

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WILLIS ELECTRIC CO., LTD.,
Petitioner,

v.

POLYGROUP MACAU LTD. (BVI),
Patent Owner.

Case IPR2017-00309
Patent 8,863,416 B2

Before WILLIAM V. SAINDON, JEREMY M. PLENZLER, and
BARBARA A. PARVIS, *Administrative Patent Judges*.

PLENZLER, *Administrative Patent Judge*.

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

I. INTRODUCTION

We have jurisdiction to hear this *inter partes* review under 35 U.S.C. § 6, and this Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1 and 4 of U.S. Patent No. 8,863,416 B2 (Ex. 1001, “the ’416 patent”) are unpatentable.

A. Background

Willis Electric Co., Ltd. (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–10 (“the challenged claims”) of the ’416 patent. Paper 1 (“Pet.”). Polygroup Macau Ltd. (BVI) (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”).

Pursuant to 35 U.S.C. § 314, we instituted trial on all challenged claims, and on all bases set forth in the Petition. *See* Paper 11 (“Dec. to Inst.”), 14–15. After institution of trial, Patent Owner filed a Patent Owner Response (Paper 27, “PO Resp.”), to which Petitioner filed a Reply (Paper 38, “Reply”).

An oral hearing was held on February 5, 2018. A transcript of the hearing is included in the record. Paper 46 (“Tr.”).

B. Related Matters

Petitioner and Patent Owner identify a district court proceeding specifically directed to the ’416 patent. Pet. 68–69; Paper 5, 2. The parties identify no other proceedings before the Patent Trial and Appeal Board specifically directed to the ’416 patent.

C. Asserted Grounds of Unpatentability and Evidence of Record

Petitioner contends that the challenged claims are unpatentable under 35 U.S.C. § 103 as set forth below (Pet. 26–67). As explained in our

Decision to Institute, trial was instituted for claims 1–10 based on the combination of Chen¹ and McLeish² and additionally for claims 1–4 and 8–10 based on the combination of Otto³ and McLeish. *See, e.g.*, Dec. to Inst. 8 n.4, 12 n.7, 15.

Petitioner provides testimony from William K. Durfee, Ph.D. Ex. 1002; Ex. 1026. Patent Owner provides testimony from Michael S. Lebby, Ph.D. Ex. 2001; Ex. 2004. Petitioner also provides deposition testimony from Dr. Lebby (Ex. 1035) and Patent Owner provides deposition testimony from Dr. Durfee (Ex. 2021).

D. The '416 Patent

The '416 patent is directed to power transfer systems and, more particularly, to “power transfer systems for use with artificial trees, such as artificial Christmas trees.” Ex. 1001, 1:14–17. Figures 7 and 10 of the '416 patent are exemplary, and are reproduced below.

¹ U.S. Pat. No. 8,454,186 B2, iss. June 4, 2013 (Ex. 1007, “Chen”).

² U.S. Pat. No. 7,066,739 B2, iss. June 27, 2006 (Ex. 1011, “McLeish”).

³ DE 8436328.2, pub. Apr. 4, 1985 (Ex. 1009, “Otto”). Exhibit 1009 includes both the original German-language document, as well as the English translation.

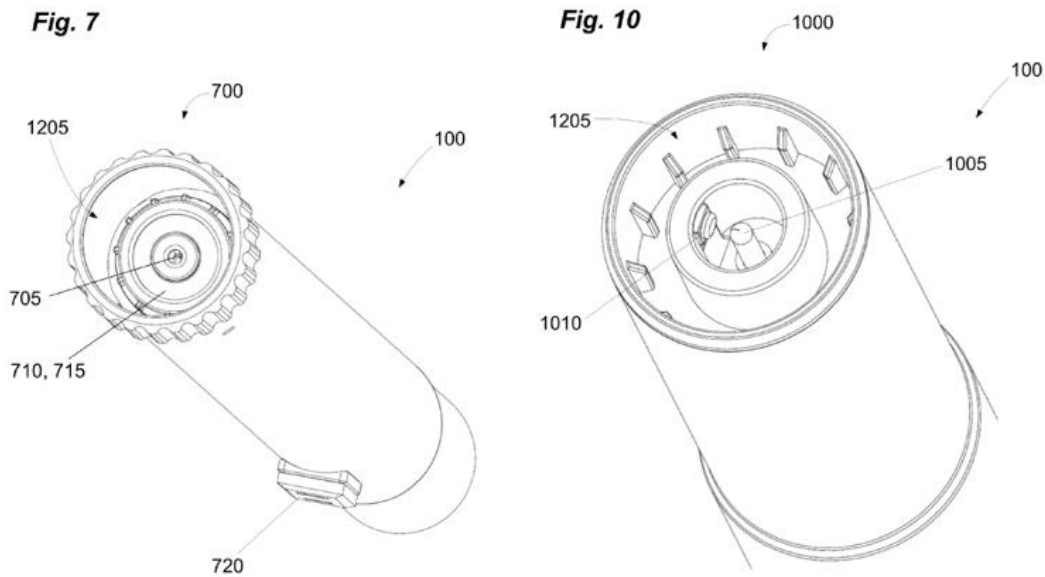


Figure 7 is a perspective view of a female end of a power distribution subsystem of a tree trunk section and Figure 10 is a perspective view of a male end of a power distribution subsystem of a tree trunk section.

The '416 patent explains that its power distribution subsystems include male and female ends and wires connecting the male and female ends, and may additionally include electrical outlets on the tree trunk sections. *Id.* at 11:4–27. The '416 patent describes female end 700 shown in Figure 7 as “compris[ing] central receiving void 705 for engaging with a prong of a male end and channel receiving void 710 for engaging with another prong of a male end.” *Id.* at 12:26–29. “[M]ale end 1000 can have one or more prongs for receiving power from, or distributing power to, a female end 700 of a tree trunk section 100.” *Id.* at 13:28–31. More specifically, the '416 patent describes male end 1000 shown in Figure 10 as “hav[ing] a central male prong 1005 and a channel male prong 1010,” and explains that “the central male prong 1005 and channel male prong 1010 of the male end 1000 are inserted into the central receiving void 705 and

channel receiving void 710 of the female end 700, respectively.” *Id.* at 13:29–36.

