

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 IPR2017-00334¹
Patent 8,959,810 B1

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

¹ IPR2017-00335 has been consolidated into this proceeding.

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 1–28 (“the challenged claims”) of U.S. Patent No. 8,959,810 B1 (Ex. 1001, “the ’810 patent”) are unpatentable.

A. Background

Willis Electric Co., Ltd. (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–28 (“the challenged claims”) of the ’810 patent. IPR2017-00334, Paper 1 (“’334 Pet.”); IPR2017-00335, Paper 2 (“’335 Pet.”)². Polygroup Macau Ltd. (BVI) (“Patent Owner”) filed Preliminary Responses. IPR2017-00334, Paper 8; IPR2017-00335, Paper 8.

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.”), 19. 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 argument was held on February 5, 2018. A transcript of the oral argument is included in the record. Paper 45 (“Tr.”).

B. Related Matters

Petitioner and Patent Owner identify a district court proceeding specifically directed to the ’810 patent. ’334 Pet. 67–68; ’335 Pet. 65–66; IPR2017-00334, Paper 5, 2; IPR2017-00335, Paper 5, 2. The parties

² Patent Owner additionally filed the ’335 Petition as Exhibit 2022 in this proceeding.

identify no other proceedings before the Patent Trial and Appeal Board specifically directed to the '810 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 ('334 Pet. 24–66; '335 Pet. 27–64). As explained in our Decision on Institution, trial was instituted for the challenge to claims 1–28 based on the combination of Chen³ and McLeish⁴, the challenge to claims 1–10 based on the combination of Chen, McLeish, and Geisthoff⁵, and the challenge to claims 1–4, 8–17, 19–23, and 25–28 based on the combination of Otto⁶ and McLeish.

Petitioner provides testimony from William K. Durfee, Ph.D. Ex. 1002; Ex. 2023⁷; Ex. 1026. Patent Owner provides testimony from Michael S. Lebby, Ph.D. Ex. 2001; Ex. 2020; 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 '810 Patent

The '810 patent is directed to “power transfer systems, and, more particularly, to power transfer systems for use with artificial trees, such as

³ U.S. Pat. No. 8,454,186 B2, iss. June 4, 2013 (Ex. 1007, “Chen”).

⁴ U.S. Pat. No. 7,066,739, iss. June 27, 2006 (Ex. 1011, “McLeish”).

⁵ U.S. Pat. No. 4,437,782, iss. Mar. 20, 1984 (Ex. 1025, “Geisthoff”).

⁶ 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.

⁷ Although this exhibit was filed by Patent Owner in this proceeding, Exhibit 2023 is the declaration from Dr. Durfee submitted by Petitioner in IPR2017-00335 as Exhibit 1002.

artificial Christmas trees.” Ex. 1001, 1:20–23. Figures 7 and 10 of the ’810 patent are exemplary, and are reproduced below.

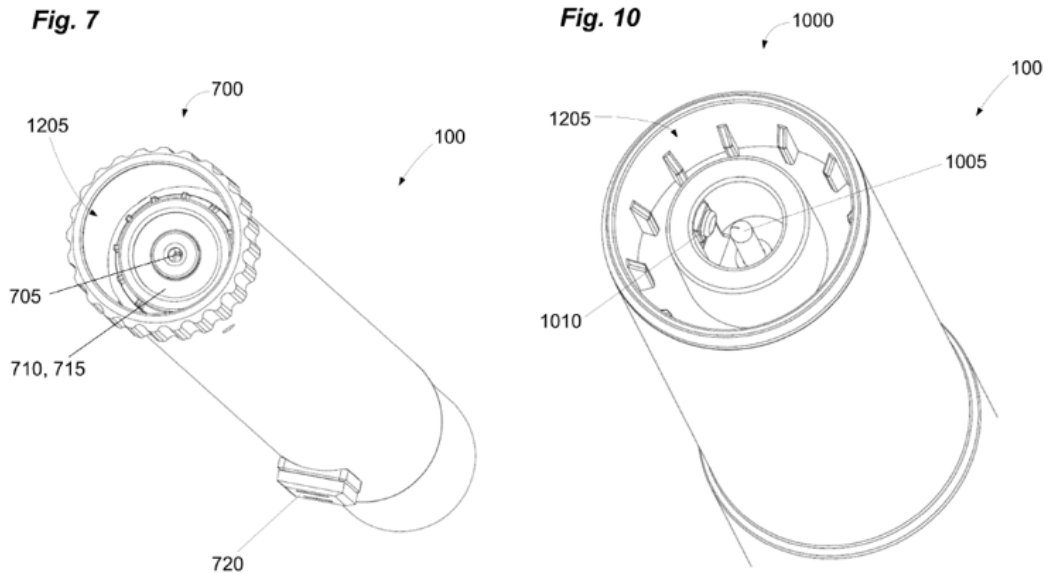


Figure 7 is a perspective view of a female end of a power distribution subsystem of a tree trunk section and Figure 10 is a perspective view of a male end of a power distribution subsystem of a tree trunk section.

The ’810 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 11:5–28. The ’810 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 13:28–30. More specifically, the ’810 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 13:31–36.

