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Paper 13
Entered: April 2, 2019

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ABBOTT LABORATORIES and ABBOTT CARDIOVASCULAR SYSTEMS INC.,
Petitioner,

v.

CARDINAL HEALTH 529, LLC,
Patent Owner.

Case IPR2019-00098
Patent 6,699,278 B2

Before BEVERLY M. BUNTING, MICHAEL L. WOODS, and ERIC C. JESCHKE, *Administrative Patent Judges.*

WOODS, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
35 U.S.C. § 314; 37 C.F.R. § 42.108

I. INTRODUCTION

Abbott Laboratories and Abbott Cardiovascular Systems, Inc., (collectively, "Petitioner") filed a petition (Paper 1, "Petition" or "Pet.") challenging claims 2–5 of U.S. Patent No. 6,699,278 B2 ("the '278 patent"), to which Cardinal Health 529, LLC ("Patent Owner")[1] filed an amended preliminary response (Paper 11, "Preliminary Response" or "Prelim. Resp.").[2]

We have authority, acting under the designation of the Director, to determine whether to institute an *inter partes* review. 35 U.S.C. § 314(a); 37 C.F.R. § 42.4(a). We may not institute an *inter partes* review unless we determine that the information presented in the Petition shows "a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). Upon consideration of the Petition and Preliminary Response, and for the reasons set forth below, we conclude that the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail in challenging claims 2–5 of the '278 patent. Accordingly, pursuant to 35 U.S.C. § 314, we hereby authorize an *inter partes* review to be instituted as to these claims under all grounds.

Our factual findings and conclusions at this stage of the proceeding are based on the record developed thus far. This is not a final decision as to

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[1] Patent Owner's Mandatory Notices indicates that Cardinal Health 529, LLC is the sole Patent Owner. Paper 4, 1; *see also* Ex. 3001 (indicating the same).
[2] By order (Paper 10), we expunged a noncompliant preliminary response (Paper 6), and allowed Patent Owner to file an amended preliminary response (Paper 11) to correct the noncompliance.

patentability of claims for which *inter partes* review is instituted. Our final decision will be based on the full record developed during trial.

A. Related Proceedings

The parties represent that the ’278 patent is involved in contract-related litigation, namely, *Tim A. Fischell et al. v. Cordis Corp.*, Case No. 16-928-PGS-LGH (D.N.J.). Pet. 1[3]; Paper 12, 1–2.

B. The ’278 Patent (Ex. 1001)

The ’278 patent is entitled “STENT WITH OPTIMAL STRENGTH AND RADIOPACITY CHARACTERISTICS.” Ex. 1001, (54). The patent describes a thin-walled stent having a tubular structure. *Id.* at (57). “The tubular structure has a longitudinal axis and the stent includes a plurality of circumferential sets of strut members.” *Id.* To illustrate an embodiment of a stent described in the ’278 patent, we reproduce Figure 5, below:

[3] Petitioner asserts that it is an intervenor in this litigation, and that the plaintiffs are not the present owners of the ’278 patent. Pet. 1.

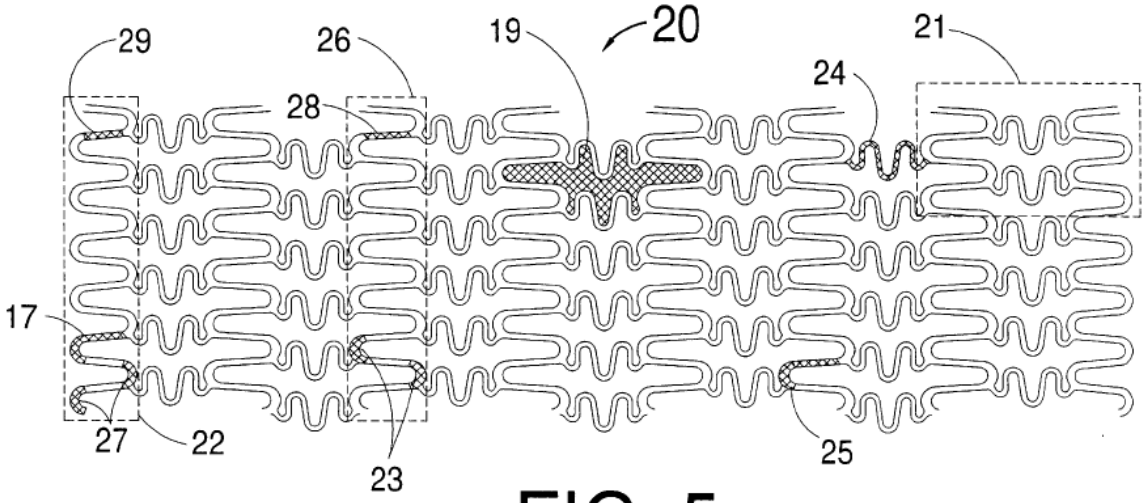

FIG. 5

According to the ’278 patent, Figure 5 depicts “a flat layout of the present invention stent design for a highly radiopaque metal.” *Id.* at 6:37–38. In particular, stent 20 is shown in a flat, pre-deployment state. *Id.* at 6:43–44. Stent 20 comprises strut members 22 located at each end of the stent, and central sets of strut members 26 connected by sets of flexible “M” links 24. *Id.* at 6:46–49. The ends of strut members 22 consist of a multiplicity of curved sections 27 connected to diagonal sections 29. *Id.* at 6:50–52. Central sets of strut members 26 located longitudinally between the end sets of strut members 22 consist of curved sections 23 connected to diagonal sections 28. *Id.* at 6:51–54.

The ’278 patent describes that an object of the invention “is to have a stent with tapered diagonal sections . . . where the center of the diagonal section is narrower than the ends to reduce the radiopacity of central sets of strut members.” *Id.* at 5:32–36. To illustrate this embodiment, we reproduce Figure 10, below:

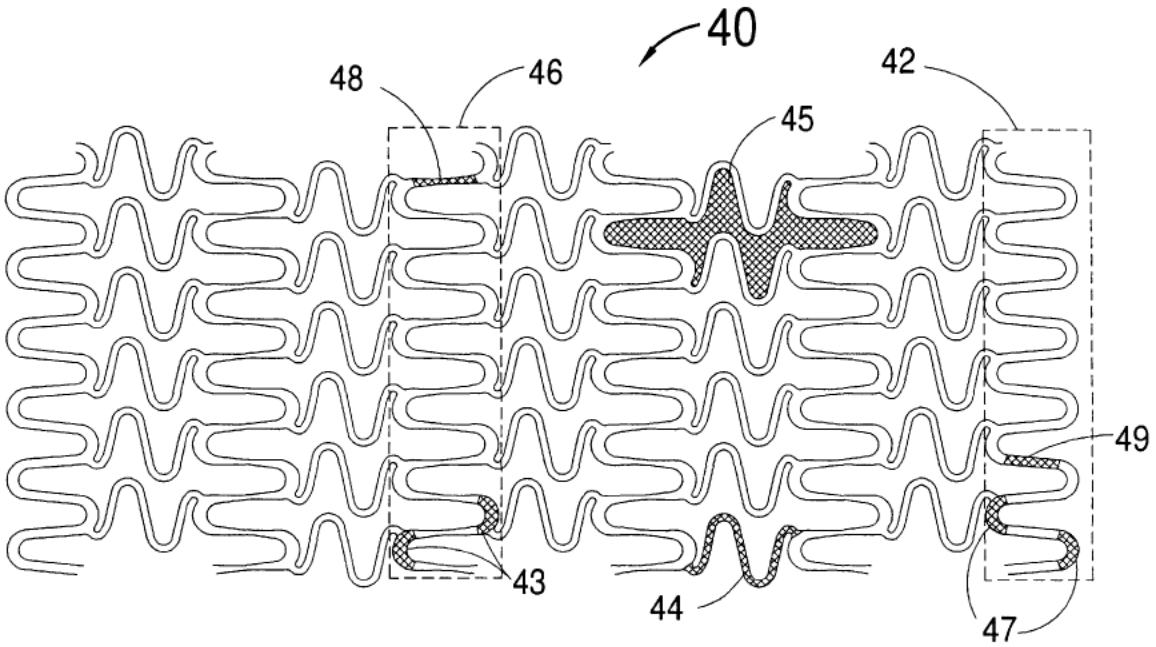

FIG. 10

According to the ’278 patent, Figure 10 depicts an embodiment including “N” shaped flexible connecting links. *Id.* at 6:48–50. In particular, Figure 10 depicts central sets of strut member 46 having curved sections 43 and diagonal sections 48 with *tapered shapes*. *Id.* at 12:20–23.

