UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SIMPSON STRONG-TIE COMPANY INC.
Petitioner

v.

COLUMBIA INSURANCE COMPANY
Patent Owner

U.S. Patent No. 11,021,867
Case No. PGR2021-00109

DECLARATION OF W. ANDREW FENNELL IN SUPPORT OF PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE AND PETITIONER'S OPPOSITION TO PATENT OWNER'S CONTINGENT MOTION TO AMEND

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Columbia EX2073
Simpson Strong-Tie Company Inc. v. Columbia Insurance Company
PGR2024-00050

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XVII. CONCLUSION .....

I, W. Andrew Fennell, declare as follows:

I. INTRODUCTION

1. I have been asked by Simpson Strong-Tie Company Inc. ("Petitioner") to provide my opinions in the above-captioned post-grant review ("PGR") proceeding involving U.S. Patent No. 11,021,867 ("the '867 patent," EX1001), which is titled "Hanger for Fire Separation Wall." I previously submitted a declaration (EX1003) in support of the Petition for post-grant review of U.S. Patent No. 11,021,867 ("the '867 patent"). This declaration is in support of Petitioner's Reply to Patent Owner's Response and Petitioner's Opposition to Patent Owner's Contingent Motion to Amend in the same proceeding, PGR2021-00109.

2. I understand that Patent Owner Columbia Insurance Company submitted a Patent Owner Response (Paper 45) ("POR") along with a declaration from Dr. Reynaud Serrette (EX2057) in support of the POR.

3. I understand that Patent Owner also submitted a Contingent Motion to Amend (Paper 46) ("MTA"). In the MTA, Patent Owner proposed to substitute claims 24-46 in place of issued claims 1-23 of the '867 patent if the Board finds the original claims unpatentable. I have been asked to provide my technical review, analysis, insights, and opinions regarding the POR and MTA.

4. My background and qualifications were provided in paragraphs 6-10 of my original declaration, Exhibit 1003, and my CV was submitted as Exhibit 1004. My statements in my original declaration regarding my review of the ’867 patent and related materials remain unchanged. In reaching my opinions, I carefully reviewed the POR and MTA, the Petition for post-grant review of the ’867 patent, my original declaration, and the materials reviewed as part of my original declaration. EX1003, ¶11 (listing references considered in my prior declaration). In addition, I reviewed and refer to the following materials:

Paper	Description
42	Institution Decision
45	Patent Owner’s Response
46	Patent Owner’s Contingent Motion to Amend

Exhibit No.	Description
1001	U.S. Patent No. 11,021,867 to Brekke et al. (“the ’867 patent”)
1002	Prosecution History of the ’867 patent
1003	Declaration of W. Andrew Fennell in Support of Petition for Post-Grant Review of U.S. Patent No. 11,021,867
1004	*Curriculum Vitae* of W. Andrew Fennell
1005	U.S. Publication No. 2002/0078656 to Leek et al. (“Leek”)
1006	U.S. Patent No. 10,024,049 to Brekke et al. (“Brekke’049”)

Exhibit No.	Description
1007	U.S. Patent No. 9,394,680 to Bundy et al. ("Bundy")
1008	U.S. Publication No. 2005/0155307 to Timony et al. ("Timony")
1009	Japanese Application No. 19991014482 to Tsukamoto ("Tsukamoto")
1010	U.S. Patent No. 4,261,155 to Gilb ("Gilb'155")
1011	U.S. Patent No. 4,230,416 to Gilb ("Gilb'416")
1012	U.S. Patent No. 4,827,684 to Allan ("Allan")
1013	U.S. Publication No. 2014/0338282 to Sidhu ("Sidhu")
1014	U.S. Patent No. 10,184,242 to Brekke et al. ("Brekke'242")
1015	U.S. Publication No. 2001/0054270 to Rice ("Rice")
1016	*Fire-Rated Assemblies in Commercial Construction ("The Purple Book")*, National Gypsum Properties, LLC (November 5, 2013)
1017	*GA-600-2012 Fire Resistance Design Manual, 20th Ed.*, Gypsum Association (June 2012).
1018	*2012 International Building Code*, International Code Council, June 2011 ("IBC-2012")
1019	Prosecution History of Brekke'049
1020	Prosecution History of the Brekke'242
1021	U.S. Patent No. 804,451 to Carlson
1022	U.S. Patent No. 3,601,428 to Gilb
1023	U.S. Patent No. 3,633,950 to Gilb
1024	U.S. Patent No. 3,752,512 to Gilb
1025	U.S. Patent No. 4,480,941 to Gilb

Exhibit No.	Description
1026	U.S. Patent No. 4,717,279 to Commins
1027	U.S. Publication No. 2015/0184370 to Brekke ("Brekke'370")
1028-1029	*Intentionally Left Blank*
1030	G. Waller and D.J. Cochrane, "Stainless Steel for Durability, Fire-resistance and Safety," Nickel Development Institute, Technical Series 10042, Toronto, Ontario, Canada
1031	Patent Owner's Infringement Claim Chart, *Columbia Insurance Company et al v. Simpson Strong-Tie Company Inc.*, 3-19-cv-04683 (N.D. Cal.), filed August 12, 2019.
1032	U.S. Patent No. 4,005,942 to Gilb ("Gilb'942")
1033	English-language Translation of Japanese Patent Application Publication No. H7-229225, with attached translator's certification.
1034	Complaint for Patent Infringement, *Columbia Insurance Company et al v. Simpson Strong-Tie Company Inc.*, 3-19-cv-04683 (N.D. Cal.), filed August 12, 2019.
1035	U.S. Patent No. 4,422,792 to Gilb ("Gilb'792")
1036	U.S. Patent No. 10,316,510 to Brekke *et al*. ("the '510 Patent")
1037	Oxford Compact English Dictionary, Second Edition, Oxford University Press, (2000).
1038	Dr. Serrette Deposition Transcript (August 22, 2022)
1040	Brick Industry Association "Fire Resistance of Brick Masonry," published March 2008
1041	Members of the National Timber Development Council "Class 1a Buildings, Design & Construction Manual," published June 2000.
1042	QuietRock® ES Product Datasheet (© 2013).
1043	Sterling Publishing Co., Inc., "Woodframe Houses, Construction and Maintenance," published 1981.

Exhibit No.	Description
1044	Sheetrock® Brand MH UltraLight Panels Tuf-Base™ Product Data Sheet (© 2013).
2016	U.S. Pat. App. Pub. No. 2005/0120669 to Harrison
2057	Supplemental Declaration of Dr. Serrette

5. I have also reviewed all other materials cited herein.

6. My work on this case is being billed at a rate of $375 per hour, with reimbursement for actual expenses. My compensation is not contingent upon the outcome of this post-grant review.

II. LEVEL OF ORDINARY SKILL IN THE ART

7. I incorporate by reference my understanding of the person of ordinary skill in the art ("POSITA") as set forth in paragraph 15 of my previous declaration.

III. UNDERSTANDING OF THE LAW

8. I incorporate by reference my understanding of the legal principles, including my discussion of claim construction and obviousness, as set forth in my previous declaration. EX1003, ¶¶12-31. I include here certain additional legal understandings.

9. As stated in my prior declaration, I understand that a patent claim can be considered obvious to a POSITA at the time the application was filed and that the

teachings of two or more prior art references may be combined if that combination would have been obvious to a POSITA. EX1003, ¶¶26-31.

10. I further understand that whether a prior art reference teaches away from the claimed invention is a factor to be considered in determining obviousness. I also understand that it is improper to combine references that teach away from their combination. I understand that though a reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, the mere disclosure of alternative designs does not teach away.

11. As stated in my prior declaration, I understand that the proper construction of any term is how a person of ordinary skill in the art would have understood the term based on the term's use in the claims, specification, and file history of the patent. EX1003, ¶¶16-17.

12. I further understand that while claims are construed in view of the specification, limitations from the embodiments in the specification should not be read into the claims, unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of exclusion.

13. I understand that using the term "comprising", for example, in the transition between the preamble and the body of the claim indicates that the claim

does not preclude the presence of components or steps that are in addition to, though not inconsistent with, those recited in the limitations that follow.

14. I understand that a patent must include a written description that makes clear the full scope of the claimed invention in such full, clear, concise, and exact terms as to enable a person of ordinary skill in the art at the time of the invention to make and use the claimed invention without undue experimentation.

15. I understand that a substitute claim in a PGR must be supported by the original disclosure of the patent application and cannot introduce what is referred to as "new matter," and that whether new matter is introduced depends on whether the disclosure in the original application as filed satisfies the written description test stated above.

16. I understand that one way to determine if this written description requirement is satisfied is if a POSITA would recognize from reading the patent specification that the inventor possessed the full scope of the subject matter claimed.

17. I understand that when performing an analysis of written description that the knowledge of a POSITA may not be used as support to teach limitations that are not in the specification, even if those limitations would be rendered obvious by the disclosure, that written description is not a question of whether a POSITA might be able to construct the subject matter claimed from the teachings

of the disclosure, but whether the application necessarily discloses that subject matter, and further that the disclosure must actually or inherently disclose the claimed subject matter.

18. I understand that the disclosure must demonstrate that the inventor possessed the subject matter of a particular claim as a whole and further that it is insufficient to separately analyze written description as a collection of independent limitations, but that rather, such analysis must show that the inventor possessed the particular claimed combination of elements in order to constitute written description support for such a claim.

IV. OVERVIEW OF THE '867 PATENT

19. I previously discussed and stand by my overview of the '867 Patent, including my discussion of the technology background, the prosecution history, and the alleged invention of the '867 patent, as set forth in my previous declaration. EX1003, ¶¶32-51.

V. CLAIM CONSTRUCTION

20. I maintain my understanding of claim construction, including my discussion of the particular terms set forth in my previous declaration. EX1003, ¶¶16-20.

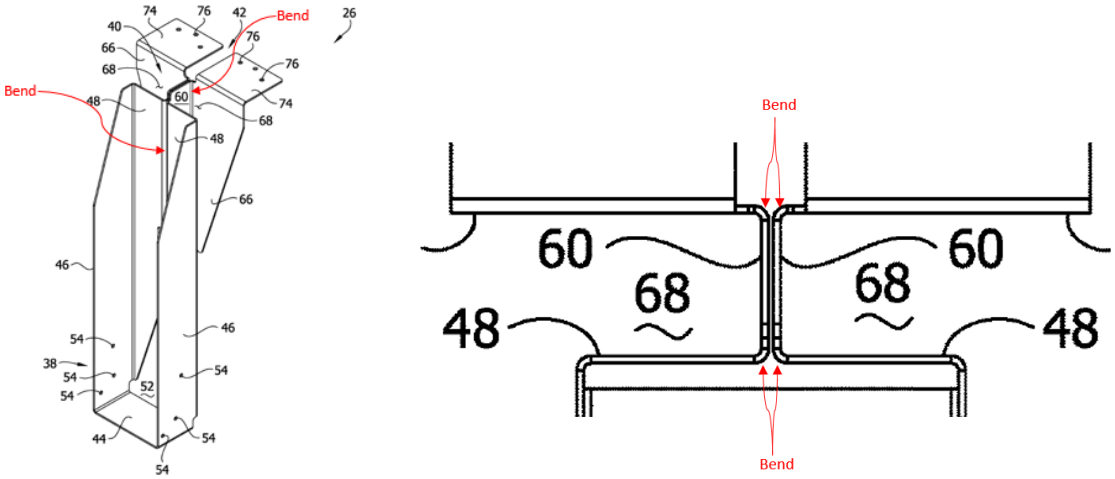
21. I understand that Patent Owner proposes constructions of the terms discussed below. Patent Owner's Response (POR), 23-57. In my opinion, Patent Owner's proposed claim constructions are improper, as explained below.

A. "each extension flange lying in an extension flange plane"

22. It is my understanding that Patent Owner asserts in its Response that the limitation "each extension flange lying in an extension flange plane" means "for each extension flange an extension flange plane is within the extent of the extension flange from the channel-shaped portion to the connection portion." POR, 26. Patent Owner's proposed construction sets forth two requirements: (1) each extension flange coincides along the extension flange plane, (2) along its extent *from* the channel-shaped portion *to* the connection portion. In my opinion, Patent Owner's proposed construction is not proper.

23. I have been informed that one of the claim construction principles in patent law is that the claims must be construed to be consistent with the specification. Based on my review of the '867 patent's disclosure, Patent Owner's construction is inconsistent with how a joist hanger is described in the '867 patent specification. The drawings of the '867 patent application, particularly Figures 2 and 7 reproduced below, clearly show the extension flange is separated from the back panel of the channel-shaped portion by a bend. The '867 patent specification further discloses that the "extension portion includes extension flanges extending

from the channel-shaped portion forming a bend between each extension flange and the channel-shaped portion." EX1001, 2:11-15; EX1002, 37. The specification also discloses that the hanger is "formed as one piece from a metal blank 100 that is stamped from a sheet metal roll and bent into shape." EX1001, 7:15-17; EX1002, 45. Accordingly, a POSITA would have understood, in view of the specification and drawings of the '867 patent, that the extension flange include bends between the channel-shaped portion and the connection portion.



EX1001, FIGs. 2 and 7 (annotated).

24. I further note that the extension flange is not the only recited element of the claimed hanger that is required to be "lying in a[] plane." For example, claims 7 and 12 both recite that the front surface of the back flange, not the entire back flange, lie in a back flange plane. A POSITA would have understood, in view of the specification and drawings of the '867 patent, that the back flange clearly includes bends to connect to the extension flange. If the same words of claim are

interpreted consistently, a POSITA would not have construed that the extension flange lies in an extension flange plane throughout its entire extent. Instead, only a section or a particular surface of the extension flange located between the channel-shaped portion and the connection portion lies in a plane throughout its extent. Planes are two-dimensional, and do not include curves. The bends of the extension flanges (as well as the bends of the back flange front surface and the rear surface of the channel-shaped portion) are curved, so they cannot lie in a plane and cannot themselves be considered truly planar. Because the ’867 patent specification and drawings clearly describe bends between the back flange and the extension flange, the construction of “each extension flange lying in an extension flange plane” must be broad enough for the extension flange to include bends—that is, a section of the extension flange must coincide with a plane, but other parts of the flange may include bends—or the patent would not support the extension flanges extending to the connection portion, as also recited in claim 1.