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

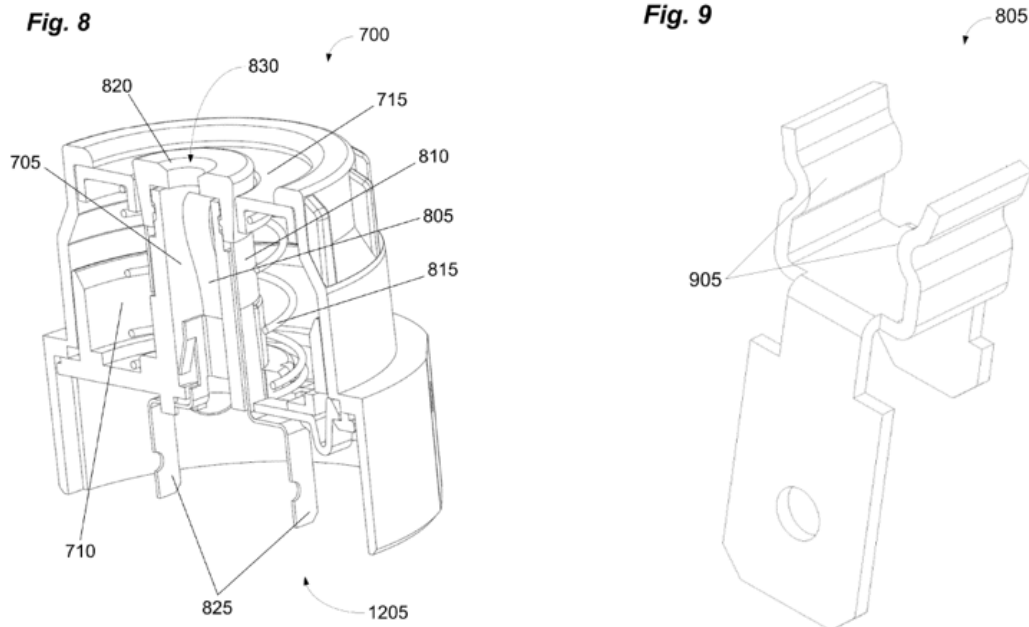


Figure 8 is a section view of female end 700 of the power distribution subsystem from Figure 7, and Figure 9 is a perspective view of the central contact device shown in Figure 8. Female end 700 includes central contact device 805 in central receiving void 705 and channel contact device 810 in channel receiving void 710. *Id.* at 12:33–44. “[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 ’810 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 13:13–22.

“[C]hannel male prong 1010 can be a bendable prong that flexes as it makes contact with channel contact device 810” and “can flex inwardly and outwardly, as required, as it slides into channel receiving void 710 and abuts channel contact device 810” to “provid[e] an effective electrical connection between the channel male prong 1010 and the channel contact device 810.” *Id.* at 13:51–60.

E. Illustrative Claims

As noted above, Petitioner challenges claims 1–28 of the ’810 patent. Claims 1, 11, and 20 are independent claims, with claims 2–10, 12–19, and 21–28 depending from claim 1, 11, or 20. Claims 1 and 11 are illustrative, and are reproduced below:

1. An artificial tree comprising:
 - a plurality of tree trunk sections;
 - a male end of a first trunk section of the plurality of tree trunk sections, the male end having a central prong and a channel prong, the central prong and the channel prong configured to conduct electricity; and
 - a female end of a second trunk section of the plurality of tree trunk sections, the female end having a central void and a channel void, the central void having a central contact device disposed at least partially therein, the central contact device comprising one or more spring activated contact sections, the channel void having a channel contact device disposed at least partially therein, the central contact device and the channel contact device configured to conduct electricity;
- wherein the central prong of the male end is configured to engage the central contact device of the female end and the channel prong of the male end is configured to engage the channel

contact device of the female end to conduct electricity between the male end of the first trunk section and the female end of the second trunk section; and

wherein, when the central prong engages the central contact device, 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 central contact device.

Ex. 1001, 15:58–16:19.

11. An artificial tree, comprising:

a plurality of tree trunk sections;

a male end of a first trunk section of the plurality of tree trunk sections, the male end having a central prong and a spring activated channel prong, the central prong and the channel prong configured to conduct electricity; and

a female end of a second trunk section of the plurality of trunk sections, the female end having a central void and a channel void, the central void having a central contact device disposed at least partially therein, the central contact device comprising one or more spring activated contact sections, the channel void having a channel contact device disposed at least partially therein, the central contact device and the channel contact device configured to conduct electricity;

wherein the central prong of the male end is configured to engage the central contact device of the female end and the spring activated channel prong of the male end is configured to engage the channel contact device of the female end to conduct electricity between the male end of the first trunk section and the female end of the second trunk section;

wherein, when the spring activated channel prong engages the channel contact device, the channel contact device pushes the spring activated channel prong causing the spring activated channel prong to press against the channel contact device to maintain electrical contact between the spring activated channel prong and the channel contact device; and

wherein, when the central prong engages the central contact device, 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 central contact device.

Id. at 16:56–17:25.

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 ’810 patent Specification. *See* 37 C.F.R. § 42.100(b). Applying that standard, we interpret the claim terms of the ’810 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. ’334 Pet. 16–22; ’335 Pet. 20–26. Patent Owner proposes constructions for “female end” and “channel void.” PO Resp. 7–14. To resolve the questions of patentability raised by Petitioner, we need only determine whether the “female end” must

be a female end of an electrical connector, and what structure can define the “channel void.”⁸

Initially, we note that neither party contends that “channel void,” itself, has any special meaning in the art or that the ’810 patent provides a lexicographical definition for that term.

