28. Muskovitz, [0087]-[0088]; Copeland, ¶ 59. The FIG. 10 embodiment provides an integrated active ventilation system without having to manufacture “a

separate and independently created vent box.” Muskovitz, [0087]-[0089]; Copeland, ¶¶ 59-62.

B. Sajic (Ex. 1006)

Sajic was published on December 18, 2008 and is therefore AIA-prior art under 35 U.S.C. § 102(a). Sajic was cited but never applied during prosecution. *See* § VII.B *infra*.

Sajic is directed to the use of a core material comprising “energy absorbing tubes” (EAT) to improve the impact absorption performance of safety helmets. Copeland, ¶ 64. Sajic discloses that safety helmets using EAT-material outperform safety helmets that employed conventional foam materials to absorb impact energy. Sajic, [0005] (citing Ex. 1007 (“Sajic-WO”)). Copeland, ¶ 64.

Sajic discloses that by orienting energy absorbing tubes at an oblique angle to an impact load, rather than the conventional axially-oriented arrangement of the of Sajic-WO, the impact attenuation performance of the EAT-material can be improved. Sajic, [0098]-[0099], [0106]-[0107]. Figs. 2 and 3a reproduced below illustrate this angled arrangement of tubes 22 of EAT-material 20 (i.e., tubes 22 with longitudinal axes 24 at an oblique angle 26 relative to an impact load 50). Sajic, [0098]-[0101]; Copeland, ¶¶ 65-67.

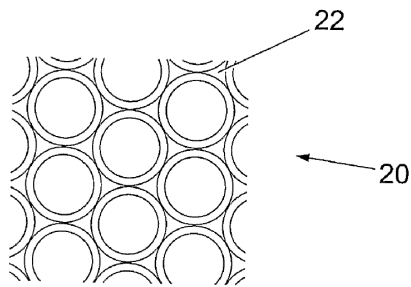


Fig. 2

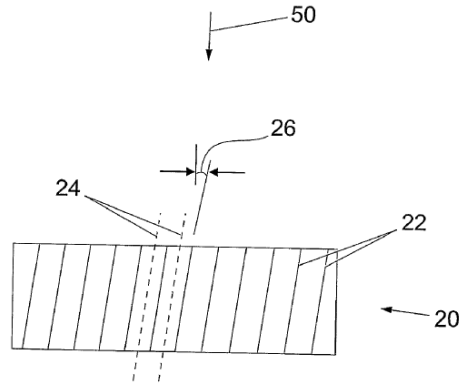


Fig. 3a

Sajic discloses this angled arrangement provides “superior performance” over the “conventional arrangement” of tubes disclosed in Sajic-WO due to utilization of both axial and lateral impact absorption properties of the tubes. Sajic, [0106]-[0107]; Copeland, ¶ 68. Sajic discloses manufacturing an integral material comprising an array of energy absorbing tubes oriented anywhere from 0° to 45° (hereinafter referred to as “EAT-material”) at wide range of dimensions using a range of material. Sajic, [0062]-[0067]; Copeland, ¶¶ 69-75.

Sajic further discloses employing the above-described EAT-material to provide impact-absorbing inserts in conventional foam liners to provide improved impact absorption at desired locations, as illustrated in FIGS. 9 and 10 reproduced below. Sajic, [0113]-[0127]; Copeland, ¶ 76.

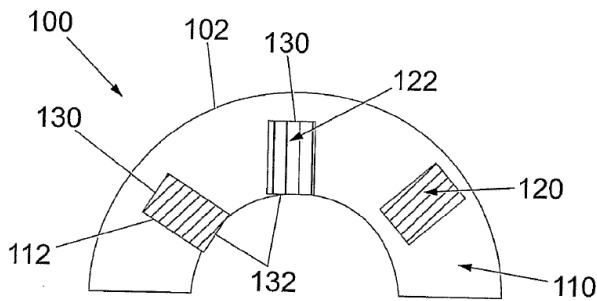


Fig. 9

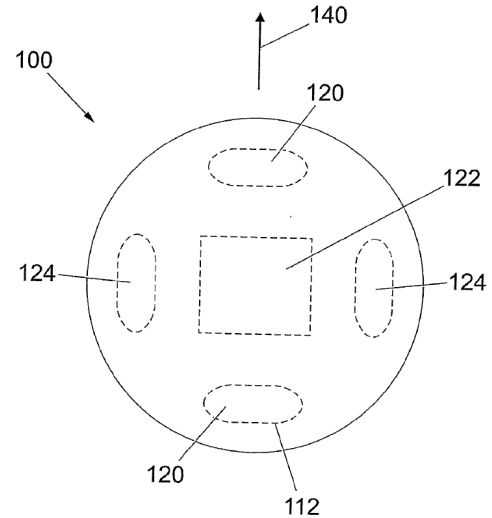


Fig. 10

By using EAT-inserts in conventional liners, the superior impact performance of Sajic’s core material can be taken advantage of in helmet designs that choose a conventional foam liner for design reasons (*e.g.*, cost or simplicity, Sajic, [0004]) to provide the “highest level of protection” for vulnerable areas such as locations where impacts occur more frequently or where the wearer is more prone to injury. Sajic, [0004], [0106]-[0107], [0113]-[0123]; Copeland, ¶ 77.

C. The Muskovitz-Sajic Combination

Muskovitz discloses that its protective helmets are manufactured in an “in molding” process in which the outer shell is joined to the inner-liner via molding or bonding in the same manufacturing process. Muskovitz, [0081]; Copeland, ¶ 79. Muskovitz gives two examples of foam materials (*e.g.*, “expanded polystyrene foam (EPS)” or “a foamed polymeric materials,” [0119]-[0120]) as suitable for the

impact-absorbing inner-liner of the disclosed “in-molded protective helmet” ([0081]). Copeland, ¶ 79.

Sajic discloses using EAT-inserts at select locations in helmet designs that employ foam material for the impact-absorbing liner of a safety helmet, such as the example foam materials Muskovitz discloses, to provide improved impact absorption at those locations. Sajic, [0004], [0123]; Copeland, ¶ 80; § VI.B. A POSA would have recognized the benefit of using Sajic’s EAT-inserts in the Muskovitz protective helmet to leverage the improved impact attenuation performance of Sajic’s EAT-inserts in the Muskovitz in-molded protective helmet; Copeland, ¶ 81.

1. It Would Have Been Obvious to Use Sajic’s EAT-Material for the Muskovitz Insert Member

As discussed in § VI.A, Muskovitz discloses an active ventilation system integrated into the components of the protective helmet. Muskovitz, [0026], [0087]-[0090]. In the FIG. 10 (reproduced below) embodiment, a vent space 28 for an active ventilation system is created by a recess formed in inner liner 18 and a removeable insert member 26 to eliminate the need to provide a separate and independently created vent box. Muskovitz, [0087]-[0089]; Copeland, ¶ 82.

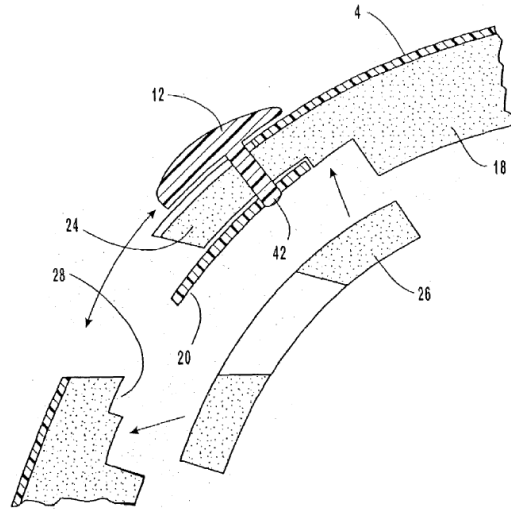


FIG. 10

A POSA would have recognized the benefit of using Sajic’s EAT-material for insert member 26 (“EAT-Insert-Member” hereinafter) to leverage the impact absorption properties of Sajic’s EAT-material in the shell/liner composite design of the Muskovitz protective helmet as taught by Sajic’s EAT-inserts. Copeland, ¶ 83.

Indeed, Muskovitz discloses that insert member 26 can be formed of any of “various material compositions” (Muskovitz, [0087]) and it would have been obvious to a POSA to use an EAT-Insert-Member at least because doing so is nothing more than the use of a known material (arrays of energy absorbing tubes) for their intended function (impact attenuation) to yield the predictable result of providing Muskovitz’s insert member with the advantageous impact attenuation properties disclosed in Sajic (*see e.g.*, [0106]-[0107]). Copeland, ¶¶ 83-84; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-421 (2007).

A POSA would have recognized that implementing an EAT-Insert-Member would have provided a simple and straightforward way to improve impact attenuation performance without changing the manufacturing process of the shell/liner construction of the Muskovitz protective helmet and a POSA would have had multiple reasons to make this modification. Copeland, ¶¶ 84-85 (*citing* Muskovitz, [0081], [0119]-[0120]).

a. Improved Impact Absorption of EAT-Material

A POSA would have been motivated to implement the EAT-Insert-Member to leverage the improved impact attenuation properties of Sajic’s EAT-material itself—*i.e.*, the improved performance of using energy absorbing tubes and the further improvement of the angle arrangement of tubes disclosed in Sajic to take advantage of both axial and lateral impact absorption properties. Sajic, [0005], [0009], [0106]-[0107], Figs. 3(a)-(b); Copeland, ¶¶ 84-86.

Furthermore, a POSA would have recognized that implementing an EAT-Insert-Member would provide meaningful impact absorption improvement given the significant footprint of active vent systems disclosed in Muskovitz. Copeland, ¶ 87. As shown in FIG. 10 (below left), the recess in inner liner 18 extends above actuator 12 and below the bottom of the corresponding vent opening, as illustrated by the solid-red-line annotation. Copeland, ¶ 87.

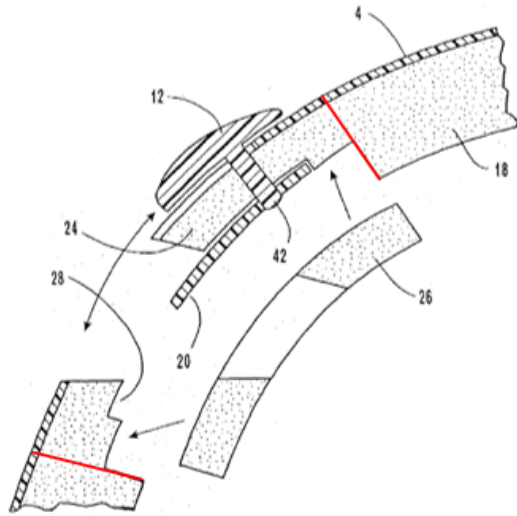


FIG. 10

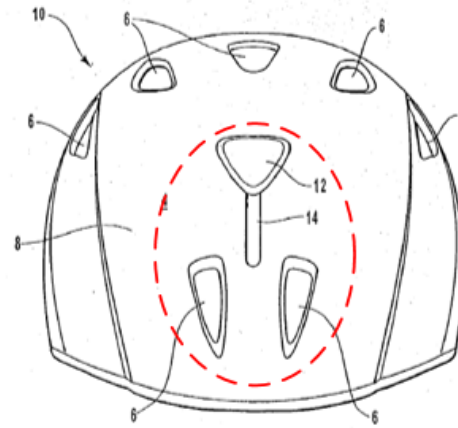


FIG. 2

FIG. 10 is a cross-sectional view so only a single vent is visible. In the configurations disclosed in Muskovitz in which a single actuator/vent shield controls air flow through multiple vents (“dual-port active vent configuration” hereinafter) (*see e.g.*, Muskovitz, [0023], [0076], [0087]-[0088], FIGS. 1-2, 7, 9-10), the recess extends across two vents to house a vent shield that covers both vents, as illustrated by the dashed-red-line annotations in FIG. 2 (above right). Copeland, ¶¶ 88-93 (describing the dual-port active vent configuration in the FIG. 10 embodiment); *see also* § VI.D.1.c.ii VI.D.1.c.ii *infra* (describing same).

Even in single-port active vent configurations, the recess extends over a significant area to encompass the actuator and extend below the bottom of the vent opening. Copeland, ¶ 94. Thus, a POSA would have had good reason to implement an EAT-Insert-Member as doing so would have provided improved impact

absorption performance over a meaningful area of the Muskovitz protective helmet. *Id.*

Additionally, Sajic discloses that protection in areas other than where the EAT-inserts are positioned is at least equal to the protection provided by the foam material in those other areas where there are no inserts, suggesting that the disclosed EAT-inserts may improve protection even in areas where the inserts are not provided. Sajic, [0126] (disclosing that in “other areas of the helmet 10” where the inserts are not positioned, the “level of protection is *at least equal*” to the “acceptable level of protection...provided by the foam spacing member” in those areas); Copeland, ¶¶ 95 (explaining reasons why EAT-inserts may provide additional protection in other areas). As such, employing an EAT-Insert-Member may improve impact absorption even beyond the active vent region.

b. Muskovitz’s Preference of Insert Material

Muskovitz discloses that insert member 26 is “preferably the same or similar impact-absorbing material as liner 18” (Muskovitz, [0087]), the obvious reason being to be to provide the same or similar impact absorption as the impact-absorbing liner 18 in regions where inner liner 18 is removed to form the recess. (Muskovitz, [0087]-[0088]). Copeland, ¶ 96. Muskovitz provides no reason that using an insert member 26 formed from a different material than the inner-liner would be any less preferable provided the material provides the similar or the same

impact absorption as the inner-liner material (which material Muskovitz also does not limit, [0082]). Copeland, ¶ 97. Thus, an EAT-Insert-Member would comport with and exceed the reasons for the stated preference of insert material. Copeland, ¶ 97.

To the extent there is some other (undisclosed) reason for Muskovitz's stated preference, use of the EAT-Insert-Member would have been no less obvious.

Muskovitz expressly states that any material composition can be used ([0087]) and a POSA would have recognized the multiple benefits of implementing an EAT-Insert-Member discussed above and additional benefits discussed below.

Copeland, ¶ 98; *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) (explaining an obvious combination need not be the "most desirable" combination, it need only be a desirable one).

c. Improved Coverage of EAT-Insert-Member

A POSA would have had the further reason to use an EAT-Insert-Member to provide impact-absorbing material over the vent openings where the Muskovitz insert member 26 provides none, as illustrated in FIG. 10 of Muskovitz reproduced below. Copeland, ¶ 99.