25. Based on my review of its specification and drawings, the ’867 patent does not disclose a single embodiment in which the extension flange extends from the channel-shaped portion without bending. Thus, in my opinion, patent owner’s construction—an extension flange plane is within the extent of the extension flange from the channel-shaped portion to the connection portion—would not cover any of the disclosed embodiments of the specification.

26. To the extent that the phrase "each extension flange lying in an extension flange plane" can be construed in a manner consistent with the specification, a POSITA would have found Patent Owner's construction too limiting. Instead, a POSITA would have understood this limitation to mean that the extension flange plane coincides with a section of a flange located between the connection portion and the channel-shaped portion, not all the way *from* the channel-shaped portion *to* the connection portion. My proposed construction is consistent with the specification of the '867 patent, which discloses "extension flanges define planar surfaces disposed in opposed face-to-face relation between the connection portion and the channel-shaped portion." EX1001, 2:20-23.

B. "configured to"

27. I have been informed that in the previous proceeding, PGR2019-00063, the Board construed the term "configured to" to mean structure designed to accomplish the claimed function. I have used the same construction to formulate my opinions herein.

28. I agree that the claims are directed to a "hanger," not the sheathing intended to be used with the hanger. As demonstrated in my first declaration, there are no structural distinctions between the claimed hanger and the hangers disclosed in the cited art.

C. "[Each Extension Flange / the First and Second Extension Flanges] Being Configured to Extend Through [the Sheathing / an Opening in the Sheathing]"

29. As set forth in my first declaration, I used the same construction to the limitation "configured to extend through the sheathing" that was adopted by the Board in PGR2019-00063—flanges that define a space to receive sheathing and that extend into one side of the sheathing and out of the other side of the sheathing. EX1003, ¶¶18-19.

30. It is my understanding that Patent Owner asserts that this construction is insufficient because this construction supposedly ignores additional structural attributes required by the limitation: (1) flanges having sufficient length to extend into one side and out of the other side of the sheathing, and (2) the arrangement of the flanges relative to other hanger components allowing the flange to extend through the sheathing when installed. POR, 47-49. In my opinion, these features identified by the Patent Owner are not structural features attributed to the hanger itself. A hanger does not come with its own sheathing or wall assembly, and a POSITA would have understood that such a hanger can be used with any sheathing and/or wall assembly the POSITA finds it works for.

31. Claim 1 does not appear to include any limitations regarding the size of any sheathing cutout necessary to allow a hanger's extension portion to extend through the sheathing. Here, Patent Owner's proposed construction is directed to how the hanger is intended to be used with sheathing, not the hanger's structure

itself. For example, the "sufficiency" of the flange's length is dependent solely on the dimension of sheathing used with the hanger. And the flange's capability of extending through sheathing depends on how the sheathing is installed around the hanger. Accordingly, based on my understanding of the claim construction principles that have been provided to me, I disagree with the Patent Owner's construction.

D. "extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating"

32. It is my understanding that Patent Owner asserts that the language of claims 5 and 17 "adds the requirement that the hanger be configured so as to minimally disturb the fire barrier (i.e., the sheathing) such that a wall assembly—including a frame wall and the sheathing—upon which the hanger is installed would pass[] a two-hour fire rating test performed according [to] the testing standards prescribed by ASTM E814 and ASTM E119." POR, 43-45. In my opinion, Patent Owner's proposed construction is neither supported from the disclosure of the '867 patent nor informs with reasonable certainty to a POSITA the scope of the claimed invention.

33. Similar to how Patent Owner proposes to construe the language of claim 1, Patent Owner's proposed construction for claims 5 and 17 is premised on how the hanger would be used, not the structure of the hanger itself. A POSITA would not have been able to determine with reasonable certainty what structure is

required by the hanger to "minimally disturb the fire barrier"—particularly since the "fire barrier" includes not just the sheathing and the hanger, but any other fire mitigation materials incorporated into the barrier. As mentioned in my first declaration, two layers of 5/8" sheathing alone does not provide a 2 hour fire rating, and it was well known to add other materials to the wall assembly to maintain a fire rating. Hangers have been used in fire-rated construction containing sheathing long before the hanger of the '867 patent, and a POSITA would have been very familiar with materials and techniques used to mitigate cuts in sheathing; even the '867 patent describes adding fire resistance materials to the wall assembly, such as wool. EX1003, ¶86. Accordingly, I believe that the Patent Owner's construction is too narrow, is not commensurate with the specification and does not account for the knowledge and practices of a POSITA.

E. "the connection portion and channel-shaped portion being in a fixed … relation relative to one another"

34. As set forth in my first declaration, I used same construction to the limitation "fixed" that was adopted by the Board in PGR2019-00063—components are connected such that they do not move freely with respect to each other. EX1003, ¶¶18-19.

35. It is my understanding that Patent Owner wants to further limit this limitation to mean "components are fixed at the time of manufacturing." POR, 49-

50, 81. In my opinion, Patent Owner's construction is not supported by the plain language of the claims. EX1001, 12:29-31.

36. Claims 1 and 16 appear to recite only "fixed … relative to one another," not "permanently" fixed. In support of its construction, Patent Owner refers to the specification describing the process for making the hanger. POR, 50-51. But a POSITA reading the specification's description of the manufacturing process would not have understood the end product to be permanently fixed in such a way that the hanger could not be manipulated again. Accordingly, I believe that Patent Owner's construction is too narrow.

F. Planar

37. As set forth in my first declaration, I construed "planar" as requiring a surface of the flange that is coincident with a plane. EX1003, ¶20. My proposed construction is supported by the '867 patent specification, which discloses "extension flanges define planar surfaces disposed in opposed face-to-face relation between the connection portion and the channel-shaped portion." EX1001, 2:20-23.

38. It is my understanding that Patent Owner proposes a different construction—the entire object having an essentially flat, thin profile with uniform thickness "throughout." In my opinion, Patent Owner's proposed construction is not supported by the '867 patent specification.

39. As discussed in Section V.A, the only use of the term "planar" in the specification corresponds to the surface of the flange, *not* the entire flange itself. Furthermore, the extension flanges described in the '867 patent include bent portions on both ends of the flanges. *See* Section V.A above. The percentage of the flanges that are flat versus the percentage of the flanges that are bent or curved is dependent on the thickness of the sheet metal used to construct the hanger, and the accuracy of the stamping machine bending the metal. Accordingly, I believe that Patent Owner's proposed construction is too narrow. Because of these bends in the '867 patent's own flanges, a POSITA would have understood this term to mean that the flange should have a surface that is coincident with a plane, but would not have required that the entire element have a flat, thin profile with a uniform thickness throughout.

VI. THE CHALLENGED CLAIMS ARE INDEFINITE

A. "each extension flange lying in an extension flange plane"

40. I disagree that a POSITA would have understood with reasonable certainty the scope of the limitation "each extension flange lying in an extension flange plane," in view of the PO's claim construction, as explained below.

41. First, Patent Owner's construction of "each extension flange lying in an extension flange plane" is inconsistent with the '867 patent specification. The specification does not describe a single embodiment, in which the extension flange

coincides along a plane entirely from the channel-shaped portion to the connection portion. The specification explicitly describes the presence of bends located between the extension flange and the channel-shaped portion, and between the extension flange and the connection portion. It is not clear exactly where the extension flange ends and the channel-shaped portion or connection portion begins, because a curve exists between the flat parts of each. For example, both the back flange surface and the extension flange are recited as lying in a plane, but there is this curved, bent portion between the two that must be dealt with. Planes are two-dimensional and do not accommodate curves. Accordingly, a POSITA would have understood that only a section (e.g., a portion of a surface) of the extension flange coincides along a plane *between* (not *from*) the channel-shaped portion and (not *to*) the connection portion.

42. Second, according to my review of the ’867 patent, there are several inconsistencies in the claim language and the specification of the ’867 patent render the scope of claim 1 indefinite. For example, the claim language and specification do not provide reasonable certainty about a crucial aspect of the “extension flange plane,” namely how much of the extension flange lies “in” the “extension flange plane.” PO appears to say that the extension flange must lie along the extension flange plane *from* the channel-shaped portion *to* the connection portion. But this construction would exclude all the embodiments disclosed in the

'867 patent specification because each disclosed embodiment includes multiple bends located between the channel-shaped portion and the connection portion. As another example noted in my first declaration, the claim language itself uses two *inconsistent* approaches to define the location of a "plane": (1) defines the location of the "base plane" based on a two-dimensional object—the upper surface of the base, and (2) defines the location of the "extension flange plane" based on a three-dimensional object—the extension flange itself. EX1003, ¶¶68-70.

43. A POSITA would not have been able to determine with reasonable certainty what extent of the "extension flange" lies in the "extension flange plane," given the inconsistencies in the claim language and the specification.

B. "extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of a wall assembly including the wall and the sheathing"

44. It is my understanding that the Patent Owner asserts that corrected language added to the claims in a Certificate of Correction moots my opinion set forth in my first declaration that claims 5 and 17 are indefinite. POR, 64-65.

45. Even if this corrected language is added to claims 5 and 17, it still does not further limit the *structure* of the claimed hanger and what is required by a *hanger* to maintain a two-hour fire resistance rating of a wall assembly. As explained in my first declaration, a two-hour fire resistance rating is defined by multiple components within the wall, not just the hanger itself. EX1003, ¶¶79-83.

Patent Owner's proposed claim construction—the hanger being configured to minimally disturb the fire barrier—still does not adequately inform a POSITA with reasonable certainty what is required by the hanger itself. Patent Owner's construction is directed to how the hanger is intended to be used with an entire wall assembly (including any other wools or fire-resistant materials), and does not have any bearing on how the hanger itself is constructed. POR, 44-45, 66-67. Accordingly, I still believe that claims 5 and 17 are indefinite, even with the corrected language from the Certificate of Correction.

VII. CLAIMS 5 AND 17 LACK ADEQUATE WRITTEN DESCRIPTION

46. Patent Owner asserts that the Certificate of Correction—adding "rating of a wall assembly including the wall and the sheathing"—mooted my opinion set forth in my first declaration that sheathing alone does not have a two-hour fire rating. POR, 68-69. I disagree.

47. As explained in my first declaration, the '867 patent specification does not describe what structural features of the extension flange allow the hanger to achieve a two-hour fire resistance rating. EX1003, ¶¶88-90. Thus, in my opinion, there is no support in the '867 patent showing how the extension flanges of the recited hanger themselves maintain a two-hour fire resistance rating. DI, 37. Based on my review, Patent Owner's Response also does not show any description in the '867 patent specification for how the structure of the hanger itself is sufficient to

maintain such a rating. Accordingly, even in view of Patent Owner's Response, I still believe that claims 5 and 17 lack adequate written description support. Adding elements to the wall or sheathing does not change the structure of the hanger itself.

VIII. A POSITA WOULD HAVE BEEN MOTIVATED TO COMBINE THE TEACHINGS OF BUNDY WITH EACH OF THE HANGERS DISCLOSED IN GILB'792, TIMONY, AND BUNDY.

48. Patent Owner contends that there would be no reason to use sheathing with the walls described in each of Gilb'792, Timony, and Tsukamoto. POR, 102-113. I disagree.

49. Patent Owner's arguments ignore the rationales set forth in my previous declaration for combining the references and rely on inaccurate technical assertions regarding the state of the art. EX1003, ¶¶92-96, 208-12, 249-53. The rationales for combining Bundy with each of Gilb'792, Timony, and Tsukamoto, as explained in my previous declaration, are based on facts gleaned from the prior art, and were not influenced by the '867 patent. EX1003, ¶¶92-96, 208-12, 249-53.

A. Bundy suggests more than one reason for using drywall.

50. Patent Owner inaccurately characterizes my reasons for combining the teachings of Bundy's drywall with the hangers of Gilb'792, Timony, and Tsukamoto. POR, 104-107. Specifically, Patent Owner contends that the sole reason for combining the references was to make the "hangers useful for a firewall application." POR, 105. This is not true.

51. While Bundy describes that drywall is "naturally fire resistant," Bundy further describes that drywall can "be used to *cover and protect* the structural members of a building." EX1007, 5:17-21 (emphasis added). A POSITA would have recognized that Bundy's suggestion to "cover and protect" structural members goes beyond just fireproofing. Particularly, a POSITA would have understood that sheathing can be used for soundproofing, insulation, and aesthetic applications, as further explained below.

52. As one example, drywall panels, such as QuietRock® gypsum panels, were used in wall assemblies by the year 2013 to serve both the purpose of increasing the wall's fire rating and to tune acoustic waves. EX1042, QuietRock® ES Product Datasheet ("QuietRock® ES is the professional's choice for acoustic walls in residential and commercial applications."). Indeed, using such type of drywall can provide a wall assembly with a sound transmission class (STC) rating between 48-60, mitigating sounds more effectively than concrete alone. *Compare* EX1042 ("STC-rated Assemblies (per ASTM E90): 48-60 … Fire-rated (per ASTM E119, UL263): 1 hour, Type X") *with* EX1043, WoodFrame Houses, p. 115 (Figure 105, row C describing "8" concrete block" having a STC Rating of 45.) Thus, a POSITA would have understood that drywall is commonly used for wall assemblies—including for both combustible structures such as wood frames

and non-combustible structures such as steel frames or concrete walls—to achieve a particular STC rating, ultimately providing a soundproof wall.

53. As another example, drywall can be used for improving the wall's thermal insulating rating. By the year 2013, it was well known that one half inch of gypsum board—a commonly used drywall—provided a thermal resistance value (R-Value) of 0.45. EX1044, Sheetrock® Brand MH UltraLight Panels, ("Product Data ... Thermal Resistance 'R' … 0.45° F x ft^2 x h/Btu (0.08 K x m^2/W)."). A POSITA would have recognized that drywall can be applied to noncombustible wall structures, such as concrete or foundation walls, to achieve a higher R-Value for the wall assembly, ultimately helping the wall assembly keep heated or cooled air within the interior of the building's interior room or outer envelope.