Petitioner contends that the claims define the “female end” as being the female end of a “trunk section,” rather than that of an electrical connector. Reply 4–6. 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” (’334 Pet. 19–20 (emphasis omitted) (citing Ex. 1002 ¶ 24))⁹ and does not need to be disposed within a portion of the female end (Reply 14–15 (citing Ex. 1026 ¶ 21)). Dr. Durfee testifies that “a POSA would understand the female end to be the end of a trunk section, not a connector” because “[t]he ’810 patent claims that the female end of the second trunk section ‘has’ a channel void.” Ex. 1026 ¶ 21. Dr. Durfee further testifies that “[a] POSA would understand . . . that the channel void is a space, separate from the central void.” Ex. 1002 ¶ 24.

Patent Owner proposes that a “female end” is “an end of an electrical connector having no externally exposed electrical conductors.” PO Resp. 7. Patent Owner contends that “[a] POSA would have understood from the

⁸ For purposes of this proceeding, we can accept Patent Owner’s contentions that the “female end” requires that no electrical conductors are externally exposed (PO Resp. 8–12; Pet. Reply 6–12), and still determine claims 1–28 to be unpatentable.

⁹ Petitioner’s contentions are the same in the ’335 Petition. See ’335 Pet. 23–24.

Claims and Specification the ‘female end’ in the context of an electrical connector, to be ‘a connector with no externally exposed electrical conductors.’” *Id.* at 7–8 (citing Ex. 2004 ¶¶ 38, 83-94). Patent Owner explains that “[b]y reciting the claimed ‘end[s]’ as being either ‘female’ or ‘male,’ the ’810 Patent indicates that those claimed elements are more than just generic ‘ends;’ otherwise, the terms ‘female’ and ‘male’ would be superfluous.” *Id.* at 8. Patent Owner contends that “[t]he ’810 Patent teaches that the female end being the lowest trunk section reduces the risk of shock because the female ends have no externally exposed electrical conductors,” and “[i]f a ‘female end’ had externally exposed electrical conductors, then there would be no safety advantage with ensuring the female end is the lowest trunk section because the energized prongs would be exposed and accessible.” *Id.* at 11. Patent Owner contends 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).

Based on the record before us, after considering all of the evidence and argument presented by the parties, we agree with Petitioner that the “female end” recited in the claims is that of a trunk section, and the channel void is not limited to being formed solely by an electrical connector. The claims specify that the “female end ha[s] a channel void,” rather than the electrical contact disposed in the female end has a channel void. This understanding is achieved simply by applying the plain language of the claim, and is consistent with the disclosure from the Specification of the ’810 patent.

Claims 1, 11, and 20 each recite “a female end of a . . . trunk section . . . having . . . a channel void.” Although each embodiment of the ’810 patent illustrates the channel void being formed in the power distribution subsystem, the Specification of the ’810 patent makes clear that the patent is not limited to these embodiments (*see, e.g.*, Ex. 1001, 6:17–59). Moreover, contrary to the claims in U.S. Patent No. 8,863,416 B1 (at issue in related IPR2017-00309), none of claims 1, 11, and 20 recite a power distribution subsystem, let alone that the channel void is formed in such a component. Patent Owner’s construction is divorced from the plain language of the claims.

As for Patent Owner’s contentions regarding the potential of rendering the terms “male” and “female” superfluous, we note that our construction gives meaning to those terms. The “female end” of the “trunk section” must be arranged to receive the “male end” of a corresponding “trunk section.” Furthermore, contrary to Patent Owner’s contentions discussed above, we note there is no requirement in the claim as to any particular orientation between “the male” and the “female end” of corresponding “trunk sections” (i.e., the “female end” does not need to be located at the bottom and the “male end” at the top). Although the Specification of the ’810 patent explains that “in some embodiments, all of the trunk sections 100 *can* be configured so that the female end 105 is the bottom end, and the male end 205 is the top end,” that is not described in the Specification as a requirement. Ex. 1001, 12:4–6 (emphasis added). As noted above, the Specification makes clear that “the use of terms such as ‘can’ . . . are intended to be open-ended and to reflect that structure, material, or acts are not necessary.” *Id.* at 6:21–23.

For at least these reasons, we determine that the “female end” recited in claims 1, 11, and 20 is the “female end” of a “trunk section,” as the claim clearly states. As for the “channel void,” the claim allows that feature to be defined, at least partially, by an inner wall of the trunk section (i.e., the “channel void” may be defined by a combination of an inner wall of a trunk section and an outer wall of a separate electrical connector).

B. Chen/McLeish Ground

Petitioner challenges claims 1–28 based on the combination of Chen and McLeish.¹⁰ ’334 Pet. 24–56; ’335 Pet. 27–53. As noted above, claims 1, 11, and 20 are independent, with claims 2–10, 12–19, and 21–28 each depending from claim 1, 11, or 20. Patent Owner does not address specifically any of the limitations from those dependent claims, other than those contained in claim 10. Petitioner cites Chen as teaching the majority of the limitations recited in the claims, other than the spring-activated elements (i.e., the contacts and/or prongs) recited in the claims.¹¹ See ’334 Pet. 24; ’335 Pet. 27–28.

¹⁰ Although Petitioner presents certain contentions in connection with the teachings from the disclosure of the provisional application incorporated by reference in Chen, we need not reach those contentions for purposes of this decision.