The ’278 patent further describes that another object of the invention is to have “a stent with tapered diagonal sections . . . where the center of the diagonal section is wider than the ends to increase the radiopacity of the end sets of strut members.” *Id.* at 5:41–46. To illustrate such an embodiment, where the diagonal sections are wider, we reproduce Figure 9 of the ’278 patent, below:

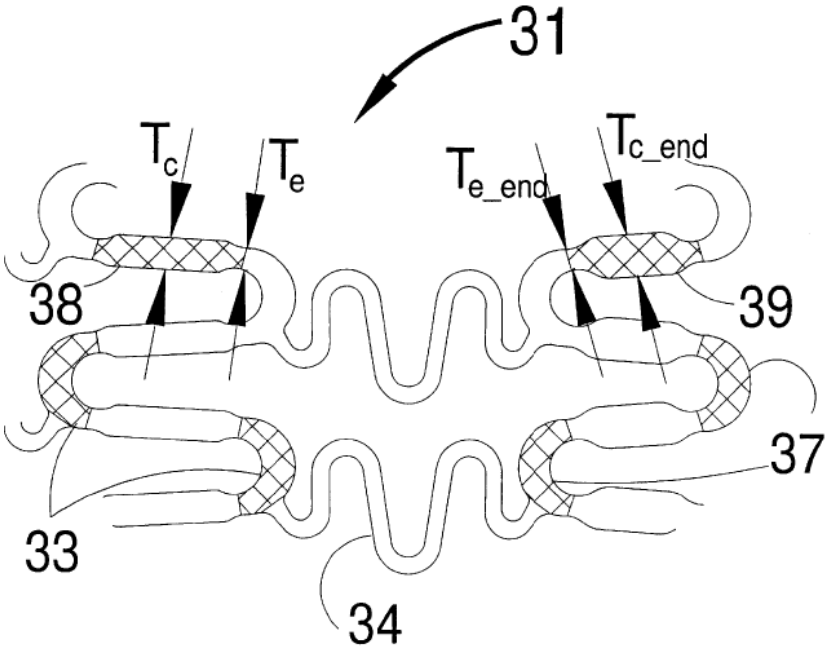

FIG. 9

According to the ’278 patent, Figure 9 depicts a stent with diagonal sections 39 having a tapered shape, in which the width at the center (T_{c_end}) is larger than the width at the end (T_{e_end}). *Id.* at 12:4–10.

C. Illustrative Claim

Claim 2 is the sole independent claim that is challenged and is reproduced below, with emphases added to disputed limitations discussed specifically in this Decision and indentations added for clarity:

> 2. A stent in the form of a thin-walled, multi-cellular, tubular structure having substantially uniform thickness throughout the length of the tubular structure,
>
> a [sic] the stent comprising a multiplicity of circumferential sets of strut members,
>
> each of the strut members being substantially the same thickness,

> each set of strut members being longitudinally separated each from the other and connected each to the other by one or more *longitudinally extending links*,
>
> each set of strut members forming a closed, cylindrical portion of the stent,
>
> each set of strut members comprising a multiplicity of connected curved sections and diagonal sections,
>
> the sets of strut members including end sets of strut members located at each end of the stent and central sets of strut members positioned between the end sets of strut members,
>
> the diagonal sections of the central sets of strut members have a center and two ends,
>
> *at least one of the diagonal sections of the central sets of strut members having a tapered shape wherein the width of the at least one diagonal section is different at the center of the diagonal section as compared to the width at either end of that diagonal section*.

Ex. 1001, 14:33–52 (emphases and indentations added).

D. Relied-Upon Art

Name	Reference	Ex. No.
Hilaire	WO 98/58600, published Dec. 30, 1998	1003
Cox	US 6,540,774 B1, issued Apr. 1, 2003	1005
Duerig	US 6,190,406 B1, issued Feb. 20, 2001	1006
Rolando	US 6,309,414 B1, issued Oct. 30, 2001	1007

E. Alleged Grounds of Unpatentability

Petitioner contends that all challenged claims (claims 2–5) of the ’278 patent are unpatentable based on the following grounds:[4]

[4] We view the usage of the term “or” in Petitioner’s table describing the asserted references as an invitation for us to select the best combination of

Ground	Prior Art	Basis	Claim(s)
1	Hilaire	§ 102	2, 4, and 5
2	Hilaire, POSITA's knowledge, Rolando	§ 103	2, 4, and 5
3	Cox	§ 102	2, 4, and 5
4	Cox, POSITA's knowledge, Rolando	§ 103	2, 4, and 5
5	Cox, POSITA's knowledge, Duerig	§ 103	3
6	Duerig	§ 102	2 and 3
7	Duerig, POSITA's knowledge, Cox	§ 103	4 and 5

Pet. 4. Petitioner also submits the declaration testimony of Brian J. Brown (Ex. 1002) in support of the grounds. *See, e.g.*, *id.* (citing Ex. 1002 ¶ 18).

Patent Owner submits the declaration testimony of Robert Burgermeister in support of its Preliminary Response. Prelim. Resp. 1 (referencing Ex. 2001).

II. ANALYSIS

A. POSITA

Petitioner proposes that a person having ordinary skill in the art ("POSITA") would have been an engineer with a degree in mechanical or biomedical engineering and several years of stent experience and "would have worked on a design team that may have included a stent-implanting physician, such as an interventional cardiologist." *See* Pet. 20 (citing Ex. 1002 ¶ 40).

Patent Owner, on the other hand, proposes that a POSITA would have been "an engineer with [a] Bachelor's degree in mechanical engineering, biomedical engineering, or a related field and at least several years of

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references, which we decline. Instead, we consider the list of references for a particular ground as inclusive of all references cited by Petitioner.

experience designing intravascular stents" and "may have worked on a design team that may have included medical personnel, such as a cardiologist." Prelim. Resp. 15–16 (citing Ex. 2001 ¶ 14).

Based on our review of the '278 patent, the types of problems and solutions described in the '278 patent and applied prior art, for purposes of this decision, we determine that a POSITA would have been an engineer with a degree in mechanical engineering, biomedical engineering, or a related field, and would have had several years of experience working on stents.

B. Claim Construction

In this *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b) (2018); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard).[5] A presumption exists that a claim term should be construed in light of its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002). "Under a broadest reasonable interpretation, words

[5] The revised claim construction standard for interpreting claims in *inter partes* review proceedings as set forth in the final rule published October 11, 2018, does not apply to this proceeding (filed October 19, 2018) because the new "rule is effective on November 13, 2018 and applies to all IPR, PGR and CBM petitions filed on or after the effective date." Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (to be codified at 37 C.F.R. part 42).

of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history." *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016).

Petitioner proposes a construction for the claim term "tapered shape" (Pet. 26–35), while Patent Owner proposes a different construction for "tapered shape" as well as a construction of "longitudinally extending link" (Prelim. Resp. 16–32). For purposes of this Decision, we determine that the claimed "tapered shape" and "longitudinally extending link" require construction.

1. "tapered shape"

The issue is whether the claimed "tapered shape" is limited to two-sided symmetrical tapered shapes "about a centerline," as Patent Owner proposes. Prelim. Resp. 17–27.

The relevant portion of claim 2 recites, "at least one of the diagonal sections . . . having a *tapered shape* wherein the width of the at least one diagonal section is different at the center of the diagonal section as compared to the width at either end of that diagonal section." Ex. 1001, 14:48–52 (emphasis added).

Patent Owner proposes that "tapered shape" should be interpreted to mean "a shape with a generally uniform and gradual decrease or increase in width *about a centerline*." Prelim. Resp. 17 (emphasis added). Patent Owner cites to the specification and extrinsic evidence in support its interpretation. *See id.* at 18–25. Specifically, Patent Owner cites to several embodiments of the '278 patent, including Figures 5–7, 9, and 10 (*id.* at 19–22), and argues generally that the specification depicts the tapered shape to

be "gradually and uniformly decreasing (or increasing) from the end of the diagonal section . . . to a minimum (or maximum) width about a centerline of the diagonal section" (*id.* at 22). Patent Owner also cites to several patents that depict symmetrical tapered shapes. *See id.* at 24–25 (citing U.S. Pat. Nos. 6,554,848, 6,569,193, and 5,810,873).