54. Moreover, a POSITA would have understood that drywall can be installed to wall structures of all types simply to improve the aesthetic appeal of the room. For example, drywall's light color typically brightens a room, which is particularly useful for a basement that receives little to no natural light. And drywall can be easily painted over so that the user can custom tailor the style of the wall assembly.

55. These applications of soundproof, thermal insulation, and aesthetic appeal collectively achieve "optimal wall integrity" as set forth in my first declaration. EX1003, ¶94. Thus, my rationale of improving wall integrity for

combining the references comes directly from the art as would be understood with the knowledge of a POSITA, not the claims or disclosure of the '867 patent. Further, for these similar reasons, a POSITA would have been motivated to combine drywall with masonry or concrete walls to provide cover for the wall structure.

B. PO's assertions about applying sheathing to masonry, concrete, and foundation walls are technically inaccurate.

56. Patent Owner argues that a POSITA would not have had a reason to use sheathing with the walls described in each of Gilb'792, Timony, and Tsukamoto because those walls—Gilb'792's masonry wall, Timony's concrete wall, and Tsukamoto's foundation wall—are already fireproof. Patent Owner's assertions are technically inaccurate.

57. Aside from the non-firewall rationales provided in Section VIII.A, which themselves are sufficient reasons to add sheathing to concrete or masonry walls, a POSITA would have understood that drywall is also commonly applied to masonry or concrete walls to achieve a particular fire rating. A POSITA does not always rely solely on the concrete or masonry itself to achieve a particular fire rating. Sheathing is a standard material used with masonry walls for satisfying code requirements. For example, the Brick Industry Association's pamphlet titled "Fire Resistance of Brick Masonry," notes that gypsum sheathing can be placed on the exterior surface of masonry walls or on a brick veneer loadbearing wall to

achieve a 2 hour fire resistance rating. EX1040, 4 (Table 1, Material "15. Exterior or interior walls" including "clay face brick with cored holes over ½ in. (12.7 mm) gypsum sheathing"), 5 (Table 3, Design Number "U302" having "(2) layers 5/8 in. (15.9 mm) thick gypsum wall board" for a "brick veneer/wood stud, loadbearing" wall.). As another example, the National Timber Development Council's manual (NTDC manual) titled "Multi-Residential Timber Framed Construction" notes that "fire grade lining," such as "plasterboard," may be applied to "timber, brick or masonry" structural members. EX1041, 15, FIG. 8(a) (showing "fire grade plasterboard" applied to "masonry piers."). In sum, a POSITA would have understood that drywall can be applied to any type of wall structures, including noncombustible wall structures such as concrete or masonry walls, to ensure that a wall satisfies the fire rating set by the local jurisdiction building code.

58. Thus, a POSITA would have been motivated to add sheathing to the each of the walls in Gilb'792, Timony, and Tsukamoto—whether the walls are masonry, concrete, or foundational walls—to achieve a particular fire rating set by the local building code.

C. Gilb'792's hanger is compatible with wood frame construction.

59. Patent Owner contends that it would not have been obvious to use Gilb'792's hanger on wood frame construction because the type of wood frame construction at the earliest possible priority date—platform framing—did not need

metal ledgers. POR, 107. While platform framing often did not use metal ledgers, metal ledgers were nonetheless used in certain situations as would have been known to a POSITA. For example, the NTDC manual notes that ledgers can be attached to both the top plate of wall assembly and a joist hanger. EX1041, 10, FIG. 4(b). A POSITA certainly would not have been deterred from using a metal ledger with platform framing.

60. Patent Owner also contends that Gilb'792's hanger is incompatible with the wood frame's top plate because Gilb'792's hanger relies on the outstanding ledger leg (3) of the metal ledger to provide vertical support for an imposed load. POR, 107. This is not technically accurate, and appears to ignore and contradict Gilb'792's own discussion of load appearing at column 3, lines 7-21.

61. Gilb'792 states that just attaching the hanger to the outstanding (i.e., top) leg (3) of the ledger "did not provide sufficient load holding capacity for some jurisdictions," but fastening the hanger's gusset foot "in face to face contact with the ledger lower leg 2" (and thus, by corollary, the wall), "a surprisingly substantial increase in holding capacity of the hanger could be obtained." EX1035, 3:7-21. "A further increase in holding capacity can be obtained" by fastening additional portions of the hanger's gusset feet face-to-face with the lower ledger leg (and, by corollary, the wall behind). *Id.*

62. Further, as explained in my previous declaration, a POSITA would have had an expectation of success in using Gilb'792's hanger in a wood frame construction (with or without a ledger), particularly in view of Bundy. EX1003, ¶95. For example, a POSITA would have understood that Gilb'792's and Bundy's hanger are constructed from the same materials (sheet metal) and used for similar purposes of hanging a structural object to a wall. EX1003, ¶95. A POSTA would have understood, in view of Bundy, that Gilb'792's hanger is suited for attaching to a wood frame wall.

D. Timony's hanger is compatible with wood frame construction.

63. Patent Owner contends that it would not have been obvious to use Timony's hanger on wood frame construction, because the spacing of Timony's retrofit brackets to accommodate a joist would require the use of two studs. POR, 108. Patent Owner's argument is premised on an inaccurate characterization that Timony's hanger can only be attached to the studs of the wood frame, not the header plate. A POSITA would have understood that Timony's retrofit brackets could and would be attached directly to the upper plate of a wood frame, while still providing the proper spacing to receive a joist. Most joists are hung from the top plate of the wall. And even in retrofit construction, the top plate would be accessible as part of the reconstruction process, either through the floor above or

ceiling below the joist, since joists are usually hidden in the space between a floor above the joist and a ceiling below the joist.

E. Tsukamoto's hanger is compatible with wood frame construction.

64. Patent Owner contends that Tsukamoto's hanger is designed for foundation walls, and therefore, is not applicable to wood frame construction. POR, 110. As explained in my first declaration and in Sections VIII.A and VIII.B above, drywall is commonly attached to foundation walls, and a POSITA would have understood how to protect the drywall from moisture. EX1003, ¶252. For example, a POSITA would have understood that moisture-retarding paint/cladding can be provided with sheathing to shield the drywall from moisture. And the structure of Tsukamoto's hanger would not need to be modified for its hanger to be mounted to a wood frame wall. Thus, a POSITA would not have been deterred from using Tsukamoto's hanger in wood construction.

F. A POSITA would have been motivated to add a stop to each of the hangers disclosed in Gilb'792, Timony, and Tsukamoto.

65. Patent Owner contends a POSITA would not have combined the teachings of Bundy's stop with Gilb'792 and Tsukamoto and interchange components between Timony's New Construction and Retrofit embodiments, without the benefit of impermissible hindsight. POR, 113-120.

66. The rationales for combining Bundy's stop with Gilb'792 and Tsukamoto and for adding a stop to Timony's retrofit hanger, as explained in my

previous declaration, are based on facts gleaned from the prior art, not guided by the '867 patent. EX1003, ¶¶139, 219, 296. As explained in my first declaration, adding a stop would allow the hangers in each of Gilb'792, Timony, and Tsukamoto to control the location of the end of the structural element. EX1003, ¶¶138-139, 217-219, 294-296. A POSITA would have recognized from the disclosures of Bundy and Timony that using flanges that project inwardly into the channel, in addition to serving other purposes, also serve to engage the structural member. This provides an obvious benefit of providing another support surface for the hanger and protecting any material that may be located beneath the hanger. Thus, a POSITA would have been motivated to include such inward-facing flanges that also act as stops, based strictly on the disclosures of Bundy and Timony, not the '867 patent application.

67. Moreover, Patent Owner's assertion that my rationale for bending only a portion of Gilb'792's and Tsukamoto's channel-shaped portions arrives "out of thin air" underestimates the skill level of a POSITA. POR, 119. A POSITA would have known that select portions of an outward projecting flange may be bent inward by well known techniques, such as punching steel with a press. For example, Timony teaches this concept, noting that forming projections "is within the purview of a worker skilled in the art" and that "outer projections 185 and inner projections 190 are formed by punching out portions of plate 130." EX1008,

¶0040. Thus, my rationale for bending only a portion of Gilb'792's and Tsukamoto's channel-shaped portions is based solely on the disclosure of the prior art and the knowledge and creativity attributed to a POSITA.

68. Patent Owner further contends that a POSITA would not have been motivated to interchange elements between Timony's New Construction embodiment shown in Figures 1-7 and Retrofit embodiment shown in Figures 8-9, because Timony's projections are allegedly only used to set depth of plate in the concrete, which would not have been applicable to Timony's Retrofit hanger. POR, 120-122. Patent Owner is again underestimating the skill level of a POSITA, who would have understood that Timony's inner projections also have the benefit of offsetting a structural element from the wall and protecting the foam sheathing, which is also useful for Timony's retrofit hanger. EX1003, ¶¶216-219.

IX. THE GILB'792-BUNDY COMBINATION DISCLOSES EVERY CHALLENGED CLAIM ELEMENT.

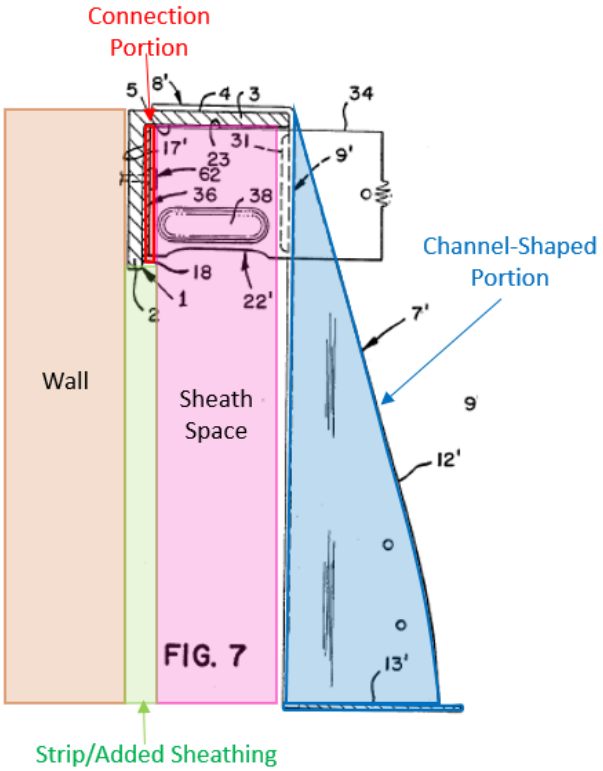
69. As explained in my previous declaration, all of the claimed structural elements are found in the Gilb'792-Bundy combination. EX1003, ¶¶91-171. From my review of the POR and Dr. Serrette's declaration, Patent Owner attempts to distinguish the claims over the Gilb'792-Bundy combination by focusing on the intended use of Gilb'792's hanger and arguing against the references individually. I maintain my opinion that the Gilb'792-Bundy *combination* discloses all the elements of the challenged claims for the reasons set forth below.

A. The Gilb'792-Bundy combination discloses an extension portion configured to extend through sheathing.

70. As explained in my first declaration, a POSITA would have understood that Gilb'792's gusset members 15'/22' are configured to extend into one side of sheathing and out of the other side because their essentially flat, thin profile spatially separates its channel-shaped portion (stirrup members 11'/12' and seat member 13') from its connection portion (base 36) and the wall. EX1003, ¶¶118-120.

71. Patent Owner contends that Gilb'792's gusset members 15'/22' are not configured to extend through sheathing because they are not "'designed to' or 'meant to' extend through sheathing." POR, 71. First, Gilb'792's gusset members are designed to define a space which would receive sheathing, and are designed such that they would extend into one side of the sheathing and out of the other side of the sheathing when sheathing is installed. It is my understanding that this is all that the construction of the term "configured to" requires. Second, Patent Owner makes the assumption that the wall's ledger shown in Figure 7 of Gilb'792 would obstruct the installation of sheathing around Gilb'792's gusset members and contends that installing sheathing around Gilb'792's hanger would require a significant deviation from its intended application. This is incorrect.

72. First, as noted in my first declaration, A POSITA would have understood that base 36 of Gilb'792's hanger can be attached directly to a wall, without a metal ledger, using nail means 62'. EX1003, ¶109.



EX1030, FIG. 7 (annotated).

73. Second, even if Gilb'792's hanger was attached to the ledger, a POSITA would still have understood how to install sheathing in the space defined by Gilb'792's gusset members 15'/22', and would have been motivated to do so. First, there is no indication that a small space between the back of the sheathing and the wall would have created an issue. As stated in the '867 patent itself, it was known

to fill any cavities in the wall assembly behind the sheathing other material, such as fire-resistant wool. EX1001, 11:45-60.

74. Second, the ’867 patent hanger is also made of sheet metal, and any sheathing in the wall assembly thereof is necessarily separated from the wall by a distance equal to the thickness of the sheet metal. Based on my years of experience in the field, sheathing can be installed such that one portion of the sheathing rests on the back flange of the hanger, such as the back flange described in the ’867 patent, with the lower portion of the sheathing still being flush against the wall structure. Here, in the setting of Gilb’792, the thickness of the metal ledger is not so great as to create new problems where none existed before.

75. Further, if there is a gap large enough to merit mitigation, a POSITA would have understood that additional sheathing or furring strips can be applied directly against the wall to account for any gap created by the metal ledger. For example, a POSITA would have understood that additional sheathing can be applied to the space defined by Gilb’792’s gusset members 15’/22’. Indeed, it was well known that sheathing is provided at various sizes and that a second layer of sheathing can be mounted directly on a first a layer of sheathing that is attached to the wall. A POSITA would also have understood that Gilb’792’s wall can include a recess sized to receive the ledger’s leg so that sheathing can be applied directly against the wall and be received in the space defined by Gilb’792’s gusset

members. Based on my years of experience in the field, these steps would have been straightforward to a POSITA. In any event, top plates are not always aligned flush with the front edges of the wall studs themselves, and in such circumstances would naturally act as a recess and accommodate a ledger, as would have been understood by a POSITA.