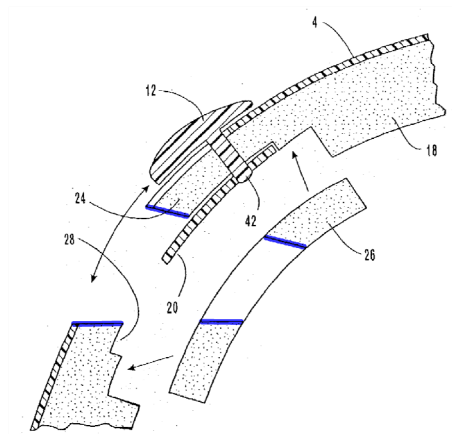
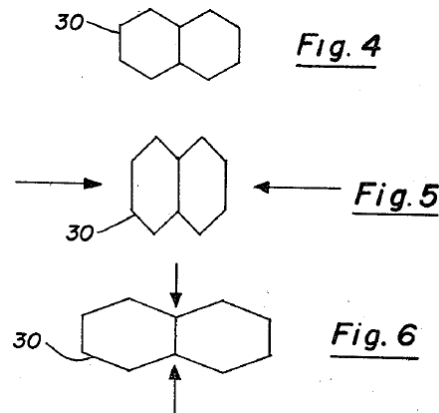


FIG. 10

To allow air flow into the interior of the helmet, portions of the Muskovitz insert member 26 aligned with corresponding vent openings are removed (both outlined in blue above), reducing the amount of impact-absorbing material in the Muskovitz insert member available to absorb energy from an impact and leaving a void across the vent opening. Copeland, ¶ 100.

It would have been readily apparent to a POSA that using an EAT-Insert-Member for improved impact absorption would have obviated the need for ventilation cut-outs because Sajic’s EAT-material itself allows air to flow freely through the tubes—this was a known property of such materials. Copeland, ¶¶ 101-103 (*citing* Landi, 1:61-33 (disclosing “honeycomb material” for impact absorption and ventilation); Copeland, 4:9-24, Figs. 6a-6b (opened-ended hollow structures provided air flow through openings in the shell); Fox-2011-Catalog, 7 (disclosing “structural honeycomb vent inserts”)).

For example, Landi discloses that “honeycomb material” (1:61-2:9) of open-ended hexagonal cells (see Figs. 4-6 of Landi below), similar to Sajic’s EAT-material of open-ended cylindrical tubes, was “*no impediment* to air flow” no matter how thick the material due to the “open nature” of the hexagonal-core (3:21-22). Copeland, ¶ 103.



Figs. 4-6, Landi

A POSA would have recognized that Sajic’s EAT-material (see Figs. 2 and 3(a) reproduced below) would likewise allow air to freely flow through the energy absorbing tubes and that the wide range of disclosed diameters and wall-thicknesses of the tubes would allow the design of an EAT-Insert-Member that achieves a desired amount of air flow for the Muskovitz protective helmet. Copeland, ¶ 104.

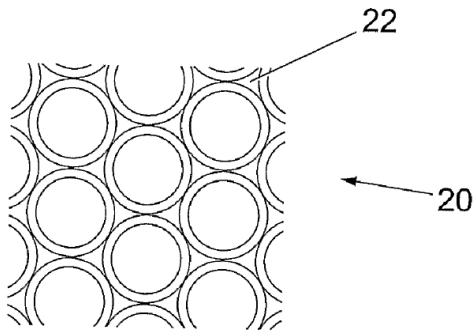


Fig. 2

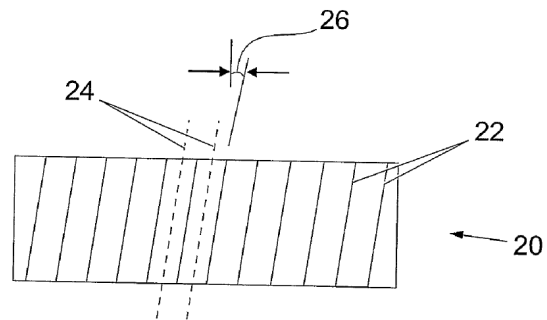


Fig. 3a

Specifically, Sajic discloses tube diameters ranging from 2 to 25 mm and wall-thicknesses between 0.1 and 0.5 mm, providing for a wide range of aspect ratios (*i.e.*, the ratio of tube-diameter to wall-thickness, Sajic, [0102]). Copeland, ¶ 105 (*citing* Sajic, [0063]-[0064], [0102]; Sajic-WO, 14:3-25). A POSA would have understood that this wide range of tube dimensions would have allowed for the choice of EAT-material that allows for virtually any amount of unimpeded air flow through the EAT-Insert-Member. Copeland, ¶ 105.

The 373 patent discloses that the disclosed inserts “may include a honeycomb material that includes an array of energy absorbing cells...each of the cells may include a tube, which may allow air to pass through, providing ventilation to the head of the wearer.” 373 patent, 2:45-52. The 373 patent does not disclose tube dimensions at all, nor describe any modification to known honeycomb needed “to allow air to pass through” because this was a known property of the material. The 373 patent says as much: “tubes with open longitudinal ends [] allow air to freely flow through the tubes” (2:18-22)—*i.e.*, the

same unimpeded air flow property described in Landi (3:21-22)). Copeland, ¶¶ 107-108. Sajic also discloses tubes with open longitudinal ends and a POSA would have understood that Sajic’s EAT-material would likewise “allow air to freely through the tubes” of the EAT-Insert-Member. *Id.*

Thus, a POSA would have recognized that employing an EAT-Insert-Member to benefit from its impact attenuation properties would also have the additional benefits of increasing the total amount of impact-absorbing material available at active vent ports and providing impact-absorbing material across the active vent openings where there otherwise is none. Copeland, ¶ 106.

d. Implementing the EAT-Insert-Member

An obvious implementation of an EAT-Insert-Member achieving one or more of the advantages discussed above (§§ VI.C.1.a-VI.C.1.c) would have been to employ the open-ended tubes with six adjacent tubes circumferentially arranged around each tube in a “close packed array” (Sajic, [0098], Fig. 2 below) to take advantage of the beneficial impact absorption properties disclosed in Sajic ([0098], [0103]). Copeland, ¶ 109.

Additionally, it would have been obvious to employ the angled arrangement of tubes disclosed in Sajic (*see e.g.*, Figs. 2 and 3(a) reproduced below) to take advantage of the improved impact absorption properties of this arrangement. Sajic, [0099], [0101], [0106]-[0107]; Copeland, ¶ 110.

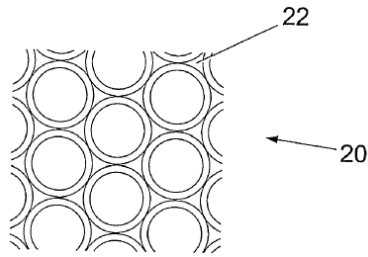


Fig. 2

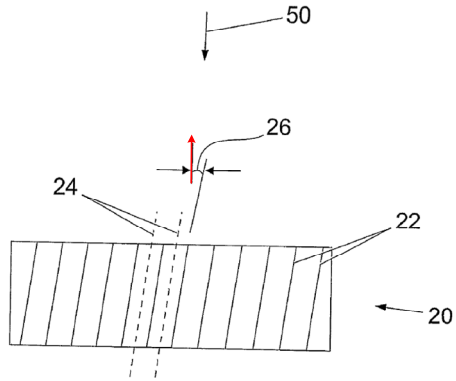


Fig. 3a

Particularly, Sajic discloses that by orienting longitudinal axes 24 of tubes 22 at an oblique angle 26 relative to the surface normal of EAT-material 20 (annotated in red above), improved impact performance is achieved by utilizing both axial and lateral impact-absorbing characteristics of the tubes. Sajic, [0099]-[0101]; Copeland, ¶ 111.

The same improved impact absorption would be achieved for an EAT-Insert-Member by orienting the energy absorbing tubes so that they align with corresponding vent openings (see annotated FIG. 10 of Muskovitz below), similar to the manner in which ventilation cut-outs of insert member 26 are provided.

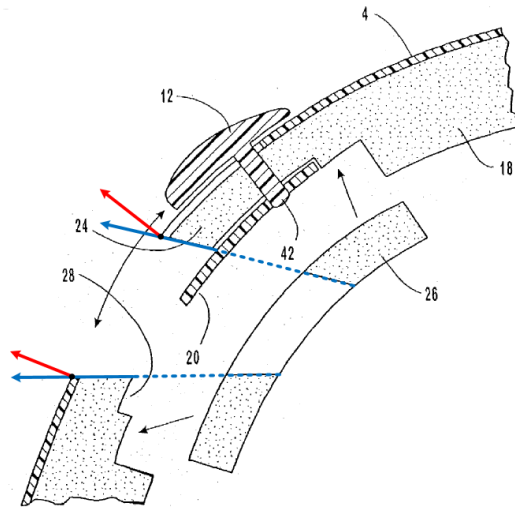


FIG. 10

As illustrated above, the vent port visible in the FIG. 10 cross-section is provided through the shell/liner composite such that the side-walls of the vents are at an angle (blue arrow) relative to the corresponding surface normal (red arrow) of outer shell 4. The visible cut-out in insert member 26 is similarly angled to align with the vent opening. Muskovitz, FIG. 10; Copeland, ¶¶ 112-113.

By orienting tubes of an EAT-Insert-Member in alignment with corresponding vent openings (either angle shown by blue arrows above), tubes would form oblique angles to the surface normal (red arrow) of the outer shell 4 (*i.e.*, angled relative to the “impact surface,” Sajic, [0099], [0101]), thereby taking advantage of both axial and lateral absorption properties of the tubes and facilitating air flow into the interior of the helmet due. Sajic, [0099]-[0101], [0106]-[0107]; Copeland, ¶ 114.

As discussed in § VI.C.1.c, a POSA would have understood that when using the EAT-Insert-Member, providing cut-outs through the insert is unnecessary as sufficient air flow would be provided through the EAT-material itself and, furthermore, that the range of dimensions of the tubes disclosed in Sajic ([0063]-[0064]) would allow for the design of an EAT-Insert-Member that provides the desired amount of air flow into and out of the helmet. Copeland, ¶ 115. Thus, it would have been obvious and desirable to a POSA to eliminate an unnecessary step in the manufacturing process of the EAT-Insert-Member. *Id.*

Additionally, a POSA would have understood that providing cut-outs or apertures in the EAT-Insert-Member is undesirable due to reduction in the amount of impact-absorbing material provided by the insert and at locations where there is no other impact-absorbing material. Copeland, ¶ 116; § VI.C.1.c. Thus, it would have been obvious, and a POSA would have been motivated to, implement the EAT-Insert-Member using the EAT-material as manufactured in a close packed array of open-ended tubes, preferably of the six-tube-adjacency arrangement, with an arcuate cross-section as disclosed in Sajic—and sized to fit into the recess of the Muskovitz inner-liner. Copeland, ¶ 116; Sajic, [0062], [0098]-[0101], [0080], [0103], [0112], [0122].

An example of this obvious implementation is shown below using Sajic's EAT-insert in the Fig. 3(a) angle-arrangement (right) using a curved (arcuately-

shaped) cross-section as disclosed in Sajic that is sized and shaped as the Muskovitz insert member 26 of Fig. 10 (left), which is nothing more than the straightforward application of Sajic's teachings to Muskovitz. Copeland, ¶ 117.

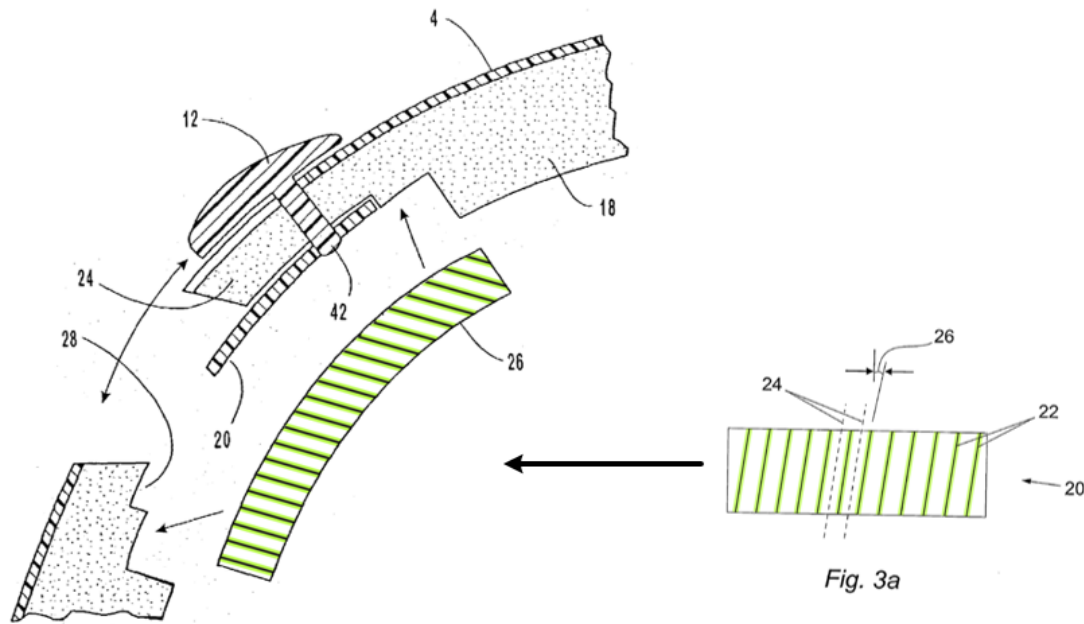


FIG. 10

Other configurations of energy absorbing tubes (*e.g.*, different sizes and orientations for the tubes) would have been obvious to a POSA to achieve desired impact attenuation and ventilation for the helmet, selection of which is merely a matter of obvious design choice for a particular helmet. Copeland, ¶ 118.

Implementing the Muskovitz-Sajic EAT-Insert would have been well within a POSA's capabilities, and a POSA would have had a reasonable expectation of success. Copeland, ¶ 119. Sajic discloses that integral EAT-material can be manufactured with tubes having a wide range of orientations and dimensions using

a range of plastic materials. Sajic, [0012]-[0063]-[0067]; Copeland, ¶ 119. Sajic further discloses that EAT-material can be formed to any geometric shape having either a planar or arcuate cross-section to provide EAT-inserts of a wide range of sizes and shapes. Sajic, [0101], [0112], [0121], Fig. 1b.; Copeland, ¶ 120.