Figures 8 and 9 illustrate additional details of female end 700, and are reproduced below.

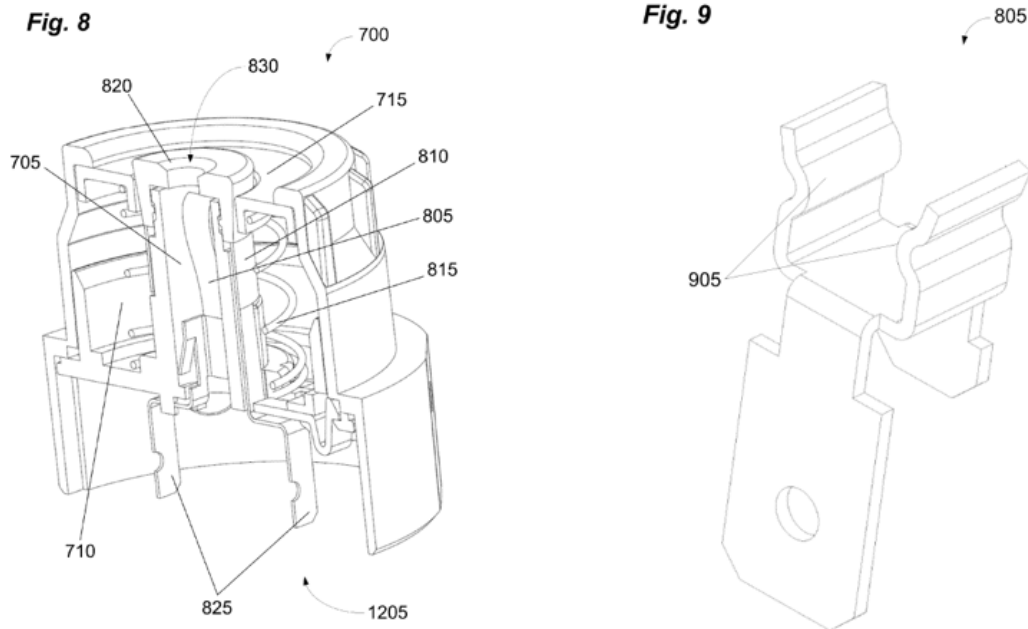


Figure 8 is a section view of female end 700 of the power distribution subsystem from Figure 7 and Figure 9 is a perspective view of the central contact device shown in Figure 8. Female end 700 includes central contact device 805 in central receiving void 705 and channel contact device 810 in channel receiving void 710. *Id.* at 12:38–44. “[C]entral contact device 805 can have one or more contact sections 905 that utilize spring action to make contact with a prong inserted into central receiving void 705.” *Id.* at 13:10–13. The ’416 patent explains that as central male prong 1005 is inserted into central receiving void 705, contact sections 905 “press against (i.e., spring back against) the prong” and this “spring action of the contact sections 905

can ensure that the electrical connection between the contact sections 905 and the prong is effective to transfer electrical power.” *Id.* at 13:13–23.

E. Illustrative Claims

As noted above, Petitioner challenges claims 1–10 of the ’416 patent. Claim 1 is the sole independent claim, and is reproduced below:

1. An artificial tree, comprising:
 - a plurality of tree trunk sections, the trunk sections forming a trunk of the artificial tree;
 - a first power distribution subsystem disposed within an inner void of a first trunk section of the plurality of tree trunk sections, the first power distribution subsystem comprising a male end, the male end having a central prong and a channel prong; and
 - a second power distribution subsystem disposed within an inner void of a second trunk section of the plurality of tree trunk sections, the second power distribution subsystem comprising a female end, the female end having a central void and a channel void, the central void having a contact device disposed at least partially therein, the contact device comprising one or more spring activated contact sections;wherein the central prong of the male end is configured to engage the central void of the female end and the channel prong of the male end is configured to engage the channel void of the female end to conduct electricity between the first power distribution subsystem and the second power distribution subsystem; and
- wherein, when the central prong engages the central void, the central prong pushes a spring activated contact section of the one or more spring activated contact sections causing the spring activated contact section to press against the central prong to maintain electrical contact between the central prong and the contact device.

Ex. 1001, 15:58–16:26.

II. ANALYSIS

A. Claim Construction

Only those terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). We construe the claims using the broadest reasonable construction in light of the '416 patent Specification. See 37 C.F.R. § 42.100(b). Applying that standard, we interpret the claim terms of the '416 patent according to their ordinary and customary meaning in the context of the patent's written description. See *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An inventor is entitled to be his or her own lexicographer of patent claim terms by providing a definition of the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, however, limitations are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

Petitioner proposes constructions for several terms. Pet. 19–24. Patent Owner proposes constructions for “female end” and “channel void.” PO Resp. 8–14. To resolve the questions of patentability raised by the Petitioner, we need only determine what structure defines the “channel void.”

Initially, we note that neither party contends that “channel void,” itself, has any special meaning in the art or that the '416 patent provides a lexicographical definition for that term.