¹¹ Petitioner additionally notes that “the ‘channel void’ of McLeish includes two external walls surrounding a void.” ’334 Pet. 24; ’335 Pet. 28. Although not necessary based on our construction of “channel void,” we note that Petitioner proposes no modification to Chen based on that alleged disclosure in McLeish, and, to the extent the discussion in the Petitions could be considered a proposed combination, there is no rationale for any particular modification to Chen to include such a channel void. See ’334 Pet. 24–28; ’335 Pet. 27–39. The general statements that “[t]he voids differ in McLeish in that the channel void is enclosed by both an outer casing 560 and an inner casing 558” and “McLeish informs a POSA as to the general

Chen “is directed to lighted artificial trees having separable, modular tree portions mechanically and electrically connectable between trunk portions.” Ex. 1007, 1:14–18. Figures 2 and 4 illustrate the various parts that form Chen’s tree, and are reproduced below.

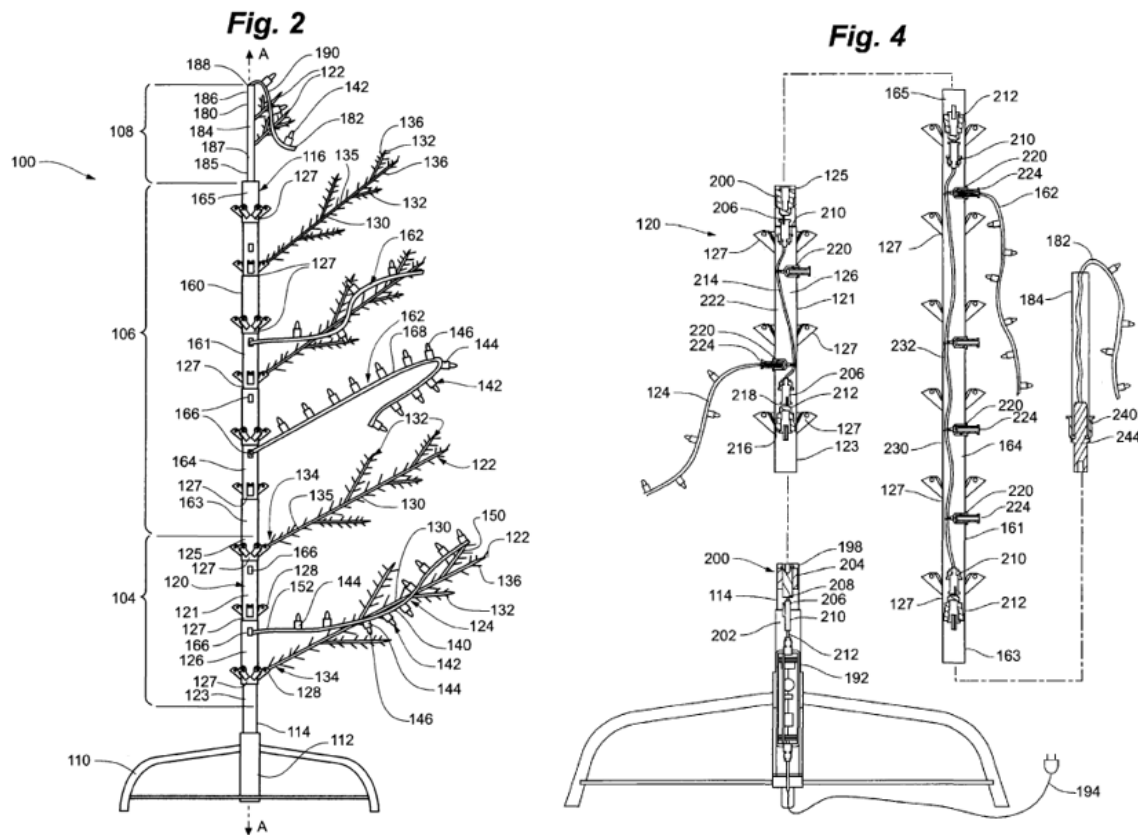


Figure 2 is a front view of Chen’s artificial tree. *Id.* at 5:21–22. Figure 4 is a cross-sectional exploded view of a base and trunk portions of Chen’s artificial tree. *Id.* at 5:25–26. Chen’s tree 100 includes base portion 102, first lighted tree portion 104, second lighted tree portion 106, and third lighted tree portion 108. *Id.* at 6:20–23. As seen in Figure 4, the various

configuration of Chen’s species of connectors” (’335 Pet. 36) fall far short of sufficient rationale to support such a modification to the structure of Chen.

portions of tree 100 include trunk bodies 121, 161, 184 housing trunk connector assemblies 200, 212.

1. Claims 1–9 and 11–28

Petitioner cites Chen’s trunk portions 120, 140, 160 as corresponding to the trunk sections recited in the claims, and the ends of those trunk portions with connector 200 as corresponding to the male end of the trunk section and the ends of those trunk portions with connector 212 as corresponding to the male end of the trunk section. ’334 Pet. 28, 33–34.¹² Petitioner contends that Chen’s contact 262 corresponds to the “central prong” and contact 260 corresponds to the “channel prong” recited in the claims. *Id.* at 29–30. Petitioner cites Chen’s contact 308 and contact 306, respectively, as corresponding to the “central contact device” and “channel contact device” in the “female end of [the] second trunk section” recited in the claims with receptacle 310 corresponding to the “central void” and the region surrounding contact 306 corresponding to the “channel void” recited in the claims. *Id.* at 33–35.