Thus, it would have been well within the skills of a POSA to successfully provide an EAT-Insert-Member sized to be “fit within the recess of liner 18” to provide the lower boundary of vent space 28 (Muskovitz, [0087]-[0088]) and to provide the desired amount of air flow. Muskovitz, [0087]-[0088] Copeland, ¶ 120.

Implementing an EAT-Insert-Member does not require modification to the disclosed “in-mold” manufacturing process of the shell/liner composite of the Muskovitz protective helmet so that implementing the EAT-Insert-Member is a routine matter of sizing Sajic’s EAT-material to fit within the recess formed in the inner-liner. Copeland, ¶ 121.

2. The Muskovitz-Sajic-Helmet

The Muskovitz-Sajic-Helmet refers herein to the Muskovitz protective helmet modified to use an EAT-Insert-Member implemented as discussed above (§ VI.C.1.d) in active vent configurations in which a single actuator/vent shield is employed to control air flow through two vents (*e.g.*, the dual-port active vent configurations illustrated in FIGS. 1-2, 7, 9, etc. of Muskovitz), as discussed in further detail below. Copeland, ¶ 122.

Muskovitz does not describe the FIG. 10 embodiment in connection with any particular vent port configuration or helmet design, nor limit its use in any way. Rather, Muskovitz discloses that “FIG. 10 illustrates a second, alternative embodiment of the protective helmet of the present invention” that provides an integrated active ventilation system for which it is not necessary to provide “a separate and independently created vent box as in the first embodiment.”

Muskovitz, [0087]-[0089]; Copeland, ¶ 123.

Thus, it would have been obvious to a POSA to employ the FIG. 10 embodiment with any of the variety of the vent port configurations and helmet designs disclosed in Muskovitz. Copeland, ¶ 124. Muskovitz expressly states that “[i]t will be readily understood that the components of the present invention, as generally described and illustrated in the figures herein, could be arranged and designed in a wide variety of different configurations.” Muskovitz, [0066]; Copeland, ¶ 124.

Muskovitz discloses protective helmets comprising active vents (*i.e.*, vents through which air flow is controllable) with additional passive vents (*i.e.*, vent ports through which air flow is not controlled) and helmets for which all of the vents on the helmet are active. Muskovitz, [0023], [0076] (“the ventilation system of the present invention may be designed to modify or adjust air flow through *any*

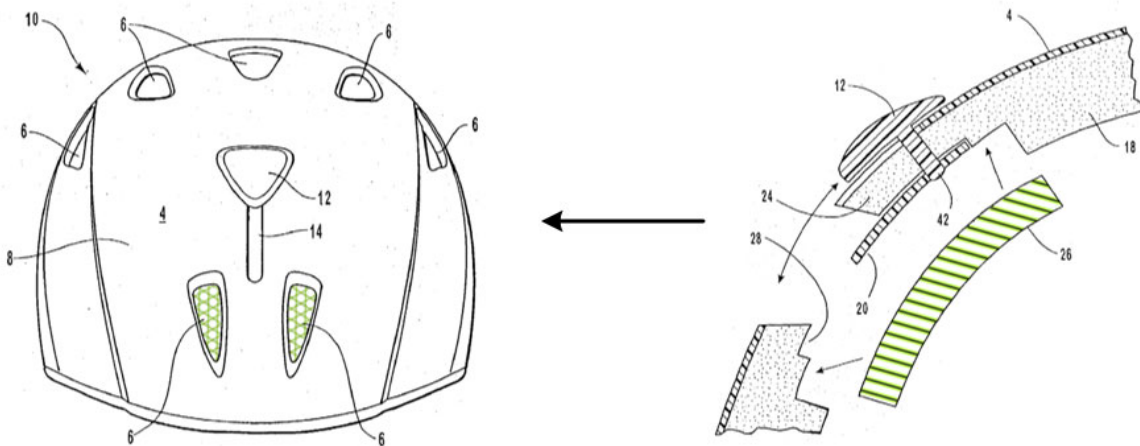
or all of ventilation ports 6 incorporated within the protective helmet 10.”), FIGS. 1-2, 6-9, 14-18 and 21. Copeland, ¶ 125.

For any one or combination of the reasons discussed in § VI.C.1 above, it would have been obvious to implement an EAT-Insert-Member to improve the impact attenuation performance of the Muskovitz protective helmet in any of the configurations disclosed in Muskovitz or any of the “wide variety of different configurations” that it would have been “readily understood” the “components of the present invention” could be “arranged and designed.” Muskovitz, [0066]; Copeland, ¶ 126.

A first Muskovitz-Sajic-Helmet example with active and passive vent ports (“Muskovitz-Sajic-Helmet-1”) and a second Muskovitz-Sajic-Helmet example with active vent ports and no passive vent ports (“Muskovitz-Sajic-Helmet-2”) are described below. Copeland, ¶ 127.

a. Muskovitz-Sajic-Helmet-1

The Muskovitz-Sajic-Helmet-1 comprises active and passive vents and a single actuator/vent shield to control air flow through a pair of front vent ports (*see e.g.*, Muskovitz, [0023], [0076], FIGS. 1-2, 7 and 9). Copeland, ¶ 128. An example of the Muskovitz-Sajic-Helmet-1 using the vent port configuration of FIGS. 1-2 is illustrated below with an EAT-Insert-Member provided for the active vent ports highlighted in green.



Muskovitz-Sajic-Helmet-1 (Modified FIGS. 2 and 10, Muskovitz)

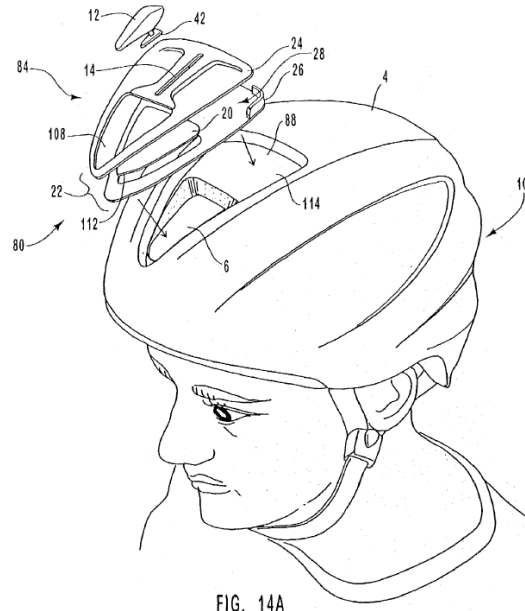
Obvious design choice variations of the example Muskovitz-Sajic-Helmet-1 above include using any of the Muskovitz dual-port active vent configurations and providing an active ventilation system for one or more additional vent ports provided on the helmet. Muskovitz, [0066], [0076]; Copeland, ¶ 129.

b. Muskovitz-Sajic-Helmet-2

The Muskovitz-Sajic-Helmet-2 differs from the Muskovitz-Sajic-Helmet-1 only in that it employs only active vents and no passive vents. Muskovitz, [0076] (air flow is adjustable “through any or all of ventilation ports 6 incorporated within protective helmet 10”), [0098]-[0102], FIGS. 14-16); Copeland, ¶ 130.

Muskovitz discloses exemplary helmet designs (*see e.g.*, FIG. 14A reproduced below) in which all of the vent ports provided on the helmet are active such that the wearer can choose to prevent air flow into the interior of the helmet altogether. Muskovitz, [0098], [0100] (“In a closed position, vent shield 20 is

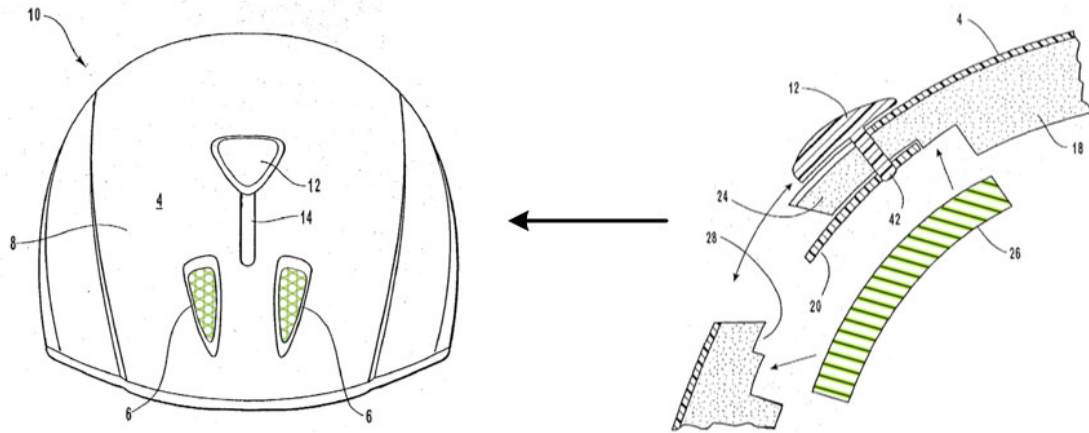
displaced such that *ambient air flow is not allowed* to flow through into the interior of protective helmet 10”). Copeland, ¶ 131.



Eliminating passive vents from the helmet allows the wearer to close all of the vents on the helmet to block air flow into the interior of the helmet in cold weather conditions to preserve body heat. Muskovitz, [0098], [0100], [0102]; Copeland, ¶ 132. It would have been an obvious to use any of the active vent configurations shown in Muskovitz in the disclosed shell design with no passive vents to provide the wearer full control over the amount of ventilation, thus allowing the wearer to prevent all air flow into the interior of the helmet if desired to preserve body heat in cold weather conditions. Muskovitz, [0066], [0076], [0098], [0100], [0102]); Copeland, ¶¶ 133-134.

An example of the Muskovitz-Sajic-Helmet-2 employing the FIG. 14A shell design (*i.e.*, with no passive vents) using the dual-port active vent configuration of

FIGS. 1-2 is illustrated below, showing the Muskovitz-Sajic EAT-Insert provided for the active vent ports highlighted in green. Copeland, ¶ 135.



Muskovitz-Sajic-Helmet-2 (Modified FIGS. 2 and 10 of Muskovitz)

D. The Muskovitz-Sajic-Helmet Renders Obvious the Challenged Claims

The Muskovitz-Sajic-Helmet renders obvious each of claims 1-5, 7, 12-13 and 15-17 as demonstrated in the limitation-by-limitation analysis in §§ VI.D.1-VI.D.11 below. In the below analysis, the term Muskovitz-Sajic-Helmet refers to any of the obvious design variations discussed above, including the Muskovitz-Sajic-Helmet-1 and Helmet-2 discussed in § VI.C.2 above.

1. Claim 1

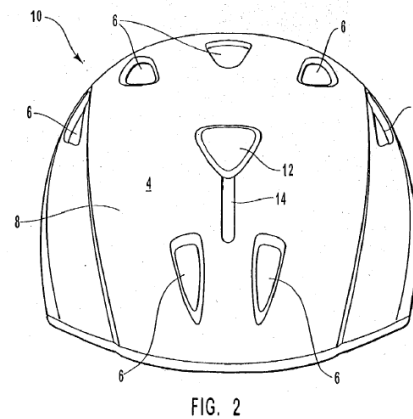
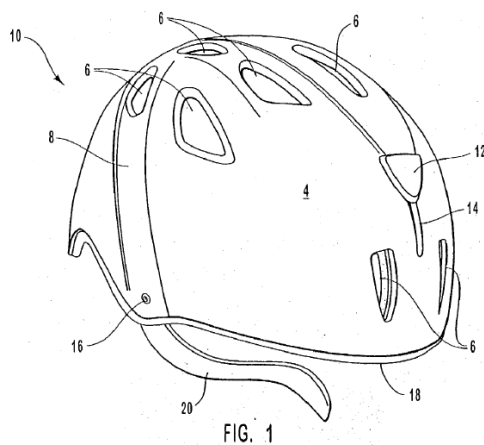
a. [1PRE] “A *helmet*, comprising:”

The Muskovitz-Sajic-Helmet uses the Muskovitz “protective *helmet* and improved ventilation control system” (Muskovitz, [0068]) with an EAT-Insert-

Member and therefore meets [1PRE]. Muskovitz, [0068], [0075]; Copeland, ¶ 137; § VI.C.2.

b. [1A] “a shell comprising a plurality of vents including a first vent defining a first opening and a second vent defining a second opening”

Muskovitz discloses a “protective helmet 10 having a plurality of ventilation ports 6” that are “designed to facilitate ambient air flow into and out of the interior of the protective helmet 10” as shown in FIGS. 1-2 of Muskovitz (reproduced below).



As discussed above in § VI.C.2, the Muskovitz-Sajic-Helmet uses a dual-port active vent port configuration as illustrated in FIGS. 1 and 2 in which the outer shell 4 comprises two active ventilation ports 6 controlled by a single actuator/vent shield (Muskovitz, [0075]-[0076], [0084]), with or without passive vents (Muskovitz, [0076], [0098], [0100]). Copeland, ¶¶ 138-139.

Thus, the Muskovitz-Sajic-Helmet includes an outer shell 4 comprising at least two ventilation ports 6 and therefore meets “*a shell comprising a plurality of vents,*” as recited in [1A]. Copeland, ¶ 140.

Muskovitz discloses that the ventilation ports 6 include “*apertures* that extend from the outer shell 4 through and into the interior of protective helmet 10” (Muskovitz, [0075])—*i.e.*, *openings* through the outer shell. *Id.*; Copeland, ¶ 141. The Muskovitz-Sajic-Helmet includes the two active ventilation ports 6 as in the FIG. 2 configuration, shown below with first and second ventilation ports 6 formed through outer shell 4 colored in blue and aqua respectively.

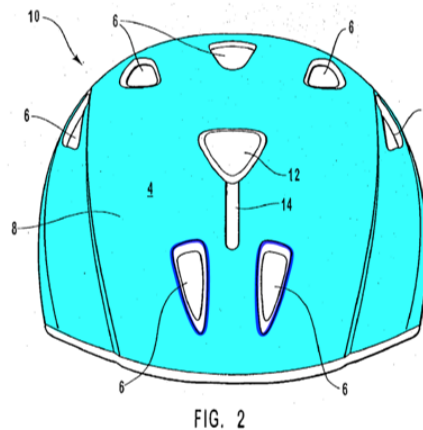
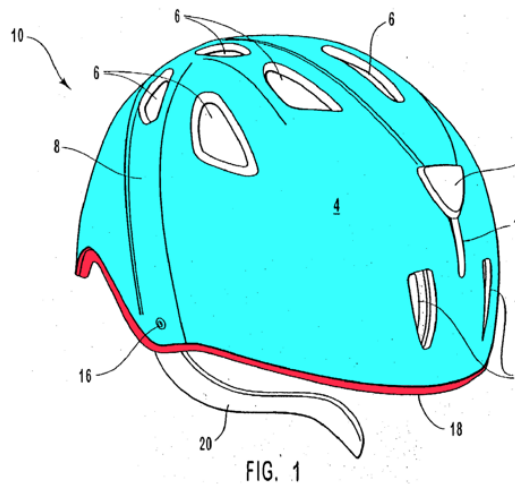


FIG. 2, Muskovitz (Annotated)

Thus, the two active vent ports 6 of the Muskovitz-Sajic-Helmet meet “*a first vent defining a first opening and a second vent defining a second opening,*” as recited in [1A]. Copeland, ¶¶ 142.