76. Third, applying sheathing to the space defined by Gilb'792's gusset members would not require any deviation from Gilb'792's intended application. Adding sheathing to the wall—as was commonly done in 2013—would neither require any structural modifications to Gilb'792's hanger nor prevent Gilb'792's hanger from holding a beam.

77. Patent Owner further asserts that Gilb'792's gusset members are not configured to extend through sheathing because Gilb'792 does not disclose the use of sheathing and that Bundy's extension flanges extend over sheathing. POR, 71. In my opinion, Patent Owner is not properly considering what the combination of Gilb'792 and Bundy would have suggested to a POSITA. As explained in my first declaration, Gilb'792's gusset members create a space between a top plate and a structural member, and a POSITA would have understood that sheathing can be applied in that space in view of Bundy, which teaches locating sheathing between a channel-shaped portion and connection portion of a hanger. EX1003, ¶¶92-95. Thus, in combining the teachings of Bundy with Gilb'792, a POSITA would have

found it obvious to add sheathing to the wall around the gusset members of Gilb'792's extension flange.

B. Gilb'792's base is configured to engage a vertical face of an upper plate of a frame wall.

78. Patent Owner contends that Gilb'792's hanger is specifically designed to attach to a metal ledger, and therefore, is not configured to engage a vertical face of the upper plate. POR, 78-79. As explained in my first declaration, a POSITA would have understood that Gilb'792's base 36 can be mounted directly against the vertical face of the upper of a frame wall without a ledger. EX1003, ¶109. I further note that there are no structural distinctions between Gilb'792's base 36 and the back flange disclosed in the '867 patent specification. *Compare* EX1035, 3:42-44 *with* EX1001, 5:19-23.

79. Further, as explained in my first declaration, Gilb'792's base 36 includes holes intended to receive screws that screw through the ledger into the wall. EX1003, ¶109. Because base 36 includes features (e.g., holes) that are explicitly for the purpose of attaching the base to a wall, base 36 is "configured to engage" the wall.

C. Gilb'792's gusset members extend from a channel-shaped portion to a connection portion.

80. Patent Owner contends that because Gilb'792's gusset members are intended to be "in registration with the lower face 5 of the outstanding leg 3 of the

ledger and a side face 17," Gilb'792's gusset members are part of the connection portion, not the extension portion, of the hanger. POR, 80-83. I disagree.

81. Based on my understanding of claim construction principles, when claims recite the transitional phrase "comprising," this renders the scope of the claims open-ended. According to my review, independent claims 1 and 16 of the '867 patent recite the transitional phrase "comprising," and therefore, are open-ended. EX1001, 12:15-17, 13:35-40. The claims do not include any limitations excluding "the extension flange" from registering with a leg of a ledger. In my opinion, the open-ended nature of claims 1 and 16 does not preclude extension flanges that register with a ledger leg. Indeed, the structure of Gilb'792's hanger itself is no different from the structural elements recited in claims 1 and 16.

82. Regardless, as discussed above, Gilb'792's hanger need not be used with a ledger at all, and in such case would connect to the wall only via the back flange (base 36).

X. TIMONY DISCLOSES EVERY CHALLENGED CLAIM ELEMENT.

83. As explained in my previous declaration, all of the claimed structural elements are found in Timony. I maintain this position, even in view of Patent Owner's arguments.

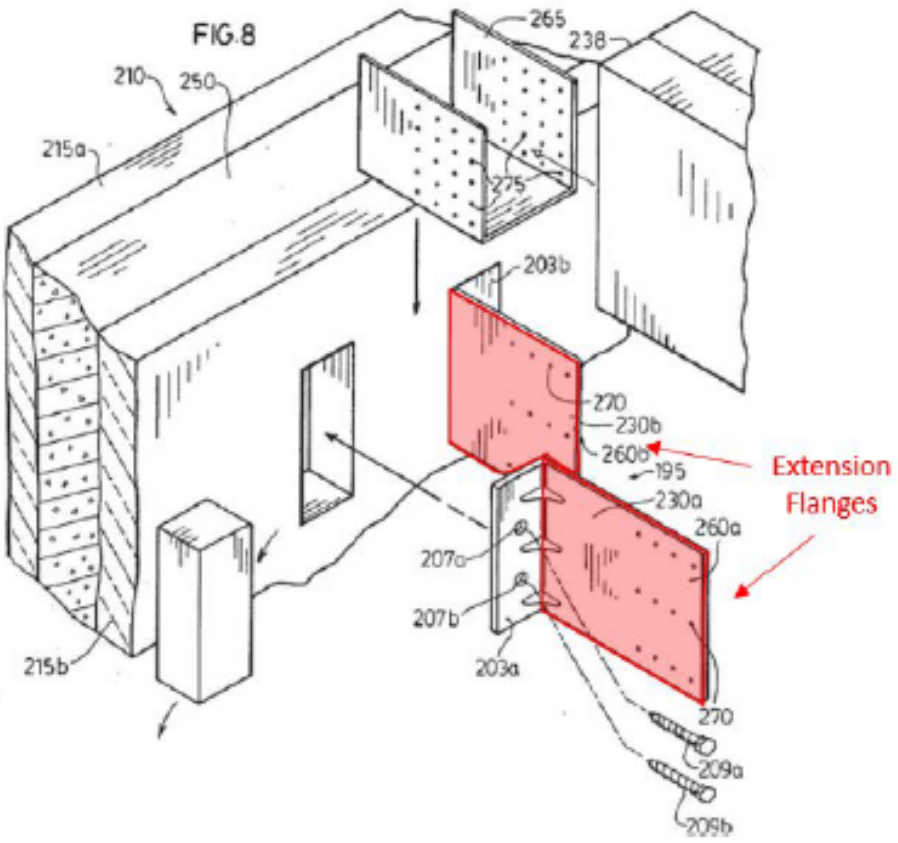
A. Timony discloses "the connection portion and channel-shaped portion being in a fixed, spaced apart relation."

84. Patent Owner contends that the recited limitation "being in a fixed, spaced apart relation relative to one another" requires that the hanger's components are fixed at the time of manufacturing. POR, 86. Because Timony's support 265 and retrofit plates 230 may be moved separately prior to installation, Patent Owner alleges that Timony fails to disclose the "fixed, spaced apart" limitation.

85. According to my review of the claims, Patent Owner is relying on an unclaimed feature—permanently fixed at the time of manufacturing—in an attempt to distinguish the claims over Timony's hanger. But as discussed above, I do not believe that is how a POSITA would interpret the claim language. As explained in my first declaration, Timony's support 265 is fixed to the hanging portions 260 by screws or nails. EX1003, ¶186. This is all the claims recite. Thus, under a proper construction, Timony's support 265 is in a "fixed relation" to its retaining portion 203.

B. Timony discloses "each extension flange being configured to extend through the sheathing."

86. As explained in my first declaration, Timony's extension flanges (retrofit plates 230a/230b shown below in FIG. 8) extend through outer foam wall 215b—a form of sheathing. EX1003, ¶190.

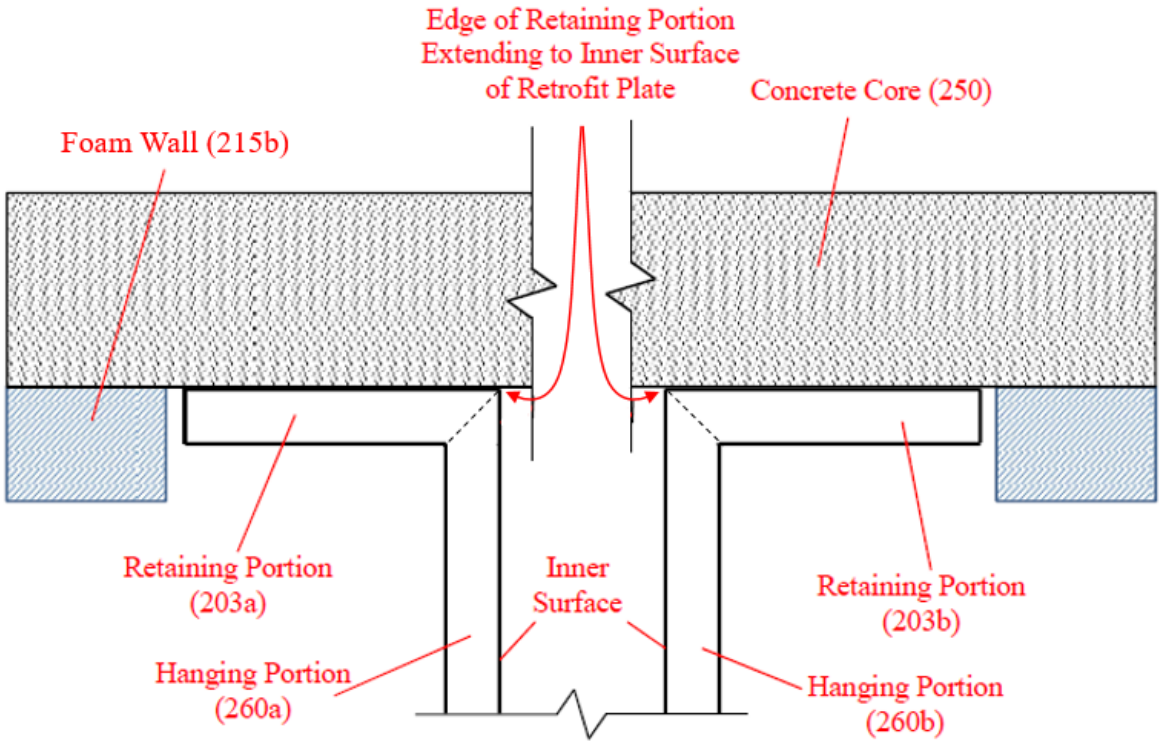


EX1008, FIG. 8 (annotated).

87. It is my understanding that Patent Owner previously argued that Timony's retrofit plates would not extend out of the other side of sheathing because Timony's retrofit plates 230 stop at the front face of retaining portion 203. Furthermore, it is my understanding that the Board was concerned that my previous declaration appeared to make conflicting statements: (1) Timony's retaining portion 203 terminates at the exterior face of the retrofit plate 230 such that retrofit plate 230 extends to wall core 250, and (2) Timony's retaining portion extends to the inner surface of retrofit plate 230 to provide an "opposed, spaced

relation" between a portion of Timony's channel-shaped portion and back flange. EX1001, 12:58-60; DI, 66-67.

88. To clarify the positions set forth in my first declaration (EX1003, ¶¶190, 201), a POSITA would have understood that boundaries of Timony's retaining portion 203 and retrofit plate 230 would generally be defined by a miter angle, as demonstrated below.

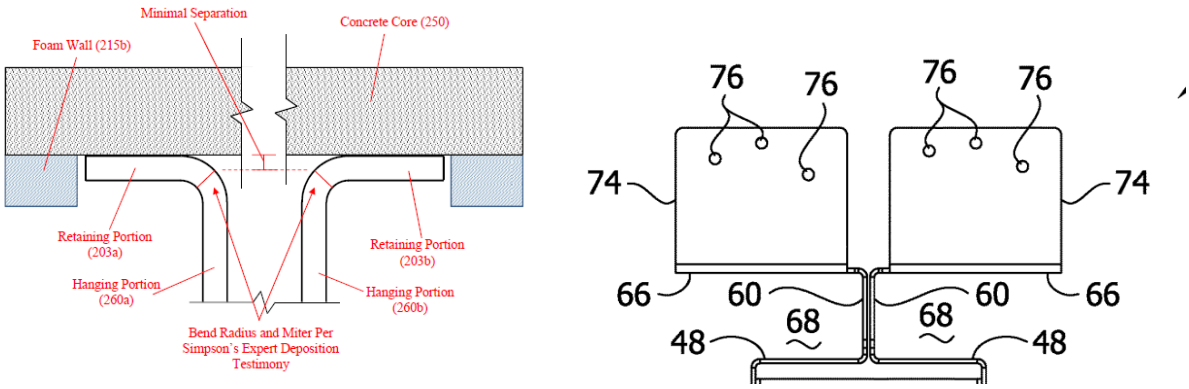


Annotated Schematic of Timony's Hanger shown in FIGS. 9 and 10.

89. As shown above, the extent of Timony's retrofit plate 203 would be determined by the ends of both the retrofit plate's exterior surface and interior

surface. Similarly, the extent of Timony's retaining portion 203 would be determined by the ends of both the retaining portion's front surface and back surface. Because Timony's retaining portion 203 and retrofit plate 230 merge at a miter angle, Timony's retrofit plate 230 would be in an opposed, spaced apart relation with at least a portion of Timony's retaining portion 203, and Timony's retrofit plate 230 would also extend to wall core 250.

90. Patent Owner further contends that because a bend formed between Timony's retrofit plates 230a/230b and retaining portions 203a/203b, there would be separation between the end of Timony's retrofit plates 230a/230b and the wall core 250, as shown by Patent Owner's schematic reproduced below. POR, 88-93. Patent Owner contends that Timony's retrofit plates 230 do not extend through the other side of sheathing due to this separation formed by the bend between the retrofit plates 230a/230b and retaining portions 203a/203b. POR, 88-93.