Petitioner cites McLeish as disclosing “spring-activated-contact terminal components” and reasons that it would have been obvious to “add[] [the] spring-activated-contact sections of McLeish to the disclosure of Chen in order to generate an artificial tree with a more secure electrical connection that is less likely to suffer from arcing or other failed and intermittent electrical connection issues.” ’334 Pet. 25–26 (citing Ex. 1002 ¶ 111); *see also id.* at 30–33, 35–40; ’335 Pet. 27–30, 36–40. Petitioner further reasons

¹² For simplicity, when the contentions presented in the ’334 Petition and ’335 Petition are essentially identical, subsequent citations are only to the ’334 Petition.

that “[a] POSA would be motivated to combine the disclosures of Chen with spring-activated-contact sections on electrical terminals because Chen suggests interchangeable terminals, including those that include spring-activated-contact regions.” ’334 Pet. 25 (citing Ex. 1007, 11:21–28, 12:30–37); *see also* ’335 Pet. 28.

We are persuaded by, and adopt, Petitioner’s contentions regarding the teachings of Chen’s disclosure and those of McLeish, the majority of which are undisputed.

Patent Owner does not dispute, for example, that Chen teaches trunk portions. Rather, Patent Owner disputes whether Chen’s trunk portions 120, 140, 160 have the “female end” required by the claims. PO Resp. 15–20. Patent Owner notes Petitioner’s contention “that the combination of the male connector 212 and the end of the trunk body is the claimed female end,” but argues that “[t]he express language of the claims require a female end of an electrical connector that is separate from the actual tree trunk section.” *Id.* at 16–17. However, this argument is based on Patent Owner’s proposed claim construction, which we do not adopt, *supra* Section II.A. Patent Owner’s annotated version of Chen’s Figure 4, provided in connection with those arguments, is reproduced below.

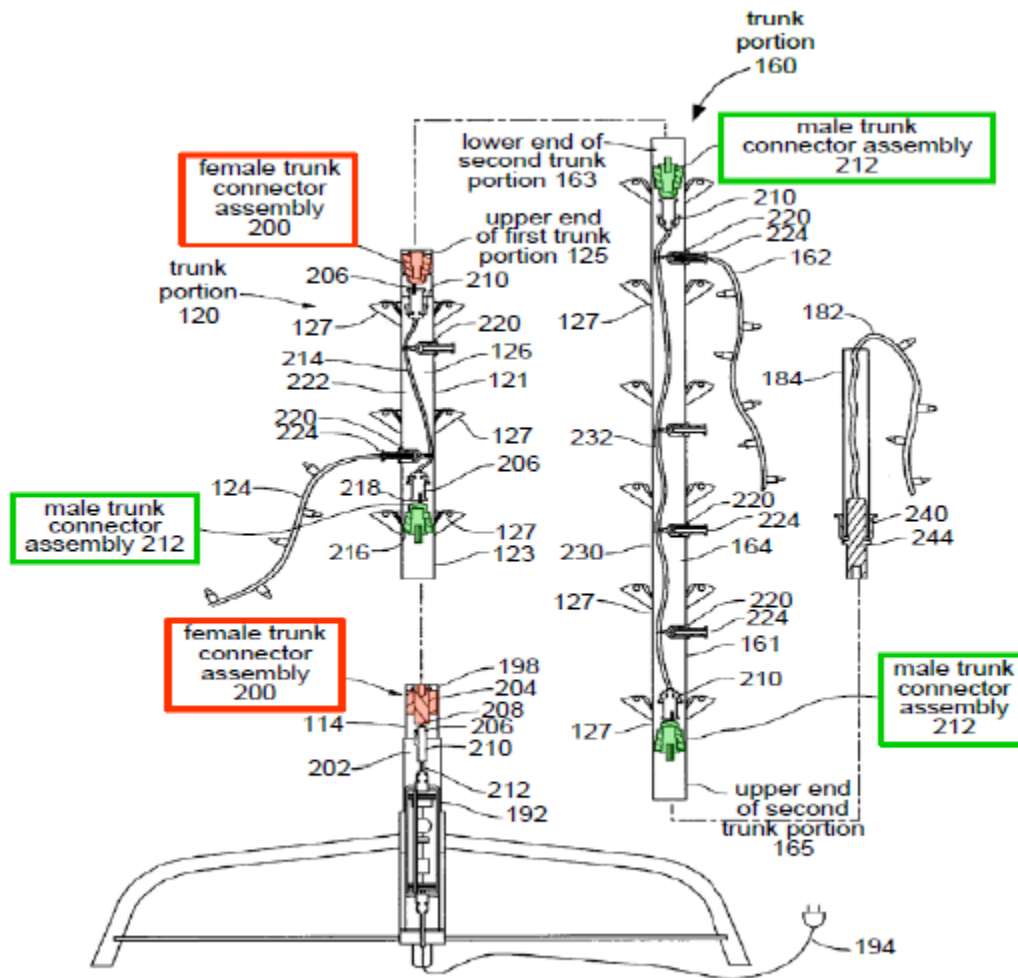


FIG. 4

The figure reproduced above is an annotated version of Chen's Figure 4, which "is a cross-sectional view of a base and trunk portions with trunk connectors of [Chen's] tree" (Ex. 1007, 5:25–26), and includes Patent Owner's annotations.

There appears to be no dispute that upper ends of the various trunk portions are inserted *into* lower ends of adjacent trunk portions. Indeed, although in one embodiment Chen describes trunk connector assembly 212 as a male trunk connector and trunk connector assembly 200 as a female trunk connector, it also explains that trunk connector assembly 212 is

inserted *into* trunk connector assembly 200. *Id.* at 9:33–37. This means that upper end 125 of first trunk portion 120, for example, is inserted *into* lower end 163 of second trunk portion 160 (i.e., lower end 163 can reasonably be considered a “female end” of the trunk and upper end 125 a “male end” of the trunk).