Petitioner contends that a “channel void” is “a hollow or aperture which may be substantially circular, offset from the central void and

configured to receive and engage a portion of another connector” (Pet. 23 (emphasis omitted) (citing Ex. 1002 ¶ 24)) and does not need to be disposed within the female end of the power distribution subsystem (Reply 11–12 (citing Ex. 1026 ¶¶ 21, 34–36)). Specifically, Petitioner concludes that “[h]aving’ a void does not require that the void must be located *inside* a structure, or that its boundary is another specific structure.” Reply 12. Dr. Durfee testifies that “[a] POSA would understand . . . that the channel void is a space, separate from the central void.” Ex. 1002 ¶ 24. Dr. Durfee further testifies that “[a] POSA would understand that ‘having’ a void simply means the disclosed female end of the power distribution subsystem possesses a void. It does not require that the void must be located *inside* the female end.” Ex. 1026 ¶ 21. Dr. Durfee contends that “[n]othing in the ’416 patent indicates such a requirement.” *Id.*

Patent Owner proposes that the “channel void” requires “[a] hollow or aperture disposed within a portion of the female end, which may be substantially circular, offset from the central void and configured to receive and engage a portion of the male end.” PO Resp. 12 (emphasis omitted). Specifically, Patent Owner contends that the “channel void” must be defined by the female end of the power distribution subsystem and not by a combination of the power distribution subsystem and the trunk section. *Id.* at 12–14 (citing Ex. 2004 ¶¶ 103, 105, 106, 108). Dr. Lebby testifies that “[b]ased on the Petitioner’s construction, a channel void could be interpreted as merely air or space that is independent of the female end,” which “is unreasonably broad and inconsistent with the claim language and specification of the ’416 Patent.” Ex. 2004 ¶ 103. Dr. Lebby explains that “the channel void includes actual structure of the ‘female end,’ and is not

simply air or space” (*id.* at ¶ 105) and cites to the Specification of the ’416 patent, including the embodiment shown in Figure 8, to support his testimony (*id.* at ¶ 106).

Based on the record before us, after considering all of the evidence and argument presented by the parties, we agree with Patent Owner’s proposed construction. We credit the testimony of Dr. Lebby over that of Dr. Durfee in that regard because, as explained below, unlike Dr. Lebby’s testimony, Dr. Durfee’s testimony is not consistent with the plain language of the claim or the disclosure from the Specification of the ’416 patent.

Claim 1 recites “a plurality of tree trunk sections” and a “power distribution subsystem comprising a female end . . . having . . . a channel void” and specifies that the “power distribution system [is] disposed within an inner void of a second [tree] trunk section.” There is no dispute that each embodiment of the ’416 patent shows the power distribution subsystem is a component separate and distinct from the tubular structure defining the body of the various “tree trunk sections.” For example, Figure 8 of the ’416 patent, reproduced above in the summary of the ’416 patent, shows the power distribution subsystem as a separate component with female end 700 of the power distribution subsystem, itself, defining channel receiving void 710. *Id.* at 12:38–44, Fig. 8.

Although the Specification of the ’416 patent makes clear that the patent is not limited to these embodiments (*see, e.g.*, Ex. 1001, 6:14–56), the claims specifically recite a “power distribution subsystem” separate and distinct from the “tree trunk section.” Specifically, they require the “power distribution subsystem [is] disposed within an inner void of [the tree] trunk section.” Contrary to Petitioner’s contentions, the plain language of claim 1

requires that the “channel void” is formed in the “power distribution subsystem,” rather than some combination of an external surface of the power distribution subsystem and an internal surface defining the inner void of tree trunk section.⁴ Petitioner’s contentions regarding the word “having” do not persuade us otherwise. Petitioner’s proposed construction is unreasonably broad, as it is divorced from the plain language of the claims. The evidence before us, discussed above in this section, supports Patent Owner’s contentions that “the female end [of the power distribution subsystem] having . . . a channel void” requires that “channel void” is formed in the female end of the power distribution subsystem.

For at least these reasons, we determine that the “channel void” in claim 1 must be formed in the female end of the power distribution subsystem (i.e., not defined only by an outer wall of the power distribution system in combination with an interior void of the tree trunk section).

B. Chen Ground

Petitioner challenges claims 1–10 based on the combination of Chen and McLeish, relying on teachings from Chen’s non-provisional disclosure in its challenge to claims 1–10 (Pet. 26–37, 42–48) and, alternatively, those disclosed in Chen’s provisional application in its challenge to claims 1 and 4 (*id.* at 37–42, 44). In our Decision to Institute, we expressly noted “Petitioner’s alternate reliance on disclosure from Chen’s provisional

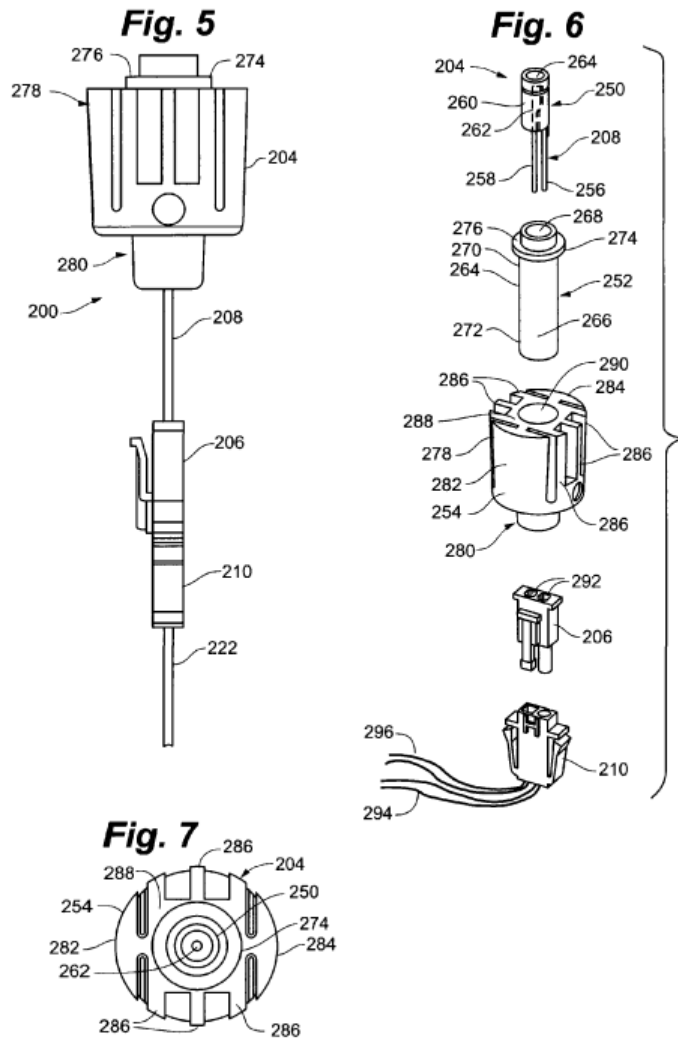
⁴ This stands in contrast to the claims of U.S. Patent No. 8,959,810 B1 (the ’810 patent), which shares a common specification with the ’416 patent. The ’810 patent is at issue in the related IPR2017-00334 proceeding. Claim 1 of the ’810 patent, for example, does not recite a “power distribution subsystem” and, instead, recites “a female end of a second trunk section . . . having . . . a channel void.”

application as part of this single ground.”⁵ Dec. to Inst. 8 n.4. That provisional application is incorporated by reference in Chen. *See* Ex. 1007, 1:6–10.