- c. [1B] “a shock absorbing liner adjacent to and attached to the shell and comprising a cavity at least partially aligned with the plurality of vents”

Muskovitz discloses that “the protective helmet comprises an inner liner *joined* to an outer shell. The inner liner may be *bonded or molded* to the outer shell to create a shell/liner composite.” Muskovitz, [0068]; Copeland, ¶ 143. FIG. 1 of Muskovitz reproduced below illustrates protective helmet 10 comprising inner liner 18 (red) bonded or molded to outer layer 4 (aqua). Copeland, ¶ 144.



Annotated FIG. 1 of Muskovitz

For the integrated vent system of FIG. 10 (reproduced below) utilized by the Muskovitz-Sajic-Helmet, Muskovitz discloses that “[p]rotective helmet 10 comprises outer shell 4 *joined* (molded or bonded)” to “*impact-absorbing* inner liner 18” (Muskovitz, [0087]).

A POSA understood that Muskovitz’s “impact-absorbing liner” is a “*shock absorbing liner*” performing the same function as the “shock absorbing liner”

described in the 373 patent. *Compare* 373 patent, 1:57-61 *with* Muskovitz, [0068] (“inner liner is constructed or manufactured from ***impact-absorbing material*** and provides the helmet its impact-absorbing attenuation properties...to protect the wearer of the helmet from potentially dangerous impacts or blows to the head.”), [0119]; Copeland, ¶ 145.

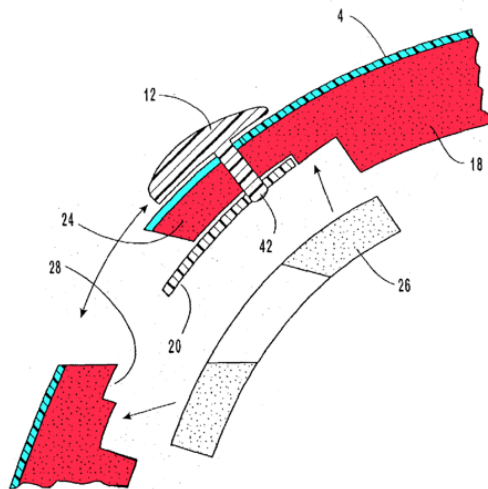


FIG. 10

FIG. 10, Muskovitz (Annotated)

As illustrated in FIG. 10 above, inner liner 18 (red) is ***adjacent*** outer shell 4 (aqua) by virtue of being “molded or bonded directly to outer shell 4,” and therefore the inner liner 18 of the Muskovitz-Sajic-Helmet meets “*a shock absorbing liner adjacent to and attached to the shell,*” as recited in [1B1]. Muskovitz, [0081]; Copeland, ¶ 146.

Muskovitz discloses “a portion of impacting absorbing inner liner 18 being removed to form a recess” into which components of the active vent system of the

FIG. 10 embodiment are integrated, as illustrated in annotated FIG. 10 reproduced below. Muskovitz, [0087]; Copeland, ¶ 147.

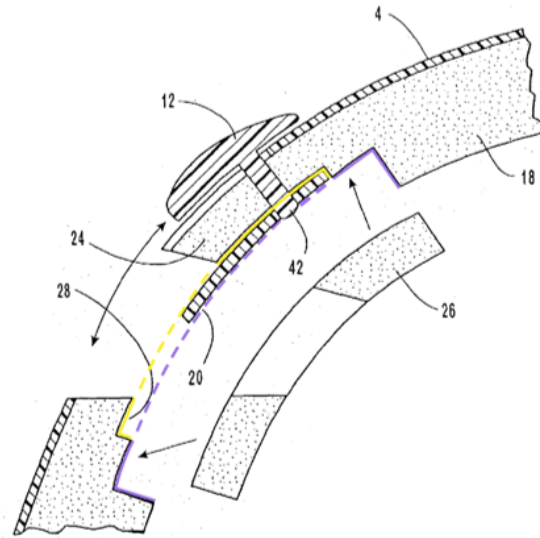


FIG. 10

FIG. 10, Muskovitz (Annotated)

The recess formed by removing a portion of liner 18 creates two distinct spaces: (1) a first space (outlined in yellow) that houses vent shield 20 and (2) a second space outlined in purple (referred to hereinafter the “insert-space”) sized so that insert member 26 fits within the recess and forms the lower boundary of vent space 28. Muskovitz, [0087]-[0088]; Copeland, ¶ 148. The insert-space meets limitation [1B]. Copeland, ¶ 149.

i. The Insert-Space is “a Cavity”

The 373 patent uses the term cavity to describe a volume of space formed in the liner to accommodate an insert. In particular, the 373 patent describes “a

cavity” as “an opening, recess, etc.” that “may be shaped to hold inserts 122 and 124.” 373 patent, 2:33-37; Copeland, ¶ 150. As illustrated in FIGS. 4 and 5 of the 373 patent (annotated below), the disclosed cavities are “opening[s]” or “recess[es]” in liner 130 that form a space (outlined in purple) to “hold inserts.”

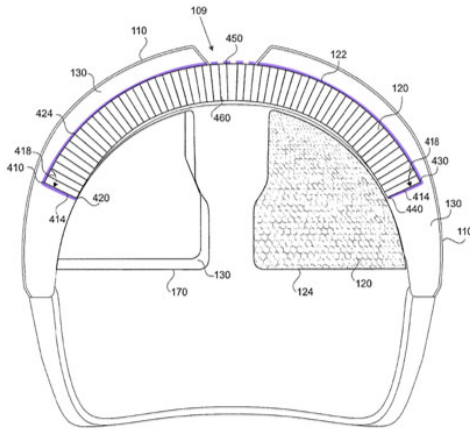


FIG. 4

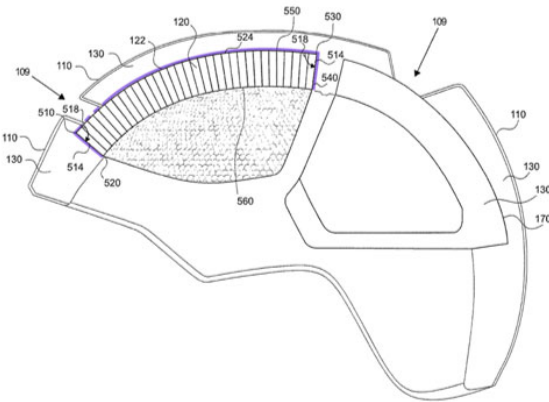


FIG. 5

Likewise, the insert-space (outlined in purple with dashed-purple where the insert-space adjoins another space in annotated FIG. 1 below) is a space (i.e., “an opening, recess, etc.,” 373 patent, 2:35-36) formed in liner 18 sized specifically to hold insert member 26. Thus, the insert-space into which insert member 26 fits (e.g., via “an interference fit” (Muskovitz, [0087]) is “a cavity” in the “shocking absorbing liner” for the same reasons the 373 patent’s cavities are also. Copeland, ¶ 151.

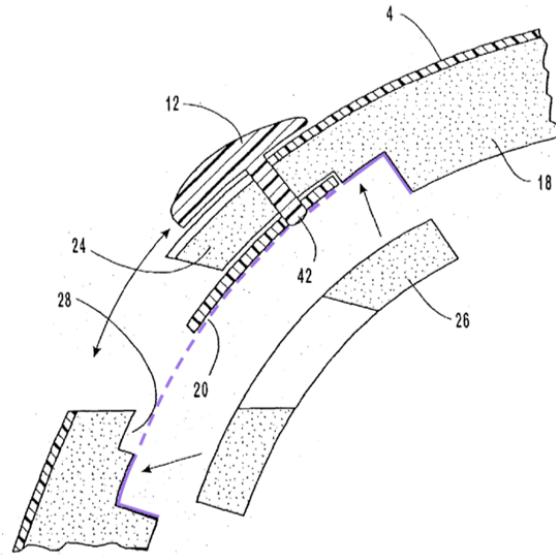


FIG. 10

FIG. 10, Muskovitz (Annotated)

PO argued in the Colorado Litigation that the claimed “cavity” is Muskovitz is limited to the entire recess in inner-liner 18. Ex. 1024, 14-16. Neither the language of claim 1 nor the specification supports PO’s reading. Limitation [1B] does not specify any *particular* cavity, only that the shock absorbing liner have one. That the Muskovitz recess may also be a cavity does not make the insert-space any less “*a cavity*.”

Indeed, the insert-space is a distinct compartment formed in inner-liner 18 specifically to accommodate insert member 28. It is immaterial that the insert-space is open to another distinct compartment that houses the vent shield. Muskovitz, [0087]-[0088]; Copeland, ¶ 152. Nothing in the claims or the 373 specification—which describes a cavity broadly as “e.g. an opening, a recess, etc.,”

(2:33-37)—requires the claimed cavity to have no adjoining spaces. Copeland, ¶ 152.

Indeed, the 373 patent’s cavities are likewise open to (at the dashed-purple line in FIGS. 4-5 above) and form an adjoining space with corresponding vent openings formed through the shell and the liner, as illustrated in FIGS. 4 and 5 above. A reading of [1B] requiring the claimed cavity to have no adjoining space would improperly read limitations into the claim that are nowhere described in, and are inconsistent with, the 373 specification. Copeland, ¶ 152.

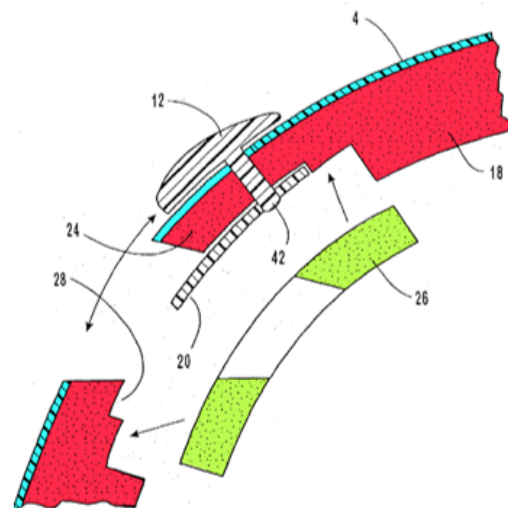
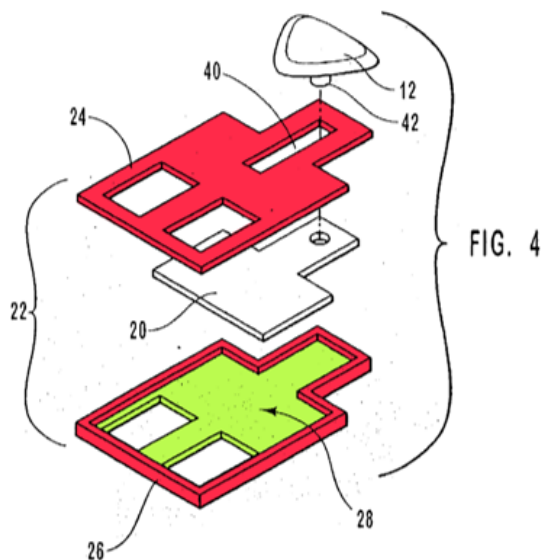
ii. The Insert-Space is Aligned with the Plurality of Active Vents

As shown in FIG. 10 (see above), the recess in liner 18 is formed by removing the portion of the liner below the corresponding vent-openings so that the recess overlaps with (and expands beyond) the active vents such that both the recess and the insert-space created therein are “*aligned*” with the corresponding vents. Copeland, ¶ 153; Muskovitz, [0087]. The 373 patent describes this same relationship where the cavity overlaps with a vent as being “aligned” with the vent. 373 patent, 4:19-21 (“[t]hus, a vent 109 of the shell 110 overlaps (e.g., *aligns*) with a portion of cavity 170 of the shock absorbing liner 130”), Fig. 2, Fig. 5. Copeland, ¶ 153.

FIG. 10 is a cross-sectional view such that one active vent is visible. A POSA understood that for dual-port active vent configurations (as employed by the

Muskovitz-Sajic-Helmet, § VI.C.2 above), the recess formed in inner-liner 18 spans both vents to be able to house the vent shield configured to cover both vents and to provide upper boundary 24 of the vent space for both vents. Copeland, ¶ 154. Muskovitz, [0023], [0076], [0087]-[0088]. Otherwise, the vent shield would not fit within the vent space to control air flow through both vents. Copeland, ¶ 155.

This can be seen by comparing the vent box for the dual-port active vent configuration of the FIG. 4 embodiment with the FIG. 10 embodiment, shown side-by-side below with like-coloring for like-numbered components. Muskovitz, [0067] (“like parts are designated by like numerals throughout.”); Copeland, ¶ 155.



FIGS. 4 and 10, Muskovitz (Annotated)

For vent box 22 of the FIG. 4 embodiment, vent space 28 is created by upper member 24 and lower member 28 that span both of the apertures that align with

corresponding vent openings such that vent shield 20 can be accommodated and displaced to control air flow through both of the corresponding two vents ports.

Muskovitz, [0078]-[0079]; Copeland, ¶ 156.

In the FIG. 10 embodiment, vent box 22 is replaced with the similarly numbered components. Muskovitz, [0067]. In particular, the recess in liner 18 (red) defines upper boundary 24 and sidewalls of vent space 28 (as seen in FIG. 10), replacing upper member 24 and sidewalls of lower member 28 of vent box 22 (also red). Muskovitz, [0087] (“inner liner 18 forms the upper boundary of vent space 28”); Copeland, ¶ 157. Insert member 26 (green) “forms the lower boundary of vent space 28” (Muskovitz, [0088]), replacing the bottom portion of lower member 28 (also green) of vent box 22. *Id.*; Copeland, ¶ 157.

