

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SILENCERCO WEAPONS RESEARCH, LLC,
Petitioner,

v.

HUXWRX SAFETY CO. LLC,
Patent Owner.

IPR2024-01214
Patent 8,286,750 B1

Before KEN B. BARRETT, SEAN P. O'HANLON, and
ANDREAS BALTATZIS, *Administrative Patent Judges*.

O'HANLON, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
Granting In Part Patent Owner's Motion to Amend
35 U.S.C. § 318(a)

Denying Patent Owner's Objection to Petitioner's Hearing Demonstratives
37 C.F.R. § 42.64

I. INTRODUCTION

A. Background

SilencerCo Weapons Research, LLC (“Petitioner”) filed a Petition for *inter partes* review of claims 1–22 (“the challenged claims”) of U.S. Patent No. 8,286,750 B1 (Ex. 1001, “the ’750 patent”). Paper 2 (“Pet.”), 1. HuxWrx Safety Co. LLC (“Patent Owner”) waived its right to file a preliminary response. *See* Paper 6. On February 4, 2025, we instituted an *inter partes* review of the challenged claims on all grounds raised in the Petition. Paper 7 (“Institution Decision” or “Inst. Dec.”).

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 17, “PO Resp.”), Petitioner filed a Reply to the Patent Owner Response (Paper 20, “Pet. Reply”), and Patent Owner filed a Sur-reply to Petitioner’s Reply (Paper 23, “PO Sur-reply”).

Patent Owner also filed a Motion to Amend, which:

non-contingently canceled claims 1, 4, 5, 7, 8, 10, 11, 15–17, 19, 21, and 22, and proposed to replace them with new substitute claims 23, 26, 27, 29, 30, 32, 33, 37–39, 40, 42, and 43, respectively, and

contingently canceled claims 2, 3, 6, 9, 12–14, and 20, and proposed to replace them with new substitute claims 24, 25, 28, 31, 34–36, and 41, respectively.

Paper 18 (“Motion” or “MTA”). Petitioner filed an opposition to the Motion. Paper 21 (“MTA Opp.”). We issued Preliminary Guidance (Paper 22, “MTA PG”) concerning the Motion to Amend. Following the Preliminary Guidance, Patent Owner filed a Reply to the Opposition to the Motion to Amend (Paper 24, “MTA Reply”), and Petitioner filed a Sur-reply to Patent Owner’s Reply (Paper 34, “MTA Sur-reply”).

An oral hearing was held on October 28, 2025. A transcript of the hearing has been entered into the record. Paper 42 (“Tr.”).

For the reasons that follow, we conclude that Petitioner has failed to prove by a preponderance of the evidence that claims 2, 3, 6, 9, 12–14, 18, and 20 of the ’750 patent are unpatentable. Accordingly, we do not reach Patent Owner’s contingent motion to amend these claims. As to the non-contingent portion of Patent Owner’s Motion to Amend, we conclude that Patent Owner has not shown that proposed substitute claim 43 complies with the applicable statutory and regulatory requirements, and Petitioner has failed to prove by a preponderance of the evidence that proposed substitute claims 23, 26, 27, 29, 30, 32, 33, 37–40, and 42 are unpatentable.

B. Real Parties in Interest

Petitioner identifies itself and its parent company, Silence Holdings, LLC, as real parties in interest. Pet. vii.

Patent Owner identifies itself as the sole real party in interest. Paper 5, 2.

The parties are reminded of their continuing obligation to update their mandatory notice information “within 21 days of a change of the information.” 37 C.F.R. § 42.8(a)(3).

C. Related Matters

The parties indicate that the ’750 patent is the subject of the following district court proceeding:

HuxWrx Safety Co. LLC v. SilencerCo Weapons Research, LLC, No. 2-24-cv-00130 (D. Utah filed February 21, 2024).

Pet. vii; Paper 5, 2.

D. The Challenged Patent

The '750 patent discloses an energy capture and control device. Ex. 1001,¹ code (57), 4:10–18. The energy capture and control device may include “a serpentine fluid pathway which dissipates energy transferred from . . . high energy material,” such as a bullet. *Id.* at 4:15–18; 9:23–25. Figures 1a and 1b illustrate an energy capture and control device and are reproduced below.

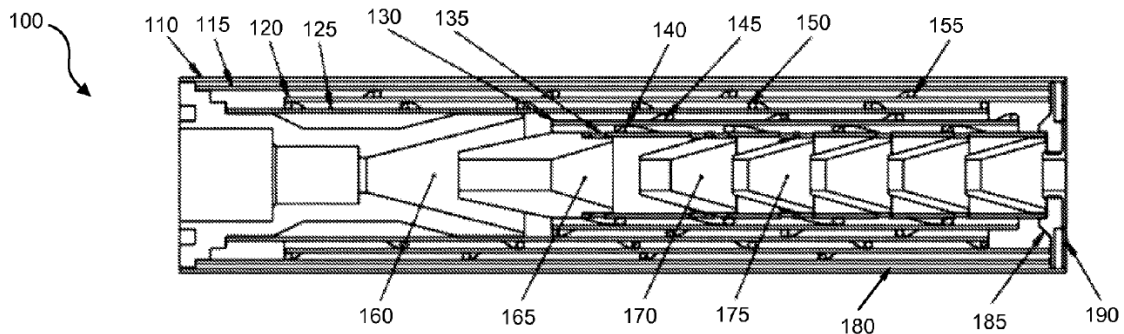


FIG. 1a

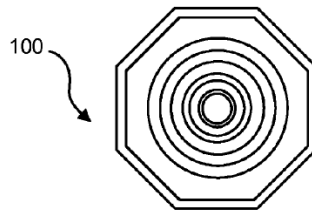


FIG. 1b

Figure 1a shows a cross-sectional side view of energy capture and control device 100, and Figure 1b shows a cross-sectional end view of the device. *Id.* at 1:56–60. The device includes outer shell 110 in which a central chamber is oriented along a central axis of the shell and in which

¹ We refer to the corrected versions of Petitioner’s exhibits filed on August 15, 2024. *See* Ex. 3001.

deflectors 165, 170, 175 are arranged. *Id.* at 4:10–12, 4:19–22. The deflectors allow the bullet to pass through the device and direct at least a portion of the generated gases, sound/shock waves, and particulates into an off axis chamber that surrounds the central chamber. *Id.* at 4:22–26.

The multiple internal walls [115, 120, 125, 130, 140, 145, 150, 155] can provide an increased volume for fluid expansion and increased acoustic absorbent path length. The fluid pathway can be an axially serpentine fluid pathway which causes fluids received in the off axis chamber to travel back and forth along a length of the off axis chamber. In another aspect, the fluid pathway can be a radially serpentine fluid pathway which causes the fluids received in the off axis chamber to flow back and forth around a radius of the off axis chamber. . . . In yet another aspect, the fluid pathway can be a helical fluid pathway which causes the fluids to spiral around the central chamber within the off axis chamber along a length of the off axis chamber.

Id. at 4:29–44.

E. The Challenged Claims

The Petition challenges claims 1–20 of the '750 patent. As noted above, Patent Owner's Motion non-contingently cancels claims 1, 4, 5, 7, 8, 10, 11, 15–17, 19, 21, and 22, including all of the independent claims (claims 1, 19, and 20). Thus, only dependent claims 2, 3, 6, 9, 12–14, 18, and 20 remain. Nonetheless, claim 1 is illustrative of the challenged claims and is reproduced below.

1. An energy capture and control device, comprising:
 - a) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet;

- b) a common off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet and multiple internal walls defining a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material; and
- c) a plurality of deflectors oriented in series along the central axis of the central chamber and configured to deflect the energy from the high energy material to the common off axis chamber.

Ex. 1001, 10:45–60.

F. Asserted Grounds of Unpatentability

The Petition relies on the following prior art references:

Name	Reference	Exhibit
Thurler	US 1,000,702, issued August 15, 1911	1015
Bouton	US 748,157, issued December 29, 1903	1016
Barlowatz	FR 493,462, published August 9, 1919 ²	1017
Reeves	US 582,485, issued May 11, 1897	1019
Eichenseher	DE 305012, published January 7, 1920 ³	1020

Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 4, 5, 7–9, 15–17, 19, 22	102(b) ⁴	Thurler

² We refer herein to the certified English translation of Barlowatz filed with the Petition (Ex. 1018).

³ We refer herein to the certified English translation of Eichenseher filed with the Petition (Ex. 1021).

⁴ The application resulting in the '750 patent was filed prior to the date when the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 4–11, 15–17, 19, 21, 22	103(a)	Thurler
18	103(a)	Thurler, Bouton
1, 4–17, 19–22	103(a)	Thurler, Barlowatz
1, 9, 19, 20	102(b)	Barlowatz
1, 9, 19, 20	103(a)	Barlowatz
2	103(a)	Barlowatz, Reeves
1, 3–5, 8, 9, 18, 19	103(a)	Eichenseher, Barlowatz

Pet. 31. Petitioner submits declarations of Eur Ing John Nixon in support of its contentions. Ex. 1013; Ex. 1037. Patent Owner submits declarations of G. Paul Neitzel, Ph.D. in support of its contentions. Ex. 2001; Ex. 2003.

II. PATENTABILITY ANALYSIS

A. Principles of Law

1. *Inter Partes Review*

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). Petitioner bears the burden of persuasion to prove unpatentability of each challenged claim by a preponderance of the evidence. 35 U.S.C. § 316(e). This burden never

Stat. 284 (2011), took effect. Thus, we refer to the pre-AIA version of sections 102 and 103.

shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

2. Anticipation

“Under 35 U.S.C. § 102 a claim is anticipated ‘if each and every limitation is found either expressly or inherently in a single prior art reference.’” *King Pharm., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1274 (Fed. Cir. 2010) (quoting *Celeritas Techs. Ltd. v. Rockwell Int’l Corp.*, 150 F.3d 1354, 1360 (Fed. Cir. 1998)). “Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim.” *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010) (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)).

A reference inherently discloses an element of a claim “if that missing characteristic is necessarily present, or inherent, in the single anticipating reference.” *Schering Corp. v. Geneva Pharm.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003) (citing *Cont’l Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991)). “Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.” *Therasense*, 593 F.3d at 1332 (quoting *Cont’l Can*, 948 F.2d at 1269).

3. Obviousness

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the

subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) when in evidence, any objective evidence of nonobviousness.⁵ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including: “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Best Med. Int’l, Inc. v. Elekta Inc.*, 46 F.4th 1346, 1353 (Fed. Cir. 2022) (quoting *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007)). “The patent’s purpose can also be informative.” *Id.*

Petitioner contends that a person having ordinary skill in the art at the time of the invention “would have had a relevant technical degree in

⁵ At this stage of the proceeding, the parties have not directed us to any such objective evidence.

Mechanical Engineering, Fluid Engineering, or the like, and 2-3 years of experience researching, designing, manufacturing, or assessing [energy suppression devices (“ESD”)], though less education may be sufficient with additional experience, and *vice versa*.” Pet. 1.

Patent Owner adopts Petitioner’s definition. PO Resp. 9.

Based on the arguments presented and the cited references, we find Petitioner’s definition of the level of ordinary skill reasonable and for purposes of this Decision, adopt it as our own.