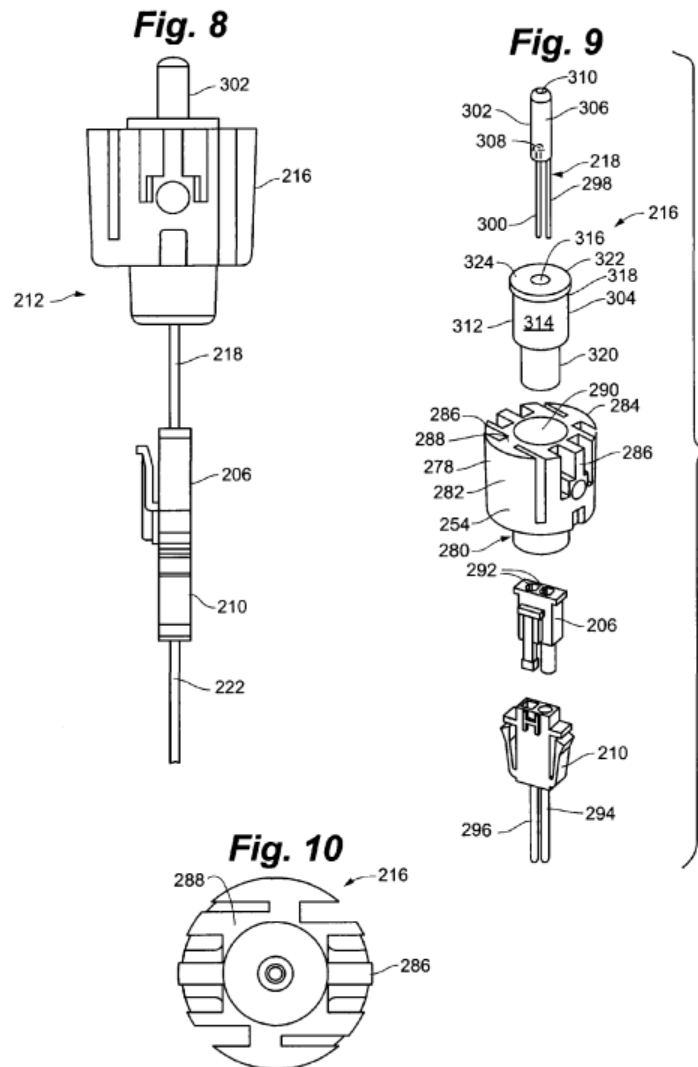
1. Non-Provisional Disclosure

Petitioner’s challenges that rely on the teachings from Chen’s non-provisional disclosure cite Chen as teaching the “channel void” recited in claim 1. *See* Pet. 30–32. Figures 5–10 of Chen are reproduced below to assist in illustrating Petitioner’s contentions.

⁵ Chen’s provisional application (“the provisional application”) is application serial number 61/385,751 and is in the record as Exhibit 1008.



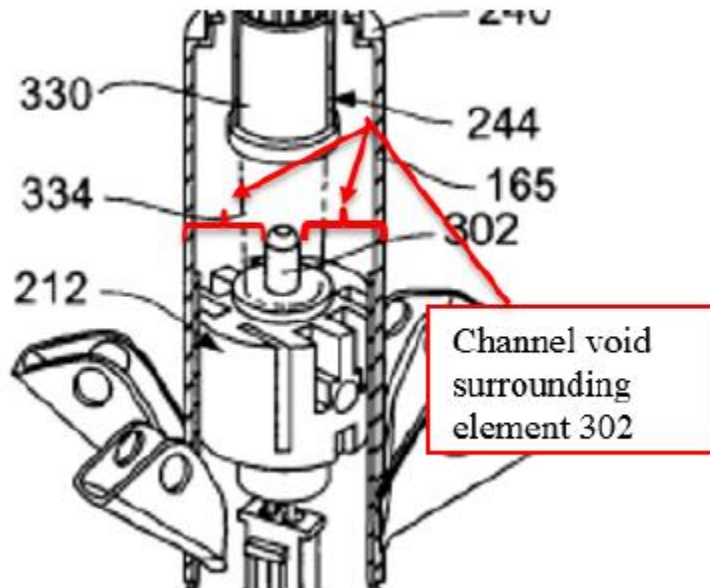
Figures 5–7 are side, exploded, and end views, respectively, of Chen’s connector 200.



Figures 8–10 are side, exploded, and end views, respectively, of Chen’s connector 212.

Petitioner cites Chen’s female connector 200 as corresponding to the male end of the first power distribution subsystem with contact 262 corresponding to the “central prong” and contact 260 corresponding to the “channel prong” (*id.* at 28–29), and male connector 212 as corresponding to the female end of the second power distribution subsystem with receptacle 310 corresponding to the “central void” and the region surrounding contact

306 corresponding to the “channel void” (*id.* at 30–31). Petitioner provides an annotated fragmentary version of Chen’s Figure 16b (“the annotated figure”), reproduced below, to illustrate the “channel void” in Chen. Pet. 31.



The figure reproduced above is a fragmentary view of Chen’s Figure 16b, which depicts a cross-sectional view of Chen’s tree, and includes Petitioner’s annotation identifying the “channel void” in that figure.