Thus, a POSA would have understood that for a dual-port active vent system, the recess formed in inner liner 18 would span across both vents to provide vent space 28 that likewise spans across both vents so that vent shield 20 housed therein can be displaced to cover both vents, as it does in the FIG. 4 embodiment. Muskovitz, [0023], [0076], [0078]-[0079]; Copeland, ¶ 158.

To the extent Muskovitz does not expressly disclose this arrangement (and to the extent there are other ways to achieve it), it would have been obvious to form the recess in liner 18 to span both active vents so that vent space 28 also spans both active vents and the vent shield accommodated therein can control air

flow through both active vents—*i.e.*, the same way vent box 22 was implemented. Copeland, ¶ 159.

As discussed in § VI.C.2 above, the Muskovitz-Sajic-Helmet employs the dual-port active vent configuration disclosed in Muskovitz to control air flow through two front vents of the helmet using the FIG. 10 embodiment, and therefore both the recess and the insert-space formed in inner liner 18 (or the obvious implementation described above) overlap with both of the two active vents provided through outer shell 4 of the Muskovitz-Sajic-Helmet (outlined in blue in the drawing in § VI.D.1.b ([1A]) above). Therefore, the insert-space is “*at least partially aligned with the plurality vents,*” as recited in [1B] under PO’s construction discussed in § V.A (Claim Interpretation)—*i.e.*, that only two vents need meet this limitation. Ex. 1022, 2-3; Copeland, ¶¶ 160-161; § VI.C.2.a *supra*.

If the Board agrees that the Muskovitz-Sajic-Helmet-2 is an obvious implementation (two active vents and no passive vents), the Board need not adopt an exact boundary for this limitation because the insert-space is “*at least partially aligned*” with the **only** two vents (*i.e.*, **all** of the claimed “*plurality of vents*”) provided in outer shell 4 (§§ VI.C.2.b and VI.D.1.b ([1A]) above). Copeland, ¶ 162.

d. [1C] “a shock absorbing insert positioned in and substantially filling the cavity”

The EAT-Insert-Member positioned within the recess of the inner liner of the Muskovitz-Sajic-Helmet meets limitation [1C]. Copeland, ¶ 163; § VI.C.2 *supra*. Sajic discloses that inserts comprising “an array of energy absorbing tubes” (Sajic, [0117]) “provide a high level of protection from impact loads” (Sajic, [0123]) and have axial and lateral “mode[s] of absorbing energy” (Sajic, [0106]-[0107]). Copeland, ¶ 163. Thus, a POSA understood that the EAT-Insert-Member comprising an array of energy absorbing tubes is “*a shock absorbing insert*” as recited in [1C] for the same reasons discussed above for the “shock absorbing” liner. Copeland, ¶ 163; § VI.D.1.c ([1B]).

Muskovitz discloses that the insert member 26 is “designed to fit within the recess in liner 18” (Muskovitz, [0087]) the recess formed in the liner 18 and is sized so that it does not “fill the entire recessed portion of inner liner 18,” (Muskovitz, [0088])—i.e., it entirely fills the insert-space. Copeland, ¶ 164. Thus, the EAT-Insert-Member of the Muskovitz-Sajic-Helmet sized as insert member 26 is “*positioned in and substantially filling the cavity*,” as recited in [1C]. Copeland, ¶ 165; §§ VI.C.1.d ([1C]), VI.C.2 *supra*.

- e. [1C1] “such that the shock absorbing insert is visible through and spans across at least a portion of each of the plurality of vents”

That the EAT-Insert-Member positioned within the insert-space would be “*visible through and spans across at least a portion of each of the plurality of vents,*” can be seen in FIG. 10 (below) modified with the EAT-Insert-Member sized as like insert member 26. Muskovitz, [0087]-[0088]; Copeland, ¶ 166.

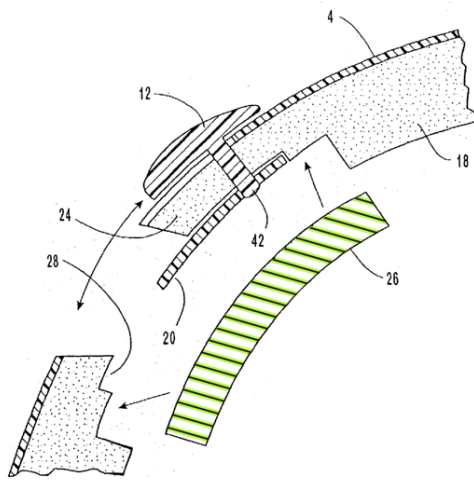


FIG. 10

FIG. 10, Muskovitz (Modified with EAT-Insert-Member)

Muskovitz’s ventilation ports 6 are “apertures that extend from the outer shell 4 through and into the interior of protective helmet 10” and, as can be seen from the above, at least the portion of the Muskovitz-Sajic EAT-Insert (colored in green) aligned with the vent opening would be visible through the corresponding vent port of the Muskovitz-Sajic-Helmet. Muskovitz, [0075]; Copeland, ¶ 167.

As discussed in § 0 ([1B]) above, a POSA would have understood that the recess and insert-space therein span across both of the active vents of the dual-port vent configuration of the Muskovitz-Sajic-Helmet to create the vent space needed for a dual-port vent shield. Copeland, ¶ 168. Likewise, a POSA would have understood that for insert member 26 to be “fit within the recess” and “form the lower boundary of the vent space” (Muskovitz, [0087]-[0088]), the insert member 26 would also span across both of the active vent ports—the insert member would not otherwise fit within the recess. Copeland, ¶ 169.

To the extent that Muskovitz does not expressly disclose that the insert member 26 spans across both vent ports in dual-port active vent configurations, it would have been obvious to implement insert member 26 the same way the FIG. 4 lower member 26 of vent box 22 was implemented—by spanning both vents to form the lower boundary of the vent space 28, as illustrated below in green in annotated FIGS. 4 and 10 (*see also* § 0 ([1B]) above). Muskovitz, [0078]-[0079]; [0087]-[0089]; Copeland, ¶ 170.

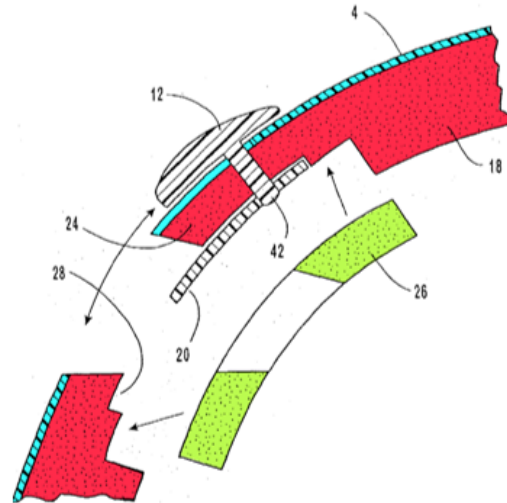
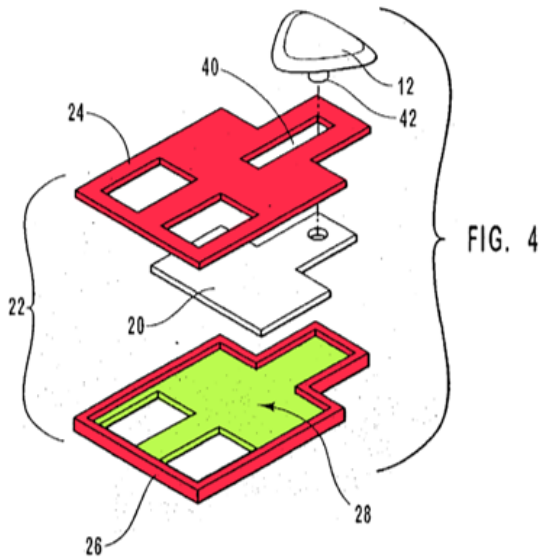
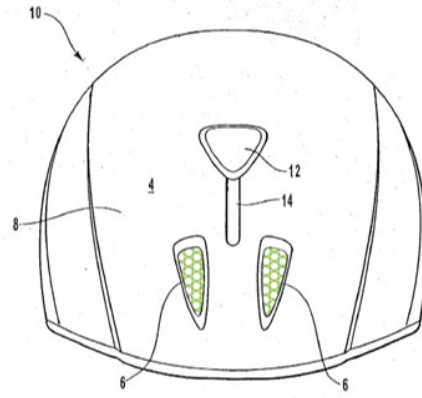
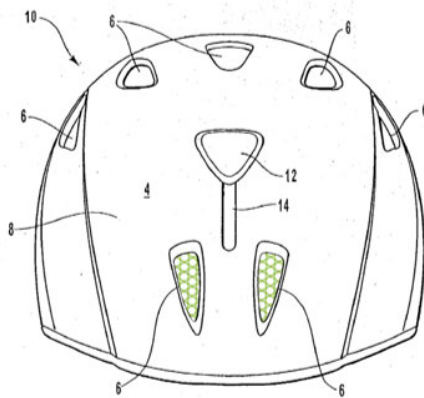


FIG. 10

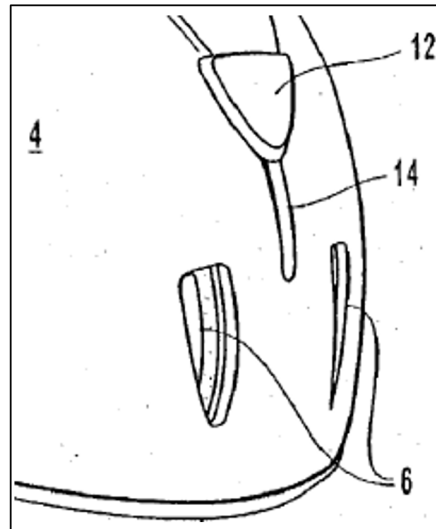
FIGS. 4 and 10, Muskovitz (Annotated)

Thus, the EAT-Insert-Member sized in this manner spans across, and as a result, is visible through both active vents of the Muskovitz-Sajic-Helmet, as illustrated below by example Muskovitz-Sajic-Helmet-1 modified with the EAT-Insert-Member (green), and example Muskovitz-Sajic-Helmet-2 modified with the EAT-Insert-Member and the FIG. 14A shell design (*i.e.*, an outer shell 4 with no passive vents) as described in § VI.C.2 above. Copeland, ¶ 171.



Modified (Per Above) FIG. 1 of Muskovitz

Indeed, FIG. 1 of Muskovitz shows that there would be no impediment to seeing the EAT-Insert-Member spanning across the vents as even the layers of the active ventilation system along the periphery of the vent-opening are visible through the vent port 6, as shown by the active vent region of FIG. 1 enlarged below. Copeland, ¶ 172.



Active Ventilation Region of FIG. 1, Muskovitz

Thus, a POSA would have understood that an EAT-Insert-Member sized to fit into the recess would have been visible through dual-active vents of any of the various vent configurations disclosed in Muskovitz where visibility is likewise unimpeded. Copeland, ¶ 173. Therefore, the EAT-Insert-Member of the Muskovitz-Sajic-Helmet is “*visible through and spans across at least a portion of each of the plurality of vents,*” as recited in [1C1] under the interpretation

advanced by PO—*i.e.*, that limitation [1C1] is met by two vents for which this relationship is satisfied (*see* Ex. 1022, 2-3 and § V.A (Claim Interpretation) above). Copeland, ¶ 173.

If the Board agrees that the Muskovitz-Sajic-Helmet-2 design would have been obvious, the Board need not adopt an exact boundary for this limitation because the EAT-Insert-Member is visible through and spans across both of the ***only two*** vents (*i.e.*, ***all*** of the vents) provided through outer shell 4 of the Muskovitz-Sajic-Helmet-2. Copeland, ¶ 173; §§ VI.C.2.b, § VI.D.1.b ([1A]).

f. [1C2] “wherein at least a portion of the shock absorbing liner is positioned between the shell and the shock absorbing insert”

As shown in FIG. 10 (annotated below), the portion of inner-liner 18 removed to form the recess leaves portions of inner liner 18 adjacent to outer shell 4 that provide upper boundary 24 of vent space 28 and form the insert-space for insert member 26. Muskovitz, [0087]-[0088]; Copeland, ¶ 174.

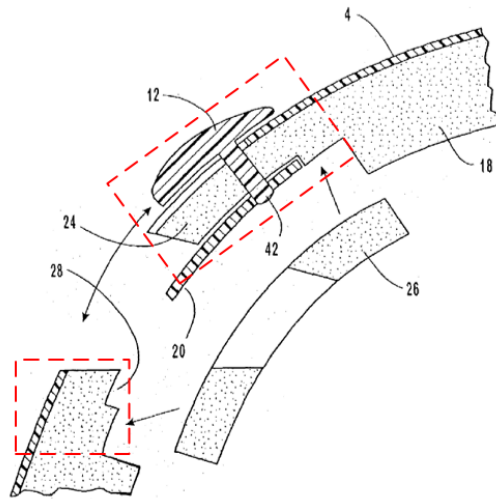


FIG. 10

(Annotated)

Thus, at least the portions of inner-lining 18 of the Muskovitz-Sajic-Helmet within the dashed-red-box-annotations in FIG. 10 above are “*positioned between the shell and the shock absorbing insert,*” as recited in [1C2]. Copeland, ¶ 175.

- g. [1C3] “wherein the shock absorbing insert comprises an array of energy absorbing cells, each having respective open first longitudinal ends and open second longitudinal ends”**

Sajic’s EAT-material used for the EAT-Insert-Member are formed of an integral material comprising “*an array of energy absorbing cells*, wherein each cell comprises a tube” (Sajic, [0053]). Copeland, ¶ 176; Sajic, [0086]-[0087] (“tubular array of cells”). Thus, the EAT-Insert-Member of the Muskovitz-Sajic-Helmet “*comprises an array of energy absorbing cells,*” as recited in [1C3]. Copeland, ¶ 176.

Sajic's energy absorbing tubes are formed by extruding plastic material (Sajic, [0067]) to produce "hollow structures" (Sajic, [0015]) having "open ends" (Sajic, [0122]). Copeland, ¶ 177. Thus, Sajic discloses manufacturing an integral material comprising energy absorbing tubes that are open-ended. Copeland, ¶ 177.

Sajic discloses embedding open-ended inserts in a foam liner so that it is preferable to subsequently apply a sealing material after manufacture of the EAT-material to "prevent[] the foam material from entering the *open ends* of the tubes" (Sajic, [0122]) during formation of the safety helmet. Sajic, [0068], [0082], [0122]. Copeland, ¶ 178. As discussed in § VI.C.1.d, the EAT-Insert-Member employs Sajic's EAT-material as manufactured with "open ends" (Sajic, [0122]). Copeland, ¶¶ 116, 178.