Petitioner, on the other hand, proposes that "tapered shape" should be broadly interpreted to mean "'a shape that transitions in width over a length.'" Pet. 35. In support of its interpretation, Petitioner relies on: a general purpose dictionary definition of "tapered"; engineering textbooks that describe "tapered"; the specification of the '278 patent; the USPTO's prior interpretation of "tapered shape" in other proceedings; and other patent documents that depict asymmetrical tapered shapes. *Id.* at 28–33.

For purposes of this Decision, we agree with and adopt Petitioner's proposed interpretation.

In this *inter partes* review, we give claims their broadest reasonable interpretation consistent with the specification, reading claim language in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). Although claims are read in light of the specification, we do not read limitations from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

For the following reasons, Patent Owner's proposed interpretation does not represent the broadest reasonable construction.

First, the claim language itself imposes no restriction on the recited "tapered shape" to be tapered uniformly about a centerline. *See, e.g.*, *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc)

("[T]he context in which a term is used in the [claim at issue] can be highly instructive.").

Second, the ordinary meaning of "tapered shape" is not limited to shapes that taper uniformly about a centerline. Petitioner's dictionary definition of "tapered" confirms this fact. *See* Pet. 28 (citing Ex. 1020 (defining "tapered" to mean "[s]omething that narrows down along a length," "a gradual decrease in thickness or width of an elongated object," or "to make thinner or narrower at one end")).

Third—and *even if* we assume to be true Patent Owner's assertion that the embodiments described in the '278 patent "consistently depict[] the tapered shape of the diagonal sections as gradually and uniformly decreasing (or increasing) from the end of the diagonal section . . . to a minimum (or maximum) width about a centerline" (Prelim. Resp. 22)—the passages of the specification Patent Owner cites do not *define* explicitly that the tapered shape gradually and uniformly increases or decreases about a centerline. *See e.g.*, Ex. 1001, 5:32–37; 5:42–47. Although an inventor may act as its own lexicographer, we do not find any language in the specification that defines "tapered shape" to be "a shape with a generally uniform and gradual decrease or increase in width about a centerline" with reasonable clarity, deliberateness, or precision. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998) (holding that for an inventor to act as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision.).

Accordingly, Patent Owner's proposed construction goes beyond the plain and ordinary meaning of the term by adding limitations from a particular embodiment described in the specification into the term. *See Van*

Geuns, 988 F.2d at 1184; *see also Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) ("Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using 'words or expressions of manifest exclusion or restriction."') (quoting *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1327 (Fed. Cir. 2002)); *see also Anchor Wall Sys., Inc. v. Rockwood Retaining Walls, Inc.*, 340 F.3d 1298, 1306–07 (Fed. Cir. 2003) (stating that "the mere fact that the patent drawings depict a particular embodiment of the patent does not operate to limit the claims to that specific configuration").

For purposes of this Decision, upon reviewing the claim language in light of the specification, we agree with Petitioner and determine that a broad, but reasonable, construction of the claimed "tapered shape" limitation means "'a shape that transitions in width over a length'" and is not limited to two-sided symmetrical tapered shapes "about a centerline." Pet. 35.

2. "longitudinally extending link"

The issue before us is whether the term "longitudinally extending link" means "'*a non-straight component* that connects two circumferential sets of strut members and that extends generally in the direction of the stent's longitudinal axis,'" as Patent Owner proposes. Prelim. Resp. 27 (emphasis added).

The relevant portion of claim 2 recites, "each set of strut members being longitudinally separated each from the other and connected each to the other by one or more *longitudinally extending links*." Ex. 1001, 14:38–40 (emphasis added). Patent Owner argues that the specification of the '278

patent (Prelim. Resp. 28–30) and Hilaire (*id.* at 30–32) support its interpretation that the claimed "longitudinally extending links" requires the links to be "non-straight components."

Patent Owner argues that "[t]he specification *consistently describes* the longitudinally extending links as non-straight components." *Id.* at 30 (emphasis added). In particular, Patent Owner relies on the following description:

> The stents described herein are typically closed cell stents, having a curved section of a central set of strut members connected to an adjacent set of strut members by a longitudinally extending link. In *one embodiment* of the present invention, the circumferential sets of strut members are joined by *undulating longitudinal connecting links* with each link having a multiplicity of curved segments so as to increase the perimeter of the stent's closed cells . . . . This feature allows the "unjailing" of side branches of the artery into which the stent is placed.

Prelim. Resp. 28 (citing Ex. 1001, 3:48–61) (emphases added).

Notably, the portion of the specification relied upon by Patent Owner refers to "one embodiment" having "undulating longitudinal connecting links." Ex. 1001, 3:48–61.

Although the '278 patent describes several embodiments of its "longitudinal extending links" as being "undulating" or non-straight (*see, e.g.*, Ex. 1001, Figs. 5–11), Patent Owner's proposed construction attempts to read limitations improperly from the specification into the claims. The specification does not define "longitudinally extending links" as non-straight components with any clarity, deliberateness, or precision. *See Renishaw PLC*, 158 F.3d at 1249. As with the claimed term "tapered shape," Patent Owner's proposed construction goes beyond the plain and ordinary meaning

of the term by adding limitations from particular embodiments described in the specification into the claim. *See Van Geuns*, 988 F.2d at 1184.

Moreover, we disagree with Patent Owner's assertion that "[t]he specification *consistently describes* the longitudinally extending links as non-straight components." *Id.* at 30 (emphasis added). To the contrary, the background portion of the specification describes, "[m]any current tubular stents use a multiplicity of circumferential sets of strut members connected by *either straight longitudinal connecting links or undulating longitudinal connecting links*." Ex. 1001, 1:20–23 (emphasis added). Indeed, the specification describes that the longitudinal links may be straight or undulating, but the claims do not explicitly recite either, and we are not persuaded that the claims should be construed so as to exclude straight links.

For purposes of this Decision, upon reviewing the claim language in light of the specification, we determine that a broad, but reasonable construction of the claimed "longitudinally extending link" limitation includes straight and non-straight components for connecting two circumferential sets of strut members.

3. Other Claim Terms

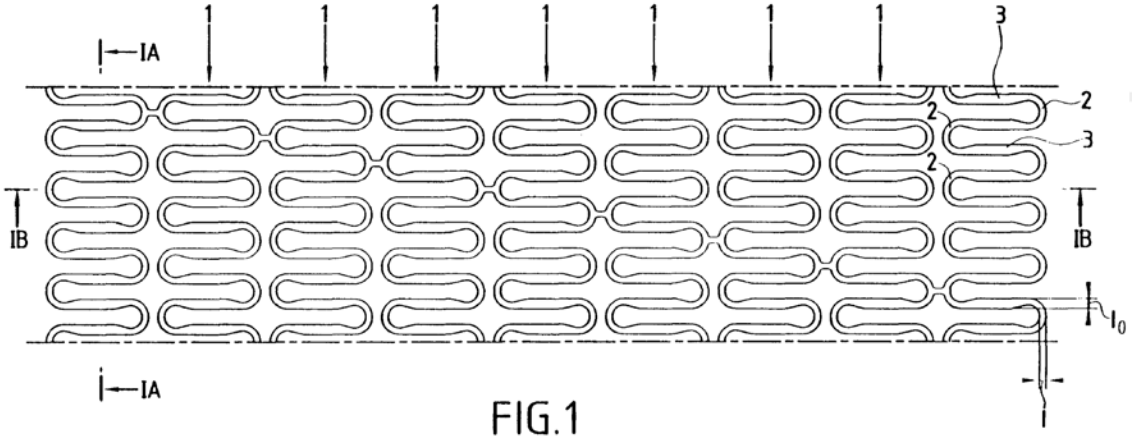
At this stage, we determine that no other claimed limitation requires express construction for purposes of this Decision. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be construed 'to the extent necessary to resolve the controversy'" (internal citation omitted).).

C. Ground 1: Claims 2, 4, and 5 as Anticipated by Hilaire

Petitioner asserts that claims 2, 4, and 5 are anticipated by Hilaire. Pet. 35.

1. Hilaire (Ex. 1003)

Hilaire is entitled "Expandable Stent with Variable Thickness" (Ex. 1003, (54)) and discloses, among other things, a stent for implantation into a blood vessel (*id.* at (57)). To depict an embodiment of Hilaire's device, we reproduce its Figure 1, below:



According to Hilaire, Figure 1 is a two-dimensional view of its first stent embodiment (*id.* at 3:12–14). The stent has an elongate, tubular frame, defined by tubular elements 1 aligned along a common longitudinal axis and successively joined in pairs by a plurality of linking members (not numbered). *Id.* at 3:28–32. Each tubular element 1 has "a strip forming a zigzag corrugation defining bent extreme portions" 2, which are connected together by rectilinear portions 3. *Id.* at 3:33–35.