With respect to the “channel void” recited in the claims, Patent Owner contends that “*Chen*’s trunk connector 212 (the actual connector) does not have the claimed channel void.” PO Resp. 21. Again, this argument is based on Patent Owner’s claim construction, which we did not adopt. As noted above in our claim construction discussion, the claim allows the “channel void” to be defined, at least partially, by an inner wall of the trunk section (i.e., the “channel void” may be defined by a combination of an inner wall of a trunk section and an outer wall of a separate electrical connector). Patent Owner’s annotated version of *Chen*’s Figure 16b, reproduced below, illustrates that under our construction, there is no dispute that *Chen* teaches a “channel void.”

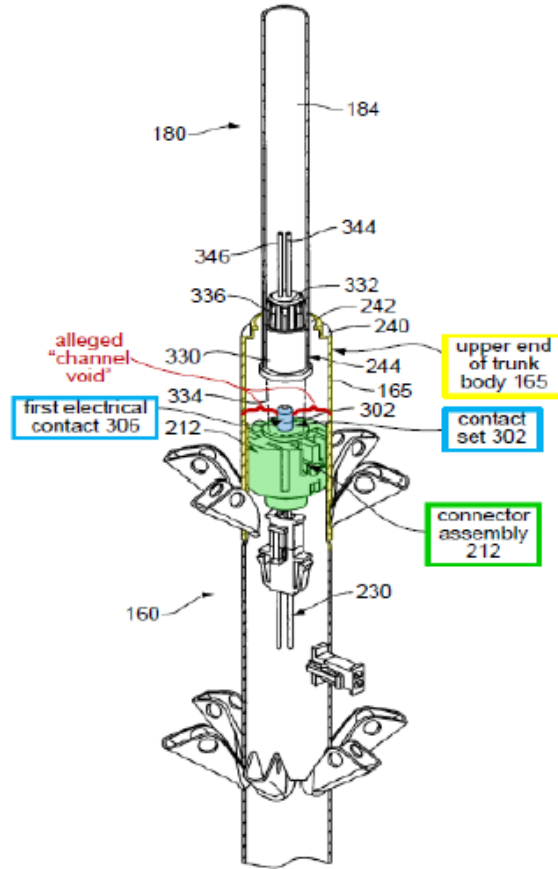


FIG. 16b

The figure reproduced above is an annotated version of Chen's Figure 16b, which "is a cross-sectional view of the middle trunk portion joined to the upper trunk portion" (Ex. 1007, 5:58–59), and includes Patent Owner's own annotation showing the "alleged 'channel void'" defined in Chen by the combination of connector assembly 212 and the body of trunk section 160.

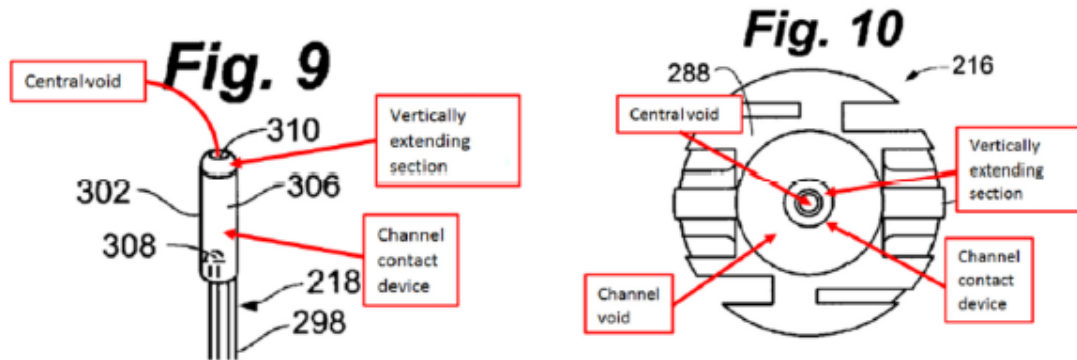
Patent Owner does not dispute Petitioner's contentions regarding Chen's electrical contacts 260, 262, 306, 308, other than arguing that contacts 306, 308 are exposed (PO Resp. 15–20) and that, even under Petitioner's construction, which we have adopted as explained above, contact 306 is not disposed within a channel void (*id.* at 22–24). With

respect to electrical contacts in the “female end” being exposed, Patent Owner’s annotated version of both Chen’s Figure 4 and Figure 16b clearly illustrate that the entirety of trunk connector assemblies 212 (shown annotated in green), which includes the electrical contacts, are within the respective ends of trunk portions 120, 160. In fact, those trunk connector assemblies and their electrical contacts are far into the ends of the trunk portions, meaning no electrical contacts extend beyond the ends of those trunk portions, which satisfies even Patent Owner’s construction requiring no exposed electrical contacts. Patent Owner’s contentions are not persuasive because, again, they require an incorrect reading of the claims, where the “channel void” is not permitted to be formed at least partially by an inner wall of the trunk section, which we expressly rejected in our claim construction discussion above.