Thus, the energy absorbing tubes of the EAT-Insert-Member of the Muskovitz-Sajic-Helmet "*each hav[e] respective open first longitudinal ends and open second longitudinal ends,*" as recited in [1C3]. Copeland, ¶ 179.

- h. [1C4] "wherein the first longitudinal ends of a first plurality of adjacent cells of the array of energy absorbing cells are positioned within a perimeter of the first opening and the first longitudinal ends of a second plurality of adjacent cells of the array of energy absorbing cells are positioned within a perimeter of the second opening"**

The EAT-Insert-Member meets [1C4] using any of numerous obvious choices of tube diameters and wall-thicknesses disclosed in Sajic. Copeland, ¶ 180.

In particular, Sajic discloses a wide range of dimensions at which the energy absorbing tubes can be manufactured (e.g., diameters between 2 and 25 mm and wall-thicknesses between 0.1 and 0.3 mm). Sajic, [0063]-[0064]; Copeland, ¶ 180.

As discussed in §§ VI.C.1.d VI.C.1.d and VI.C.2, an obvious implementation of the EAT-Insert-Member would have been to orient the energy absorbing tubes in alignment with openings of the active vents (*i.e.*, the “*first vent defining a first opening*” and the “*second vent defining a second opening*,” § VI.D.1.b ([1A])) to benefit from the improved impact-attenuation and to facilitate air flow into the interior of the protective helmet 10 via the corresponding active vents. Muskovitz, [0075], [0098]; Copeland, ¶ 181.

In this arrangement, the EAT-Insert-Member having energy absorbing tubes “adjacent to six other tubes” in a “close packed array” (Sajic, [0062], [0098], [0103]) that spans across both active vents (see § VI.D.1.e ([1C1]) above) would have energy absorbing tubes “*positioned within a perimeter of the first opening and the first longitudinal ends of a second plurality of adjacent cells of the array of energy absorbing cells are positioned within a perimeter of the second opening*,” as recited in [1C4] for any number of tube dimensions disclosed in Sajic when positioned across vents of the sizes/shapes illustrated in Muskovitz (*e.g.*, the active vents illustrated in FIGS. 1-2, 7, etc). Copeland, ¶ 182.

For example, an EAT-Insert-Member implemented with a 2-mm diameter tube would unquestionably meet [1C4] because numerous such tubes would be positioned within the respective perimeters of the openings of the corresponding active vents for any of the vent-sizes illustrated in Muskovitz for dual-port active vents. Copeland, ¶¶ 183-187 (describing approximate vent dimensions for the FIG. 1-2 active vents of 15-20 mm x 25-35 mm and citing Ex. 1018, 15-16 showing a photograph of the Muskovitz FIG. 1-2 helmet). Numerous other (if not all) obvious choices of tube dimensions disclosed in Sajic would likewise meet [1C4]. Copeland, ¶ 187.

The 373 patent does not disclose dimensions of cells of the disclosed honeycomb material or vent sizes, nor does the 373 patent disclose or suggest the arrangement recited in [1C4] is anything more than what results from using a shock absorbing insert made from honeycomb material positioned across the vents. Indeed, all [1C4] requires is that *more than one* longitudinal end of a cell be positioned with the perimeter of each vent opening. Copeland, ¶ 188.

Thus, a POSA would have understood that [1C4] is met by the EAT-Insert-Member of the Muskovitz-Sajic-Helmet using any of numerous obvious choices of tube dimensions disclosed in Sajic with the active vent sizes/shapes disclosed in Muskovitz. Copeland, ¶ 189.

- i. **[1C5] “such that air is able to flow from an exterior side of the helmet through each of the first and second**

vents and through a respective one of the first and second plurality of adjacent cells toward an interior of the helmet”

Limitation [1C5] is an intended result that does not further limit the structure of the claimed helmet. To the extent that [1C5] is limiting, a POSA would have understood that an EAT-Insert-Member fit within the recess of inner-liner 18 and spanning both active vents of the Muskovitz-Sajic-Helmet would allow air to flow through the tubes of the EAT-material using tube dimensions disclosed in Sajic. Copeland, ¶ 190; § VI.C.1.d ([1C]) *supra*.

Muskovitz discloses that the “[v]entilation ports 6 are designed to facilitate ambient air flow into and out of the interior of protective helmet 10” (Muskovitz, [0075]) and that the active ventilation system allows the user to “lower or raise vent shield 20” to control “ambient air to flow” through active vents “into the interior of protective helmet 10” (Muskovitz, [0079]-[0080]). Copeland, ¶ 191.

Thus, a POSA would have understood that the EAT-Insert-Member arranged with energy absorbing tubes oriented in alignment with the corresponding active vents of the Muskovitz-Sajic-Helmet (§§ VI.C.1.d, VI.D.1.h ([1C4]) would provide a configuration where “*air is able to flow from an exterior side of the helmet through each of the first and second vents and through a respective one of the first and second plurality of adjacent cells toward an interior of the helmet,*” as recited in [1C5]. Copeland, ¶ 192.

j. The Recess Also Meets the Claimed Cavity

As an alternative basis for limitations [1B] and [1C], the recess formed in inner-liner 18 of the FIG. 10 embodiment also meets the claimed “*cavity*” (*i.e.*, “an opening, recess, etc.” ’373 patent, 2:35-36) in the claimed “*shock absorbing liner*,” and meets each of the requirements of the cavity recited in claim 1. Muskovitz, [0087]; Copeland, ¶ 193; Ex. 1024, 14-15 (acknowledging that the recess is a cavity in inner liner 18).

The recess in inner-liner 18 is “*at least partially aligned with the plurality of vents*,” as recited in [1B] for the same reasons discussed in § VI.D.1.c.ii ([1B]) at least because the insert-space is created within the recess. Copeland, ¶ 194. Thus, the recess in inner-liner 18 of the Muskovitz-Sajic Helmet meets [1B] as an alternative basis. Copeland, ¶ 194.

Limitation [1C] is also met for this alternative basis because the EAT-Insert-Member is positioned within and also “*substantially*” fills the recess. Insert member 26 does not “fill the *entire*” recess, but limitation [1C] has no such requirement. Instead, [1C] specifically uses qualified language to recite the extent to which the claimed shock absorbing insert need fill the cavity—*i.e.*, it need not fill the cavity *entirely*, only “*substantially*.” Copeland, ¶ 195.

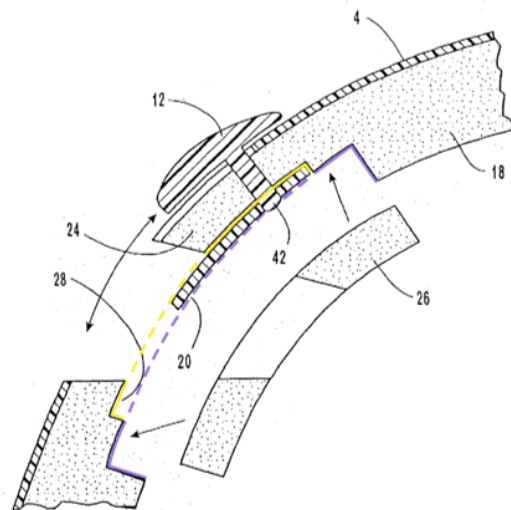


FIG. 10

FIG. 10, Muskovitz (Annotated)

The narrow vent space 28 for vent shield 20 (i.e., the space between the yellow and purple outlines in annotated FIG. 10 above) accounts for a small portion of the recess—the substantial portion is filled by insert member 26.

Muskovitz, [0087]-[0088]; Copeland, ¶ 196.

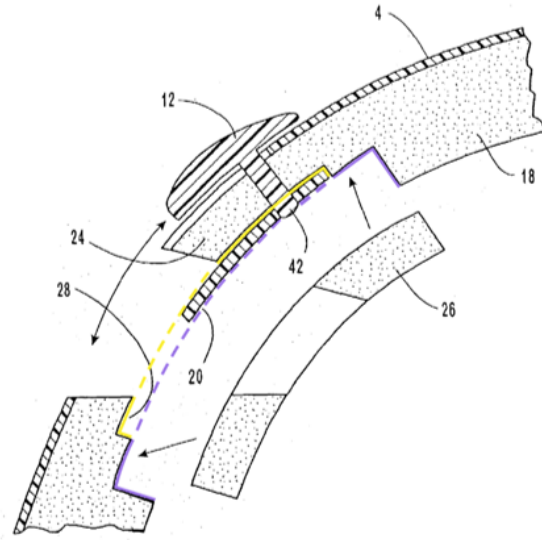


FIG. 10

FIG. 10, Muskovitz (Annotated)

A POSA would have understood that the insert member 26 sized to “fit within the recess” to “form an integrated whole,” (Muskovitz, [0088]) leaving only enough space to house vent shield 20 such that it forms the lower boundary of vent space 28, is “*positioned in and substantially fills*” the recess. Copeland, ¶ 196. Thus, the EAT-Insert-Member meets [1C] under this alternative basis.

2. Claim 2

Claim 2 recites that the “*shock absorbing liner is seamless.*”

Muskovitz discloses manufacturing the protective helmet using an “in-molding” process in which the outer-shell and the inner-liner are joined together by molding or bonding in the same manufacturing process. Muskovitz, [0081]-[0082]

(“inner liner 18 is ... preferably a material that is capable of being molded directly to outer shell 4.”). Copeland, ¶ 198.

A POSA would have understood Muskovitz to be disclosing a helmet manufactured using widely-adopted and conventional processes in which the outer-shell and inner-liner form a generally continuous “shell/liner composite” in the desired helmet shape. Copeland, ¶ 199. Muskovitz’s inner-liner is illustrated throughout (*see, e.g.*, FIGS. 10-12) as a continuous seamless layer of impact-absorbing material, except at vents and at the recess in the FIG. 10 embodiment (to the extent the recess is a “seam”)—*i.e.*, the **same** arrangement that the 373 patent discloses is “seamless.” 373 patent, 3:7-25.

Muskovitz does not describe manufacturing the inner-liner in segments or otherwise describe any discontinuities in the inner-liner, but instead discloses that the inner-liner and outer-shell are molded together in the same manufacturing process. Thus, a POSA would have understood Muskovitz to disclose an inner-liner that is “seamless” at least for the reasons the liners disclosed in the 373 patent are seamless. Copeland, ¶ 200.

To the extent Muskovitz does not expressly disclose that the inner-liner is seamless, it would have been obvious to manufacture the inner-liner as a continuous layer in the shape of the helmet as helmet liners were conventionally manufactured. Copeland, ¶ 201. Like the 373 patent (1:57-61), Muskovitz

discloses that EPS may be used as the impact-absorbing liner for the disclosed protective helmet. The conventional technique for manufacturing an EPS liner was to fill a helmet mold with polystyrene “pellets” that are then heated and blown to fuse and expand the pellets into a continuous foam in the shape of the helmet—i.e., a seam. Copeland, ¶ 201.

Thus, a POSA would have understood that the Muskovitz inner liner 18 employed by the Muskovitz-Sajic-Helmet, or the conventional and obvious implementation of inner liner 18, meets “*wherein the shock absorbing liner is seamless,*” as recited in claim 2. Copeland, ¶ 202.

3. Claim 3

Claim 3 recites that the “*array of energy absorbing cells of the shock absorbing insert comprises an array of tubes.*”

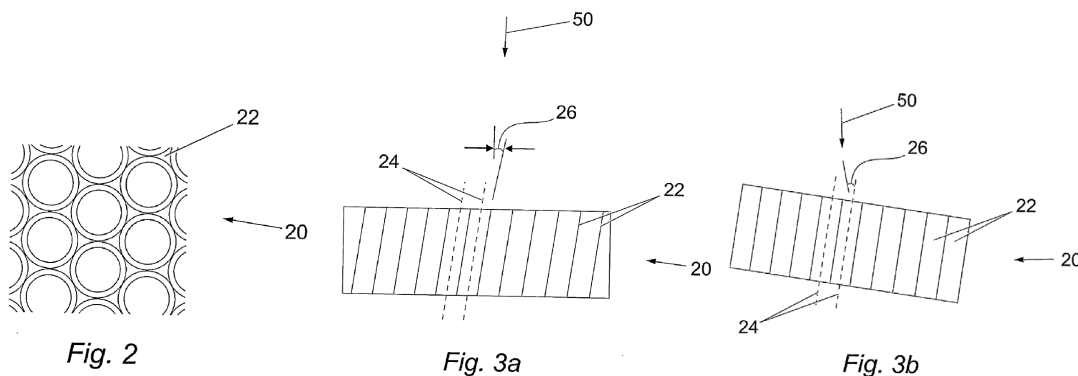
As discussed in § VI.D.1.g ([1C3]), Sajic discloses EAT-material formed as an integral material “comprises an array of energy absorbing tubes” (Sajic, [0117]), precisely as recited in claim 3. Copeland, ¶ 204; *see also* Sajic, [0053] (inserts comprising “an array of energy absorbing cells, wherein each cell comprises a tube.”).

Thus, the EAT-Insert-Member using Sajic’s EAT-material meets “*wherein the array of energy absorbing cells of the shock absorbing insert comprises an array of tubes,*” recited in claim 3. Copeland, ¶ 205.

4. Claim 4

Claim 4 recites “*wherein the tubes are cylindrical in shape.*”

As shown by the top-view of Sajic’s Fig. 2 (disclosed as a “cylindrical arrangement,” [0098]) and side-views of Figs. 3(a)-(b) reproduce below, the energy absorbing tubes of Sajic’s EAT-material used by the EAT-Insert-Member of the Muskovitz-Sajic-Helmet are cylinders and therefore are “*cylindrical in shape,*” as recited in claim 3. Copeland, ¶ 207; *see also* Sajic, [0016].



5. Claim 5

Claim 5 recites “*wherein the tubes are oriented along a thickness of the shock absorbing insert.*”

As Sajic’s Figs. 3a-b above show, longitudinal axes 24 of the tubes are oriented along the thickness of the integral material, the “thickness” of which is merely the length of tubes forming the integral material. Sajic, [0099], [0101]; Copeland, ¶ 209. The EAT-Insert-Member uses this same arrangement and therefore has “*the tubes are oriented along a thickness of the shock absorbing*

insert,” as recited in claim 3. Copeland, ¶¶ 209-210; 373 patent, 4:6-11 (disclosing this same arrangement of tubes as Sajic being oriented along the thickness).