We also reproduce Figure 1A of Hilaire, below:

FIG.1A

Figure 1A is a cutaway view along line IA-IA of Figure 1. *Id.* at 3:15–16. According to Hilaire, the thickness of the strip forming each tubular element 1 in rectilinear portion 3 is approximately equal to the thickness of the strip in bent portions 2. *Id.* at 4:15–17.

Hilaire also discloses an alternative embodiment, shown in Figure 2 (*id.* at 3:19–20), reproduced below:

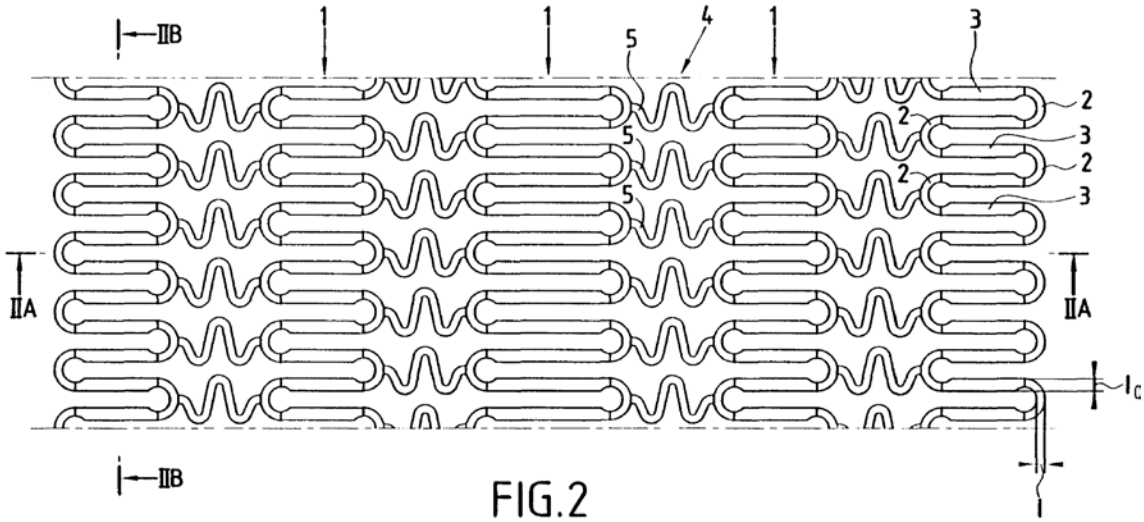


FIG.2

Figure 2 is a two-dimensional view of a second embodiment of Hilaire's stent. *Id.* at 3:19–20 ("Figure 2 is a two-dimensional view similar to Figure 1 of a device according to a second embodiment of the invention"). According to Hilaire, linking members 4 consist of a strip forming a corrugation defining three bent intermediate portions, and the linking members are joined at each end to tubular element 1 via portion 5, which is also bent. *Id.* at 5:17–21. In the second embodiment shown in Figure 2, the thickness of the strip forming each tubular element 1 in rectilinear portions 3

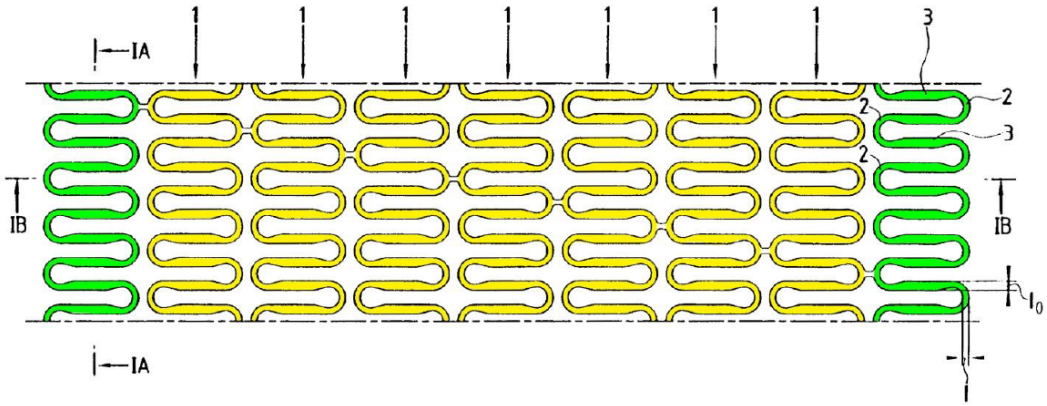
is less than the thickness of the strip in the bent portions. *Id.* at 4:24–26; *see also id.* at Fig. 2A (depicting the varying thicknesses).

2. Analysis

Petitioner contends that Hilaire discloses each limitation of claims 2, 4, and 5, citing Hilaire's first embodiment (Fig. 1) and second embodiment (Fig. 2) and relying on the declaration testimony of Mr. Brown (Ex. 1002). Pet. 35–41. Petitioner supports its contentions with a claim chart demonstrating the alleged correspondence between Hilaire's disclosure and the limitations of claims 2, 4, and 5. *Id.* at 41–45. Specifically, Petitioner relies on the first embodiment shown in Figure 1 of Hilaire, and alternatively, the second embodiment shown in Figure 2. *Id.*

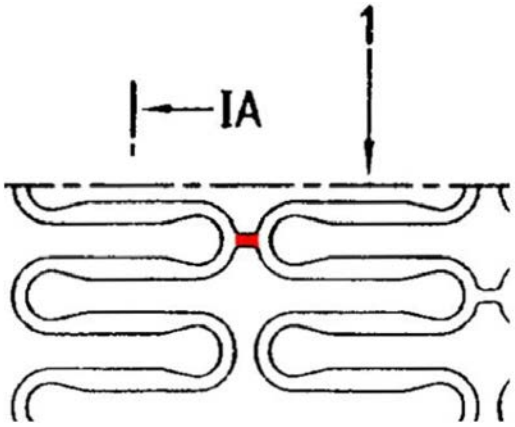
As discussed above (*supra* Part II.C.1), Hilaire's second embodiment (Figure 2) has a non-uniform thickness throughout the length of the tubular structure (Ex. 1003, 4:24–26, Fig. 2A). Petitioner's arguments do not persuade us that Figure 2 satisfies the claimed "substantially uniform thickness throughout the length of the tubular structure" (Ex. 1001, 14:16–17) limitation. Accordingly, the embodiment of Figure 2 does not anticipate independent claim 2, and our analysis will focus on Hilaire's first embodiment, shown in Figure 1.

Petitioner asserts that Hilaire's Figure 1 stent is a "thin-walled, multi-cellular, tubular structure having substantially uniform thickness throughout" its length. Pet. 41 (citations omitted). Petitioner also submits several annotated versions of Hilaire's Figure 1 (*id.* at 36, 37, 38, 39), one of which we reproduce below:



According to Petitioner, and as shown in the annotated version of Hilaire's Figure 1 embodiment above, Hilaire's stent has "circumferential sets of strut members" (in yellow) and "end sets of strut members" (in green). *Id.* at 35–36.

Petitioner also asserts that Hilaire's "strut members" are longitudinally separated from each other and connected to each other "by one or more longitudinally extending links" (not numbered). *Id.* at 36 (citations omitted). To illustrate Hilaire's "longitudinally extending links," Petitioner submits an annotated version of an enlarged plan view of Hilaire's Figure 1 showing the link, which we reproduce below:



According to Petitioner, and as shown in the above annotated figure, Hilaire's "strut members" are longitudinally separated and connected to each

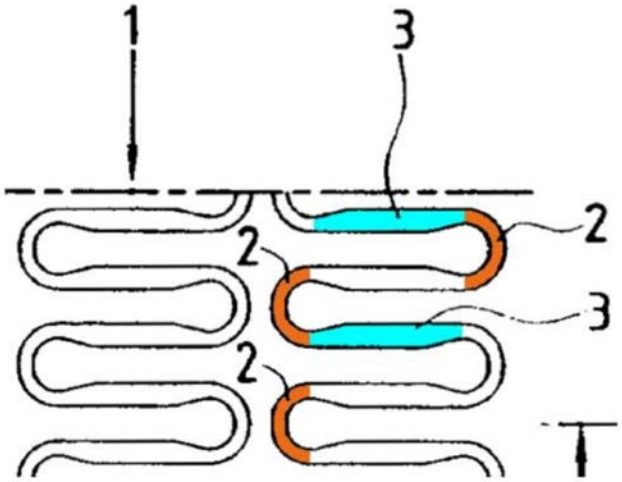
other by "longitudinally extending links" (in red). Pet. 36–37. As shown above, Hilaire's "longitudinally extending links" appear straight.