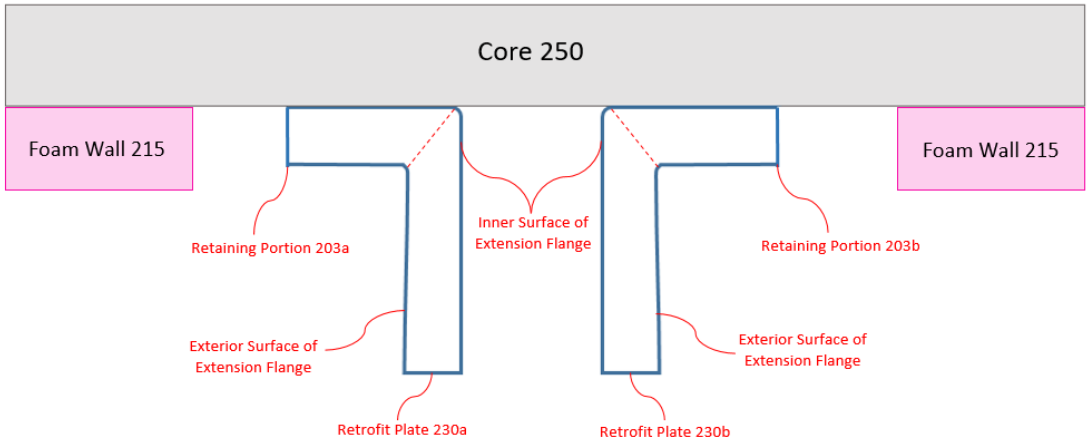


POR, 91 (schematic) and EX1001, FIG. 7.

91. In my opinion, there is no structural difference between Timony's hanger and the hanger of the '867 patent, as illustrated by the above comparison between Patent Owner's representation of Timony and the '867 patent hanger as illustrated in Figure 7. *See* EX1001, 7:15-17, FIG. 7. No structural modifications would have needed to have been made to Timony's hanger (as depicted in Patent Owner's own drawing) for a POSITA to have used Timony's hanger in a wood frame construction, where sheathing would be inserted between the back flange and the channel-shaped portion of Timony. Thus, just as the extension flanges disclosed in the '867 patent are configured to extend through sheathing when used on a wood frame wall where sheathing is to be installed, Timony's retrofit plates are also configured to extend through one side of sheathing and out of the other side of sheathing when used on a wood frame wall where sheathing is to be installed. Timony's hanger is structurally no different from claim 1.

92. Furthermore, a POSITA would have understood that a bend defined between Timony's retaining portion 203 and retrofit plate 230 can be set at different radii to minimize or eliminate any separation between the end of Timony's retaining portion 203 and core 250. In my opinion, PO's schematic assumes bending Timony's retaining portion 203 from retrofit plate 230 at a large radius to purposefully include some separation between the end of Timony's retaining portion 203 and core 250. Based on my years of experience in the field of

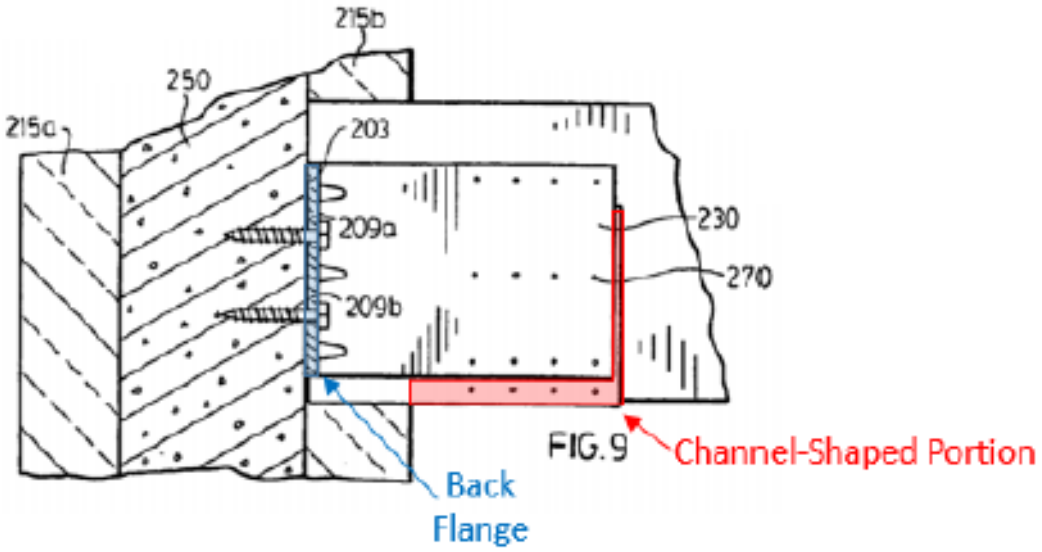
structural design, a POSITA would have understood that Timony's retaining portion 203 and retrofit plate 230 could be formed by bending at a smaller radius and still allow Timony's retrofit plate 230 to extend to core 250, as demonstrated below.



Schematic of Timony's Hanger shown in FIGS. 9 and 10.

C. Timony discloses a "back flange … located on an opposite side of the sheathing."

93. Patent Owner contends that Timony does not disclose "the back flange is located on an opposite side of the sheathing" because Timony's retaining portion 203 is located within the sheathing. POR, 92-93. In my opinion, Patent Owner's arguments rely on inaccurate characterizations of Timony.



EX1008, FIG. 9 (annotated).

94. First, as shown above in Figure 9, the back face of retaining portion 203 is disposed flush (i.e., touches) against core 250, and therefore reaches completely through the sheathing and is located on "an opposite side" of the foam wall from the channel-shaped portion. Second, in my opinion, the claims do not require that the entire back flange—all front and back surfaces/edges—be located entirely outside of the sheathing, so the Patent Owner is relying on a feature that is not positively recited in the claims. EX1001, 12:15-14:50. Third, based on my review of the claim language, the claims are directed only to a hanger, not sheathing. As explained in my first declaration, a POSITA would have understood that Timony's hanger can applied to a wood frame wall and, without any changes to the structure

of Timony's hanger, receive sheathing such that Timony's retaining portion 203 is located on the sheathing's opposite side. EX1003, ¶174.

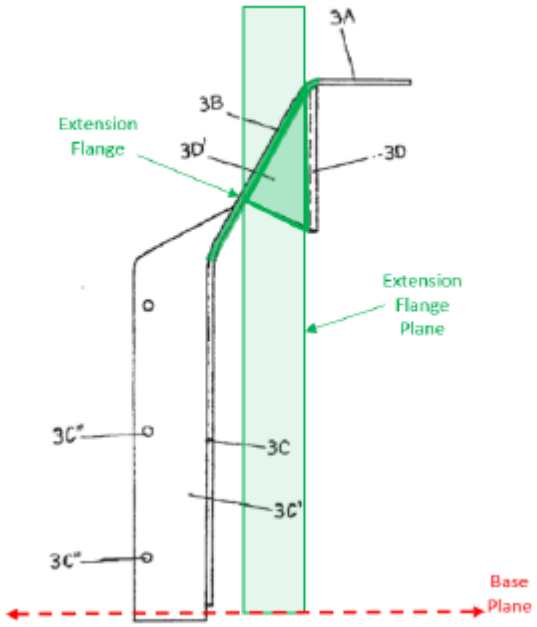
95. Thus, I maintain my opinion that Timony discloses all the recited elements of claims 1-4, 6, 10, and 11, and that the Timony-Bundy combination discloses all the recited elements of claims 5, 7-9, 12, 15, 16, 17, and 21-23.

XI. THE TSUKAMOTO-BUNDY COMBINATION DISCLOSES EVERY CHALLENGED CLAIM ELEMENT.

96. As explained in my previous declaration, all of the claimed structural elements are found in the Gilb'792-Bundy combination. EX1003, ¶¶248-329.

A. Tsukamoto discloses "first and second extension flanges extending from the channel-shaped portion to the connection portion … [and] lying in an extension flange plane."

97. As explained in my first declaration, a POSITA would have recognized that Tsukamoto's inclined portions 2B/3B and connection plates 2D'/3D' collectively correspond to the "first and second extension flanges," which extend from a connection portion (Tuskamoto's vertical plates 2D/3D) to a channel-shaped portion (Tuskamoto's holding plates 2C'/3C'). EX1003, ¶¶271-273. And a POSITA would have understood that Tsukamoto's connection plates 2D'/3D' lie in an extension flange plane that is perpendicular to a base plane. Pet., 102; EX1003, ¶¶277-278.



EX1009, FIG. 3 (annotated).

98. Patent Owner contends that Tsukamoto's connection plates 2D'/3D' are separated from its channel-shaped portion, and therefore, "cannot extend from the channel-shaped portion as required by claim 1." POR, 96.

99. In my opinion, Patent Owner is construing the claims too narrowly and applying the cited art—Tsukamoto—inconsistently from how the recited hanger is disclosed in the '867 patent specification. As explained above, independent claims 1 and 16 each recite the transitional phrase "comprising," and therefore, are open-ended in claim scope. Accordingly, the claims do not exclude the extension flange from including other elements, such as a bend merging with the channel-shaped portion. Indeed, the '867 patent specification discloses a bend between the extension flange and the channel-shaped portion. EX1001, 2:11-15. Similar to the

extension flange disclosed in the ’867 patent, Tsukamoto’s extension flange includes bends (i.e., section of Tsukamoto’s inclined portion 2B/3B) to connect with holding plates 2C’/C’ and vertical plates 2D/3D. EX1009, FIG. 3. Thus, a POSITA would have understood that Tsukamoto’s extension flange—Tsukamoto’s inclined portions 2B/3B and connection plates 2D’/3D’—extends from the channel-shaped portion to the connection portion in a manner consistent with the specification of the ’867 patent.

100. Further, based on my review, claim 1 does not require that the extension flange coincide along an extension flange plane in its entirety from the channel-shaped portion to the connection portion. Construing claim 1 this way would be inconsistent with the ’867 patent specification which, as noted above, includes curved portions. In my opinion, the claims just require that at least a portion of the first and second extension flanges coincides with the extension flange plane at a location between the connection portion and the channel-shaped portion, without further specifying to what extent the extension flange coincides with the plane. EX1001, 12:35-36.

101. As explained above, I construe the claims to mean that the extension flanges coincide along an extension flange plane *between* the channel-shaped portion and the connection portion. Under a proper construction, Tsukamoto’s connection plates 2D’/3D’ are each *between* the channel-shaped portion and the

connection portion of the hanger and coincide along an extension flange plane that is perpendicular to a base plane.

B. Tsukamoto-Bundy combination discloses "extension flange[s] being configured to extend through the sheathing."

102. As explained in my first declaration, a POSITA would have understood that Tsukamoto's connection plates 2D'/3D' and inclined portions 2B/3B are constructed as a continuous metal sheet and are therefore configured to extend into one side of sheathing and out of the other side of sheathing. EX1003, ¶¶274-276. Thus, in my opinion, Tsukamoto's extension flanges are "designed to" extend through sheathing when sheathing is installed therein, as taught by the Tsukamoto-Bundy combination.

103. Patent Owner asserts that Tsukamoto's extension flanges are not configured to extend through sheathing because Tsukamoto (by itself) does not disclose the use of sheathing and that Bundy's extension flanges (by themselves) extend over sheathing. POR, 99. In my opinion, Patent Owner is only considering the references individually, and is not properly considering what the combination of Tsukamoto and Bundy would have suggested to a POSITA. As explained in my first declaration, Tsukamoto's inclined portions 2B/3B and connection plates 2D'/3D' create a space between a top plate and a structural member, and a POSITA would have understood that sheathing can be applied in that space in view of Bundy, which teaches locating sheathing between a channel-shaped portion and

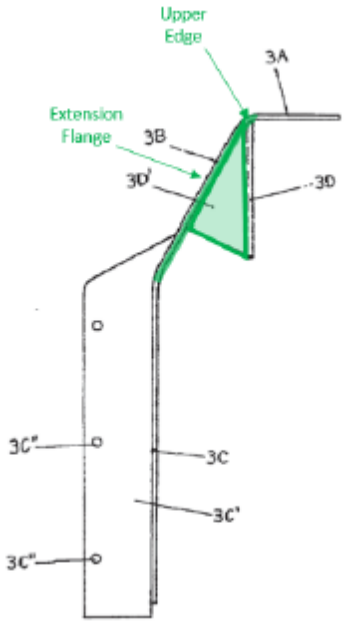
connection portion of a hanger. EX1003, ¶¶249-253. Thus, in the hanger resulting from combining the teachings of Bundy with Tsukamoto, a POSITA would have found it obvious to add sheathing to the wall around Tsukamoto's extension flange.

C. Tsukamoto discloses "planar" extension flanges.

104. In my opinion, Patent Owner construes the term "planar" too narrowly by requiring a flange to have an essentially flat, thin profile with uniform thickness *throughout*. POR, 98-99. But as explained above, Patent Owner's claim construction is inconsistent with the specification, which discloses extension flanges as defining planar surfaces "*between* the connection portion and the channel-shaped portion." EX1002, 37 (emphasis added). Under a proper claim construction, a POSITA would have understood that Tsukamoto's connection plates 2D'/3D' are planar.

D. Tsukamoto discloses extension flanges having "an upper free edge."

105. In my opinion, Patent over-narrowly construes the term "free edge" to mean "an edge that is free of direct attachment to another component," in attempt to distinguish claim 4 over Tsukamoto's extension flange. POR, 101-102.



EX1009, FIG. 3 (annotated).

106. Based on my review, Patent Owner is relying on unclaimed features—an edge free of direct attachment to another component—in attempt to distinguish the claims over the cited art. Under a proper construction, a POSITA would have recognized that the upper edge of Tsukamoto's connection plates are "free" because they are exposed. EX1003, ¶¶287-288.

XII. SUBSTITUTE CLAIMS

107. I understand that Patent Owner proposes if the challenged claims are found to be unpatentable, to replace claims 1-23 with substitute claims 24-46. MTA, 2-3. I understand that Patent Owner proposes that such substitute claims would be amendments to issued claims as set forth below.

A. Claim 24

108. It is my understanding that that substitute claim 24 recites, in part (changes to originally issued claim 1 underlined):

a) **Claim Element [24.b.3]** "the connection portion and channel-shaped portion being in a permanently fixed, spaced apart relation relative to one another as manufactured,"

b) **Claim Element [24.c.3]** "each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion"

c) **Claim Element [24.c.4]** "the first and second extension flanges and the channel-shaped portion being formed as one piece of sheet metal"

B. Claim 25

109. It is my understanding that substitute claim 25 recites, in part (changes to originally issued claim 2 underlined): "wherein each of the first and second extension flanges are planar, the first extension flange being unbent between the channel-shaped portion and the back flange"

C. Claim 26

110. It is my understanding that substitute claim 26 recites, in part (changes to originally issued claim 3 underlined): "wherein each of the first and second extension flanges include an edge, the first and second extension flanges arranged to extend edgewise through the sheathing, the first extension flange extending

edgewise from the channel-shaped portion toward the back flange in an extension direction, the extension direction being parallel to the base plane, and wherein each of the first and second extension flanges are planar."