As seen in the annotated figure above, male connector 212 (considered the female end of the second power distribution subsystem by Petitioner) does not, by itself, define a “channel void” as required by our construction of that term. This is not surprising because Chen explains that “trunk connector assembly 200 is a female trunk connector configured to receive a male counterpart [connector 212] to form a coaxial-like electrical connection.” Ex. 1007, 9:9–11. Moreover, we note that Petitioner does not even allege that this structure from Chen meets our construction of “channel void” (*see, e.g.*, Reply 19–25), which it was aware of when it filed its Reply because that construction was in Patent Owner’s Response (PO Resp. 12–

14), as noted above. Petitioner's challenges relying on the teachings of Chen's non-provisional disclosure fail for at least that reason, as they are based on Petitioner's claim construction, which we do not adopt, *supra* Section II.A.

We note that Petitioner's combination of the teachings of McLeish with those of Chen does not cure the deficiencies set forth above. The Petition explains that "McLeish includes express disclosure of spring-activated-contact sections utilized in both 'channel prong' locations as well as 'central void' locations, and there is no such express disclosure in Chen or Chen provisional," and that "McLeish discloses a structure for a 'channel prong' that is not circular, but is instead an elongated slender projectile, and may meet a narrower construction for a 'channel prong' than is suggested by Petitioner." Pet. 48. Petitioner contends "[s]pecifically, [that] a POSA would find it obvious to combine the coaxial tree-trunk connectors of Chen with the spring-activated-contact sections of McLeish." *Id.* Petitioner reasons that "[a] POSA would be motivated to combine or utilize such contacts in the design of Chen because spring-activated-contacts prevent arcing and have a more secure electrical connection since the electrical contacts are held together," and "[a]s a result, a POSA could readily envision adding spring-activated-contact sections to the disclosure of Chen." *Id.* at 49. Accordingly, we do not read the Petition as proposing any modifications to Chen related to the structure defining the channel void. Indeed, Petitioner made this very clear at oral hearing. *See* Tr. 59:8–9 ("With McLeish we're only looking in this proceeding for very limited disclosure of electrical contacts.").

Nevertheless, we acknowledge that the Petition states that “McLeish discloses an embodiment of the female end of a power sub-distribution system that includes a central void 554 and a channel void.” Pet. 51. We read that statement simply as supporting the proposed modification to use McLeish’s spring-activated contacts in Chen, rather than asserting a teaching of a “channel void” for modifying Chen’s structure to include such a feature. Moreover, even if one were to disregard Petitioner’s express statement at oral hearing regarding the nature of its reliance on McLeish, noted above, and read the Petition as relying on McLeish teaching the “channel void” for purposes of meeting that claim element, the Petition fails to provide any, let alone sufficient, rationale for modifying Chen accordingly. The generic statement that “POSAs would find it obvious to combine the disclosures of Chen with the disclosures of McLeish” (*id.* at 48) provides no reason to combine specific teachings of McLeish with those of Chen related to the structure defining the channel void.

For these reasons, Petitioner’s contentions in connection with the teachings of Chen’s non-provisional disclosure fail to establish by a preponderance of the evidence that claims 1–10 are unpatentable.

2. Provisional Disclosure

As noted above, Petitioner alternatively contends that the disclosure from the provisional application teaches a majority of the limitations recited in the challenged claims. *See, e.g.*, Pet. 37–42, 44. As noted above, Petitioner only references the teachings of the disclosure from the provisional application with respect to its challenges to claims 1 and 4. Patent Owner contends that it is improper for Petitioner to rely on teachings from that provisional application. PO Resp. 47–51.

Initially, it is worthwhile to clarify the dispute between the parties with respect to the disclosure from the provisional application, as several of the arguments presented by Patent Owner are not relevant to the basis for which Petitioner relies on that disclosure from the provisional application. There is no dispute between the parties that Chen qualifies as prior art under at least 35 U.S.C. § 102(e). Pet. 9; PO Resp. 50–51. Petitioner does not rely on the provisional application for a priority date for Chen or as a standalone printed publication. *See, e.g.*, Tr. 7:7–9:9. Rather, Petitioner relies on the provisional application as being part of the disclosure of Chen due to its incorporation by reference. Patent Owner does not identify, nor do we find, any particular fault in the manner in which the provisional application was incorporated by reference into Chen. PO Resp. 51–57. Patent Owner made clear at oral hearing that the dispute concerning the disclosure from the provisional application centers on when that disclosure was publicly available, rather than there being any dispute as to whether the incorporation by reference, itself, is proper. *Id.* 38:9–20, 40:1–14; *see also* PO Resp. 53 (“effective incorporation has always been predicated on public disclosure of the incorporated material”).

Petitioner contends that “[t]he provisional application was available as of the March 29, 2012 publication date of *Chen*’s non-provisional application.” Reply 19 (citing 37 C.F.R. §1.14(a)(1)(v)–(vi)). Patent Owner contends that “[a]fter the patent, Chen patent issues, then there would be the ability to get access to the Chen provisional. But before that there wouldn’t be.” Tr. 38:9–11.

Chen was published on March 29, 2012. Ex. 1007, (65). A provisional patent application, such as the one at issue in this proceeding, is

available to the public upon written request and payment of a fee after, for example, the non-provisional application is published. *See, e.g.*, 37 C.F.R. §§ 1.11(a) and 1.14(a)(1)(v). We see no basis for Patent Owner’s position that Chen’s provisional patent application was not sufficiently publicly available. Indeed, as noted above, Patent Owner’s position is premised on the mistaken understanding that provisional patent applications are not publicly available until the corresponding non-provisional filing issues as a patent. Patent Owner acknowledges it has no particular support for its contentions. *See, e.g.*, Tr. 38:22–39:1 (“And while both sides have cited a variety of cases, surprisingly to me there is no case that precisely addresses this.”).