Patent Owner responds that Hilaire's Figure 1 embodiment does not disclose the claimed "longitudinally extending links." Prelim. Resp. 35.

We disagree.

Patent Owner's argument is premised on its interpretation of the claimed "longitudinally extending links," which we do not adopt. *See id.* at 36 ("[T]he embodiment shown in Figure 1 does not contain 'a non-straight component . . . .'"). As discussed above (*supra* Part II.B.2), we construe "longitudinally extending links" to include straight and non-straight components, and Hilaire's seemingly straight "longitudinally extending links" satisfy the claimed limitation.

Petitioner further asserts that Hilaire's "circumferential sets of strut members" comprise a "multiplicity of connected curved sections and diagonal sections." Pet. 37 (citations omitted). To illustrate these sections, Petitioner submits yet another annotated, enlarged plan view of the strut members of Hilaire's Figure 1, which we reproduce below:



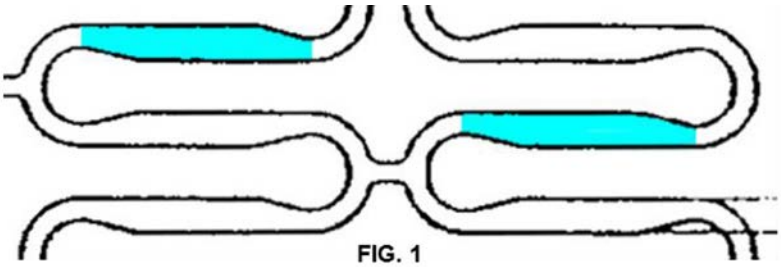
According to Petitioner, and as shown in the above annotated figure,

Hilaire discloses a "multiplicity of connected curved sections" (in orange) and "diagonal sections" (in blue). *Id.* at 38.

Petitioner also submits that Hilaire meets the claimed "at least one of the diagonal sections of the central sets of strut members having a *tapered shape* wherein the width of the at least one diagonal section is different at the center of the diagonal section as compared to the width at either end of that diagonal section." *Id.* at 39.

Patent Owner responds that Hilaire does not disclose the claimed "tapered shape." Prelim. Resp. 34. Patent Owner's argument is premised, however, on its interpretation of tapered shape, which we did not adopt. *See id.* (contending that Hilaire's "'tapered shape'" is not "'a shape with a generally uniform and gradual decrease or increase in width about a centerline.'").

As discussed above (*supra* Part II.B.1), we construe "tapered shape" to mean "a shape that transitions in width over a length." To illustrate how Hilaire meets the limitation, we reproduce a Petitioner-annotated version of an enlarged plan view of the strut member shown in Hilaire's Figure 1 (Pet. 40), below:



We are persuaded by Petitioner's assertion that Hilaire's diagonal sections—shown above in blue—are tapered, with the width of the sections gradually widening when moving inward from each end of the section

towards the central portion. *See id.* at 39–40. Petitioner also refers to Hilaire's explicit disclosure that the "'width transitions between the rectilinear portions 3 and bent portions 2 will be gradual in order to avoid the formation of an incipient fracture.'" *Id.* at 39 (quoting Ex. 1003, 4:34–5:2) (emphasis omitted).

Dependent claim 4 recites, "wherein the width of the at least one diagonal section is *greater at the center* of that diagonal section as compared to the width at either end." Ex. 1001 (Certificate of Correction) (emphasis added). Dependent claim 5 recites similarly,

> wherein the diagonal sections of the end sets of strut members have a center and two ends, at least one of the diagonal sections of the end sets of strut members has a tapered shape wherein the width of the at least one diagonal section is *greater at the center* of the diagonal section as compared to the width at either end of that diagonal section.

Id. (emphasis added). To address these claimed limitations, Petitioner relies on Hilaire's Figure 1 embodiment, discussed above, as having diagonal sections where the width at the center is greater than the width at either end. Pet. 44.

Patent Owner does not separately dispute Petitioner's contentions as to claims 4 and 5.

At this stage of the proceeding, Petitioner establishes a reasonable likelihood that Hilaire anticipates claims 2, 4, and 5.

D. Ground 2: Claims 2, 4, and 5 as Unpatentable over Hilaire in view of a POSITA's Knowledge and Rolando

Petitioner asserts—in the alternative—that claims 2, 4, and 5 would have been unpatentable over Hilaire in view of a POSITA's knowledge and

Rolando. Pet. 45; *see also supra* n.4. In particular, Petitioner presents this alternate ground "out of an abundance of caution" in the event that we construe "tapered shape" as advanced by both plaintiffs in the pending litigation and Patent Owner in this proceeding. *See id.* (discussing the "erroneous proposed construction of 'tapered shape' (which would arbitrarily limit that term to a narrow subset of tapered shapes having a generally uniform change in width 'about a centerline')").

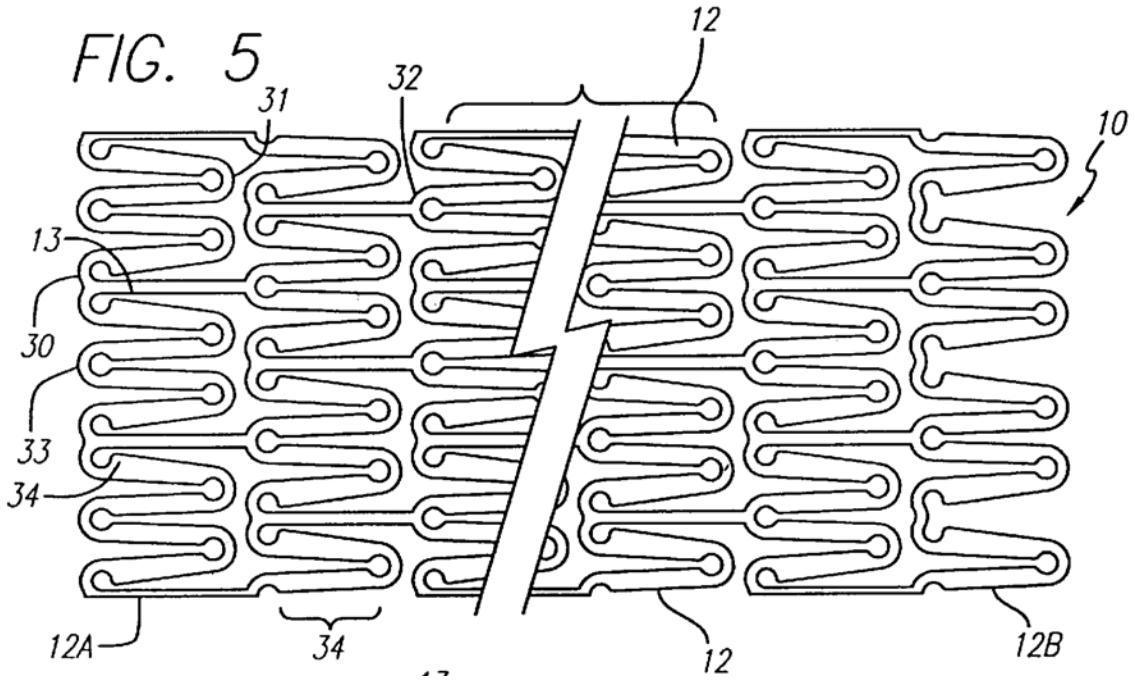
We do not construe "tapered shape" as Patent Owner proposes (*see supra* Part II.B.1). As such, we do not substantively address this ground as any analysis on our part would be advisory.

E. Ground 3: Claims 2–5 as Anticipated by Cox

Petitioner asserts that claims 2–5 are anticipated by Cox. Pet. 53.