As for contact 306 not being disposed within a channel void, Patent Owner contends that, under Petitioner’s mapping of Chen’s elements to the claims, Chen’s contact 302 defines a wall of the channel void and, therefore, is not within the channel void. *Id.* at 22–24. We disagree, and find no fault with the channel void being defined between contact 302 and the body of trunk section surrounding contact 302, while considering contact 302 as being within that channel void, as we discussed in our claim construction section above. Moreover, Petitioner explains, for example, that “[a] POA would understand Chen to disclose a non-conductive material, such as plastic, between the two electrical connectors 306 and 308 of the female side in order for Chen to work.” Reply 20 (citing Ex. 1026 ¶¶ 48–50).

Petitioner provides annotated versions of Chen’s Figures 9 and 10, reproduced below, noting that “Chen show[s] a vertically extending tube

surrounding the central void receptacle 310, which creates a necessary barrier between second electrical contact 308 and first electrical contact 306 that comprises a portion of the *outside surface* of contact set 302” and further supports its position with testimony from Dr. Durfee. Reply 20–21 (citing Ex. 1007, 12:20–28; Ex. 1026 ¶¶ 50–53).



The figures reproduced above are from Chen’s Figures 9 and 10, which are a fragmentary exploded view and a top view, respectively, of Chen’s connector assembly 212 (Ex. 1007, 5:37–40) and include Petitioner’s annotations. Petitioner’s contentions are persuasive. Referencing the annotated versions of Figures 9 and 10 above, Dr. Durfee testifies, for example, that “[a] POSA would . . . understand such a non-conductive section to be a necessary element to the female contact to separate contacts 306 and 308 to avoid arcing or a short circuit when the male and female ends are connected” and “would understand these elements were disclosed by Chen and were well-known ways to ensure the electrical contacts did not touch, thereby creating a failed electrical connection.” Ex. 1026 ¶ 52.

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, e.g., Pet. 31 (citing Ex. 1002 ¶¶ 91–103, 128); see also Ex. 1007, 2:5–18, 11:21–28, 12:30–37; Ex. 1011, 12:64–

67. Indeed, there appears to be no dispute concerning that contention. *See, e.g.*, PO Resp. 28. We also 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, 2:17–18. 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 ¶¶ 91–103, 128.

We also are persuaded that one skilled in the art would have found it obvious to utilize a spring activated contact in Chen at least because “maintaining elastic pressure between contact points utilizing spring-activated-contact sections in a contact device . . . secure[s] a reliable electrical connection, and prevent[s] arcing.” ’334 Pet. 30 (citing Ex. 1002 ¶¶ 123–126).

Patent Owner contends that Petitioner’s rationale is based on impermissible hindsight, there is no evidence Chen’s connectors suffered from problems requiring the proposed modifications, and the proposed modifications would render Chen inoperable. PO Resp. 25–33. Patent Owner’s response, however, does not identify fault in Petitioner’s contentions, which we find persuasive, with respect to the proposed modifications to the teachings of Chen.

Patent Owner does not allege that it invented spring contacts. In support of its hindsight argument, however, Patent Owner appears to allege that it discovered that spring contacts prevent arcing and provide a more secure electrical connection. *See* PO Resp. 26 (“the advantages of spring contacts indicated by Petitioner are garnered only from the Specification of

the '810 Patent"). This is not true, as those advantages are simply the result of using a spring contact. See *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) ("if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill"). Indeed, it is hard to imagine for what other reason one would employ a spring contact in an electrical connector. As explained above, and supported by the testimony of Dr. Durfee and the evidence relied on in his declaration, spring contacts were well-known and widely in use at the time of the invention. See Ex. 1002 ¶¶ 91–103, 123–126, 128. That the '810 patent took advantage of those known benefits does not make any subsequent use impermissible hindsight. Petitioner's rationale is not based on impermissible hindsight, as it is based on the known uses of spring contacts in electrical connectors, rather than being based on the '810 patent's disclosure.

We also are not persuaded by Patent Owner's argument that Petitioner's proposed combination would render Chen's connector assemblies inoperable. See PO Resp. 30–33. Patent Owner's inoperability argument alleges that Petitioner's "modification to *Chen* would result in the 'spring contact finger 551' contacting the inner walls of *Chen*'s 'receptacle 310' and come into electrical communication with *Chen*'s 'first electrical contact 306,' thus short circuiting *Chen*'s first and second electrical contacts and rendering *Chen*'s connectors inoperable." *Id.* at 33 (citing Ex. 2004 184). Such a characterization is misleading. As discussed above in connection with Chen's Figures 9 and 10, we are persuaded that a person skilled in the art would understand that contact 306 is isolated from central

void 310. *See* Reply 19–22. At the very least, one skilled in the art would appreciate the need to isolate contacts 306, 308 from one another. *See, e.g.* Ex. 1026 ¶¶ 48–54.

2. Claim 10

Claim 10 depends from claim 1 and adds “a safety cover to obstruct access to the channel void, the safety cover supported by a spring member.” Petitioner cites McLeish’s arrangement including shutter 556 as corresponding to this feature and reasons that “[a] POSA would be motivated to add the shutter to Chen to ‘reduce[] the likelihood of electrical shock to a user.’” ’335 Pet. 53. Figure 15 from McLeish, which illustrates shutter 556, is reproduced below.