C. Claim Construction

In an *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b), including construing the claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b). “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention” and “after reading the entire patent.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 1321 (Fed. Cir. 2005) (en banc). In addition to the specification and prosecution history, we also consider use of the terms in other claims and extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Id.* at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

The specification may reveal a special definition given to a claim term by the patentee, or the specification may reveal an intentional disclaimer or disavowal of claim scope by the inventor. *Phillips*, 415 F.3d at 1316; *see also Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (citing *Thorner v. Sony Computer Ent. Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)) (“We depart from the plain and ordinary meaning of claim terms based on the specification in only two instances: lexicography and disavowal.”). If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision. *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998). A disavowal, if any, can be effectuated by language in the specification or the prosecution history. *Poly-America, L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016). “In either case, the standard for disavowal is exacting, requiring clear and unequivocal evidence that the claimed invention includes or does not include a particular feature.” *Id.* “Ambiguous language cannot support disavowal.” *Id.* (citing *Omega Eng’g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003)).

“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (alteration in original) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner asserts that no “specific constructions are required at this time,” but presents its interpretation of the ordinary and customary meanings of four claim terms. Pet. 12–19. Similarly, Patent Owner asserts that “no

construction of any term may be necessary to resolve the issues in this IPR,” but presents its interpretation of the ordinary and customary meanings of four claim terms. PO Resp. 9–21. We address two of the parties’ interpretations below.

1. Radially Serpentine

Petitioner argues that the ordinary and customary meaning of “a serpentine fluid pathway which is . . . radially serpentine” is “a fluid pathway that causes fluids to flow back (e.g., counterclockwise) and forth (e.g., clockwise) in alternate rotational directions, changing direction at least twice, *while advancing outwardly* along a radius of the off-axis chamber.” Pet. 17. Petitioner argues that the ’750 patent “provides that a ‘radially serpentine fluid pathway . . . causes the fluids received in the off-axis chamber to flow back and forth around a radius of the off axis chamber.” *Id.* at 15 (alteration in original) (emphasis omitted) (citing Ex. 1001, 4:34–37). Petitioner argues that “‘back and forth’ movement requires at least two changes in direction.” *Id.* at 17.

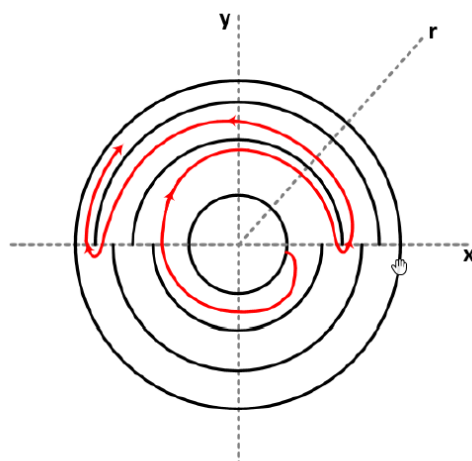
In the Institution Decision, we gave our preliminary interpretation of “radially serpentine” as recited in the claims of the ’750 patent to mean “a back and forth flow around a radius of the off axis chamber,” but did not require two changes of direction or only flows outwardly along the radius of the off axis chamber. Inst. Dec. 11–14 (citing Ex. 1001, 4:34–44; Ex. 1004, 40, 88, 90, 93, 252). We also gave our preliminary interpretation that we disagreed with the Applicant’s assertion during prosecution that the fluid pathway described at column 9, lines 1–13 in conjunction with Figure 14 is a radially serpentine fluid pathway. *Id.* at 14 (citing Ex. 1004, 93). We

explained that this fluid pathway flows *circumferentially* about the central chamber, but does not flow around a radius of the off axis chamber and, thus, is not a radially serpentine fluid pathway. *Id.*

Patent Owner agrees with our preliminary interpretation “that ‘radially serpentine’ as recited in the claims of the ’750 patent means a back and forth flow around a radius of the off axis chamber.” PO Resp. 10 (citation modified) (quoting Inst. Dec. 14); *see also* PO Sur-reply 2 (agreeing that “radially serpentine” requires “a back and forth flow around a radius of the off axis chamber”). However, Patent Owner asserts that the fluid pathway illustrated in Figure 14 flows “about the radius” of the off axis chamber and is “a ‘radially serpentine’ pathway.” PO Response 14–16; *see also* MTA Reply 3–6 (presenting substantially similar arguments).

Petitioner agrees with both our preliminary interpretation of “radially serpentine” and that Figure 14 and the description thereof in the specification of the ’750 patent describe a circumferentially serpentine fluid pathway rather than a radially serpentine fluid pathway. Pet. Reply 9–12; MTA Sur-reply 4–8. Petitioner explains that, “[i]n view of the Board’s reasoning for the distinction between ‘radially serpentine’ and ‘circumferential’ fluid flow, Petitioner agrees with the Board.” Pet. Reply 12. Petitioner disagrees with Patent Owner’s interpretation of Figure 14, noting that Patent Owner cites only to the testimony of its witness, Dr. Neitzel. *Id.* at 12–13. Petitioner argues that “Dr. Neitzel’s opinions on this topic are fundamentally flawed, for several reasons.” *Id.* at 13–14 (citing Ex. 1037 ¶ 48).

Patent Owner reiterates its interpretation that “radially serpentine” includes the flow path with respect to radius *r* depicted in the figure below:



PO Sur-reply 2–3. The figure is a cross-sectional view taken from “[t]he perspective . . . as if one were looking down the barrel of the gun.” *Id.* at 3 n.2. Patent Owner criticizes our characterization of this illustrated flow (indicated by red curves and arrows) in the Institution Decision as flowing circumferentially about the central chamber, arguing that the ’750 patent does not use the term “circumferential.” *Id.* at 3–6.

We disagree with Patent Owner’s assertion that the flow depicted in the figure reproduced above is a radially serpentine fluid pathway for the reasons set forth in the Institution Decision:

The ’750 patent states that “the fluid pathway can be a radially serpentine fluid pathway which causes the fluids received in the off axis chamber to flow back and forth *around a radius* of the off axis chamber,” also using “radially serpentine fluid pathway” to refer to this rotation around the chamber radius “while also traversing a length of the off axis chamber.” Ex. 1001, 4:34–41 (emphasis added). This is the only description of “radially” serpentine flow in the ’750 patent. Notably, the ’750 patent does not use “radially” or “serpentine” to describe a fluid pathway “which causes the fluids to spiral around the central chamber within the off axis chamber along a length of the off axis chamber,” instead referring to such a fluid pathway as a “helical fluid pathway.”

Id. at 4:41–44. *See CAE Screenplates, Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000) (“In the absence of any evidence to the contrary, we must presume that the use of . . . different terms in the claims connotes different meanings.”); *Bd. of Regents of the Univ. of Tex. Sys. v. BENQ Am. Corp.*, 533 F.3d 1362, 1371 (Fed. Cir. 2008) (“Different claim terms are presumed to have different meanings.”).

Inst. Dec. 11–12. We explained that the flow path depicted above, which is equivalent to that of Figure 14 of the ’750 patent, “flows *circumferentially* about the central chamber.” *Id.* at 14. We maintain this interpretation. Stated differently, the depicted flow is around a longitudinal axis of the chamber. *See* MTA PG 6 (describing the flow path depicted above as “a back and forth flow path around a longitudinal axis of the off axis chamber; that is, a circumferentially serpentine pathway”); *see also* Ex. 2003 ¶ 40 (Dr. Neitzel describing the flow path depicted above as “a back and forth flow path around a longitudinal axis of the off axis chamber”). The flow is *not* around a radius of the chamber, which Patent Owner recognizes is required for a flow path to be radially serpentine. *See* PO Resp. 10 (“Patent Owner agrees with the Board’s conclusion in the [Institution Decision] that ‘radially serpentine’ as recited in the claims of the ’750 patent means a back and forth flow around a radius of the off axis chamber.” (citation modified)); PO Sur-reply 2 (agreeing that “radially serpentine” requires “a back and forth flow around a radius of the off axis chamber”).

Notably, during prosecution of the application resulting in the ’750 patent, the Applicant amended the claims that issued as independent claims 1 and 19 to recite that the serpentine fluid pathway “is at least one of axially serpentine and radially serpentine.” Ex. 1004, 88, 90; *see also id.*

at 40 (presenting the final claim numbering). The Applicant argued that “radially serpentine” means the “fluids travel in an alternating clockwise to counterclockwise pattern” and the “fluid would flow back and forth from clockwise to counter-clockwise around the axis as described in page 7, lines 20-22.” *Id.* at 93. That description states, “In another aspect, the fluid pathway can be a radially serpentine fluid pathway which causes the fluids received in the off axis chamber to flow back and forth around a radius of the off axis chamber.” Ex. 1004, 252 (corresponding to Ex. 1001, 4:34–37). We understand the Applicant’s use of “the axis” of rotation to refer to the “radius of the off axis chamber.” Thus, the Applicant interpreted a “radially serpentine” fluid pathway to require the fluid to flow back and forth from clockwise to counterclockwise around the radius of the off axis chamber. We agree.

Moreover, the ’750 patent uses a specific term for the flow depicted in Patent Owner’s figure above. The depicted flow of fluids is “around the central chamber within the off axis chamber,” which, when also considering the fluid movement “along a length of the off axis chamber,” the ’750 patent refers to as “a helical fluid pathway.” Ex. 1001, 4:41–44. Again, this use of a different term confirms that the flow described by Patent Owner and its witness is *not* a radially serpentine fluid pathway. *See CAE Screenplates*, 224 F.3d at 1317; *Bd. of Regents of the Univ. of Tex.*, 533 F.3d at 1371.

Even if we were to accept the very broad definition of “around” suggested by Patent Owner (*see* MTA Reply 5 (suggesting that the definition of “around” includes “in, along, or through a circuit”)), the flow depicted in the figure above does not meet that overly broad definition because it does not move in a direction that is “in, along, or through” the radius of the off

axis chamber. Rather, as discussed above and throughout the record, the flow is “in, along, or through” the *circumference* of the off axis chamber. *See, e.g.*, Inst. Dec. 14; MTA PG 6.

Accordingly, for the foregoing reasons and those presented in the Institution Decision (*see* Inst. Dec. 11–14), we interpret “radially serpentine” as recited in the claims of the ’750 patent to mean a back and forth flow around a radius of the off axis chamber.

2. At Least One Of

In the Petition, Petitioner interprets “axially serpentine” and “radially serpentine” to be categories and argues, therefore, that the ordinary and customary meaning of “a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine” is “a fluid pathway that is *both* axially serpentine *and* radially serpentine.” Pet. 17–19 (citing *SuperGuide Corp. v. DirecTV Enters.*, 358 F.3d 870, 886 (Fed. Cir. 2004); Ex. 1001, Fig. 1a).

In the Institution Decision, we gave our preliminary interpretation of “at least one of” as recited in the claims of the ’750 patent “to have its plain and ordinary meaning of one or more.” Inst Dec. 14–16.

The parties agree with our preliminary interpretation. PO Resp. 17; Pet. Reply 18. Accordingly, for the reasons set forth in the Institution Decision (*see* Inst. Dec. 14–16), we interpret “at least one of” as recited in the claims of the ’750 patent to have its plain and ordinary meaning of one or more.