1. Cox (Ex. 1005)

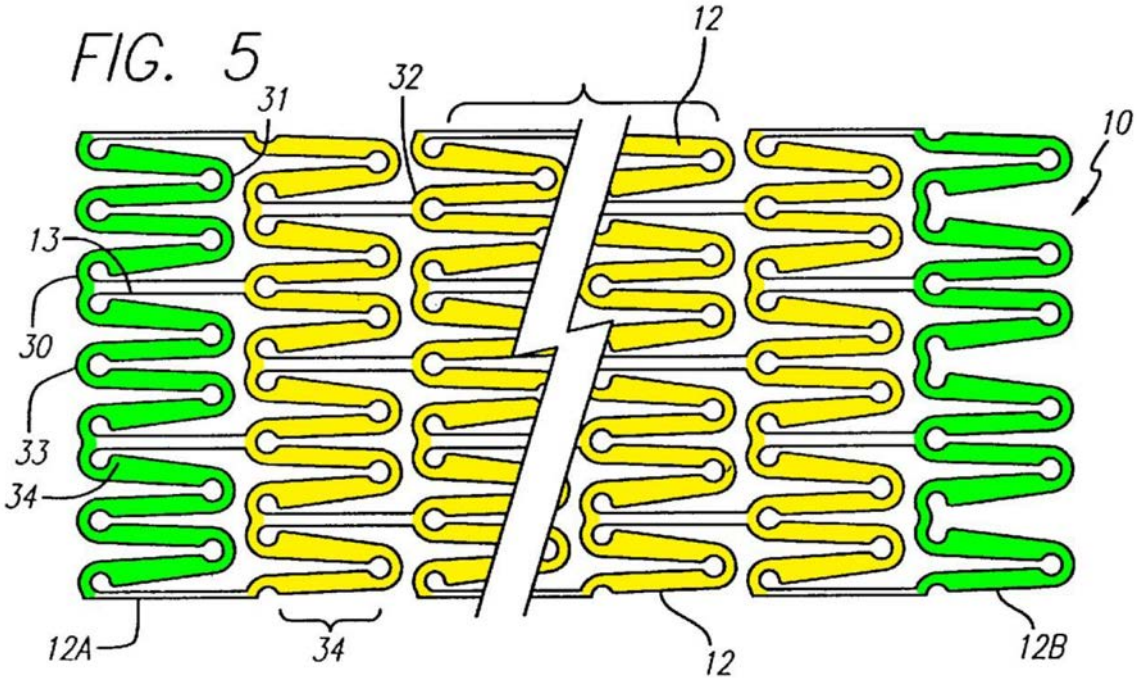
Cox is entitled "Stent Design with End Rings Having Enhanced Strength and Radiopacity" (Ex. 1005, (54)) and discloses an expandable stent with "a plurality of radially expandable cylindrical elements generally aligned on a common longitudinal stent axis and interconnected by one or more interconnecting members" (*id.* at (57)). To illustrate an embodiment of Cox's stent, we reproduce Figure 5, below:



According to Cox, Figure 5 depicts a "plan view of a preferred embodiment of a flattened stent," illustrating "the serpentine pattern including peaks and valleys which form the cylindrical elements of the stent and include regions having wider struts in low stress regions and narrower struts in high stress regions." *Id.* at 6:55–60.

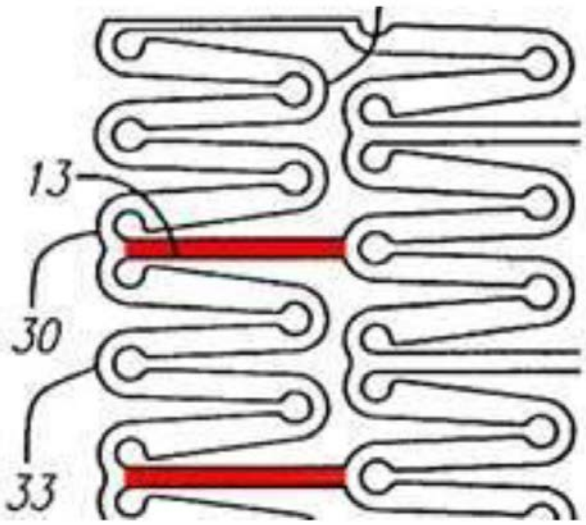
2. *Analysis*

Petitioner contends that Cox discloses each limitation of claims 2–5, citing in part Cox's Figure 5. Pet. 62–66 (claim chart). In support of its assertions, Petitioner submits an annotated version of Cox's Figure 5 (*id.* at 54), which we reproduce below:



According to Petitioner, and as shown above in annotated Figure 5, Cox's stent has a "multiplicity of . . . circumferential sets of strut members," including "ends of strut members" (in green) and "central sets of strut member" (in yellow). *Id.* at 53–54.

To address the claimed "longitudinally extending links," Petitioner submits an annotated, enlarged plan view of the links in Cox's Figure 5 (*id.* at 55), which we reproduce below:

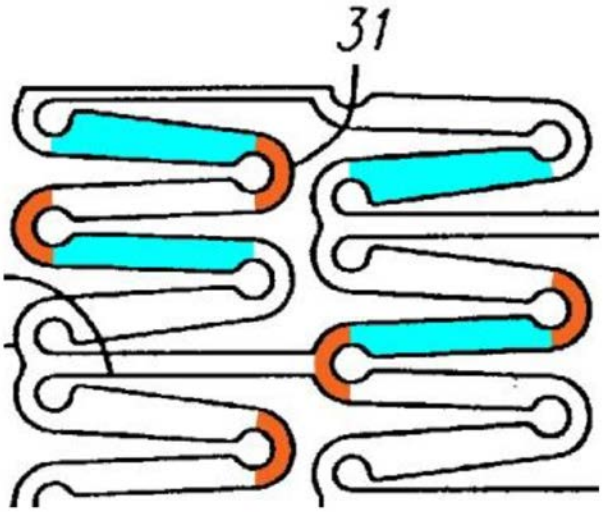


According to Petitioner, the above annotated figure depicts the claimed "longitudinally extending links" (in red). *Id.*

Patent Owner responds that Cox does not satisfy the claimed "longitudinally extending links" (Prelim. Resp. 41) because Cox's links are straight (*id.* at 42).

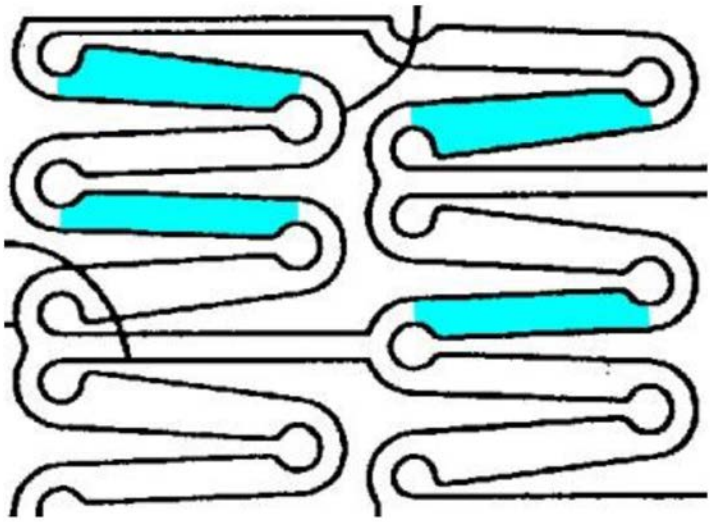
As explained above, however, we disagree with Patent Owner's proposed construction of this term and instead conclude that straight and non-straight components meet the claimed limitation. *See supra* Part II.B.2. Accordingly, we are not persuaded by Patent Owner's argument that Cox's seemingly straight components do not satisfy the claimed "longitudinally extending links."

To address the claimed "each set of strut members comprising a multiplicity of connected curved sections and diagonal sections," Petitioner submits another annotated, enlarged version of Cox's Figure 5 (*id.* at 56), which we reproduce below:



According to Petitioner, and as shown in the annotated, enlarged version of Figure 5, Cox discloses "curved sections" (in orange) and "diagonal sections" (in blue). *Id.*

To address the claimed "tapered shape wherein the width of the at least one diagonal section is different at the center of the diagonal section as compared to the width at either end," Petitioner submits yet another enlarged, annotated version of Cox's Figure 5 (*id.* at 58), which we reproduce below:



According to Petitioner, and as shown in the above annotated,

enlarged version of Figure 5, the "above diagonal sections have two different shapes—one with a one-sided taper at each end of the diagonal section (lower two examples in blue) and one that additionally . . . tapers along the full length of the diagonal section (upper two examples in blue)." *Id.*

Patent Owner responds that Cox fails to disclose the claimed "tapered shape" (Prelim. Resp. 40), relying on its claim construction that "tapered shape" means "'a shape with a generally uniform and gradual decrease or increase in width *about a centerline*'" (*id.* at 41 (emphasis added)).

As discussed above (*supra* Part II.B.1), we disagree with Patent Owner's construction of this term and instead agree with Petitioner that Cox's "diagonal section" meets the claimed "tapered shape," even if these diagonal sections are not tapered about a centerline. *See* Ex. 1005, Fig. 5 (reference numeral 34).