6. Claim 7

Claim 7 recites “*wherein the shock absorbing insert extends to a portion of the helmet configured to [be] positioned at a back of a wearer’s head.*”

As discussed in § VI.C.2, an obvious variation of the Muskovitz-Sajic Helmet would have been to provide additional active vents on the helmet in addition to the two active vents provided at the front of the example Muskovitz-Sajic Helmet-1 (§ VI.C.2.a)—one obvious choice being to make additional “vent ports 6 positioned along the rear of helmet 10” (Muskovitz, [0075]) active as contemplated by Muskovitz. Copeland, ¶ 212; Muskovitz, [0076].

One obvious implementation based on Muskovitz teaching would have been to also provide a dual-port active vent system (*i.e.*, a single actuator/vent shield for two vent ports) that controls air flow through two vent ports positioned at the “rear of the helmet 10,” thereby allowing the wearer the ability to control air flow through the front and back of the helmet. Copeland, ¶ 213.

Providing both “intake” and “exhaust” active vents provides for “an increased efficiency cooling system” (Muskovitz ([0075]) with improved wearer control over air flow. Copeland, ¶ 213. Muskovitz discloses a number of different configurations for providing ventilation ports at the rear of the helmet (*e.g.*, FIGS.

1-3, 6-7, 17). A POSA would have understood that positioning and sizing of rear vent ports would have been one of the “variety of different configurations” in which the “components of the present invention” could be “arranged and designed” that Muskovitz states would be “readily understood” (Muskovitz, [0066]). Copeland, ¶ 214; *See also* § VI.C.2.

A POSA implementing dual-port active vent systems at the front and back of the helmet would have been motivated to implement the rear dual-port active vent system in the same way as the front dual-port active vent system of the Muskovitz-Sajic-Helmet (*see* § VI.C.2 above). The Muskovitz-Sajic-Helmet employing both front and back dual-port active vent systems (with or without passive vents) is referred to hereinafter as the Muskovitz-Sajic-Helmet-3. Copeland, ¶ 215.

The rear dual-port active vent system of the Muskovitz-Sajic-Helmet-3 meets each of the limitations recited in claim 1 for the same reasons discussed in § VI.D.1 because it employs the same components of the dual-port active vent (i.e., an EAT-Insert-Member positioned in the recess formed in the liner) that was demonstrated to meet each of the limitations of claim 1, but positioned at the rear of the helmet. Copeland, ¶ 216. Thus, the Muskovitz-Sajic-Helmet-3 meets each of the limitations of claim 1 in two ways as both the front and the rear dual-port active vent system meet the corresponding limitations of claim 1 in the manner discussed in § VI.D.1. Copeland, ¶ 216.

The EAT-Insert-Member of the rear dual-port active vent system of the Muskovitz-Sajic-Helmet-3 “*extends to a portion of the helmet configured to be positioned at a back of the helmet*” recited in claim 7 at least because it spans across both active vents positioned at the “rear of [the] helmet” (Muskovitz, [0075]). Copeland, ¶ 217.

The 373 patent does not describe what portions of the helmet are configured to be positioned at the “back” of the wearer’s head or provide any guidance as to what constitutes the back of the wearer’s head. Copeland, ¶ 218. The rear vents 109 of the helmet of the 373 patent are positioned similarly to the rear vent ports 6 of the Muskovitz protective helmet, as shown below.

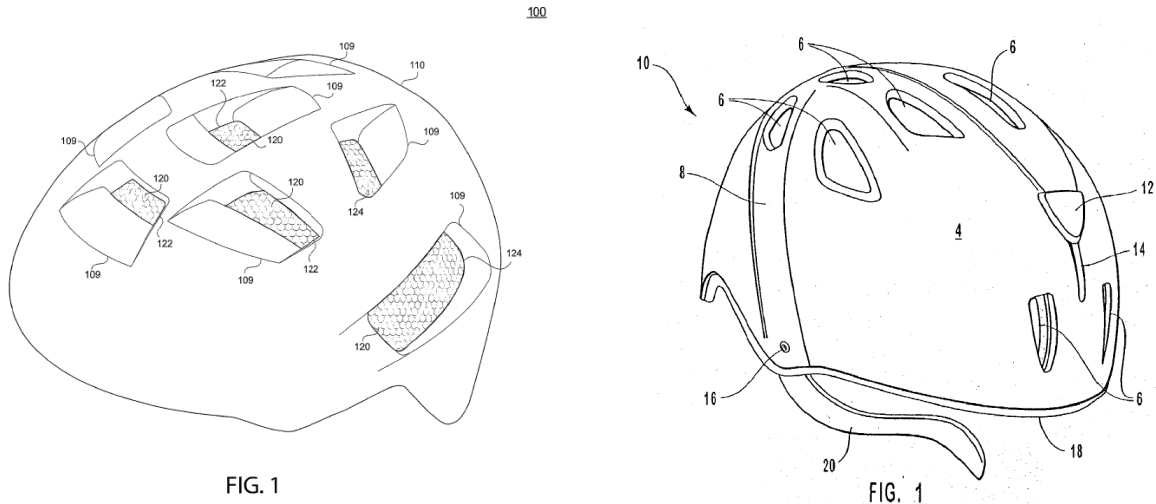


FIG. 1, 373 Patent (Left) and Fig. 1, Muskovitz (Right)

Thus, a POSA would have understood that rear vent ports 6 of the Muskovitz helmet are provided on a portion configured to be positioned at the back of the wearer’s head to the same extent rear vents 109 are. Copeland, ¶ 219.

Moreover, the Muskovitz insert member 26 extends beyond the vent openings of the active vent ports in both directions (i.e., above actuator and below corresponding vent openings) to fit within the recess in FIG. 10 (below). Copeland, ¶ 219.

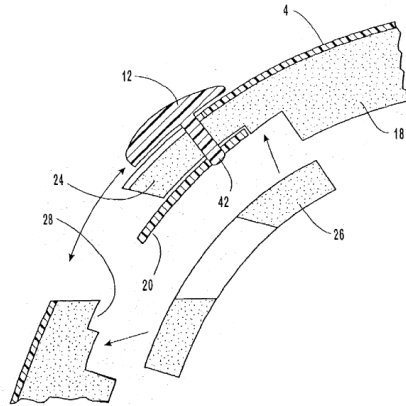


FIG. 10

Thus, the EAT-Insert-Member of the rear dual-port active vent system of the Muskovitz-Sajic-Helmet-3 sized the same way “*extends*” even further than the rear vent ports provided at locations at the back of the wearer’s head and meets claim 7 for this additional reason.

Furthermore, it would have been obvious to position the Muskovitz rear vent ports further towards the back of the helmet as a matter of “readily understood” design choice. Muskovitz, [0066]. Claim 7 is therefore also obvious to the extent that “*a back of the wearer’s head*” is interpreted as requiring locations even *further* towards the back of the head. Copeland, ¶¶ 220-221.

7. **Claim 12**

a. **[12PRE] “*A helmet, comprising:*”**

See § VI.D.1.a ([1PRE]) above.

b. **[12A] “*a shell including a first vent defining a first opening and a second vent defining a second opening*”**

[12A] recites the same shell as [1A], but without reciting “a plurality of vents.” Therefore, outer shell 4 comprising the two active vents of the Muskovitz-Sajic-Helmet meets [12A] for the same reasons discussed in § VI.D.1.b ([1A]) above. Copeland, ¶ 223.

c. **[12B] “*a shock absorbing liner adjacent to and attached to the shell, the shock absorbing liner having a cavity that extends from and that spans across at least a portion of each of the first and second openings*”**

[12B] recites the same “*shock absorbing liner*” as [1B] with the cavity recited using different language that is also met by the insert-space of the Muskovitz-Sajic-Helmet. As discussed above in § VI.D.1.c ([1B]), the insert-space is a “*cavity*,” (see § VI.D.1.c.i ([1B])) formed in inner-liner 18 that spans across both active vent ports. Thus, the inner-liner of the Muskovitz-Sajic-Helmet meets [12B] for the reasons discussed in § 0 ([1B]) above. Copeland, ¶ 224.

The recess in inner-liner 18 is also a “*cavity*” (see § VI.D.1.j) that spans across both active vent ports and meets [12B] as an alternative basis. Copeland, ¶ 224;

d. [12C] “*a shock absorbing insert positioned in and substantially filling the cavity*”

[12C] recites the same limitation as [1C] and therefore the EAT-Insert-Member of the Muskovitz-Sajic-Helmet meets [12C] for the same reasons discussed in § VI.D.1.d ([1C]) above. Copeland, ¶ 225.

[12C] is also met as an alternate basis with the recess as the claimed “*cavity*” for the reasons discussed in § VI.D.1.j. Copeland, ¶ 225.

e. [12C1] “*such that the shock absorbing insert is visible through and spans across at least a portion of each of the first and second vents*”

As discussed in § VI.D.1.b ([1A]), the two active vent ports of the Muskovitz-Sajic-Helmet meet the claimed “*first and second vents*” that the EAT-Insert-Member “*is visible through and spans across,*” as discussed in § VI.D.1.e ([1C1]). Therefore, the EAT-Insert-Member meets [12C1] for at least the same reasons it meets [1C1]. Copeland, ¶ 226; § VI.D.1.e ([1C1]).

f. [12C2] “*wherein the shock absorbing insert comprises an array of hollow structures defining a plurality of adjacent through-passages extending through a thickness of the shock absorbing insert*”

Sajic discloses that a tube is a “hollow structure” ([0015]) that have “open ends” ([0122]). Copeland, ¶ 227; § VI.C.1.d ([1C]). A POSA understood that hollow tubes having open ends form “*through-passages*” that extend through the length of the tubes, which length forms the “*thickness*” of the EAT-material. *Id.*; § VI.D.5 *supra*. Any two of the six adjacent tubes (Sajic, [0103]) form “*a plurality of*

adjacent through-passages.” Copeland, ¶ 227. Thus, the EAT-Insert-Member’s array of energy absorbing tubes meets [12C2]. *Id.*; §§ VI.D.1.g ([1C3])), VI.D.2 *supra*.

- g. [12C3] ***“wherein a first portion of the shock absorbing insert that includes a first group of the plurality of adjacent through-passages overlaps with the first opening to allow air to enter through the first opening and pass through the first group of adjacent through-passages to an interior of the helmet wherein a second portion of the shock absorbing insert that includes a second group of the plurality of adjacent through-passages overlaps with the second opening to allow air to enter through the second opening and pass through the second group of adjacent through-passages to the interior of the helmet”***

As discussed in §§ VI.D.1.e ([1C1]) and VI.D.7, the EAT-Insert-Member spans across both active vents. Copeland, ¶ 228. A POSA would have understood the EAT-Insert-Member in the region overlapping the first active vent (i.e., “*a first portion*”) would include “*a first group of the plurality of adjacent through-passages [that] overlaps with the first opening*” and in the region overlapping the second active vent (i.e., “*a second portion*”) would include “*a second portion of the shock absorbing insert that includes a second group of the plurality of adjacent through-passages [that] overlaps with the second opening,*” for any group of two or more adjacent tubes manufactured at any number of dimensions disclosed in Sajic, at least for the reasons discussed in § VI.D.1.h ([1C4]). Copeland, ¶ 228.

Similarly, a POSA would have understood that the tubes of the EAT-Insert-Member would “*allow air to enter through*” the openings and “*pass through*” adjacent through-passages “*to the interior of the helmet*” for the same reasons discussed in § VI.D.1.i ([1C5]) above. Copeland, ¶ 229.

8. Claim 13

Claim 13 is met by the EAT-Insert-Member because both the insert-space of the recess and the EAT-Insert-Member sized to fit in the recess are arcuate in shape. Copeland, ¶ 230; § VI.C.1.d. Therefore, the side of the EAT-Insert-Member closer to outer shell 4 is greater than the interior side as a matter of geometry, as illustrated in annotated FIG. 10 below. Copeland, ¶ 231.

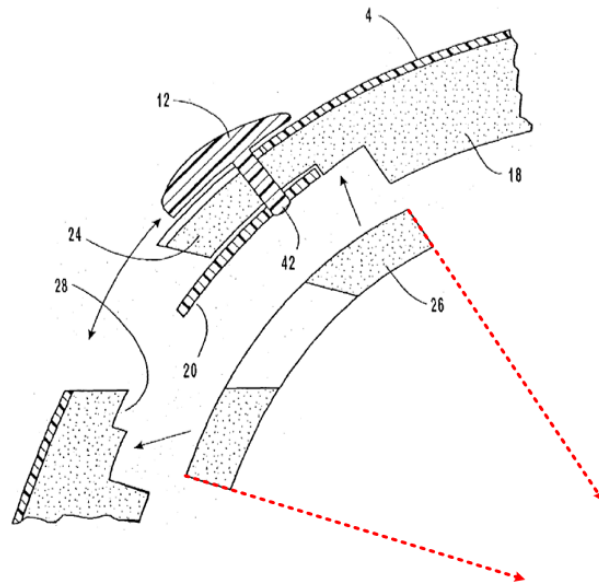


FIG. 10

As shown by the red-dashed-arrow annotations, arc-length decreases in the direction away from the outer shell such that the arc-length of the side of the EAT-

Insert-Member closer to the shell (i.e., the side that “forms the lower boundary of vent space 28,” Muskovitz, [0087]) is greater than the side away from the shell when positioned in the corresponding arcuately-shaped insert-space. Copeland, ¶ 232; Muskovitz, [0087]-[0088].

9. Claim 15

Claim 15 is met by the Muskovitz-Sajic-Helmet for the same reasons discussed in § VI.D.5 because the tubes of the EAT-Insert-Member are “*oriented along a thickness of the shock absorbing insert,*” as recited in claim 15. Copeland, ¶ 233-234.

10. Claim 16

Claim 16 is met for the same reasons discussed in § VI.D.4 because the tubes of the EAT-Insert-Member are “*cylindrical in shape.*” Copeland, ¶ 235-236.

11. Claim 17

Claim 17 is met because the “*thickness*” of the EAT-Insert-Member (sized like insert member 26) is substantially the same thickness of the insert-space in inner-liner 18 into which it fits and the insert-space is less than the thickness of the inner-liner 18, as shown with purple and red arrows, respectively, in annotated FIG. 10 below. Copeland, ¶ 238.