D. Overview of the Asserted Prior Art

1. Thurler

Thurler discloses devices for lessening the report of firearms by guiding the combustion gases through a series of chambers. Ex. 1015, 1:9–19. Figures 1 and 2 illustrate an embodiment of the suppression device and are reproduced below, with Figure 1 rotated clockwise 90°.

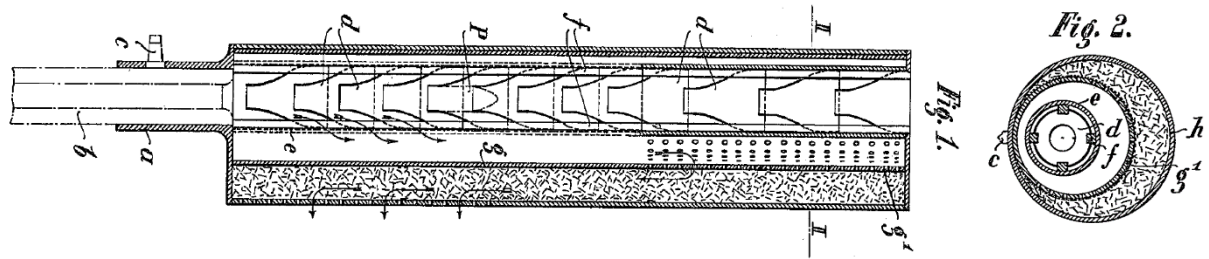


Figure 1 shows a horizontal longitudinal cross-section of the device, and Figure 2 shows a cross-section taken along line II–II of Figure 1. *Id.*

at 1:40–43. The device includes a series of tubular sleeves *d* placed coaxially within tube *e*. *Id.* at 1:53–55. Tube *e* is surround by tube *g*, which is perforated with annular openings for the one-third of its length *g*¹. *Id.* at 1:69–74. Tube *g* is surrounded by tube *h*, which is perforated at an opposite end for one-third of its length. *Id.* at 1:75–77. The device may include additional intermediate tubes *g*. *Id.* at 1:27–30. The direction of gas flow is indicated by arrows. *Id.* at 1:83–84. Gases generated by firing projectile *P* are directed by sleeves *d* into the space between tubes *e* and *g* where they partially expand. *Id.* at 1:84–91. The gases then travel along this space and pass through the annular openings of tube *g* into the space between tubes *g* and *h*. *Id.* at 1:91–99. The gases pass through this space, which is filed with metal shavings to prevent the gases from expanding instantly, and escape through the openings in tube *h*. *Id.*

2. Bouton

Bouton discloses devices for muffling or deadening the sound of escaping vapors. Ex. 1016, 1:8–10. Figure 2 illustrates an embodiment of the muffler and is reproduced below.

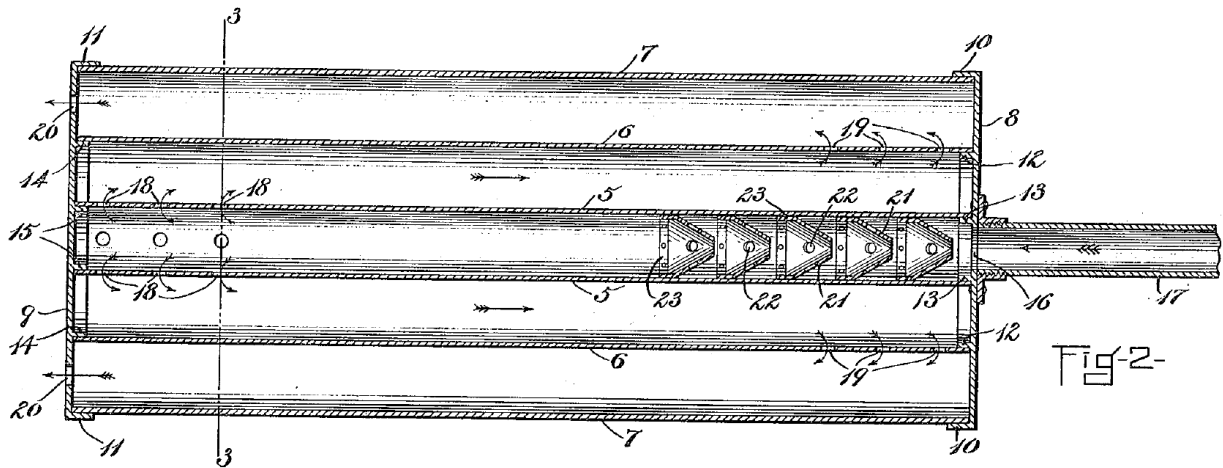
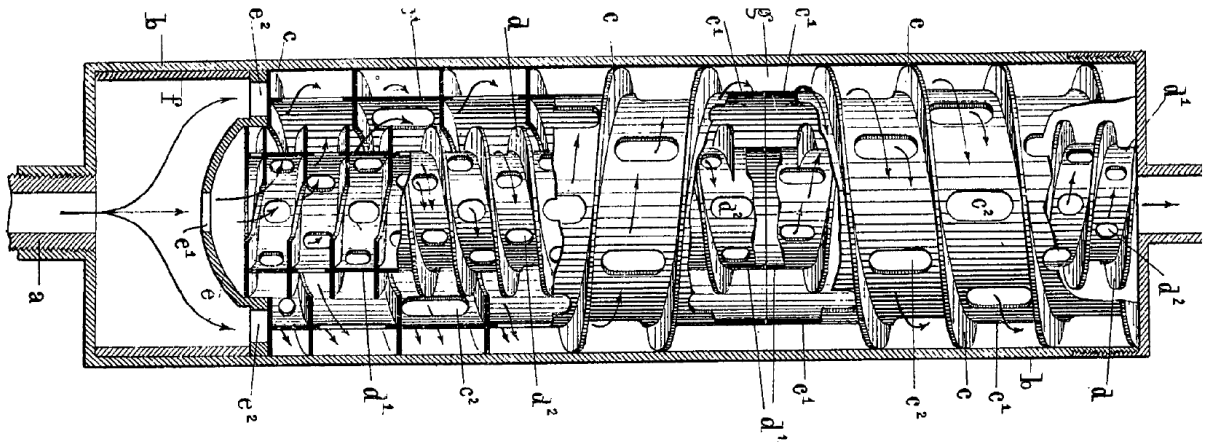


Figure 2 shows a longitudinal cross-section of the muffler. *Id.* at 1:39–41. The muffler includes concentric cylindrical tubes 5, 6, 7. *Id.* at 1:19–30, 1:47–53. Annular flanges 12, 13, 14, 15 on heads 8, 9 hold the tubes concentrically in place. *Id.* at 1:53–60. Head 8 includes inlet-orifice 16 that connects with exhaust pipe 17 of an engine. *Id.* at 1:61–64. Exhaust gases enter the muffler through the exhaust pipe and pass into innermost tube 5 where they encounter truncated cones 21, which decrease the gas velocity. *Id.* at 1:82–87. The gases then travel the length of tube 5 and pass through orifices 18 into tube 6. *Id.* at 1:89–91. The gases then travel through tube 6 in the reverse direction as through tube 5 and pass through orifices 19 into tube 7. *Id.* at 1:92–95. The gases then travel in the first direction through tube 7 and exit the muffler through orifices in head 9. *Id.* at 1:95–99. The velocity of the gases is constantly reduced by the increased travel distance, the obstacles in the path, the changes of direction, and the increased volume

of the respective tubes, such that there is no perceptible sound upon exiting the muffler. *Id.* at 1:99–2:5.

3. Barlowatz

Barlowatz discloses a silencer device. Ex. 1018, 1. The sole drawing figure is reproduced below, rotated clockwise 90°.



The figure shows, in partial cross-section, an axial view of the silencer device. *Id.* The device includes cylindrical sleeve b fastened to the end of gun barrel a. *Id.* External coil c and internal coil d are nested within the sleeve, the coils having turns that are oriented in different directions. *Id.* Each of the coils is divided into groups, with the turns of the coils being opposite for each group. *Id.* at 1, 2, Fig. The external and internal coils are supported by metal sheets c1 and d1, respectively, which are positioned halfway along the width of the coils to define two ducts for each coil, one on either side of the metal sheets. *Id.* at 2. These bracing sheets have perforations, allowing the gases passing along the coils to interact. *Id.* The coils are supported by cap e, which is held at a distance from the gun barrel by spacer sleeve f. *Id.* at 1. Some of the blast gases generated by firing the gun follow the projectile and enter the inner coil, but most of the gases are

diverted by the dome shape of the cap toward the external coil. *Id.* As indicated by the arrows in the figure, the gases flow through the two coils in opposite directions and, therefore, “counteract each other, so that their progress is delayed and they leave the sleeve at the end of the two coils at a much reduced velocity, with a notable reduction in noise.” *Id.* at 2. The change of rotational direction imparted by the reversed coil orientation among the groups of each coil also reduces the velocity of the gases. *Id.*

4. Reeves

Reeves discloses mufflers for engines. Ex. 1019, 1:6–9. Figures 1 and 2 illustrate the muffler and are reproduced below.

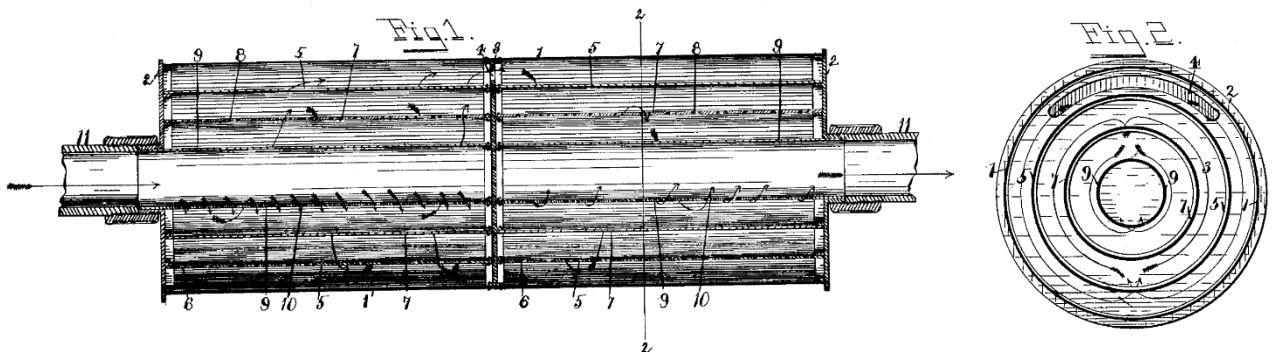


Figure 1 shows a central vertical section of the muffler, and Figure 2 shows a cross-section taken along line 2–2 of Figure 1. *Id.* at 1:32–34. The muffler includes an outer shell 1 inside of which additional concentric shells 5, 7, 9 are positioned. *Id.* at 1:35–53. Partition 3 divides the muffler into two compartments. *Id.* at 1:37–39. The muffler is attached to pipe 11 at either end. *Id.* at 1:54–55.