Dependent claim 3 recites, "wherein the width of the at least one diagonal section is *less at the center* of that diagonal section compared to the width at either end." Ex. 1001, 14:53–56 (emphasis added). To address this limitation, Petitioner relies on the full-length taper (i.e., the *upper* two examples shown in the annotated, enlarged version of Cox's Figure 5, reproduced at the bottom of the preceding page). *See* Pet. 66.

As discussed above, dependent claims 4 and 5 require the width of the diagonal section to be *greater at the center* than at the ends. *See supra* Part II.C.2. To address these claimed limitations, Petitioner relies on each of Cox's diagonal sections as having a tapered shape where the width at the center is greater than the width at either end. *See* Pet. 66.

Patent Owner does not separately dispute Petitioner's contentions as

to claims 4 and 5.

At this stage of the proceeding, Petitioner establishes a reasonable likelihood that Cox anticipates claims 2–5.

F. Ground 4: Claims 2, 4, and 5 as Unpatentable over Cox in view of a POSITA's Knowledge and Rolando

Petitioner asserts in the alternative that claims 2, 4, and 5 would have been unpatentable over Cox in view of a POSITA's knowledge and Rolando. Pet. 67; *see also supra* n.4. In particular, Petitioner presents this alternate ground "out of an abundance of caution" in the event that we construe "tapered shape" as Patent Owner proposes. *See id.* (explaining that this ground is premised on an "erroneous proposed construction of 'tapered shape.'").

We do not construe "tapered shape" as Patent Owner proposes (*see supra* Part II.B.1). As such, we do not substantively address this ground as any analysis on our part would be advisory.

G. Ground 5: Claim 3 as Unpatentable over Cox in view of a POSITA's Knowledge and Duerig

Petitioner asserts, in the alternative, that claim 3 would have been unpatentable over Cox in view of a POSITA's knowledge and Duerig. Pet. 69; *see also supra* n.4. In particular, Petitioner presents this alternate ground "out of an abundance of caution" in the event that we construe "tapered shape" as Patent Owner proposes. *See id.* at 70 (explaining that this ground is premised on an "erroneous proposed construction of 'tapered shape.'").

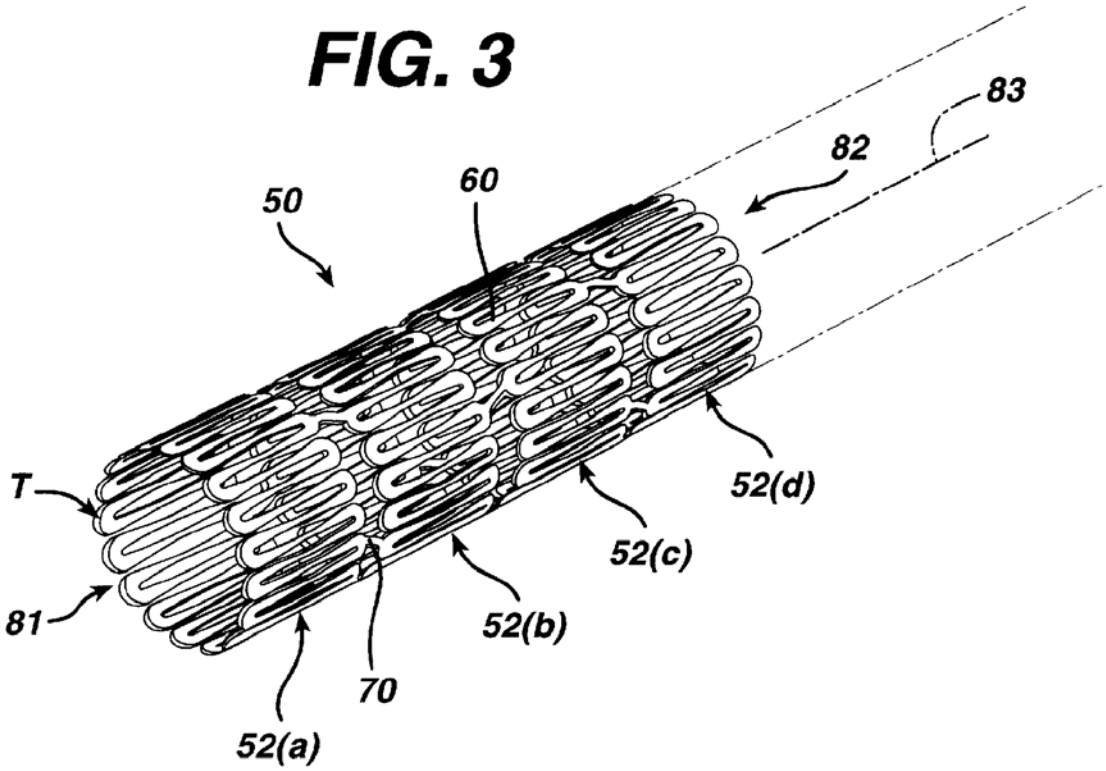
We do not construe "tapered shape" as Patent Owner proposes (*see supra* Part II.B.1). Accordingly, we do not address this ground as any analysis on our part would be advisory.

H. Ground 6: Claims 2 and 3 as Anticipated by Duerig

Petitioner asserts that claims 2 and 3 are anticipated by Duerig. Pet. 74.

1. Duerig (Ex. 1006)

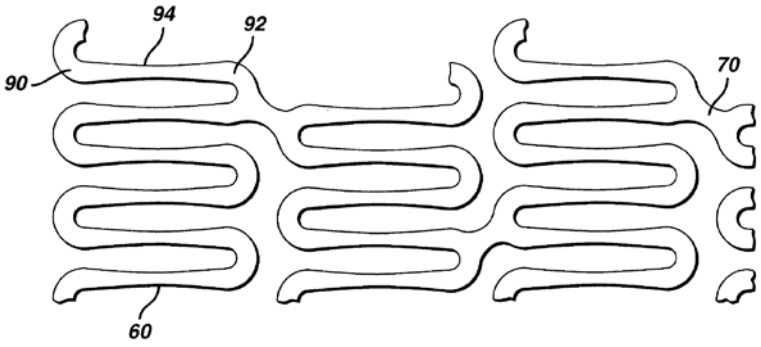
Duerig is entitled "Intravascular Stent Having Tapered Struts" (Ex. 1006, (54)) and discloses a self-expanding stent with struts that have a "width which is greater at its ends than at its center" (*id.* at (57)). To depict an embodiment of Duerig's stent, we reproduce Figure 3, below:



According to Duerig, Figure 3 depicts its stent 40, with hoops 52(a)–52(d) in a compressed shape. *Id.* at 4:65–67, 5:27–34.

We also reproduce Duerig's Figure 4A, below:

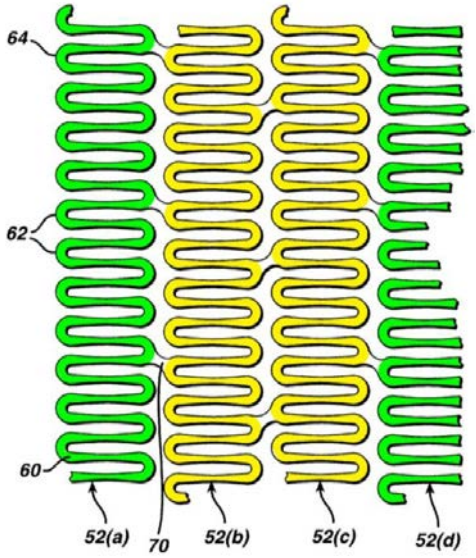
FIG. 4A



According to Duerig, Figure 4A depicts a sectional, flat view of its stent. *Id.* at 5:1–2. Specifically, Figure 4A illustrates strut 60 with two opposing ends 90, 92 and center 94. *Id.* at 5:36–38. Figure 4A also shows bridge 70, which connects the adjacent hoops. *See id.* at 5:43–45 (referencing Figure 4).