D. Claim 27

111. It is my understanding that substitute claim 27 recites, in part (changes to originally issued claim 4 underlined): "wherein the first and second extension flanges each include an upper free edge, and wherein the channel-shaped portion includes side panels extending up from the base on opposite sides of the base, the base and side panels being made of sheet metal, and wherein the first and second extension flanges are extensions of the sheet metal forming the side panels."

E. Claim 28

112. It is my understanding that substitute claim 28 recites, in part (changes to originally issued claim 5 underlined): "wherein the first and second extension flanges each have an exterior side face configured to face and extend through the sheathing while maintaining a 2 hour fire resistance rating of a wall assembly including the wall and the sheathing."

F. Claim 29

113. It is my understanding that substitute claim 29 recites, in part (changes to originally issued claim 6 underlined): "wherein a portion of the channel-shaped portion is in an opposed, spaced apart relation with a front face of the back flange."

G. Claim 33

114. It is my understanding that substitute claim 33 recites, in part (changes to originally issued claim 10 underlined): "wherein the first and second extension flanges are parallel to one another, wherein the channel-shaped portion includes first and second side panels extending upward from the base, and wherein a front edge of the first extension flange abuts a rear edge of the first side panel."

H. Claim 34

115. It is my understanding that substitute claim 34 recites, in part (changes to originally issued claim 11 underlined): "first connections between the first and second extension flanges and the channel-shaped portion, locations of the first connections being spaced apart from a lower end of the channel-shaped portion where the base of the channel-shaped portion is located, each first connection extending from an upper end of the first connection to a lower end of the first connection in a first direction, the hanger further comprising second connections between the first and second extension flanges and the connection portion, each second connection extending from an upper end of the second connection to a lower end of the second connection in a second direction, the first and second directions being parallel to one another and parallel to the extension flange planes."

I. Claim 39

116. It is my understanding that substitute claim 39 recites, in part (changes to originally issued claim 16 underlined):

a) **Claim Element [39.a.2]** "the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane"

b) **Claim Element [39.b.4]** "the connection portion including a top flange extending rearwardly from a remainder of the connection portion and arranged to overlie an upper surface of the wooden upper plate when the hanger is installed on the frame wall, the top flange including a rear edge located rearwardly of the back flange"

c) **Claim Element [39.c.3]** "the first extension flange including an edge, the first extension flange extending edgewise from the channel-shaped portion toward the wall frame in an extension direction, the extension direction being parallel to the base plane"

J. Claim 40

117. It is my understanding that substitute claim 40 recites, in part (changes to originally issued claim 17 underlined): "wherein the first and second extension flanges each have an exterior side face configured to face and extend through the sheathing while maintaining a 2 hour fire resistance rating of a wall assembly including the frame wall and the sheathing."

K. Claim 41

118. It is my understanding that substitute claim 41 recites, in part (changes to originally issued claim 18 underlined): "wherein the back flange extends down from the top flange."

L. Claims 30-32, 35-38, and 42-46

119. It is my understanding that substitute claims 30-32, 35-38, and 42-46 do not add any amendments to the subject matter of originally issued claims 7-9, 12-15, and 19-23.

XIII. GROUND 1: CLAIMS 24-46 SHOULD BE FOUND UNPATENTABLE AS LACKING WRITTEN SUPPORT.

120. In my opinion, substitute claims 24-46 recite limitations that are not adequately supported by the disclosure, including the drawings and specification, of the '867 patent, as explained below.

A. The limitation [element 24.b.3] "permanently fixed, spaced apart relation relative to one another as manufactured" lacks written description.

121. Substitute claim 24 recites "the connection portion and channel-shaped portion being in a permanently fixed, spaced apart relation relative to one another as manufactured." MTA, Appx. A, 4. From my review of the MTA, Patent Owner asserts that written support for this amendment can be found in paragraphs [0056] and [0067] and Figures 1, 2, and 15 of the '799 application. MTA, 15. Specifically, Patent Owner alleges that the manufacturing routine described in para. [0067] of the '799 Application—a truss hanger formed from one piece of

sheet metal stamped and bent into shape—provides written description support for "permanently fixed." MTA, 15-17. In my opinion, this description lacks adequate support.

122. A POSITA would have understood that the new limitation "permanently fixed … as manufactured" must have some meaning beyond simply being "fixed," which was in the originally-issued claims. But the specification fails to provide any support for this new language. There are only three uses of the word "fixed" in the specification as filed, and no occurrences of the word "permanently" or any variation thereof. EX1002, 35-58. The specification of the '867 patent does not describe that the channel-shaped portion cannot move permanently with respect to the connection portion once the hanger is manufactured.

123. Further, a POSITA would not have considered the channel-shaped and connection portions being in a "permanently fixed" relation based on the stamping and folding process described in paragraph [0067] of the '799 application. Formed from 12-14 gauge sheet metal, the hanger described in the '867 patent is susceptible to bending, even after being "manufactured." Based on my years of experience in the field, sheet metal hangers are commonly bent at construction sites to account for slight angle misalignments during beam installation. In my opinion, the hanger of the '867 patent would be susceptible to this type of bending when installed on site. Indeed, the stamping and bending process described in

paragraph [0067] of the '799 application confirms that the hanger itself is bendable after being "manufactured," and therefore, the claimed hanger portions would not be in a "permanently fixed" relation.

124. Bending single sheet metal hangers has been common practice for field installers to mitigate misalignments during installation, and multiple hangers that are stamped out of a single sheet of sheet metal are nonetheless identified as "adjustable" or "skewable". EX1045; EX1046. Accordingly, in my opinion, the '799 Application does not disclose the hanger portions being in a "permanently fixed" relation. Thus, claim 24 and dependent claims 25-38 lack written support.

B. The limitation [element 24.c.3] "each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion" lacks written support.

125. The amended language in Patent Owner's MTA specifies that the extension flange must: (1) lie along the extension flange plane throughout its extent (2) from the channel-shaped portion to the connection portion. In my opinion, this limitation lacks support from the specification.

126. As discussed above with regards to Patent Owner's claim construction for the originally-issued claims, the '867 patent specification and drawings make clear that bends are provided at the extension flanges' ends. EX1002, 37 ("a bend between each extension flange and the channel-shaped portion."), 45 ("formed as one piece from a metal blank 100 that is … bent into shape."), FIG. 7. Because the

extension flanges' ends are bent, a POSITA would not have recognized that the '799 Application describes an extension flange lying in an extension flange plane throughout its extent *from* the channel-shaped portion *to* the connection portion. Thus, claim 24 and dependent claims 25-38 lack written support.

C. The limitation [element 25.b] "the first extension flange being unbent between the channel-shaped portion and the back flange" lacks written support.

127. Patent Owner's MTA attempts to add a negative limitation in claim 25, specifying that first extension flange is not bent between the channel-shaped portion and the back flange. MTA, Appx. A, 5. But paragraph [0005] of the '799 application contradicts this feature by describing "a bend between each extension flange and the channel-shaped portion." EX1002, 37. The Figures of the '799 application also illustrate that the extension flanges are bent between the channel-shaped portion and the back flange. Any attempts to create a boundary along the extension flange's flat section to "end" the flange prior to a bend would be arbitrary, and would contradict other aspects of the claims that identify, for example, the front surface of the back flange as lying in a plane. Thus, claim 25 lacks written support.

D. The limitation [element 39.b.4] "The connection portion including a top flange extending rearwardly from a remainder of the connection portion" lacks written support.

128. Based on my review, Patent Owner's MTA requires the connection portion in claim 39 to include three elements: (1) a back flange, (2) a top flange, and (3) a remainder of the connection portion. POR, Appx. A, 9-10 ("[T]he connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall, … [and] a top flange extending rearwardly from a remainder of the connection portion."). Claim 39 recites that the "top flange extend[s] rearwardly from a remainder of the connection portion." POR, Appx. A, 9-10. This limitation is not supported.

129. In my opinion, a POSITA would have construed the "remainder of the connection portion" to be a distinct element from the recited "back flange," given that the plain language of the claims introduces the remainder of the connection portion as a separate element from the back flange. Because the "remainder of the connection portion" is a distinct, separate element from the "back flange," the scope of claim 39 appears to recite a hanger having a top flange extending from something other than its back flange. But based on my review, the '799 Application fails to provide support for such type of a hanger. EX1002, 35-58. All embodiments described in the '799 Application include a top flange extending just from the back flange, not some other element of the connection portion. EX1002,

35-58. Accordingly, the scope of claim 39 is not in commensurate with the written description. Thus, claim 39 and dependent claims 40-46, lack written description support.

XIV. GROUND 2: CLAIMS 24-35 SHOULD BE FOUND UNPATENTABLE AS LACKING ENABLEMENT.

130. In my opinion, Claim 24 is not enabled because it does not recite a top flange having fastening elements, which is essential for the hanger described by the ’867 patent to be operable. I have been informed that claims lack enablement when omitting a feature that is taught by the specification to be essential.

131. Based on my review, each hanger embodiment of the ’799 Application includes a top flange with fastening elements. EX1002, 35-58. And the specification never describes the top flange as being an optional feature used in a preferred embodiment. Nowhere does the ’799 Application disclose that the back flange alone includes some mechanism to attach the hanger to the wall, nor does the ‘799 Application identify a tool that could be used that would fit in between the channel-shaped portion and the back flange so as to fasten the back flange to a top plate. If the hanger described in the ’799 Application was constructed as disclosed in the ’799 Application, but without a top flange, such a hanger would fall off the top plate. This is because the ’799 Application does not include any mechanism or method for fastening the back flange (the only other part of the connection portion described in the ’799 Application) to the top plate.

132. Accordingly, in view of the specification, a POSITA would have considered a top flange with fastening elements to be essential for the claimed hanger to be connected to a wall's structural component given the disclosure of the '799 Application. Because claim 24 does not recite such a top flange, the scope of the enabling disclosure is not commensurate with the scope of claim 24. Thus, claim 24 and dependent claims 25-35 lack enablement.

XV. GROUND 3: CLAIMS 24-46 SHOULD BE FOUND UNPATENTABLE AS INDEFINITE UNDER § 112(B).

A. The term [element 24.b.3] "permanently fixed" is indefinite.

133. In my opinion, the amended language "permanently fixed" renders substitute claim 24 indefinite.

134. It is my understanding that a claim must inform those skilled in the art about the scope of the invention with reasonable certainty. A POSITA would recognize that "permanently" is a term of degree that calls for a comparison against some baseline. It is my understanding that when read in light of the specification, terms of degree must provide objective boundaries for ascertaining the scope of the claim.

135. Based on my review, neither the substitute claim itself nor the '867 patent provides a baseline for comparison for the term "permanently" to inform a POSITA about the claim scope with reasonable certainty. In my opinion, "permanently fixed" here could encompass alternative meanings— channel-

shaped, extension, and connection portions are: (1) simply not intended to be moved after being manufactured, or (2) connected in such a manner (e.g., welded) that prevents any movement, even when exposed to a significant amount of force. Accordingly, it is unclear how permanent the fixed, spaced relation is needed for the channel-shaped and connection portions to be considered "permanently fixed … relative to one another."

136. The specification would not have informed a POSITA with reasonable certainty the scope of the term "permanently." The specification never recites the term "permanent," only "fixed." EX1002, 35-58. In my opinion, "fixed" is not the same as the explicitly claimed "permanently fixed."

137. A POSITA would have understood that different metals will have different tolerances for bending. Neither the claim nor the specification identifies a tolerance level for being permanently fixed. For example, if an applied force causes the hanger portions to move relative to each other, it is not clear what threshold of applied force or movement does a hanger cease to be "permanent." This guidance is not provided by the specification. EX1002, 35-38. Indeed, some stamped sheet metal hangers exist that are formed at the manufacturer yet intentionally tolerant of some bending (e.g., adjustment or skewing). As neither the claims nor the specification specify conditions necessary to identify the extent of movement allowed by the term "permanently fixed," claims 24-38 are indefinite.

B. The term [element 24.c.3] "each extension flange lying in an ex-tension flange plane throughout its extent from the channel-shaped portion to the connection portion" is indefinite.

138. In my opinion, substitute claim 24 does not properly address the indefiniteness challenges to originally-issued claim 1, as supported by my first declaration. EX1003, ¶¶67-78. Clam 24 still defines the location of the "extension flange plane" based on a three-dimensional, multi-planar object—the extension flange—without identifying any particular surface or cross-section on the ex-tension flange. It is unclear how a three-dimensional object can lie along a two-dimensional plane throughout its extent. The amended language is therefore indefinite for the same reasons discussed in my first declaration. EX1003, ¶¶67-78. Thus, claim 24 and dependent claims 25-38 are indefinite.

C. The limitation [element 39.b.4] "[t]he connection portion including a top flange extending rearwardly from a remainder of the connection portion" is indefinite.

139. As noted above, the connection portion in claim 39 includes three elements: (1) a back flange, (2) a top flange, and (3) a remainder of the connection portion. POR, Appx. A, 9-10 ("[T]he connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall, … [and] a top flange extending rearwardly from a remainder of the connection portion."). Based on my review, claim 39 does not recite where the "remainder of the connection portion" is located relative to the "back flange." Without reciting

the spatial arrangement between the "remainder of the connection portion" and the "back flange," claim 39 is open to alternative interpretations: (1) the top flange is off-set with respect to the back flange, or (2) the top flange is aligned with respect to the back flange. Accordingly, it is not clear in view of claim 39 where the top flange is located relative to the back flange. Thus, claim 39 and dependent claims 40-46 are indefinite.