A gas or liquid entering the small chamber at one end must, before being expelled at the other end, pass through 180° in each annular chamber between the shells. For illustration, suppose the pipe 11, at the left, is connected with the exhaust

of an engine. The exhaust product first passes into the small chamber, then through perforations 10 into the annular chamber between shells 9 and 7, around within this chamber, through perforations 8, into the chamber between shells 7 and 5, thence to perforations 6, into the chamber between shells 5 and 1, thence through opening 4 in partition 3 into the chamber at the right-hand side. In this latter chamber the gas passes from the larger to the smaller chamber through a path similar to that described, only reversed, and is finally exhausted from the smaller chamber into the latter series. The gas is thus gradually expanded and exposed to a large cooling-surface, whereby it is reduced in pressure and temperature to a point nearly normal, thereby preventing the report incident to the engine-exhaust.

Id. at 1:55–79.

5. Eichenseher

Eichenseher discloses silencers for firearms. Ex. 1021, 1. Figure 1 illustrates a silencer for rifles and is reproduced below, rotated clockwise 90°.

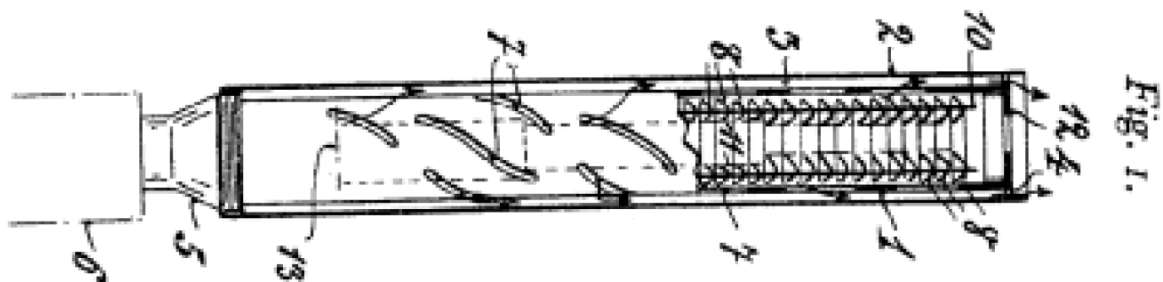


Figure 1 shows a silencer for rifles. *Id.* at 1. The silencer includes two cylinders 1, 2 placed one inside the other. *Id.* A number of sound absorbers 8 are provided within inner cylinder 1. *Id.* Gases resulting from the firing of the rifle pass into the inner cylinder and engage the sound absorbers. *Id.* at 2. Notches 9 are formed in the sound absorbers to allow

the gases to escape. *Id.* at 1–2. Slots 7 are formed in the inner cylinder to allow the gases to pass into cavity 3 between the cylinders. *Id.* at 1.

“[S]ound is effectively intercepted by sound absorbers 8, while the powder gases can escape through [notches] 9, [slots] 7, [cavity] 3 and [slots] 4, whereby the resistance is reduced to a minimum.” *Id.* at 2.

E. Motion to Amend

Patent Owner’s Motion to Amend non-contingently cancels claims 1, 4, 5, 7, 8, 10, 11, 15–17, 19, 21, and 22. MTA 1. We *grant* Patent Owner’s request to cancel claims 1, 4, 5, 7, 8, 10, 11, 15–17, 19, 21, and 22, and, as a result, we do not reach the asserted challenges to these claims.

F. Asserted Anticipation by Thurler

Petitioner argues that claims 1, 4, 5, 7–9, 15–17, 19, and 22 are anticipated by Thurler. Pet. 31–46. Of these, only claim 9 remains after Patent Owner’s non-contingent motion to amend. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons explained below, Petitioner has failed to show, by a preponderance of the evidence, that claim 9 is anticipated by Thurler.

Claim 9 depends directly from claim 1 and further recites “wherein the multiple internal walls are formed to produce a radially serpentine fluid pathway.” Ex. 1001, 11:24–26. Petitioner relies on its showing for claims 1 and 5. Pet. 40. Regarding claim 1, Petitioner argues that Thurler discloses a radially serpentine fluid pathway. *Id.* at 35–36. According to Petitioner,

the walls of tubes *e* and *g* will cause gas that escapes from the top of tube *e* to travel in a first (*e.g.*, clockwise) direction before traveling radially outward into the larger tube *h*, where the

walls of tubes *g* and *h* will cause the gas to travel back in an opposing (*e.g.*, counterclockwise) direction before traveling radially outward into the larger added tube, where the gas will travel *forth* in the first direction.

Pet. 36 (citing Ex. 1013 ¶ 176).

Patent Owner argues that “Thurler only discloses an *axially* serpentine fluid pathway” but “does not disclose walls that produce a radially serpentine pathway.” PO Resp. 33–34.

Petitioner replies that, “[u]nder [the definition set forth in § II.C.1 above], Petitioner concedes that Thurler fails to disclose a radially serpentine fluid flow, as required by Claim 9 of the ’750-Patent.” Pet. Reply 19.

Accordingly, for the foregoing reasons, Petitioner has not shown, by a preponderance of the evidence, that claim 9 is anticipated by Thurler.

G. Asserted Obviousness Based on Thurler

Petitioner argues that claims 1, 4–11, 15–17, 19, 21, and 22 would have been obvious in view of Thurler. Pet. 46–53. Of these, only claims 6 and 9 remain after Patent Owner’s non-contingent motion to amend. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons explained below, Petitioner has failed to show, by a preponderance of the evidence, that claims 6 and 9 would have been obvious in view of Thurler.

1. Claim 6

Claim 6 depends indirectly from claim 1 through claims 4 and 5 and further recites “wherein the fluid communication between the common off axis chamber and the central chamber occurs only at the primary deflector, the secondary deflector and a first tertiary deflector.” Ex. 1001, 11:13–16.

Petitioner appears to map Thurler's first tubular sleeve *d* (that is, the tubular sleeve closest to rifle barrel *b*) to the recited primary deflector, Thurler's second tubular sleeve *d* to the recited secondary deflector, and Thurler's third through eighth tubular sleeves *d* to the recited tertiary deflector.

Pet. 38 (citing Ex. 1015, Fig. 1), 48. Petitioner notes that Thurler discloses that its tube *e* is perforated for two thirds of its length and argues,

Accordingly, Thurler contemplates other lengths of perforations but opted to use a perforation configuration that extends two thirds of the length. Thus, Thurler at least teaches or suggests shorter and longer perforation configurations for the tube *e*, including a shorter perforation configuration that limits fluid communication between the central chamber and common off-axis chamber of Thurler to the first three sleeves *d*.

Id. at 48–49 (citing Ex. 1013 ¶ 212). Alternatively, Petitioner argues that it would have been obvious to modify Thurler's device to have “a shorter perforation configuration that limits fluid communication between the central chamber and common off-axis chamber of Thurler to the first three sleeves *d*” for three reasons: as a simple matter of design choice, to increase the fluid path length, or to limit the amount of fluid transferred to Thurler's off-axis chamber. *Id.* at 49 (citing Ex. 1013 ¶ 213); *see also* Pet.

Reply 21–22 (presenting substantially similar arguments).

Patent Owner argues that “Petitioner has not actually pointed to anything that suggests a shorter or longer perforation configuration.” PO Resp. 36. Patent Owner argues that, even if a shorter perforation configuration were used, “it does not follow that [an ordinarily skilled artisan] would limit the fluid communication to any particular subset of the sleeves *d*.” *Id.* at 37 (citing Ex. 2001 ¶¶ 111–121).

Petitioner replies that Thurler discloses “other lengths of perforations” for its other tubes, such as tube g. Pet. Reply 20–21.

Patent Owner replies that “there is nothing in Thurler that discloses or suggests any particular connection between the sleeves *d* and the length of the perforations.” PO Sur-reply 11.

We agree with Patent Owner that neither Petitioner nor its witness, Mr. Nixon, has explained adequately how Thurler’s disclosure of its tube e being perforated for two thirds of its length “contemplates other lengths of perforations.” *See* Pet. 48; Ex. 1013 ¶ 212. Such conclusory assertions fail to apprise us of why an ordinarily skilled artisan would have been motivated to modify Thurler’s device in contradiction to Thurler’s explicit disclosure.

We are also not persuaded by Petitioner’s proffered reasoning for modifying Thurler’s device. First, the modification is not a matter of design choice because the perforations allow the gases generated by firing the projectile to pass into the space between tubes e and g where they partially expand. *See* Ex. 1015, 1:84–91. Thus, modifying the number of perforations necessarily affects the flow of gases through the device.

Next, neither Petitioner nor Mr. Nixon explains adequately how reducing the amount of perforation in tube e results in an increased fluid length. *See* Pet. 49; Ex. 1013 ¶ 213. Rather, although less fluid may enter into tube e with Petitioner’s modification, it appears that that fluid would travel the same distance along tubes e and h as in Thurler’s unmodified device.

Finally, neither Petitioner nor Mr. Nixon explains adequately how limiting the amount of gases generated by firing the projectile from entering the expansion zones of tubes g and h provides any benefit. To the contrary,

limiting the amount of gases in the manner suggested by Petitioner would reduce the suppression of such gases, resulting in a less effective device.

Moreover, Thurler discloses that “there is still a space of a few millimeters between [tubes] *e* and *g* which is necessary” to prevent the application of “pressure on the projectile causing the same to deviate.” Ex. 1015, 1:106–2:3. Thus, Petitioner’s modification would not result in the passage of gases occurring only at the first three of Thurler’s tubular sleeves as asserted by Petitioner.

Additionally, in the Institution Decision, we explained that Petitioner did not provide adequate reasoning to support the proposed modification of Thurler’s device regarding parent claim 1 to have concentric tubes around the central tube *e*. *See* Inst. Dec. 29–31. This shortcoming, which we maintain, carries through to dependent claim 6.

Accordingly, for the foregoing reasons, Petitioner has not shown, by a preponderance of the evidence, that claim 6 would have been obvious in view of Thurler.

2. Claim 9

Claim 9 depends directly from claim 1 and further recites “wherein the multiple internal walls are formed to produce a radially serpentine fluid pathway.” Ex. 1001, 11:24–26. Petitioner argues that, “[t]o the extent [Patent Owner] argues that Thurler fails to disclose any limitations of Claim[9], Thurler renders obvious any such limitations.” Pet. 46 (footnote omitted).

Patent Owner argues that Petitioner’s “conclusory assertion is insufficient to meet Petitioner’s burden.” PO Resp. 37; *see also* PO Sur-reply 11–12 (presenting substantially similar arguments).

Petitioner replies that, “[u]nder [the definition set forth in § II.C.1 above], Petitioner concedes that Thurler fails to disclose a radially serpentine fluid flow, as required by Claim 9 of the ’750-Patent.” Pet. Reply 22.

Accordingly, for the foregoing reasons, Petitioner has not shown, by a preponderance of the evidence, that claim 9 is anticipated by Thurler. Additionally, in the Institution Decision, we explained that Petitioner did not provide adequate reasoning to support the proposed modification of Thurler’s device regarding parent claim 1 to have concentric tubes around the central tube e. *See* Inst. Dec. 29–31. This shortcoming, which we maintain, carries through to dependent claim 9.

H. Asserted Obviousness Based on Thurler and Bouton

Petitioner argues that claim 18 would have been obvious in view of Thurler and Bouton. Pet. 54–56. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons explained below, Petitioner has failed to show, by a preponderance of the evidence, that claim 18 would have been obvious in view of Thurler and Bouton.