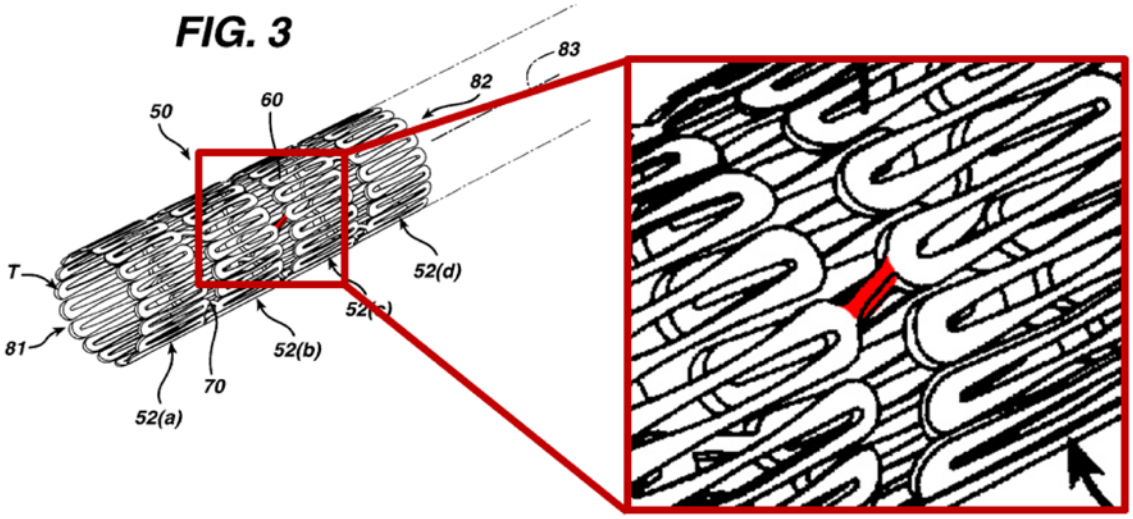
2. Analysis

Petitioner contends that Duerig anticipates claims 2 and 3, and submits an annotated version of Figure 4 (Pet. 75), which we reproduce below:



According to Petitioner, the above annotated Figure 4 depicts a "multiplicity of circumferential sets of strut members" including "end sets of strut members" (in green) and "central sets of strut members" (in yellow). Pet. 74–75.

To address the claimed "longitudinally extending links," Petitioner submits an annotated version of Duerig's Figure 3 (Pet. 76), which we reproduce below:



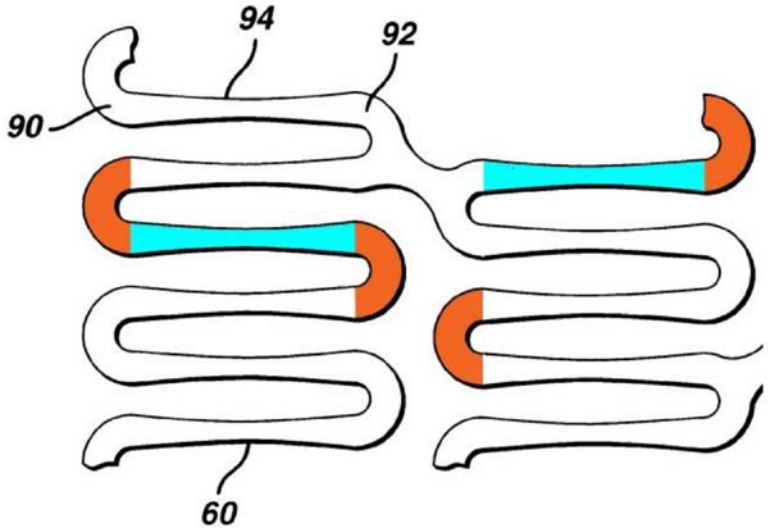
According to Petitioner, and as shown in the above annotated Figure

3, Duerig discloses "longitudinally extending links" (in red) that connect adjacent sets of strut members. *Id.* at 75–76.

Patent Owner responds that Duerig's components do not satisfy the claimed "longitudinally extending link" because they are not a "'non-straight component that connects two circumferential sets of strut members and that extends generally in the direction of the stent's longitudinal axis.'" Prelim. Resp. 45.

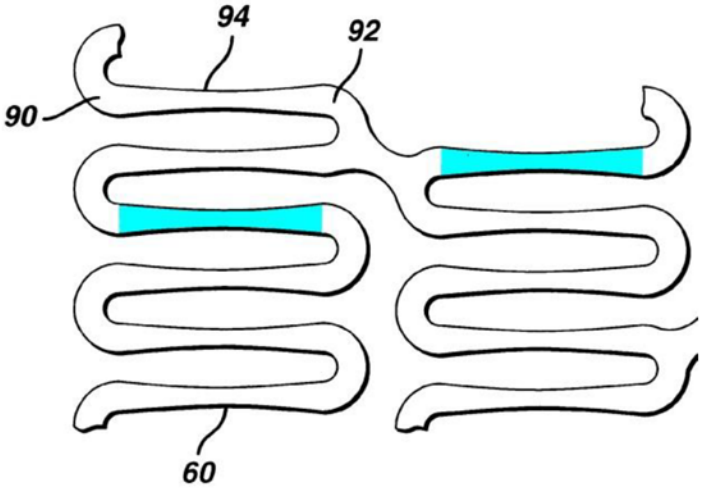
We are not persuaded by Patent Owner's position. As discussed above, we interpret the claimed "longitudinally extending links" to include straight and non-straight components, and the claimed links need not extend *solely* in the direction of the longitudinal axis. *Supra* Part II.B.2. Accordingly, we determine that Duerig's components 70 meet the claim limitation.

To address the claimed "each set of strut members comprising a multiplicity of connected curved sections and diagonal sections," Petitioner submits another partially annotated, enlarged version of Duerig's Figure 4A (Pet. 77), which we reproduce below:



According to Petitioner, and as shown above in annotated Figure 4A, Duerig discloses "a multiplicity of connected curved sections" (in orange) and "diagonal sections" (in blue). *Id.*

To address the claimed "tapered shape wherein the width of the at least one diagonal section is different at the center of the diagonal section as compared to the width at either end," Petitioner submits another partially annotated, enlarged view of Duerig's Figure 4A (*id.* at 79), which we reproduce below:



According to Petitioner, and as shown in the above annotated Figure 4A, Duerig discloses "diagonal sections" (in blue) in which "'the width continuously tapers from a greater width at the ends to a smaller width at the center.'" *Id.* at 78 (citing Ex. 1006, 4:49–52).

Dependent claim 3 further recites, "wherein the width of the at least one diagonal section is *less at the center* of that diagonal section compared to the width at either end of that diagonal section." Ex. 1001, 14:53–56 (emphasis added). To meet this limitation, Petitioner relies on Duerig's "diagonal sections" with a smaller width at the center, as discussed above. *See* Pet. 84–85.

Patent Owner does not separately dispute Petitioner's challenge of claim 3.

At this stage of the proceeding, Petitioner establishes a reasonable likelihood that Duerig anticipates claims 2 and 3.

I. Ground 7: Claims 4 and 5 as Unpatentable over Duerig in view of a POSITA's Knowledge and Cox

Petitioner asserts that claims 4 and 5 are unpatentable over Duerig in view of a POSITA's knowledge and Cox. Pet. 85; *see also supra* n.4.

In a nutshell, claims 4 and 5 require that the width at the center of the diagonal section be greater than the width at either end. *See supra* Part II.C.2; *see also* Ex. 1001 (Certificate of Correction).

To address these limitations, Petitioner asserts that Cox teaches using diagonal sections wherein the width at the center is greater to increase radiopacity. Pet. 85. Cox discloses, "the overall radiopacity of the stent can be increased by increasing the width of the strut in the low stress regions." Ex. 1005, 4:16–17. Mr. Brown testifies that a POSITA would have been motivated to modify Duerig to widen the center of its "diagonal sections" for several reasons, including the "desire to have sufficient stent radiopacity to ensure that the implanting physician could place the stent in the proper location." Ex. 1002 ¶ 54.

Relying on Cox's disclosure and Mr. Brown's testimony, Petitioner reasons that a POSITA would have modified Duerig's "diagonal sections such that the center was wider—instead of narrower—than either end in the manner recited in claims 4 and 5." Pet. 85–86.

Patent Owner does not separately dispute Petitioner's challenge of claims 4 and 5.

At this stage of the proceeding, Petitioner establishes a reasonable likelihood that claims 4 and 5 would have been unpatentable Duerig in view of a POSITA's knowledge and Cox.

III. CONCLUSION

Upon review of Petitioner's analysis and supporting evidence, we conclude that Petitioner has demonstrated a reasonable likelihood that it will prevail with regards to its challenge of claims 2–5 as unpatentable. At this stage of the proceeding, although we exercise our discretion and institute review, we remind the parties that we have not yet made a final determination as to the patentability of any challenged claims.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 2–5 of the '278 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '278 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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