XVI. PATENT OWNER'S PROPOSED SUBSTITUTE CLAIMS WOULD HAVE BEEN OBVIOUS.

140. Should the Board determine that the amendments in the substitute claims are supported by the '867 patent and are definite in claim scope, the prior art likewise discloses the newly recited limitations to at least the same degree. Thus, a POSITA would have also understood that these added limitations were disclosed by the prior art as detailed below. Accordingly, in my opinion, the substitute claims are unpatentable over the prior art based at least on the following grounds.

Ground	References	Basis	Substitute Claims Challenged
4	Gilb'792, Bundy, Harrison	§103	24-35 and 38
5	Tsukamoto, Bundy	§103	24, 26-32, 35, 39, 40, and 43-46

A. Claim Construction

141. Other than the exceptions noted in the Petition and the construction provided below, the terms of the substitute claims are construed based on their plain and ordinary meaning as understood by a POSITA.

1. "Permanently fixed … as manufactured"

142. The term "permanently fixed" does not appear anywhere in the specification. To the extent "permanently fixed … as manufactured" can be construed with any reasonable certainty, this limitation means components that cannot move with respect to each other as manufactured.

2. "each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion"

143. To the extent that claim element [24.c.3] can be construed in a manner *consistent* with the specification, a POSITA would have understood this limitation to mean that the extension flange plane coincides with a section/surface of the extension flange defined *between* the connection and channel-shaped portions, *not from* the channel-shaped portion to the connection portion. EX1001, 2:20-23. As explained in Section V.A, the '867 patent specification describes that the extension flange includes bent portions. EX1001, 2:11-14. Therefore, the '867 patent specification only supports a section of the extension flange located *between* the

channel-shaped portion and the connection portion lying in an extension flange plane throughout its extent.

3. "the first extension flange extending edgewise from the channel-shaped portion toward the back flange [wall frame] in an extension direction, the extension direction being parallel to the base plane"

144. To the extent that claim elements [26.a], [39.c.3] can be construed in a manner *consistent* with the specification, a POSITA would have understood these limitations to mean that a section of the extension flange defined *between* the connection and the channel-shaped portions extends edgewise toward the back flange/wall frame in a direction parallel to the base plane. EX1001, 2:20-23. As explained in Section V.A, the '867 patent specification describes that the ends of the extension flanges are bent in a curved shape. EX1001, 2:11-15. Therefore, the '867 patent specification only supports a section of the extension flange defined between the channel-shaped and connection portions extending edgewise toward the back flange/wall frame in a direction parallel to the base plane, rather than the entirety of the extension flange extending edgewise *from* the channel-shaped portion.

B. Overview of the Prior Art

1. Gilb'792

145. I maintain my analysis regarding the overview of Gilb'792 as set forth in my previous declaration. EX1003, ¶¶53-56.

2. Tsukamoto

146. I maintain my analysis regarding the overview of Tsukamoto as set forth in my previous declaration. EX1003, ¶¶61-63.

3. Bundy

147. I maintain my analysis regarding the overview of Tsukamoto as set forth in my previous declaration. EX1003, ¶¶64-65.

4. Harrison

148. I understand that U.S. Patent Application Publication No. 2005/0120669 to Harrison—published on June 9, 2005—is prior art under 35 U.S.C. § 102(a)(1).

149. Harrison relates to a "joist hanger for use in the construction industry" and includes "first and second side flanges, a seat, at least one back flange and at least one bottom flange." EX2016, Abstract. Harrison's "seat (50) is provided between the first and second side flanges (30, 40) to form a stirrup for supporting a first joist (1, 2, 3)." EX2016, ¶0033. Harrison's "back flanges (61) and [] bottom flanges (80) form a bracket for abutting a lower surface and a side surface of a second joist." EX2016, ¶0036. Harrison describes that the joist hanger "is formed/folded from a single piece of metal (e.g., steel)," which makes the manufacturing process "more economic and efficient" compared to other processes, such as welding. EX2016, ¶0031.

Figure 4

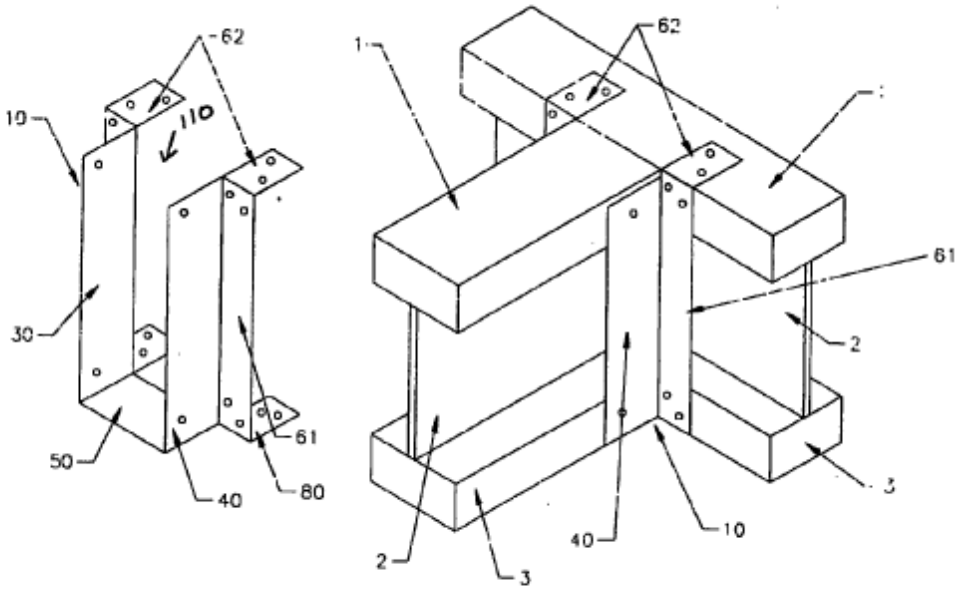


Figure 4A

Figure 4B

EX2016, FIGS. 4A and 4B.

C. Ground 4: Claims 24-35 and 38 would have been obvious over Gilb'792 in view of Bundy and Harrison.

150. In the interest of brevity, I only address the added limitations presented by the proposed substitute claims, as the Gilb'792-Bundy combination I discussed in my previous declaration applies equally to the same elements here.

1. Motivation to Combine Harrison with the Gilb'792-Bundy Combination

151. Gilb'792, Bundy, and Harrison are from the same field—joist hangers formed from sheet metal—and include analogous features, such as a channel-

shaped portion for receiving a structural member. EX1035, 3:22-350; EX1007, 1:5-10; EX2016, ¶¶0003, 0032. Accordingly, a POSITA would have recognized that the teachings of Harrison are analogous to both Gilb'792's and Bundy's hanger. Gilb'792 describes connecting its extension flanges (gusset members 15'/22') to its channel-shaped portion (stirrup members 11'/12') by welding two pieces of sheet metal together. EX1035, 2:49-58, 3:23-25. But a POSITA would have understood that there are more efficient ways of manufacturing a joist hanger, such as Gilb'792's hanger.

152. For example, Harrison teaches a joist hanger 10 that "is formed/folded from a single piece of metal (e.g. steel)." EX2016, ¶0031. Harrison teaches that forming the joist hanger from folding one piece of sheet metal "is more economic and efficient to manufacture compared to the known joist hangers." EX2016, ¶0031. Harrison specifies that "unlike a welded two part hanger," a joist hanger formed from folding one piece of sheet metal "does not require secondary protective coatings such as hot dip galvanizing for durability." EX2016, ¶0031. Alternatively, Harrison teaches that its joist hanger can be "formed from multiple pieces which are connected by for example welding." EX2016, ¶0031. A POSITA would have understood in view of Harrison that joist hangers may be constructed by two alternative processes—(1) folding one piece of sheet metal, or (2) welding

two pieces of sheet metal—and that the folding process eliminates metal processing steps required in welding.

153. A POSITA would have been motivated to construct Gilb'792's hanger from folding one piece of sheet metal, as taught by Harrison, to manufacture the hanger with less costs and more efficiency. Indeed, a POSITA would have understood that cutting and welding multiple pieces of steel requires more specialized equipment (e.g., CNC cutter) than metal stamping. And forming Gilb'792's hanger from stamped metal, rather than welded metal, would reduce the production time for yielding the hanger. And a POSITA would have had a reasonable expectation of success in doing so because the thickness of sheet metal used to construct Gilb'792's hanger—12 gauge steel—is suitable for bending. EX1035, 2:52-53. A POSITA would also have been able to determine, using common CAD tools, how to create a single sheet blank that maintains the fundamental shape of the Gilb'792 and its components. Overall, a POSITA would have also understood that forming Gilb'792's hanger from metal stamping, rather than welding, would still allow Gilb'792's hanger to perform its intended function of attaching a structural beam member to a wall via a metal ledger.

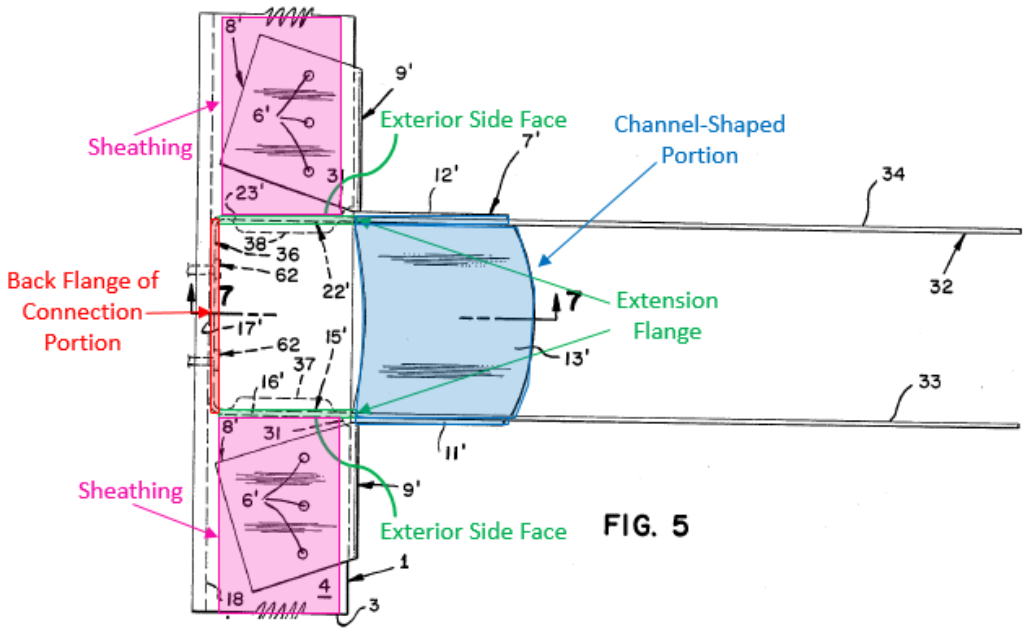


FIG. 5

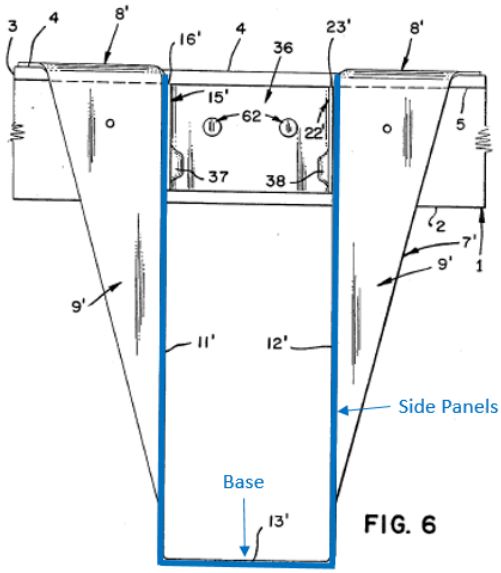


FIG. 6

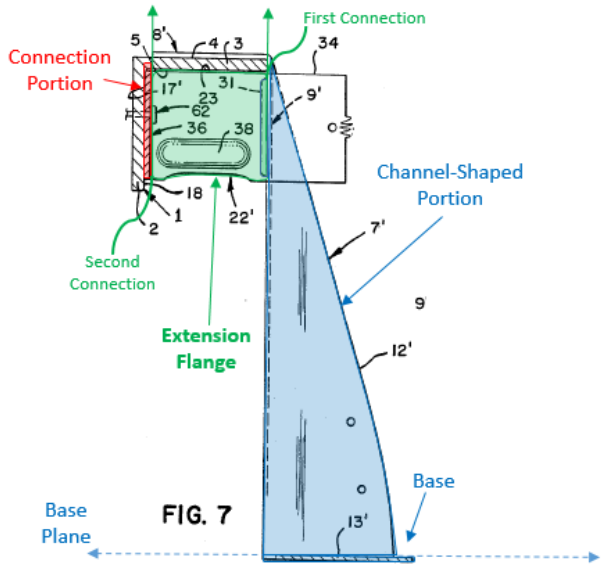


FIG. 7

EX1035, FIGs. 5-7 (annotated).

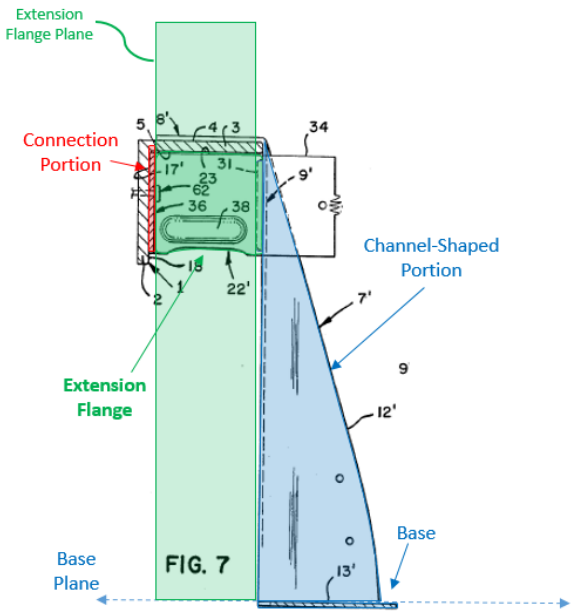
2. Element [24.b.3]

154. Gilb'792 discloses that the connection portion (base 36) and channel-shaped portion (stirrup members 11',12') are permanently fixed (as best that phrase can be understood) and spaced apart at the time of manufacturing in the

form of welding two-pieces of metal together, which welding would occur at the manufacturer of the hanger. EX1035, 2:49-58, 3:23-44.