Claim 18 depends directly from claim 1 and further recites “wherein the outer shell includes an end cap assembly at an outlet end of the central chamber and which allows fluid to escape from the common off axis chamber through the fluid outlet, the fluid outlet being only accessible to the fluid in the common off axis chamber.” Ex. 1001, 12:3–7. Petitioner maps Thurler’s tube e to the recited central chamber, tube h to the recited outer

shell, and the openings in tube h to the recited end cap assembly. Pet. 32 (citing Ex. 1015, Figs. 1–2), 54 (citing Ex. 1015, Fig. 1). Petitioner asserts that Bouton discloses a muffler having concentric tubes that form an axially serpentine fluid pathway that exhausts gases out a front end cap. *Id.* at 54–55 (citing Ex. 1016, Fig. 2). Petitioner maps Bouton’s head 9 to the recited end cap assembly and argues that it would have been obvious to modify Thurler’s device “to include an additional outermost tube (which is similarly disclosed within Thurler itself) and to implement an endcap that allows the energy to escape from the outlet end of the central chamber . . . to improve noise suppression by increasing a path length and expansion area for the deflected energy.” *Id.* at 55 (citing Ex. 1016, 2:99–3:8; Ex. 1013 ¶ 229); *see also id.* at 56 (presenting modified versions of Thurler Figure 2).

Patent Owner argues that an ordinarily skilled artisan would not add an outermost tube from Bouton’s device to Thurler’s device because Thurler contemplates an alternative method for including additional tubes:

“Thurler’s solution for ‘lessening the report of fire-arms’ and ‘destroying’ ‘the gases of combustion’ is to add more chambers of the *same* design, eccentric and hanging below the path of the barrel and sight, to lengthen its pathway.” PO Resp. 40 (citing Ex. 1015, 1:9–19; Ex. 2001 ¶¶ 121–122). Patent Owner notes that “the modifications contemplated by Thurler maintain the *downward* direction of the fluid outlet.” *Id.* at 40. Patent Owner further notes that Petitioner relied on this disclosure of Thurler in its anticipation challenge to claim 1 based on Thurler. *Id.* (citing Pet. 34).

Petitioner replies that including Bouton’s end cap with Thurler’s device would “enhance[e] not only the efficiency of exhaust and noise

reduction but also ensur[e] directed fluid flow” and a “more controlled fluid exit.” Pet. Reply. 23–24 (citing Ex. 1037 ¶¶ 78–86).

Patent Owner replies that “Petitioner does not explain what the benefits of a ‘more controlled fluid exit’ are or how implementing Bouton’s end cap design would lead to a ‘more controlled fluid outlet.’” PO Sur-reply 13.

We agree that Petitioner has not explained adequately why an ordinarily skilled artisan seeking to “increas[e] a path length and expansion area for the deflected energy” in Thurler’s device would disregard the express teaching of Thurler to add another mantle layer (that is, another tube g) and instead add Bouton’s tube. Indeed, Petitioner relies on this disclosure of Thurler: Petitioner argues that “Thurler discloses embodiments that include a common off-axis chamber having three or more tubes that are alternately perforated” and presents a rendering of this embodiment. Pet. 34 (citing Ex. 1015, 1:27–30; Ex. 1013 ¶ 174).

We addressed Petitioner’s reliance on this disclosure in the Institution Decision. *See* Inst. Dec. 24. We explained:

Thurler discloses that its device includes an innermost tube e, which is eccentrically surrounded by tube g, which is surrounded by tube h. Ex. 1015, 1:53–55, 1:69–77. Thurler further discloses that “[t]he inner casing is further[e]nclosed in one or more mantles.” *Id.* at 1:27–30. Based on Figure 1, which is reproduced in § II.D.1 above, we understand Thurler’s use of “inner casing” to refer to tube e and “mantle” to refer to tube g. Thus, we agree with Petitioner’s contentions that Thurler’s tube g and tube h correspond to the recited off axis chamber and that Thurler discloses including one more additional tubes in its device.

Id. (alterations in original). Mr. Nixon similarly recognizes and relies on this teaching in Thurler. *See* Ex. 1013 ¶ 174. Yet, both Petitioner and Mr. Nixon fail to address this teaching here when proposing to increase Thurler’s fluid path length.

Additionally, Petitioner does not explain adequately why its rationale—“to improve noise suppression by increasing a path length and expansion area for the deflected energy” (Pet. 55)—would lead an ordinarily skilled artisan to add an end cap assembly. Furthermore, we agree with Patent Owner that Petitioner fails to provide adequate support for its new rationales proposed in the Reply. *See* Pet. Reply 23–24 (citing Ex. 1037 ¶¶ 78–86). Petitioner merely asserts that directing exhaust gases through an end cap would “ensure[] directed fluid flow” and provide a “more controlled fluid exit” for Thurler’s device, but Petitioner does not explain how these asserted attributes would be achieved or the benefit they would provide. Nor does Petitioner explain how Thurler’s device lacks these attributes, further leading us to question why an ordinarily skilled artisan would be motivated to make the modifications suggested by Petitioner. Mr. Nixon also fails to provide adequate support; he cites to paragraphs 226 through 231 of his first declaration (*see* Ex. 1037 ¶ 82), but those paragraphs do not mention directed flow or a controlled fluid exit.

For the foregoing reasons, Petitioner has not shown sufficiently that it would have been obvious to include an end cap assembly on Thurler’s device. Therefore, Petitioner has not shown, by a preponderance of the evidence, that claim 18 would have been obvious in view of Thurler and Bouton.

I. Asserted Obviousness Based on Thurler and Barlowatz

Petitioner argues that claims 1, 4–17, and 19–22 would have been obvious in view of Thurler and Barlowatz. Pet. 56–63. Of these, only claims 6, 9, 12–14, and 20 remain after Patent Owner’s non-contingent motion to amend. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons explained below, Petitioner has failed to show, by a preponderance of the evidence, that claims 6, 9, 12–14, and 20 would have been obvious in view of Thurler and Barlowatz.

Regarding independent claims 1 and 19, Petitioner argues that, “[s]hould [Patent Owner] argue that Thurler fails to disclose or render obvious ‘a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine,’” Barlowatz teaches “a fluid pathway that is both axially and radially serpentine.” Pet. 57–60. Petitioner relies on Barlowatz to teach a radially serpentine fluid pathway and proposes to modify Thurler’s device to include Barlowatz’s external coil c and internal coil d, which Petitioner asserts form a flow path that is both axially and radially serpentine, to improve noise suppression. *Id.* (citing Ex. 1015, Fig. 1; Ex. 1018, 1–2, Fig.; Ex. 1013 ¶ 238).

Patent Owner argues that Petitioner’s combination of Thurler and Barlowatz is improper for two reasons. PO Resp. 41–45. First, Patent Owner argues that to “lengthen[] the fluid pathway, . . . Thurler teaches adding additional eccentric chambers.” *Id.* at 43 (citing Ex. 1013 ¶ 174; Pet. 34). Second, Patent Owner argues that Barlowatz requires both its inner coil d and external coil c so that the gases counteract each other, but such counteraction of the blast gases would lessen or prevent “the desired flow along the chambers to the perforations of Thurler to achieve Thurler’s

purpose of directing gases towards the metal shavings and out the bottom.” *Id.* at 43–45 (citing Ex. 1018, 1–2, 4, Fig.; Ex. 2001 ¶¶ 130–133; Pet. 67; Ex. 1013 ¶ 260).

Petitioner replies that, under the definition of “radially serpentine” set forth in § II.C.1 above, Petitioner withdraws this ground of challenge. Pet. Reply 25.

Accordingly, for the foregoing reasons, Petitioner has not shown, by a preponderance of the evidence, that claims 6, 9, 12–14, and 20 would have been obvious in view of Thurler and Barlowatz. Additionally, in the Institution Decision, we explained that Petitioner did not explain adequately how Barlowatz discloses either an axially serpentine or radially serpentine fluid pathway as required by parent claims 1 and 19. *See* Inst. Dec. 32–34. These shortcomings, which we maintain, carry through to dependent claims 6, 9, 12–14, and 20.

J. Asserted Anticipation by Barlowatz

Petitioner argues that claims 1, 9, 19, and 20 are anticipated by Barlowatz. Pet. 63–70. Of these, only claims 9 and 20 remain after Patent Owner’s non-contingent motion to amend. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons explained below, Petitioner has failed to show, by a preponderance of the evidence, that claims 9 and 20 are anticipated by Barlowatz.

Regarding independent claims 1 and 19, Petitioner maps Barlowatz’s distal-most perforations d2 of the inner coil to the recited off axis chamber fluid outlet. Pet. 65, 68.

Patent Owner argues that Barlowatz does not disclose a fluid outlet as recited in independent claims 1 and 19 from which claims 9 and 20 depend because, in Barlowatz’s device, “the gases come together and exit from the central chamber, not the common off axis chamber.” PO Resp. 46–47. Patent Owner argues that Barlowatz does not disclose a plurality of deflectors as recited in independent claims 1 and 19 because, “to the extent a coil is a deflector at all, these ‘turns’ fail to disclose a *plurality* of deflectors as they are part of a single, continuous ‘helically wound metal strip.’” *Id.* at 48.

Petitioner replies that, under the definition of “radially serpentine” set forth in § II.C.1 above, Petitioner withdraws this ground of challenge. Pet. Reply 25.

Accordingly, for the foregoing reasons, Petitioner has not shown, by a preponderance of the evidence, that claims 9 and 20 are anticipated by Barlowatz. Additionally, in the Institution Decision, we explained that Petitioner did not explain adequately how Barlowatz discloses either an axially serpentine or a radially serpentine fluid pathway as required by parent claims 1 and 19. *See* Inst. Dec. 34 (citing *id.* at 32–34). These shortcomings, which we maintain, carry through to dependent claims 9 and 20.

K. Asserted Obviousness Based on Barlowatz

Petitioner argues that claims 1, 9, 19, and 20 would have been obvious in view of Barlowatz. Pet. 70. Of these, only claims 9 and 20 remain after Patent Owner’s non-contingent motion to amend. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons

explained below, Petitioner has failed to show, by a preponderance of the evidence, that claims 9 and 20 would have been obvious in view of Barlowatz.

Regarding independent claims 1 and 19, Petitioner argues that it would have been obvious “to modify Barlowatz’s ESD to include fewer or additional coils, perforations, or deflectors (e.g., by increasing or decreasing the winding of the coils), and the like.” Pet. 70.

Patent Owner relies on its arguments advanced for the anticipation challenge based on Barlowatz and further argues that “Petitioner offers nothing but conclusory assertions” regarding the proposed modification to Barlowatz’s device. PO Resp. 48–49.

Petitioner replies that, under the definition of “radially serpentine” set forth in § II.C.1 above, Petitioner withdraws this ground of challenge. Pet. Reply 25.

Accordingly, for the foregoing reasons, Petitioner has not shown, by a preponderance of the evidence, that claims 9 and 20 are anticipated by Barlowatz. Additionally, in the Institution Decision, we identified further shortcomings in Petitioner’s arguments for modifying Barlowatz’s device. *See* Inst. Dec. 35–36. These shortcomings, which we maintain, carry through to dependent claims 9 and 20.