Based on the record before us, we determine that the disclosure from the provisional application was properly incorporated by reference in Chen and publically available as of the publication date of the application resulting in the Chen patent (i.e., March 29, 2012). Therefore, the provisional application is part of the disclosure of Chen.

a) Claim 1

Petitioner cites the disclosure of the provisional application as expressly teaching each limitation recited in claim 1, other than “the central void having a contact device disposed at least partially therein, the contact device comprising one or more spring activated contact sections” and “when the central prong engages the central void, the central prong pushes a spring activated contact section . . . causing the spring activated contact section to press against the central prong to maintain electrical contact between the central prong and the contact device.” Pet. 37–42. With respect to those additional limitations, Petitioner notes that “Chen Provisional also suggests

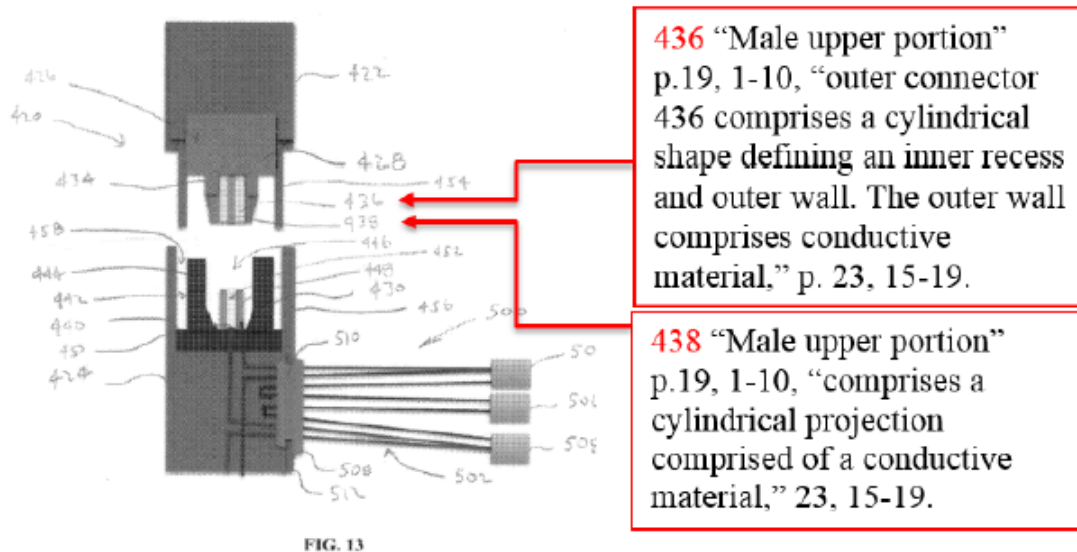
that a POSA may utilize contact terminals other than the ones specifically disclosed” (Pet. 41 (citing Ex. 1008, 24⁶)) and “[i]ncorporating by reference arguments *supra*, Parts (V)(A)(vi)&(viii), POSAs would find it obvious to employ spring-activated-contact sections in the contact device and recognize how such connections function” (*id.*). The arguments in “Parts (V)(A)(vi)&(viii)” referenced by Petitioner are found on pages 32–36 of the Petition and reference “Chen[’s] suggest[ion of] interchangeable terminals, including those that include spring-activated-contact regions” (Pet. 33), as well as “[t]he use of spring-activated electrical terminals was well known at the time of the ’416’s invention and fell within the knowledge of a POSA,” such as those from McLeish (*id.* at 33–34). Petitioner reasons that “[i]t would be obvious to a POSA to employ . . . a [spring-activated] contact in the central void of the female end in order to secure a reliable connection.” *Id.* at 35 (citing Ex. 1002 ¶¶ 101–105).

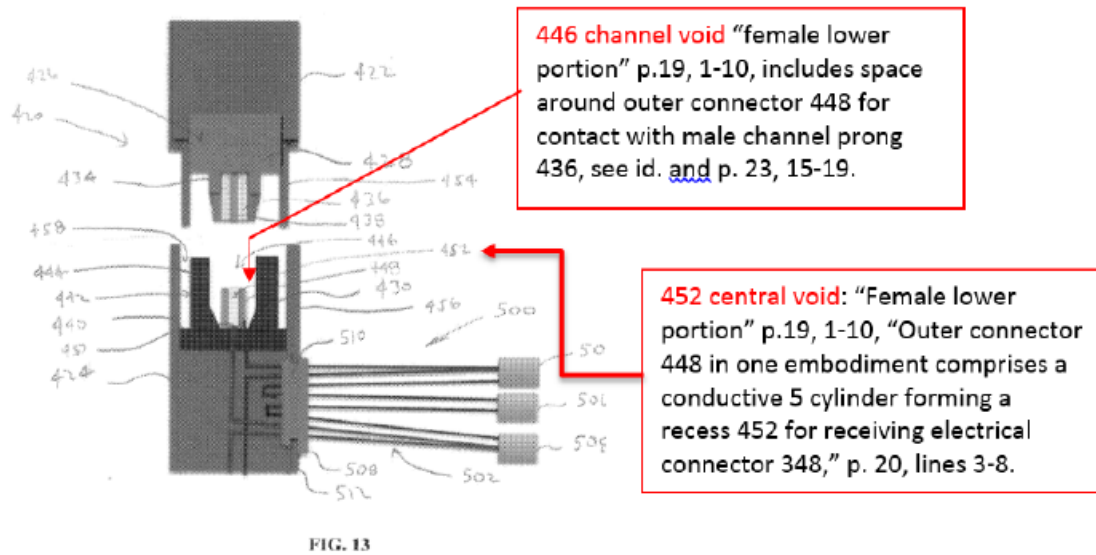
Patent Owner does not dispute Petitioner’s contentions regarding the alleged teachings from the disclosure of the provisional application and, instead, relies on its contentions with respect to whether the disclosure from the provisional application can be used for Petitioner’s challenges. PO Resp. 14 n.2. As noted above, we are not persuaded by those contentions.