3. Element [24c.3]

155. While substitute claim 24 does not identify a surface/section defining the extension flange plane, Gilb'792's extension flanges (gusset members 15'/22') are generally flat between the channel-shaped portion and the connection portion, and maintain the same generally perpendicular relationship with the base plane as shown in Figures 5-7. Thus, Gilb'792 discloses extension flanges (gusset members 15'/22') lying in an extension flange plane (as best that phrase can be understood) throughout its extent from the channel-shaped portion to the connection portion.



EX1035, FIG. 7.

4. Element [24.c.4]

156. While Gilb'792 describes welding its gusset members 15'/22' to stirrup members 11'/12', a POSITA would have found it obvious to modify Gilb's hanger such that gusset members 15'/22' and stirrup members 11'/12' could be formed by folding one piece of sheet metal, as taught by Harrison, to eliminate the post-processing requirements required for welding metal pieces together, ultimately manufacturing the hanger more efficiently. EX2016, ¶0031. And a POSITA would have had a reasonable expectation of success in doing so because Gilb'792's hanger is constructed out of metal (12 gauge steel) that is suitable for metal stamping. Thus, the Gilb'792-Bundy-Harrison combination renders claim element [24.c.4] obvious.

5. Element [25.b]

157. As shown above in Figures 5–7, Gilb'792 discloses extension flanges (gusset members 15'/22') being unbent between the channel-shaped portion (stirrup members 11'/12') and the back flange (base 36).

6. Element [26.a]

158. As shown above in Figures 5–7, Gilb'792 discloses a first extension flange (one of gusset members 15'/22') extending edgewise from the channel-shaped portion (stirrup members 11'/12') toward the back flange (base 36) in an extension direction that is parallel to the base plane.

7. Element [26.b]

159. As shown above in Figures 5–7, Gilb'792 discloses each of the extension flanges (gusset members 15'/22') being planar.

8. Element [27.b]

160. As shown above in Figure 6, Gilb'792 discloses the channel-shaped por-tion includes side panels (stirrup members 11'/12') extending up from the base (seat member 13') on opposite sides of the base.

9. Element [27.c]

161. Gilb'792 discloses the base (seat member 13') and side panels (stirrup members 11'/12') being made of sheet metal. EX1035, 2:52-53, 3:51-52. In combining the teachings of Harrison's sheet metal folding process with Gilb'792-Bundy, Gilb792's extension flanges (gusset members 15'/22') would have extended from its side panels (stirrup members 11',12') as one piece of sheet metal. Thus, the Gilb'792-Bundy-Harrison combination renders claim element [27.c] obvious.

10. Element [28]

162. As shown above in annotated Figure 5, Gilb'792 discloses extension flanges (gusset members 15'/22') having exterior side faces configured to face and extend through the sheathing while maintaining a two-hour fire resistance rating. And as explained in my previous declaration, a POSITA would have found it

obvious, in view of Gilb'792-Bundy, to extend Gilb'792's extension flanges through any sheathing installed therein in a way that maintains a two-hour fire resistance rating for the assembly. EX1003, ¶¶131-134.

11. Element [29]

163. As shown above in annotated Figure 5, Gilb'792 discloses a portion of the channel-shaped portion (stirrup members 11'/12', seat member 13') being in an opposed, spaced apart relation with a front face of the back flange (base 36).

12. Elements [33.b] and [33.c]

164. As shown above in annotated Figure 6, Gilb'792 discloses that the channel-shaped portion includes first and second side panels (stirrup members 11', 12') ex-tending upward from base (seat 13'). In combining the teachings of Harrison's sheet metal folding process with Gilb'792-Bundy, Gilb'792's extension flanges (gusset members 15'/22') would abut a side panel's rear edge in the form of the gusset members extending continuously from stirrup members as one piece of sheet metal. Thus, the Gilb'792-Bundy-Harrison combination renders claim elements [33.b] and [33.c] obvious.

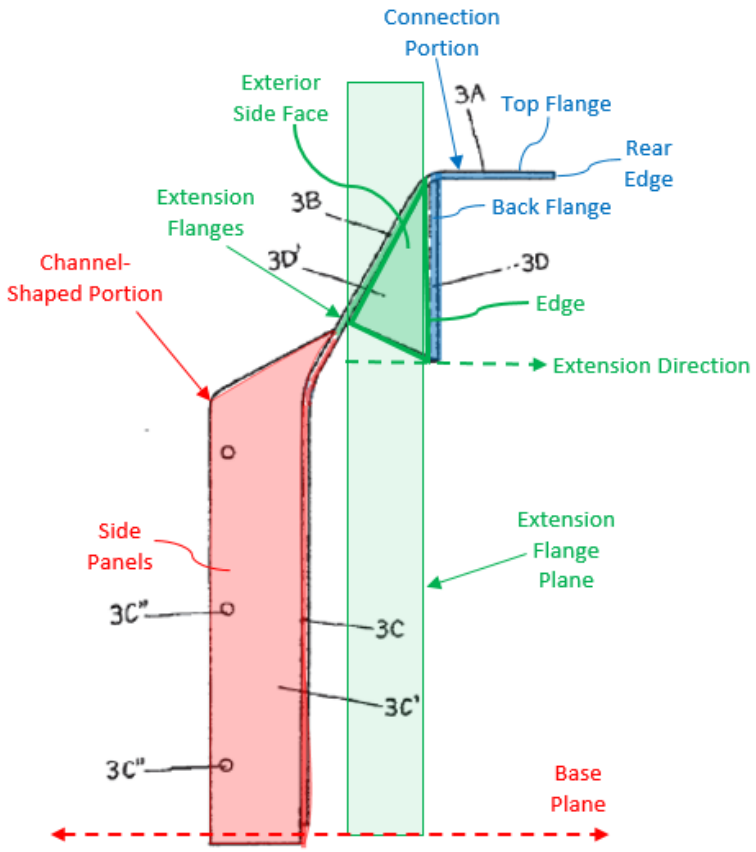
13. Elements [34.a], [34.b], and [34.c]

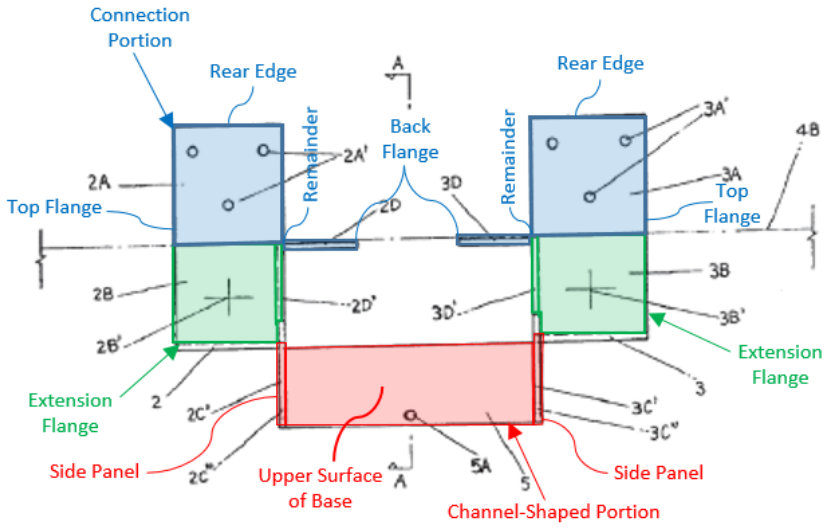
165. As shown above in annotated Figure 7, Gilb'792 discloses: (1) first connections between extension flanges (gusset members 15'/22') and channel-shaped portions (stirrup members 11'/12') extending in a first direction from its

upper end to its lower end; (2) second connections between extension flanges (gusset members 15'/22') and connection portion (base 36) extending in a second direction from its upper end to its lower end; (3) the first and second directions being parallel to one another and parallel to the extension flange planes.

D. Ground 5: Claims 24, 26-32, 35, 39, 40, and 43-46 would have been obvious over Tsukamoto in view of Bundy.

166. In the interest of brevity, I only address herein the two added limitations presented by the proposed substitute claims, as the discussion of the Tsukamoto-Bundy combination in my previous declaration applies equally to the same elements here.





EX1009, Tsukamoto, FIGs. 3 and 4 (annotated).

1. Element [24.b.3]

167. Tsukamoto discloses the connection portion (vertical plates 2D/3D) and channel-shaped portion (holding plates 2C'/3C') being permanently fixed (as best that term is understood) and spaced apart relative to one another at the time of manufacturing. EX1009, 2-3.

2. Element [24.c.3]

168. Under a proper construction of this limitation, Tsukamoto discloses a section of each extension flange (connection plates 2D'/3D') lying in an extension flange plane throughout its extent from the channel-shaped portion (holding plates 2C'/3C') to the connection portion (vertical plates 2D/D), where the extension flange planes are generally perpendicular to the base plane, as shown in Figure 3. EX1009, 2-3, FIGS. 1-6. As explained in Section XVI.A.2, a POSITA would have

understood claim element [24.c.3] to mean a section of the extension flange located between the channel-shaped and the connection portions lying in an extension flange throughout its extent so that this limitation is construed consistently with the specification. Tsukamoto's connection plates 2D'/3D' each correspond to a section of Tsukamoto's extension flanges located between the channel-shaped portion (holding plates 2C'/3C') and the connection portion (vertical plates 2D/D). Tsukamoto's connection plates 2D'/3D' lie in an extension flange plane throughout its extent, where the extension flange plane is perpendicular to the base plane. Thus, Tsukamoto discloses element [24.c.3].

3. Element [24.c.4]

169. While Tsukamoto does not explicitly disclose how beam hanger 1 is constructed, a POSITA would have understood, or at least found it obvious, that Tsukamoto's channel-shaped portion (holding plates 2C'/3C') and extension flanges (connection plates 2D'/3D', inclined portions 2B/3B) are formed as one piece of sheet metal. Indeed, Tsukamoto's figures and specification show and describe each portion of the hanger as being continuous extensions from each other. EX1008, 2-3, FIGs. 1-6. And Bundy discloses that it is well known to construct hangers out of "light gauge sheet steel." EX1007, 4:46-49. Thus, the Tsukamoto-Bundy combination renders claim element [24.c.4] obvious.

4. Elements [26.a] and [39.c.3]

170. Under a proper construction of this limitation, Tsukamoto discloses a section of each extension flange (connection plate 2D'/3D') including an edge and extending edgewise from channel-shaped portion toward the wall frame in an extension direction parallel to the base frame, as shown above in Figure 3. As explained in Section XVI.A.3, a POSITA would have understood claim elements [26.a], [39.c.3] to mean that a section of the extension flange defined between the channel-shaped and the connection portions extends edgewise toward the back flange/wall frame in a direction parallel to the base plane so that these limitations are construed consistently with the specification. Tsukamoto's connection plates 2D'/3D' each correspond to a section of Tsukamoto's extension flanges defined between the channel-shaped portion (holding plates 2C'/3C') and the connection portion (vertical plates 2D/D). Tsukamoto's connection plates 2D'/3D' extend edgewise toward the back flange/wall frame in a direction parallel to the base plane. Thus, Tsukamoto discloses elements [26.a], [39.c.3].

5. Element [26.b]

171. Under a proper claim construction, Tsukamoto discloses that each of the extension flanges (connection plates 2D'/3D') are planar in the form of a surface coincident with a plane as shown above in Figure 4. Pet., 105.

6. Element [27.b]

172. As shown above in Figure 3, Tsukamoto discloses that the channel-shaped portion includes side panels (holding plates 2C'/3C') extending up from the base (receiving plate 5) on opposite sides of the base.

7. Element [27.c]

173. In combining the teachings of Bundy with Tsukamoto, a POSITA would have understood to construct holding plates 2C'/3C' and receiving plate 5 out of sheet metal and form Tsukamoto's extension flanges (inclined portions 2B/3B, connection plates 2D'/3D') as sheet metal extending from its side panels (holding plates 2C'/3C'). EX1007, 4:47-49. Thus, the Bundy-Tsukamoto combination renders claim element [27.c] obvious.

8. Elements [28] and [40]

174. As shown above in annotated Figure 3, Tsukamoto discloses the extension flanges (connection plates 2D'/3D', inclined portions 2B/3B) each having an exterior side face (connection plates 2D'/3D') configured to face and extend through sheathing when used in such a wall assembly. And, as discussed in my previous declaration, a POSITA would have found it obvious, in view of Tsukamoto-Bundy, to extend Tsukamoto's extension flanges through any sheathing installed therein in a way that maintains a two-hour fire resistance rating for the assembly.

9. Element [29]

175. As shown above in annotated Figure 3, Tsukamoto discloses a portion of the channel-shaped portion (holding plates 2C'/3C', seat plate 5) being in an opposed, spaced-apart relation with a front face of the back flange (vertical plate 2D/3D).

10. Element [39.a.2]

176. As shown above in annotated Figures 3–4, Tsukamoto discloses a base (plate 5) having an upper surface lying in a base plane and configured to engage the structural component.

11. Element [39.b.4]

177. To the extent this limitation can be reasonably construed, Tsukamoto discloses a top flange (horizontal portions 2A/3A) extending rearwardly from a remainder of the connection portion and arranged to overlie an upper surface of the wooden upper plate when the hanger is installed on the frame wall, as shown above in Figures 3–4. Tsukamoto discloses that the top flange (horizontal portions 2A/3A) includes a rear edge located rearward of the back flange (vertical plates 2D/3D), as shown above in Figures 3–4.

XVII. CONCLUSION

In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required, I will appear for cross-examination within the United States during the time allotted.

I hereby declare that all statements made herein are of my own knowledge and are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on this 1st day of September 2022, at Walnut Creek, California,

09-01-2022

/ W. A. Fennell /

W. ANDREW FENNELL