L. Asserted Obviousness Based on Barlowatz and Reeves

Petitioner argues that claim 2 would have been obvious in view of Barlowatz and Reeves. Pet. 71. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons explained below,

Petitioner has failed to show, by a preponderance of the evidence, that claim 2 would have been obvious in view of Barlowatz and Reeves.

Claim 2 depends directly from claim 1 and further recites “wherein the common off axis chamber comprises a plurality of sub-chambers defined by the plurality of deflectors, each with the radially serpentine fluid pathway, and wherein the radially serpentine fluid pathways of each of the deflectors are axially non-linearly interconnected along an outermost portion of the plurality of sub-chambers.” Ex. 1001, 10:61–67. Petitioner relies on Barlowatz to disclose a radially serpentine fluid pathway. Pet. 71. Petitioner argues that “Reeves discloses a series of compartments that each include encapsulated shells” and that it would have been obvious to partition Barlowatz’s device “into three chambers that are connected along alternating outermost points” “to increase the path length.” *Id.*

Patent Owner argues that neither Barlowatz nor Reeves discloses a fluid outlet as recited in independent claim 1 from which claim 2 depends. PO Resp. 50–51.

Petitioner replies that, under the definition of “radially serpentine” set forth in § II.C.1 above, Petitioner withdraws this ground of challenge. Pet. Reply 25.

Accordingly, for the foregoing reasons, Petitioner has not shown, by a preponderance of the evidence, that claim 2 would have been obvious in view of Barlowatz and Reeves.

M. Asserted Obviousness Based on Eichenseher and Barlowatz

Petitioner argues that claims 1, 3–5, 8, 9, 18, and 19 would have been obvious in view of Eichenseher and Barlowatz. Pet. 72–82. Of these, only

claims 3, 9, and 18 remain after Patent Owner's non-contingent motion to amend. We have reviewed the parties' briefs and the evidence of record and determine that, for the reasons explained below, Petitioner has failed to show, by a preponderance of the evidence, that claims 3, 9, and 18 would have been obvious in view of Eichenseher and Barlowatz.

Regarding independent claims 1 and 19, Petitioner proposes to add Barlowatz's external coil c to Eichenseher's cavity 3, asserting that this modification would impart both an axially serpentine and a radially serpentine fluid pathway. Pet. 74–75, 81.

Patent Owner argues that the designs of Eichenseher and Barlowatz are incompatible because adding Barlowatz's outer coil c to Eichenseher's device as asserted by Petitioner

would either result in a device with Barlowatz's coils in which gases exit out of the alleged off-axis chamber, defeating the purpose of Barlowatz, or a device with Barlowatz's coils in which gases exit out the central chamber, defeating Eichenseher's design to allow gases to escape with as little resistance as possible.

PO Resp. 55 (citing Ex. 2001 ¶ 157).

Petitioner replies that, under the definition of “radially serpentine” set forth in § II.C.1 above, Petitioner withdraws this ground of challenge. Pet. Reply 25.

Accordingly, for the foregoing reasons, Petitioner has not shown, by a preponderance of the evidence, that claims 3, 9, and 18 would have been obvious in view of Eichenseher and Barlowatz. Additionally, in the Institution Decision, we explained that Petitioner did not explain adequately how Barlowatz discloses either an axially serpentine or a radially serpentine fluid pathway as required by parent claims 1 and 19. *See* Inst. Dec. 36

(citing *id.* at 32–34). These shortcomings, which we maintain, carry through to dependent claims 3, 9, and 18.

III. PATENT OWNER’S MOTION TO AMEND

Patent Owner’s Motion to Amend proposes substitute claims 23–43 to replace challenged claims 1–17 and 19–22. MTA 1. The Motion is non-contingent as to claims 1, 4, 5, 7, 8, 10, 11, 15–17, 19, 21, and 22, which Patent Owner proposes to replace with new substitute claims 23, 26, 27, 29, 30, 32, 33, 37–39, 40, 42, and 43, respectively. *Id.* at 1–2. The Motion is contingent as to claims 2, 3, 6, 9, 12–14, and 20, which Patent Owner proposes to replace with new substitute claims 24, 25, 28, 31, 34–36, and 41, respectively. *Id.* As we found that Petitioner has failed to prove by a preponderance of the evidence that claims 2, 3, 6, 9, 12–14, and 20 of the ’750 patent are unpatentable, we do not reach Patent Owner’s contingent motion to amend these claims. Thus, we consider the patentability of proposed substitute claims 23, 26, 27, 29, 30, 32, 33, 37–40, 42, and 43.

For the reasons discussed below, Patent Owner has shown that proposed substitute claims 23, 26, 27, 29, 30, 32, 33, 37–40, and 42 meet the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. However, Patent Owner has failed to make such a showing for proposed substitute claim 43. Additionally, for the reasons discussed below, Petitioner has not proven by a preponderance of the evidence that proposed substitute claims claims 23, 26, 27, 29, 30, 32, 33, 37–40, and 42 would have been obvious. Therefore, we *grant in part* Patent Owner’s Motion to Amend.

A. Principles of Law

In an *inter partes* review, amended claims are not added to a patent as of right, but rather must be proposed as a part of a motion to amend claims. 35 U.S.C. § 316(d). Ordinarily, the “petitioner bears the burden of persuasion to show, by a preponderance of the evidence, that any proposed substitute claims are unpatentable.” 37 C.F.R. § 42.121(d)(2); *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 3–4 (PTAB Feb. 25, 2019) (precedential); *Bosch Auto. Serv. Sols. LLC v. Matal*, 878 F.3d 1027, 1040 (Fed. Cir. 2017).

But before considering the patentability of the substitute claims, we first must determine whether the Motion to Amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. *Lectrosonics*, Paper 15 at 4. In that regard, Patent Owner bears the burden of persuasion to show that: (1) the amendment proposes a reasonable number of substitute claims; (2) the amendment responds to a ground of unpatentability involved in the trial; (3) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter; and (4) the original disclosure sets forth written description support for each proposed substitute claim. *Lectrosonics*, Paper 15 at 4–8; 35 U.S.C. § 316(d); 37 C.F.R. § 42.121(d)(1).

B. The Proposed Substitute Claims

Patent Owner proposes to amend the ’750 patent by adding new claims 23–43 as substitutes for original claims 1–17 and 19–22. *See* MTA 1, App. A. As noted above, we do not reach Patent Owner’s contingent motion to amend claims 2, 3, 6, 9, 12–14, and 20 with proposed substitute

claims 24, 25, 28, 31, 34–36, and 41. Regarding proposed substitute claims 23, 26, 27, 29, 30, 32, 33, 37–39, 40, 42, and 43, Patent Owner asserts that the only substantive amendments “are to original independent claims 1, 19, and 22” and “[t]he amendments in all other proposed substitute claim merely change dependencies from the original claims to other proposed substitute claims or correct minor typographical errors.” *Id.* at 3–4. Proposed substitute claim 23 is a substitute for original claim 1 and is reproduced below. Underlined language reflects subject matter added to original claim 1. *See* MTA, App. A, i n.1.

23. An energy capture and control device for use with a weapon, comprising:

- a) a central chamber oriented along a central axis within an outer shell oriented along the central axis, said central chamber having an inlet configured to receive a high energy material comprising a projectile and gases from a high energy outlet of the weapon;
- b) a common off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet and multiple internal walls defining a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material, wherein the fluid outlet is located at an opposite end of the energy capture and control device as the inlet; and
- c) a plurality of deflectors oriented in series along the central axis of the central chamber and configured to deflect the energy from the high energy material to the common off axis chamber.

MTA, App. A, i. Proposed substitute claim 40 is a substitute for original claim 19 and is reproduced below. Underlined language reflects subject

matter added to original claim 19, and double-bracketed language reflects subject matter omitted from original claim 19.

40. An energy capture and control device for use with a weapon, comprising:
- a) a central chamber oriented along a central axis within an outer shell oriented along the central axis, said central chamber having an inlet configured to receive a high energy material comprising a projectile and gases from a high energy outlet of the weapon;
 - b) a common off axis chamber oriented within the outer shell in fluid communication with the central chamber via a plurality of orifices and further including a fluid outlet, the common off axis chamber comprising a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine, wherein the fluid outlet is located at an opposite end of the energy capture and control device as the inlet; and
 - c) a plurality of deflectors oriented in series along the central axis of the central chamber, wherein a position of multiple individual deflectors of the plurality of deflectors corresponds with the individual orifices of the plurality of orifices to the common off axis chamber.

Id. at App. A, iv–v. Proposed substitute claim 43 is a substitute for original claim 22 and is reproduced below. Underlined language reflects subject matter added to original claim 22, and double-bracketed language reflects subject matter omitted from original claim 22.

43. A method for energy capture and control from a [[high energy device]] weapon, comprising:
- a) discharging a high energy material comprising a projectile and gases from the [[high energy device]] weapon through an energy capture and control device comprising a central chamber oriented along a central axis within an outer shell oriented along the central axis, said central chamber having an inlet configured to receive [[a]] the high energy material

from a high energy outlet of the weapon, and a common off axis chamber oriented within the outer shell in fluid communication with the central chamber, the common off axis chamber comprising an axially serpentine fluid pathway and a fluid outlet, wherein the fluid outlet is located at an opposite end of the energy capture and control device as the inlet; and

- b) capturing energy within the common off axis chamber via a plurality of orifices from the central chamber using the axially serpentine fluid pathway, the energy being associated with discharge of the high energy material from the [[high energy discharge device]] weapon.

Id. at App. A, vi–vii.

C. Statutory and Regulatory Requirements

1. Reasonable Number of Substitute Claims

A motion to amend must “propose a reasonable number of substitute claims.” 35 U.S.C. § 316(d)(1)(B); *see also* 37 C.F.R. § 42.121(a)(3) (“A motion to amend may cancel a challenged claim or propose a reasonable number of substitute claims.”). “There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim.” *Lectrosonics*, Paper 15 at 4; *see also* 37 C.F.R. § 42.121(a)(3) (“The presumption is that only one substitute claim would be needed to replace each challenged claim, and it may be rebutted by a demonstration of need.”).

Patent Owner proposes no more than one substitute claim for each challenged claim. MTA 4, App. A. Petitioner does not contend that Patent Owner proposes more than a reasonable number of substitute claims. *See generally* MTA Opp. We determine that Patent Owner has proposed a reasonable number of substitute claims.

2. Responsive to a Ground of Unpatentability

“A motion to amend may be denied where . . . [t]he amendment does not respond to a ground of unpatentability involved in the trial.” 37 C.F.R. § 42.121(a)(2)(i). The Petition asserts that claims 1–22 are unpatentable over prior art. *See* Pet. 31. As shown above, through the Motion to Amend, Patent Owner has sought to change the substantive features of all challenged independent claims (claims 1, 19, and 22). The proposed amendments to the challenged dependent claims make them depend, directly or indirectly, from the proposed substitute independent claims. Petitioner does not contend that the proposed amendments fail to respond to a ground of unpatentability in this trial. *See generally* MTA Opp. We determine that the proposed amendments are responsive to a ground of unpatentability involved in this trial.