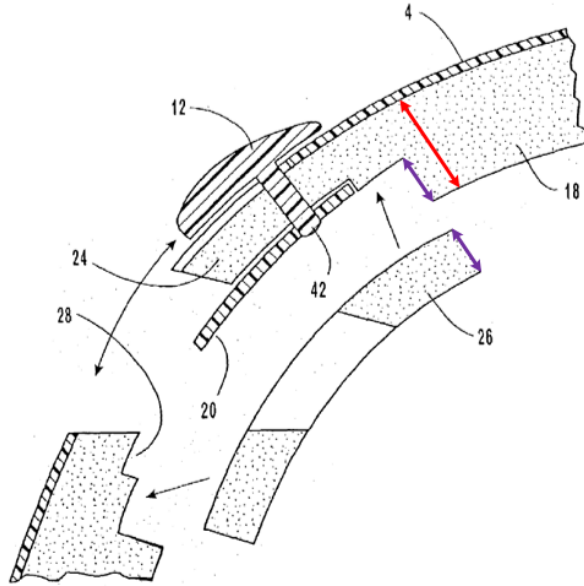


FIG. 10

12. Conclusions

For the reasons discussed in §§ VI.D.1-VI.D.11, the Muskovitz-Sajic-Helmet renders obvious each of claims 1-5, 7, 12-13 and 15-17 and are therefore unpatentable. Copeland, ¶ 239.

VII. NO BASIS EXISTS FOR DISCRETIONARY DENIAL

A. Section 314(a): The Parallel Litigation Is In Its Infancy

The Board's discretion to deny institution in view of litigation is based on considerations of efficiency, fairness, and patent quality. *Apple v. Fintiv*, IPR2020-00019, Paper 11, 5 (Mar. 20, 2020) ("*Fintiv*"). Given the infancy of the Colorado Litigation, the uncertainty of the trial date, the potential to simplify issues, Petitioner's concurrently filed motion to stay, and Petitioner's expeditious filing of this Petition, the *Fintiv* factors weigh strongly against discretionary denial.

1. Factor-1: Motion to Stay Disfavors Discretionary Denial

Petitioner is concurrently filing a Motion to Stay the Colorado Litigation in light of this Petition attached as Ex. 1031. Ex. 1032, (attesting to the concurrent filing of Motion to Stay). The presiding judges in the Colorado Litigation have granted *both* pre-institution motions to stay which were presented to them. Ex. 1028 (Motion Metrics); Ex. 1029 (Order Granting Motion to Stay); Ex. 1030 (Motion Granting Order to Stay). Given this “specific information” of the likelihood of Petitioner’s motion being granted, factor-1 weighs against discretionary denial. *Sand Revolution II v. Continental Intermodal Group-Trucking*, IPR2019-01393, Paper 24, 7 (June 15, 2020) (Informative).

2. Factor-2: No Trial Date Has Been Set

A final written decision here will likely be due in June 2023. Although a scheduling order (Ex. 1025) recently issued in the Colorado Litigation, no trial date has been set. This lack of a trial date weighs against the exercise of discretion to deny institution. *See Google LLC v. Uniloc 2017 LLC*, IPR2020-00441, Paper 13, 35 (July 17, 2020) (“The fact that no trial date has been set weighs significantly against exercising our discretion to deny institution.”).

A pre-trial conference date has been set for January 17, 2023 (Ex. 1025, 8), but the timing of trial thereafter is uncertain. Pursuant to the Civil Practice Standards of the presiding judge in the Colorado Litigation, counsel are to confer

and submit a request for trial dates with chambers immediately after the final pre-trial conference. Ex. 1026, 21. However, where, as here, the parties have stipulated to a trial of seven days, “the Court will review the case to determine whether a status conference needs to be set, at which time the parties will present argument to the Court as to why a longer trial is necessary.” *Id.* Thus, the trial date is uncertain and will remain so until at least the pre-trial conference date. This uncertainty weighs against the exercise of discretion. *Oticon Med. AB v. Cochlear Ltd.*, IPR2019-00975, Paper 15, 23-24 (PTAB Oct. 16, 2019) (precedential).

3. Factor-3: Litigation Investment

Fact discovery has just commenced in the Colorado Litigation. The parties have not exchanged infringement and invalidity contentions, expert reports are not yet due, the district court has not conducted a *Markman* hearing, and substantive motion practice has yet to occur. Ex. 1025. Although the parties provided preliminary invalidity analyses during the preliminary injunction briefing and hearing, this limited investment in time and effort does not weigh in favor of denial. *See Medtronic, Inc., et al. v. Teleflex Innovations S.A.R.L.*, IPR2020-00134, Paper No. 20, 11 (June 26, 2020) (finding district court’s denial of a preliminary injunction motion did not evidence that the litigation was “in such an advanced stage that [it] would favor denial of institution.”).

The Board considers the timing of trial as balanced against the timeliness of Petitioner's filing under Factors 2 and 3. Petitioner filed its petition *seven months before its statutory bar*. *Apple v. Seven Networks*, IPR2020-00235, Paper 10, 11 (four months early is "reasonably diligent") and filed *before* invalidity contentions were due in district court, demonstrating diligence. *HP v. Neodron*, IPR2020-00459, Paper 17, 40 (Sept. 14, 2020). Thus, the "speed in which Petitioner [has] acted" weighs against exercise of discretion. *Id.*

4. Factor-4: Overlap of Issues

The issues the Board will decide do not completely overlap with those the Court may consider as Petitioners challenge claims 4-5 (dependent), claim 12 (independent) and claims 13 and 15-17 (dependent), *none* of which is asserted in the district court litigation. Ex. 1027; *Apple Inc. v. Maxell, Ltd.*, IPR2020-00200, Paper 11 at 22 (July 15, 2020) (factor-4 weighs against denial where unasserted claims challenged); *Apple Inc.*, IPR2020-00156, Paper 10 at 16-18 (same).

5. Factor-5: Petitioner is Litigation Defendant

Where (as here), the Petitioner is the defendant in the Colorado Litigation and the trial date is uncertain, factor-5 weighs against discretionary denial because Petitioner would be estopped in the Colorado Litigation from raising the same issues upon issuance of the Board's final written decision. *MEDEL*

Elektromedizinische Geräte Ges.m.b.H v. Advanced Bionics AG, IPR2020-00190, Paper 15 at 14–15 (PTAB June 3, 2020).

6. Factor-6: Other Circumstances, Including the Merits

The challenged claims are demonstrably unpatentable as the Ground reveals. The petition’s “strong showing on the merits” weighs against denial. *Apple v. Seven Networks*, IPR2020-00235, Paper 10, 17 (PTAB July 28, 2020); *Apple Inc. v. Maxell, Ltd.*, IPR2020-00204, Paper 11 at 17-20 (Jun. 19, 2020) (“relatively strong preliminary showing of unpatentability” favors institution).

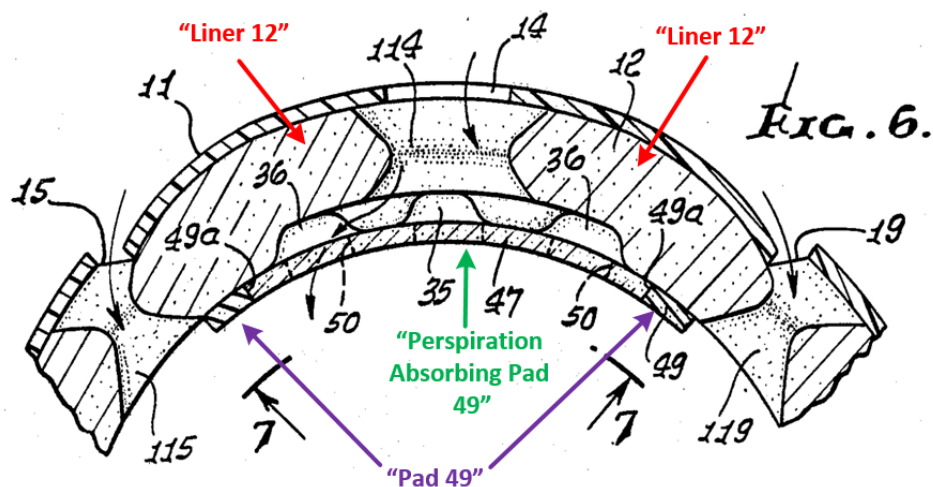
B. Section 325(d): The *Advanced Bionics* Framework Is Not Satisfied

The Board should not exercise its discretion under Section 325(d) to deny institution of this Petition. It is undisputed that the Petition’s primary reference, Muskovitz, was not before the Patent Office during prosecution of the 373 patent. Ex. 1002 (373 patent File History, hereinafter the “373-FH”).

Since this reference was not before the Examiner, Step 1 of *Advanced Bionics* is not satisfied, and discretionary denial is unwarranted. *Progenity, Inc. v. Natera, Inc.*, IPR2021-00279, Paper 12, 42 (June 11, 2021) (where “no overlap between the arguments or assertions made during examination and the manner in which Petitioner relies on the prior art” Board “fully justifie[d] declining to exercise [its] discretion to deny the Petition under Section 325(d)”).

Muskovitz is not cumulative information considered during prosecution. PO argued in the Colorado Litigation that Muskovitz is cumulative of Sundahl (Ex. 1019) cited during prosecution. Ex. 1022, 6-7. During prosecution, PO told the opposite story. Indeed, Muskovitz discloses *multiple* limitations missing from Sundahl that Patent owner specifically argued patentably distinguished the claims over Sundahl.

Specifically, the Examiner rejected then claim 31 (now issued claim 1) in view of Sundahl, pointing to the two distinct components “liner 12” and “padding 49” as together meeting the claimed “shock absorbing liner” and pointing to “perspiration absorbing pad 47” as the claimed “shock absorbing insert” (see annotated Fig. 6, Sundahl below). ” 373-FH, 602-622 (Office Action) at 606, 617.



To distinguish claim 31, the PO argued that the “two separate components, liner 12 and padding 49” do not correspond to “Applicant’s single component, the ‘shocking absorbing liner.’” 373-FH, 591. Furthermore, PO argued that as a result,

Sundahl’s “pad 47 is not **positioned in a cavity of a shock absorbing liner which is adjacent to and attached to the shell**,” but is rather “in a cavity of padding 49.” 373-FH, 592. This same limitation emphasized above that PO argued was patentably distinct over Sundahl is recited in both challenged claims 1 and 12.

Furthermore, Sundahl’s pad 47 (which PO argues no evidence shows is “energy absorbing,” 373-FH, 466) is positioned in relationship to a single front vent, not “the plurality of vents,” recited in then claim 31, as argued by PO during prosecution. 373-FH, 467. Additionally, PO argued that a POSA would not have replaced Sundahl’s perspiration pad 47 with the core material of Sajic-599 (Ex. 1020) because “pad 47 is easily removable, can be quickly pulled out of padding 49, and wrung out to remove perspiration.” 373-FH, 592 (*see also* 541 (“Sajic cannot function as a perspiration absorbing pad as described in Sundahl”).

Muskovitz has **none** of the deficiencies that PO specifically pointed to in Sundahl to distinguish the claims to obtain allowance—i.e., Muskovitz discloses a single component shock absorbing liner (inner liner 18), attached to an outer shell (outer shell 4), and having a cavity (insert-space and/or recess) spanning a plurality of vents (dual-active port configurations) in which a shock absorbing insert (insert member 26) is positioned, as discussed in §§ IV.D.1 and VI.D.1.a-VI.D.1.c above.

Thus, Muskovitz discloses **each** of the limitations that PO alleged patentably distinguished the claims over Sundahl and Muskovitz discloses a *shock absorbing*

insert, not a perspiration absorbing pad, that PO alleged taught away from modification of Sundahl with a honeycomb insert. None of this information was presented to or considered by the Office and Step 1 of the *Advanced Bionics* framework is therefore not satisfied. *Pfizer, Inc. v. Uniqure Biopharma B.V.*, IPR2021-00926, Paper 16, 24 (Nov. 17, 2021).

The Ground's Sajic reference was cited in the Notice of References and Examiner Search Notes during prosecution, but it was not cited in any office action, not used to reject any claims during the prosecution, nor was it substantively discussed during prosecution, which weighs "strongly against" denial on the basis of its inclusion in this petition. *SolarEdge, Techs. Ltd. v. SMA Solar Tech. AG*, IPR2020-0021, Paper 8, 11-12 (Apr. 10, 2020); *see also Samsung Elecs. v. SNIK LLC*, IPR2020-01428, Paper 10, 14-17 (Mar. 9, 2021) (finding Step 1 not met where grounds combined previously considered art with new art).

Moreover, the Ground's Sajic reference is material different from Sajic-599 relied on during prosecution in respects relied upon in Ground 1 and is not cumulative of Sajic-599. Specifically, Sajic-599 does not disclose using its core material as *inserts* in the shocking absorbing liner of a safety helmet as Sajic does (see e.g., Sajic, [0113]), but only as the liner *itself*. In any event, the Ground's combination of Muskovitz and Sajic was not considered by the Office.

As the Ground's references were not applied during prosecution nor considered in combination, there is no prior analysis to review for error, other than allowance of claims that are unpatentable over the references cited herein as explained above. *Bowtech v. MCP IP*, IPR2019-00382, Paper 12, 13 (Aug. 6, 2019). The Office also lacked the benefit of expert testimony. This new evidence weighs "heavily against denying institution." *Adobe v. RAH Color Techs.*, IPR2019-00627, Paper 41, 20 (Sept. 10, 2019).

Thus, the Board should ***not*** exercise its discretion under Section 325(d).

VIII. CONCLUSION

The Board should institute review and cancel claims 1-5, 7, 12-13 and 15-17.

Dated: December 21, 2021

Respectfully submitted,
The Burton Corporation

/Marc S. Johannes/

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WOLF, GREENFIELD & SACKS, P.C

CERTIFICATE OF SERVICE UNDER 37 C.F.R. § 42.6 (E)(4)

I certify that on December 21, 2021, I will cause a copy of the foregoing document, including any exhibits or appendices filed therewith, to be served via Priority Mail Express at the following correspondence address of record for the patent:

DORSEY & WHITNEY LLP - Seattle
701 Fifth Avenue, Suite 6100
Columbia Center
Seattle WA 98104

Date: December 21, 2021

/Brooke Lunn/

Brooke Lunn
Paralegal
WOLF, GREENFIELD & SACKS, P.C.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24, the undersigned certifies that the foregoing Petition for *Inter Partes* Review contains 13,994 words excluding a table of contents, a table of authorities, Mandatory Notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing. Petitioner has relied on the word count feature of the word processing system used to create this paper in making this certification.

Date: December 21, 2021

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