With respect to Petitioner’s challenge, we are persuaded by, and adopt, Petitioner’s undisputed contentions regarding the teachings of the

⁶ The citations herein to the provisional application (Ex. 1008) reference the page number of the exhibit, rather than the page number of the application, itself. To avoid confusion, we note that Petitioner mixes citations between page numbers from the application, itself (*see, e.g.*, Pet. 39 (referencing Ex. 1008, 9)), and those from the exhibit (*see, e.g., id.* at 41 (referencing Ex. 1008, 24)).

provisional application's disclosure. Pet. 38–41. For example, the provisional application describes a tree with “trunk 166 includ[ing] three portions, base portion 172, middle portion 174, and upper portion 176, that are each electrically and mechanically linked together” (Ex. 1008, 20), which Petitioner cites as corresponding to the “plurality of tree trunk sections” in claim 1. As for the “first power distribution subsystem comprising a male end” and the “second power distribution subsystem comprising a female end,” Petitioner provides annotated versions of Figure 13 from the provisional application, which are reproduced below.





The figures reproduced above are Figure 13 from the provisional application, which is a section view of a connection system for the tree disclosed in the provisional application, and include annotations labeling the portions of Figure 13 corresponding to the various parts of the male and female ends of the power distribution subsystems.

As seen in the figures reproduced above, the provisional application teaches a "male end having a central prong and a channel prong," as well as a "female end having a central void and a channel void." See Ex. 1008, 30–31 (describing the arrangement shown in Figure 13 consistent with Petitioner's contentions). Specifically, the disclosure of the provisional application describes the part including 436, 438 as a male connector (*id.* at 30) and the part including barrel receiving portion 446 and recess 452 as a female connector (*id.* at 30–31).

The Petition cites connectors 436, 438, 448, 450 as forming the electrical connection between the "male upper portion" and "female lower portion" in the disclosure from the provisional application noted above. Pet.

41 (citing Ex. 1008, 31). With respect to that connection, we find that the female end has “no externally exposed electrical conductors,” as required by Patent Owner’s construction of “female end” (PO Resp. 8), which we have adopted. The disclosure from the provisional application cited by Petitioner explains that “[o]uter connector 448 . . . comprises a conductive cylinder forming a recess 452 for receiving electrical connector 348” and “[i]nner connector 450 . . . comprises a pad-like, flat connection point for contacting with an end of electrical connector 438.” Ex. 1008, 31.

Based on our review of Petitioner’s undisputed contentions and the corresponding disclosure from the provisional application, we are persuaded that the provisional application teaches the features asserted by Petitioner.

As for the “spring activated contact” limitations, we are persuaded by Petitioner’s contentions that spring-activated contacts were well known in the art at the time of the invention. *See* Pet. 33–35 (citing, *e.g.*, Ex. 1007, 2:5–18, 11:21–28, 12:30–37; Ex. 1011, 12:64–67; Ex. 1002 ¶¶ 101–104). Indeed, there appears to be no dispute concerning that contention. *See, e.g.*, PO Resp. 24. Nevertheless, we find that McLeish discloses spring-activated contacts. Ex. 1011, 12:64–67. Moreover, Chen also discloses, for example, “bringing a pair of spring contacts into alignment with a pair of terminals to make an electrical connection.” *See* Ex. 1007, 2:5–18. Further, we credit Dr. Durfee’s testimony, which provides additional evidence that spring-activated contacts were well known at the time of the invention. *See* Ex. 1002 ¶¶ 101–104.

We are also persuaded that one skilled in the art would have found it obvious to utilize a spring-activated contact in the provisional application at least because “such a contact in the central void of the female end [would]

secure a reliable connection.” Pet. 35; *see also id.* at 41–42. Patent Owner does not dispute Petitioner’s rationale in connection with the disclosure of the provisional application.

With respect to the non-provisional disclosure, Patent Owner contends that Petitioner’s rationale is based on impermissible hindsight, that there is no evidence Chen’s connectors suffered from problems requiring the proposed modifications, and that the proposed modifications would render Chen inoperable. PO Resp. 22–29. To the extent these contentions are relevant to Petitioner’s proposed modification to the provisional application’s disclosure, we determine that Patent Owner’s response does not identify fault in Petitioner’s persuasive contentions with respect to the proposed modifications to the teachings of the provisional application’s disclosure. The provisional application explains that the portion considered the “central void” by Petitioner is “a conductive cylinder forming a recess 452 for receiving electrical connector [43]8.” Ex. 1008, 31. Petitioner’s proposed modification is simply to include a spring-activated contact on recess 452 to aid the engagement between recess 452 and electrical connector 438. Pet. 35; *see also* Tr. 59:8–9 (“With McLeish we’re only looking in this proceeding for very limited disclosure of electrical contacts.”). That recess 452 is part of what the provisional application’s disclosure, itself, characterizes as the female end. For at least the reasons explained above, we do not agree that such a modification is based solely on the disclosure from the ’416 patent. Nor does the proposed modification render the arrangement disclosed in the provisional application inoperable. Rather, spring-activated contacts improve the connection. *See* Ex. 1002 ¶ 102 (“[S]pring-activated contact(s) will ensure a more reliable electrical

connection between two contacts. This is especially true where the electrical connections are detachable.”).

For these reasons, Petitioner’s contentions in connection with the teachings of the provisional application’s disclosure establish by a preponderance of the evidence that claim 1 is unpatentable.

b) Claim 4

Claim 4 depends from claim 1, and further requires that “the channel void of the female end is substantially circular, and the central void of the female end is disposed proximate the center of the substantially circular channel void.” Petitioner contends that “Chen Provisional . . . discloses that the outer connector of the female portion is a conductive cylinder, meaning the negative space surrounding it and extending between itself and the trunk wall is also cylindrical.” Pet. 44 (citing Ex. 1002 ¶ 124). Patent Owner does not address specifically Petitioner’s contention with respect to claim 4.

Petitioner’s annotated versions of Figure 13 from the provisional application, reproduced above in connection with our discussion of claim 1, support Petitioner’s contentions related to claim 4. Those figures further cite various portions of the provisional application supporting Petitioner’s contentions. See Pet. 40 (citing, *e.g.*, Ex. 1008, 19–20). The cited portions of the provisional application describe barrel receiving portion 446 as being formed by cylindrical walls (i.e., “the channel void being substantially circular”), as well as recess 452 being within the cylinder defining the inner wall of barrel receiving portion 446 (i.e., “the central void of the female end is disposed proximate the center of the substantially circular channel void”). See Ex. 1008, 19–20.