3. Scope of the Claims

A motion to amend may not enlarge the scope of the claims of the patent. 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii). Patent Owner asserts that it “has introduced new claim elements to each” of proposed substitute independent claims 23, 40, and 43. MTA 5. Patent Owner further asserts that it “has not removed any claim limitations from the original claims.” *Id.* We agree that proposed substitute claims 23–42 do not enlarge the scope of the respective original claims. However, proposed substitute claim 43 improperly enlarges the scope of original claim 22.

a. Proposed Substitute Claims 23–42

Proposed substitute independent claims 23 and 40 include narrowing limitations compared to their corresponding original independent claims, and

the proposed substitute dependent claims incorporate the narrowing limitations added to their respective proposed substitute independent claims. *See* MTA, App. A, i–vii; *see also* MTA PG 4–5. Petitioner does not argue otherwise. *See generally* MTA Opp.

b. Proposed Substitute Claim 43

In the Preliminary Guidance, we expressed our preliminary view that, in proposed substitute independent claim 43, which corresponds to original independent claim 22, Patent Owner improperly broadens the claim scope by deleting “high energy device” and replacing it with “weapon.” MTA PG 4–5. Patent Owner argues that “any ‘weapon’ that practices Proposed Substitute Claim 43 must be a high-energy weapon” because “[i]f the weapon discharges ‘a high energy material,’ it must be a high-energy weapon.” MTA Reply 1 (citing Ex. 2003 ¶¶ 19–25).

Petitioner replies that proposed substitute claim 43 is broader than claim 22 because “the term ‘weapon’ . . . includes some low energy devices not previously within the scope of Claim 22 [that] could admittedly produce high energy material.” MTA Sur-reply 2 (citing Paper 33, 17:7–18:14).⁶ Petitioner argues that Patent Owner “conflates the nature of the material being discharged with the classification of the device doing the discharging.” *Id.*; *see also id.* at 3 (“[S]cenarios where a ‘weapon’ could discharge high-energy material without qualifying as a ‘high energy device’ are readily ‘conceivable.’”).

⁶ Petitioner cites to Exhibit 1040. However, the document Petitioner intended to file as Exhibit 1040, the transcript of the second deposition of Dr. Neitzel, was filed as Paper 33.

We agree with Petitioner that the amendment is broadening. Petitioner's witness testified that he "wouldn't call a BB gun a high energy device or a high energy weapon." Paper 33, 18:4–6. Thus, per Petitioner's witness, use of a BB gun would not be covered by claim 22, no matter what is discharged from the BB gun. However, if high energy material is discharged from that same BB gun, that use would be covered by proposed substitute claim 43 (assuming the other claim recitations were met). *See id.* at 21:10–12 (Dr. Neitzel agreeing that "if something produces a high energy material, it automatically is a high energy weapon"). Thus, by deleting "high energy device" and replacing that language with "weapon," proposed substitute claim 43 impermissibly broadens the scope of claim 22. *See Sisvel Int'l S.A. v. Sierra Wireless, Inc.*, 81 F.4th 1231, 1241 (Fed. Cir. 2023) ("But if a substitute claim 'is broader *in any respect* it is considered to be broader than the original claim even though it may be narrower in other respects.'" (citation modified) (quoting *Hockerson-Halberstadt, Inc. v. Converse Inc.*, 183 F.3d 1369, 1374 (Fed. Cir. 1999))); *see also Lectrosonics*, Paper 15 at 6 ("A patent owner may not seek to broaden a challenged claim in any respect that enlarges the scope of the claims of the patent Likewise, a proposed substitute claim may not remove a feature of the claim in a manner that broadens the scope of the claims of the challenged patent.").

4. Written Description Support

A motion to amend may not introduce new subject matter. 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii). New subject matter is any addition to the claims that lacks sufficient support in the subject patent's

original disclosure. *See TurboCare Div. of Demag Delaval Turbomach. v. Gen. Elec. Co.*, 264 F.3d 1111, 1118 (Fed. Cir. 2001) (“When [an] applicant adds a claim . . . , the new claim[] . . . must find support in the original specification.”). Patent Owner also is required to show written description support in “the original disclosure of the patent for each claim that is . . . amended” and in “an earlier-filed disclosure for each claim for which benefit of the filing date of the earlier filed disclosure is sought.” 37 C.F.R. § 42.121(b).

In the Preliminary Guidance, we expressed our preliminary view that, by relying only on the disclosure describing Figure 14, Patent Owner did not identify written description support for a radially serpentine fluid pathway. MTA PG 5–6; *see also* § II.C.1 above (interpreting “radially serpentine”). Patent Owner argues that the application resulting in the ’750 patent “states that a ‘radially serpentine’ pathway can be one in which the fluids ‘flow back and forth around a radius of the off axis chamber.’” MTA Reply 3 (citing Ex. 1004, 252 (referencing page 7, lines 20–22, which corresponds to column 4, lines 34–37 of the ’750 patent)).

We agree that, in its Reply, Patent Owner has identified proper support for the radially serpentine fluid pathway as we have interpreted the term above. *See* MTA Reply 3; § II.C.1 above.

5. Conclusion

For the foregoing reasons, Patent Owner has shown that proposed substitute claims 23–42 comply with the applicable statutory and regulatory requirements, but has not made such a showing regarding proposed

substitute claim 43. Therefore, we do not further address proposed substitute claim 43 herein.

D. Petitioner's Assertions of Unpatentability

In addition to the prior art references discussed above, Petitioner relies on the following prior art references in challenging the proposed substitute claims:

Name	Reference	Exhibit
Kenney	US 1,017,003, issued February 13, 1912	1039
WerBell	US 3,667,570, issued June 6, 1972	1038

Petitioner asserts the following grounds of unpatentability for the proposed substitute claims:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
23, 26–30, 32, 33, 37–40, 43	103(a)	Thurler, Kenney, WerBell
34–36, 41, 42	103(a)	Thurler, Kenney, WerBell, Barlowatz
24	103(a)	Thurler, Kenney, WerBell, Barlowatz, Reeves
25, 31	103(a)	Thurler, Kenney, WerBell, Barlowatz, Eichenseher

MTA Opp. 6. As Petitioner's third and fourth asserted grounds involve only claims for which we conclude above that Petitioner has not established to be unpatentable, we do not reach these grounds.

1. Overview of the Asserted Prior Art

a. Kenney

Kenney discloses symmetrical silencers for firearms. Ex. 1039, 1:2–18. Figure 2 illustrates the silencer and is reproduced below.

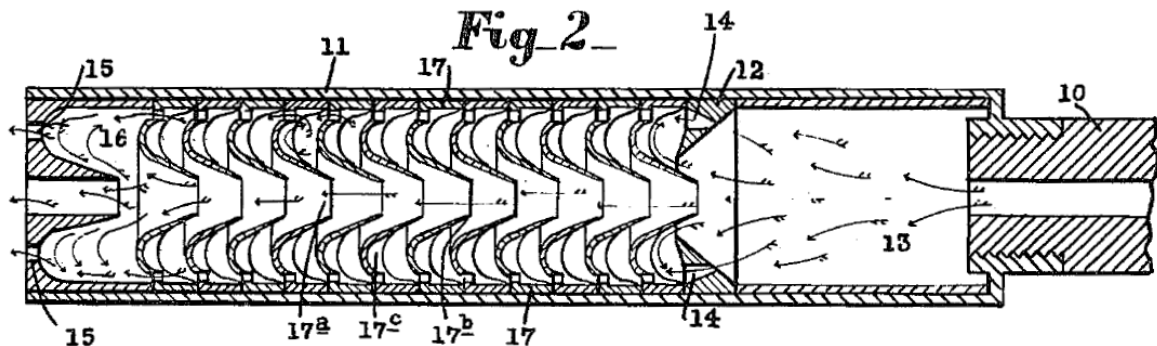


Figure 2 shows a longitudinal sectional view of the silencer housing 11 positioned on barrel 10 of a firearm. *Id.* at 1:61–67. Gases generated from discharging a bullet from the firearm expand in chamber 13, and a portion of the gases impact ring 12, which includes openings 14 through which the gases pass. *Id.* at 1:67–90. Another portion of the gases pass through the bore of the housing, in which a plurality of cup-shaped disks 17 are positioned. *Id.* at 1:91–111. Each of the disks includes a proximally-positioned knife-edge that directs gases radially outward into the space between adjacent disks. *Id.* at 1:111–2:7. As the gases proceed radially, they unite with gases passing forward through circumferential openings provided in the disks. *Id.* at 2:20–23. The united gases then pass forward and are discharged through openings 15 that are concentrically provided in the muzzle end of the silencer. *Id.* at 1:97–103, 2:24–26. This gas flow path equalizes the gas forces and reduces the gas velocity. *Id.* at 2:44–47. The concentric arrangement of the discharge openings retards the rapid

destruction of the vacuum in the atmosphere caused by discharging the firearm. *Id.* at 1:19–28, 2:30–48.

b. WerBell

WerBell discloses silencers for firearms. Ex. 1038, 1:6–9. Figure 2 illustrates the silencer and is reproduced below.

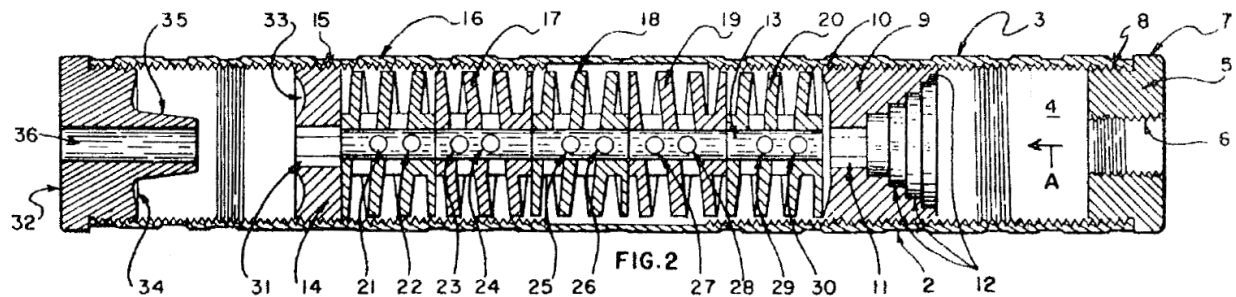


Figure 2 is a cross-sectional view of silencer 2. *Id.* at 2:46–47. When a bullet is fired (in the direction of arrow A), the generated gases quickly expand in entry chamber 4 then pass through aperture 11 into passageway 13. *Id.* at 3:15–24. The gases exit through ports 21–30 into the suppression chamber, which extends between partitions 9, 14. *Id.* at 3:25–39. The gases encounter helical suppressor elements 16–20, which are reversely wound such that the opposed vibrations tend to neutralize each other. *Id.* at 3:39–44. The silencer is attached to the rifle via threads 6 or, alternatively, via a mounting device that slips over the rifle barrel and affixes to the sight. *Id.* at 3:1–4, 4:37–67, Fig. 7.