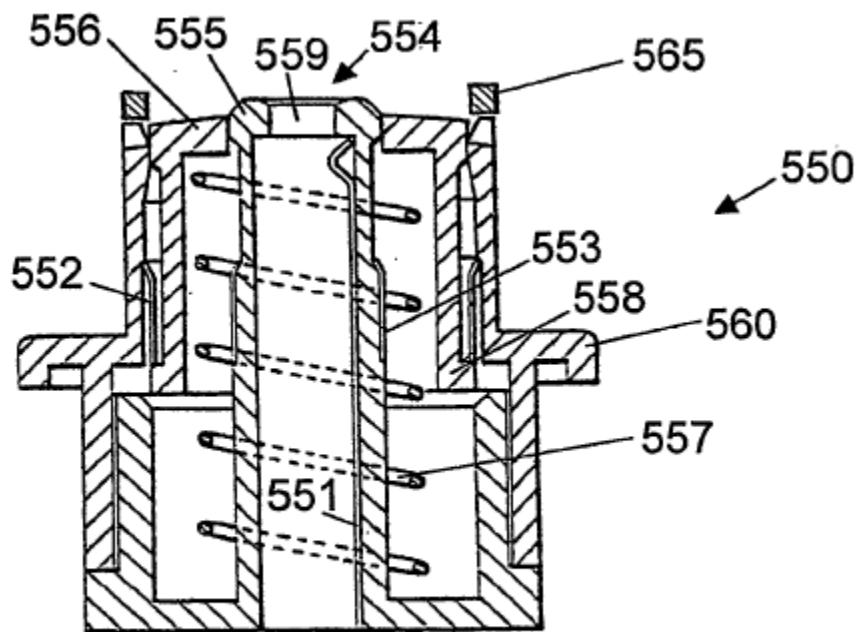


Fig. 15

Figure 15 is a sectional view of a female part of connector. Ex. 1011, 5:8–9.

Patent Owner does not dispute that McLeish teaches the additional features found in claim 10, or that Petitioner’s proposed modification to

Chen based on those teachings would result in an arrangement that reduce the risk of electrical shock to a user. Rather, Patent Owner alleges that Petitioner fails to explain “how *Chen* could be modified to include such a shutter” and “how the inclusion of a shutter in *Chen* would ‘obstruct access to the channel void’ . . . or . . . reduce the likelihood of electrical shock to a user of the *Chen* device.” PO Resp. 33–34. Patent Owner additionally contends that “Petitioner fails to allege—even in a conclusory fashion—that the POSA would have had a reasonable expectation of success in modifying the *Chen* connector to include the shutter of *McLeish*” or “how such a connector would still allow contact set 302 to be inserted into aperture 264 in the opposing connector 200, as required in *Chen* to establish an electrical connection between the connectors.” *Id.* at 34–35. We disagree with Patent Owner’s characterization of Petitioner’s challenge.

Initially, we agree with Petitioner’s unrebutted contention that including a safety cover for Chen’s connector 212 would reduce the risk of electrical shock to a user. For example, including a safety cover in the “channel void” defined in Chen by the combination of connector assembly 212 and the body of trunk section 160, such as that shown in Chen’s Figure 16b, discussed and reproduced above, would provide such an arrangement. Petitioner responds to Patent Owner’s contentions by explaining that “a POSA would understand that the shutter from *McLeish* could be added to Chen with only routine modifications” because “shutter 556 uses the outer side of hollow post 555 as the gliding surface for sliding up and down, and with only a minor change to the thickness of the top ring of shutter 556 can be applied to the post of contact set 302 of Chen . . . without needing any

structure outside of contact set 302 for an attachment point.” Reply 31 (citing Ex. 1026 ¶¶ 55–57; Ex. 1007, Figs. 8–9).

Based on the record before us, we are persuaded by Petitioner’s contentions. We agree with Petitioner’s undisputed contentions regarding the teachings of McLeish and that one skilled in the art would have combined those teachings with the teachings of Chen for the reasons set forth by Petitioner, which are noted above. As noted above, we disagree with Patent Owner’s response to Petitioner’s contentions. Rather, we agree with Petitioner that a person of ordinary skill in the art would consider it relatively straightforward to include a safety cover in Chen and, contrary to Patent Owner’s contentions, we agree that Chen’s connector would still allow contact set 302 to be inserted into aperture 264 in the opposing connector 200 while using a safety cover because an aperture, like that disclosed in McLeish, would provide such access. *See, e.g.*, Ex. 1011, Fig. 15. As for the manner in which such an arrangement would obstruct access to the channel void or reduce the likelihood of electrical shock to a user of the Chen device, it is also readily apparent that, as in McLeish, such an arrangement would prevent access to the channel void in Chen until a mating connector is inserted into the channel void.

3. Summary

Based on consideration of all arguments and evidence presented, we are persuaded that Petitioner has established by a preponderance of the evidence that claims 1–28 are unpatentable in view of the combined teachings of Chen and McLeish.

C. Chen/McLeish/Geisthoff Ground

As noted above, we have determined that all challenged claims are unpatentable based on the combination of Chen and McLeish. Moreover, Petitioner added Geisthoff to the combination of Chen and McLeish to address potential claim construction arguments by Patent Owner that never materialized. Accordingly, we do not reach the alternate bases for unpatentability of claims 1–10 based on the combined teachings of Chen, McLeish, and Geisthoff.

D. Otto/McLeish Ground

As noted above, we have determined that all challenged claims are unpatentable based on the combination of Chen and McLeish. Accordingly, we do not reach the alternate bases for unpatentability of claims 1–4, 8–17, 19–23, and 25–28 based on the combined teachings 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 1–28 of the '810 patent are unpatentable.

IV. ORDER

For the reasons given, it is

ORDERED that claims 1–28 of the '810 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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