Accordingly, we are persuaded that Petitioner has established by a preponderance of the evidence that claim 4 is unpatentable over the combined teachings of the provisional application's disclosure and those of McLeish.

c) Additional Dependent Claims

Petitioner offers no specific contentions with respect to claims 2, 3, and 5–10 in connection with the teachings of the provisional application's disclosure. To the extent the Petition attempted to combine the teachings of the disclosure of the provisional application with the other disclosure of Chen (i.e., the other embodiments), we note that there is no particular combination or modification articulated in the Petition. In the discussion of claim 1, the Petition simply notes that

A POSA would find it obvious to combine the disclosures of 61/385,751 with the '186 because the '186 incorporates the '751 in its entirety, the two references are highly related, from the same field of art, and seek to solve the same problem; and do so by disclosing aspects of the same invention in a different manner.

Pet. 38. This is not sufficient to establish obviousness of any particular dependent claim features not specifically addressed in the Petition.

3. Summary

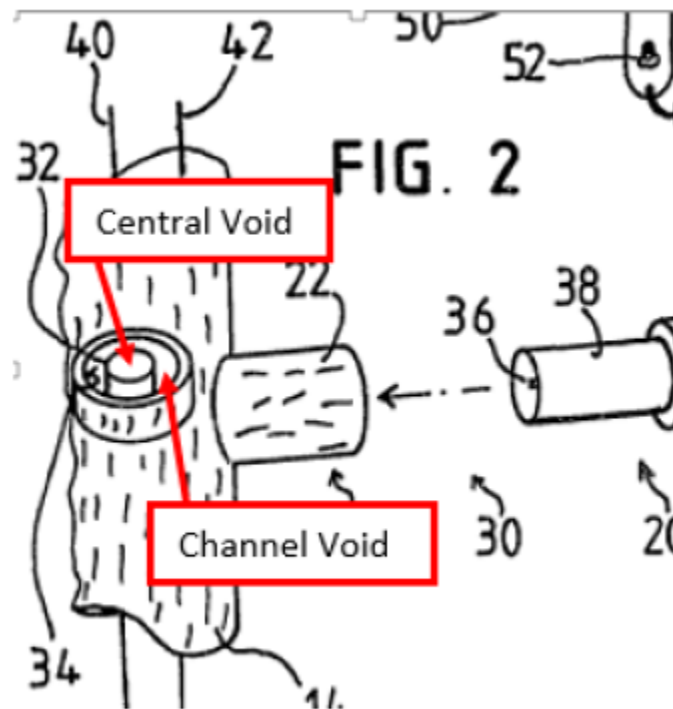
For the reasons set forth above, Petitioner has established by a preponderance of the evidence that claims 1 and 4 are unpatentable over the combined teachings of Chen and McLeish. Petitioner has failed to establish sufficiently that claims 2, 3, and 5–10 are unpatentable.

C. Otto Ground

Petitioner challenges claims 1–4 and 8–10 as unpatentable over Otto and McLeish. Pet. 56–67. Petitioner cites Otto as teaching the “channel

void” in the “female end” of the “second power distribution subsystem” recited in claim 1. Pet. 59. Patent Owner responds, for example, that “[b]ased on the limited disclosure in Otto, Petitioner fails to sufficiently demonstrate that Otto discloses a channel void.” PO Resp. 35. We agree with Patent Owner.

As noted above, we construe claim 1 as requiring that the “channel void” is formed in the power distribution subsystem. Otto discloses a Christmas tree having detachable trunk elements and branches. Ex. 1009, 21. Petitioner contends that “Otto teaches a lighted tree with conductors integrated inside the trunk” and “[t]he branch and trunk portions are mated using a coaxial connector as shown” in Figure 2. Pet. 17. Petitioner provides an annotated fragmentary version of Otto’s Figure 2 (Pet. 59), which is reproduced below.



The figure reproduced above is a fragmentary view of Otto's Figure 2, which is a partial exploded view of Otto's Christmas tree, and includes Petitioner's annotations indicating the portions considered the "central void" and the "channel void."

With respect to the "second power distribution subsystem," Petitioner explains that Otto "discloses four trunk sections" and "[t]he mechanical connecting areas for each of the four sections have electrical plug-in connections inside the trunk." Pet. 58 (citing Ex. 1009, 5:14, 18:10–12; 20:23–26). When mapping the teachings of Otto to the second power distribution subsystem, Petitioner merges the portion considered the trunk section and those considered the power distribution subsystem. *See id.* at 58–59. Petitioner contends that "bushing 34 is configured to accommodate coaxial plug 38" and "[f]rom this, and Fig. 2, a POSA would understand . . . the channel void was disclosed by bushing 34." Pet. 59.

The problem is that, at best, Petitioner has established that Otto discloses a "channel void" formed as part of a tree section (e.g., trunk element 14 discussed on page 57 of the Petition), rather than a "channel void" formed within a female end of a power distribution subsystem that is separate and distinct from the tree section, as required by our claim construction above. Petitioner's contentions with respect to the dependent claims do not remedy this deficiency.

We further note that, unlike the Chen challenge, the challenge based on Otto does not even reference McLeish having a "channel void." Accordingly, any reliance on McLeish does not remedy the deficiencies noted above.

For at least these reasons, Petitioner has failed to establish sufficiently that claims 1–4 and 8–10 are unpatentable over the combination of Otto and McLeish.

III. SUMMARY

For the reasons set forth above, we determine that Petitioner has established by a preponderance of the evidence that claims 1 and 4 of the '416 patent are unpatentable, but has failed to establish sufficiently that claims 2, 3, and 5–10 are unpatentable.

IV. ORDER

For the reasons given, it is

ORDERED that claims 1 and 4 of the '416 patent are unpatentable;
and

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

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Patent 8,863,416 B2

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