2. Asserted Obviousness Based on Thurler, Kenney, WerBell

Petitioner argues that proposed substitute claims 23, 26–30, 32, 33, and 37–40 would have been obvious in view Thurler, Kenney, and WerBell. MTA Opp. 7–19. We have reviewed the parties’ briefs and the evidence of

record and determine that, for the reasons explained below, Petitioner has failed to show, by a preponderance of the evidence, that proposed substitute claims 23, 26–30, 32, 33, and 37–40 would have been obvious in view Thurler, Kenney, and WerBell.

a. Proposed Substitute Independent Claim 23

Proposed substitute claim 23 replaces original independent claim 1 and adds four new limitations as identified below with brackets added for clarity. *See* MTA, App. A, i. In particular, proposed substitute claim 23 amends original claim 1 to recite,

[a]n energy capture and control device [1] for use with a weapon, comprising: a) a central chamber oriented along a central axis within an outer shell [2] oriented along the central axis, said central chamber having an inlet configured to receive a high energy material [3] comprising a projectile and gases from a high energy outlet of the weapon, [and] b) a common off axis chamber . . . having a fluid outlet . . . [4] wherein the fluid outlet is located at an opposite end of the energy capture and control device as the inlet.

MTA, App. A, i.

Petitioner asserts that, as set forth in the Institution Decision, Thurler discloses many of the limitations of claim 1, each of which is also recited in proposed substitute claim 23, including:

(1) an energy capture and control device; (2) a central chamber oriented along a central axis within an outer shell, said central chamber having an inlet configured to receive a high energy material from a high energy outlet; (3) a common off axis chamber oriented within the outer shell in fluid communication with the central chamber and having a fluid outlet and multiple internal walls defining a serpentine fluid pathway which is at least one of axially serpentine and radially serpentine and which dissipates energy transferred from the high energy material; and

(4) a plurality of deflectors oriented in series along the central axis of the central chamber and configured to deflect the energy from the high energy material to the common off axis chamber.

MTA Opp. 7 (citing Inst. Dec. 22–27). As to Patent Owner’s proposed amendments, Petitioner asserts that “Thurler in view of Kenney and WerBell renders these limitations in the proposed amended claims obvious.” *Id.* at 8. We address the dispositive new limitation below.

Proposed substitute claim 23 recites, in relevant part, that “the fluid outlet is located at an opposite end of the energy capture and control device as the inlet.” MTA, App. A, i. Petitioner asserts that “Thurler’s ESD, in view of Kenney and WerBell, further discloses or renders obvious” a fluid outlet located at an opposite end of the device as the inlet. MTA Opp. 11. Petitioner asserts that “Kenney discloses a silencer with an end cap for the gases to forwardly discharge the device at the opposite end than where the high energy material enters. *Id.* According to Petitioner, this configuration provides “the benefits of keeping the gases concentric throughout the device, including upon the gases’ exit, [which] is linked directly to predictable, symmetric gas expansion.” *Id.* (citing Ex. 1039, 1:19–28, 1:91–108; Ex. 1037 ¶¶ 113–118). Thus, according to Petitioner, “it would have been obvious to [an ordinarily skilled artisan] to implement an endcap that allows the energy to escape from the outlet end of the central chamber” because it “would improve predictable symmetric gas expansion, increase noise suppression by increasing a path length, and improve the expansion area for the deflected energy.” *Id.* at 11–12 (citing Ex. 1001, 4:29–31; Ex. 1037 ¶¶ 113–118).

In the Preliminary Guidance, we expressed our preliminary view that Petitioner did not explain adequately how the proposed modification would

increase the exhaust gas path length, how the proposed modification would meet the requirement for a serpentine fluid pathway, or why an ordinarily skilled artisan would modify Thurler in contrast to its express teaching. MTA PG 11–12.

Patent Owner argues that Kenney’s end cap is not a fluid outlet because it does not allow fluids to escape an off axis chamber. MTA Reply 8 (citing Ex. 2003 ¶¶ 56–57). Patent Owner asserts that Kenney does not have an off axis chamber. *Id.* Patent Owner argues that the devices described in Thurler and Kenney operate in different manners and “Petitioner does not explain why or how [an ordinarily skilled artisan] would combine their two very different flow paths.” *Id.* at 8–9 (citing Ex. 2003 ¶¶ 58–59; MTA PG 11).

Petitioner replies that the proposed modification “is a predictable, results-effective adaptation” that “relocates the final egress to obtain Kenney’s benefits.” MTA Sur-reply 10.

We are not persuaded by Petitioner’s arguments. Notably, Petitioner has not responded persuasively to the concerns we expressed in the Preliminary Guidance. *See* MTA PG 11–12. Petitioner’s modification is “to implement an endcap that allows the energy to escape from the outlet end of the *central chamber*.” MTA Opp. 11–12. As we stated in the Preliminary Guidance, “given that Petitioner maps Thurler’s tube e to the recited central chamber (Pet. 32; [MTA] Opp. 11), it is not apparent how gas exiting the central chamber [(that is, tube e)] would still be guided” through the axially serpentine fluid pathway defined by tubes e and h. *See* MTA PG 11. Nor does Petitioner explain how adding a fluid outlet to the central chamber satisfies the requirements of the proposed substitute claims that the fluid

outlet be from the common off axis chamber, which Petitioner maps to Thurler's tubes g and h. *See* MTA Opp. 11.

Additionally, Petitioner's assertion that the proposed modification would be a "results-effective adaptation" is unsupported and, therefore, unpersuasive, as Petitioner has not established that the art recognizes the asserted result-effective variable. *See In re Antonie*, 559 F.2d 618, 620 (CCPA 1977); *In re Applied Materials, Inc.*, 692 F.3d 1289, 1295, 1297 (Fed. Cir. 2012).

For the foregoing reasons, Petitioner has not shown sufficiently why an ordinarily skilled artisan would modify Thurler's device to have a fluid outlet located at an opposite end of the energy capture and control device as the inlet. Therefore, Petitioner has not shown, by a preponderance of the evidence, that proposed substitute claim 23 would have been obvious in view of Thurler, Kenney, WerBell.

b. Proposed Substitute Claims 26, 27, 29, 30, 32, 33, and 37–39

In proposed substitute claims 26, 27, 29, 30, 32, 33, and 37–39, Patent Owner only proposes to change the dependence from claim 1 to proposed substitute claim 23 and does not include any proposed claim amendments. MTA, App. A, ii–iv. "The only substantive amendments that Patent Owner proposes are to original independent claims 1, 19, and 22. Patent Owner proposes substituting these claims with Proposed Substitute Claims 23, 40, and 43." *Id.* at 3. For the same reasons discussed above as for proposed substitute independent claim 23, Petitioner has not shown, by a preponderance of the evidence, that proposed substitute claims 26, 27, 29,

30, 32, 33, and 37–39 would have been obvious in view of Thurler, Kenney, WerBell.

c. Proposed Substitute Claim 40

Proposed substitute claim 40 recites, in relevant part, “wherein the fluid outlet is located at an opposite end of the energy capture and control device as the inlet.” MTA, App. A, v. “Petitioner relies on the arguments set forth in th[e] Opposition and the Petition with respect to Claim 19, as well as those set forth herein with respect to Proposed Amended Claim 23.” MTA Opp. 18; *see also id.* (asserting that “Proposed Amended Claim 40 . . . is identical to Claim 19 other than the identical amendments proposed by [Patent Owner] for Proposed Amended Claim 23”).

Accordingly, for the same reasons discussed above regarding proposed substitute claim 23, Petitioner has not shown, by a preponderance of the evidence, that proposed substitute claim 40 would have been obvious in view of Thurler, Kenney, WerBell.

3. Asserted Obviousness Based on Thurler, Kenney, WerBell, and Barlowatz

Petitioner argues that proposed substitute claim 42 would have been obvious in view Thurler, Kenney, WerBell, and Barlowatz. MTA Opp. 19–22. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons explained below, Petitioner has failed to show, by a preponderance of the evidence, that proposed substitute claim 42 would have been obvious in view Thurler, Kenney, WerBell, and Barlowatz.

Proposed substitute claim 42 depends from proposed substitute claim 40. Petitioner's use of Barlowatz does not remedy the deficiencies noted above based on the combination of Thurler, Kenney, and WerBell. For the same reasons, Petitioner has not shown by a preponderance of the evidence, that claim 42 would have been obvious in view Thurler, Kenney, WerBell, and Barlowatz.

IV. PATENT OWNER'S OBJECTION TO PETITIONER'S DEMONSTRATIVE EXHIBITS

Patent Owner objected to certain demonstrative slides and animations presented in the oral hearing as purportedly violating the restriction against presenting new evidence or argument during the hearing. Paper 41, 1. We have considered Patent Owner's objections. However, the demonstrative exhibits are not evidence, and, in this Decision, we rely solely on the arguments properly presented in the parties' briefs and the evidence of record, not on the demonstrative exhibits. *Cf.* Tr. 4:2–7 (the Board stating, at the beginning of the hearing: "We note that Patent Owner has objected to certain slides and animations in Petitioner's demonstratives. We're not going to exclude anything today, but the demonstratives are just for the presentations today, [they are] not evidence. We will keep your objections in mind when drafting the final written decision, and that decision will be based on the evidence and arguments of record."). Thus, the objections are overruled.

V. CONCLUSION⁷

Based on the evidence presented with the Petition, the evidence introduced during the trial, and the parties' respective arguments: Petitioner has failed to show, by a preponderance of the evidence, that claims 2, 3, 6, 9, 12–14, 18, and 20 of the '750 patent are unpatentable; Patent Owner has failed to show that proposed substitute claim 43 complies with the applicable statutory and regulatory requirements; and Petitioner has failed to show, prove by a preponderance of the evidence, that proposed substitute claims 23, 26, 27, 29, 30, 32, 33, 37–40, and 42 are unpatentable. In summary,⁸

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 4, 5, 7–9, 15–17, 19, 22	102(b)	Thurler		9
1, 4–11, 15–17, 19, 21, 22	103(a)	Thurler		6, 9

⁷ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. §§ 42.8(a)(3), (b)(2).

⁸ Claims 1, 4, 5, 7, 8, 10, 11, 15–17, 19, 21, and 22 are canceled and thus not designated as "Shown Unpatentable" or "Not Shown Unpatentable" in this table. See § II.E.

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
18	103(a)	Thurler, Bouton		18
1, 4–17, 19–22	103(a)	Thurler, Barlowatz		6, 9, 12–14, 20
1, 9, 19, 20	102(b)	Barlowatz		9, 20
1, 9, 19, 20	103(a)	Barlowatz		9, 20
2	103(a)	Barlowatz, Reeves		2
1, 3–5, 8, 9, 18, 19	103(a)	Eichenseher, Barlowatz		3, 9, 18
Overall Outcome				2, 3, 6, 9, 12–14, 18, 20

Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	23–43
Substitute Claims: Motion to Amend Granted	23, 26, 27, 29, 30, 32, 33, 37–40, 42
Substitute Claims: Motion to Amend Denied	43
Substitute Claims: Not Reached	24, 25, 28, 31, 34–36, 41

VI. ORDER

Accordingly, it is

ORDERED that Patent Owner’s Motion to Amend is *granted* as to the non-contingent request to cancel claims 1, 4, 5, 7, 8, 10, 11, 15–17, 19, 21, and 22 of the ’750 patent;

FURTHER ORDERED that claims 2, 3, 6, 9, 12–14, 18, and 20 of the '750 patent have not been shown to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is *granted* as to the request to add proposed substitute claims 23, 26, 27, 29, 30, 32, 33, 37–40, and 42 to the '750 patent;

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied* as to the request to add proposed substitute claim 43 to the '750 patent; and

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

IPR2024-01214
Patent 8,286,750 B1

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