PRACTUS, LLP
DUANE H. MATHIOWETZ (CA# 111831)
201 Spear Street, Suite 1100
San Francisco, CA 94105
Phone: 415-501-0350
Email: duane.mathiowetz@practus.com

STINSON LLP
B. SCOTT EIDSON (Pro Hac Vice TBF)
JOHN R. SCHROEDER (Pro Hac Vice TBF)
JULIE C. SCHEIPETER (Pro Hac Vice TBF)
JUDITH ARAUJO (Pro Hac Vice TBF)
ZACHARY T. BUCHHEIT (Pro Hac Vice TBF)
7700 Forsyth Blvd., Suite 1100
St. Louis, MO 63105
Phone: 314-863-0800
Email: scott.eidson@stinson.com
Email: john.schroeder@stinson.com
Email: julie.scheipeter@stinson.com
Email: judith.araujo@stinson.com
Email: zachary.buchheit@stinson.com

Attorneys for Plaintiffs Columbia Insurance Co. and MiTek Inc.

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

COLUMBIA INSURANCE, CO., and MiTek INC., Plaintiffs, v. SIMPSON STRONG-TIE COMPANY INC., Defendant.	Case No. **COMPLAINT FOR PATENT INFRINGEMENT; JURY TRIAL REQUESTED**

COMPLAINT

Plaintiffs Columbia Insurance Co. ("Columbia") and MiTek Inc. (f/k/a MiTek USA, Inc.) ("MiTek") (collectively "Plaintiffs"), for their Complaint against Defendant Simpson Strong-Tie Company Inc. ("Simpson"), state as follows:

Parties

1. Plaintiff Columbia is incorporated under the laws of Nebraska having a principal place of business in Omaha, Nebraska.

2. Plaintiff MiTek is incorporated under the laws of Missouri having a principal place of business in Chesterfield, Missouri.

3. Defendant Simpson is incorporated under the laws of California having a principal place of business located at 5956 W. Las Positas Boulevard, Pleasanton, California 94588.

Jurisdiction and Venue

4. This is an action for patent infringement under 35 U.S.C. § 271. The Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

5. The Court has personal jurisdiction over Simpson in that Simpson is a California corporation with its principal place of business located in Pleasanton, California.

6. Venue is proper in this District under 28 U.S.C. §§ 1391(c) and 1400(b) because Simpson has committed acts of infringement and has a regular and established place of business in this District.

Factual Background

7. Simpson and MiTek are direct competitors with both companies offering products across many of the same product segments, especially structural connectors for buildings.

8. One of the most successful recent innovations in structural connectors is MiTek's FWH Series Firewall Hanger (the "FWH Hangers"). The FWH Hangers are unique structural connectors designed to connect a truss or joist to wall framing. Wall framing is typically made from standard components, such as 2X4 or 2X6 wood studs. Wood-framed walls typically include a horizontal top plate formed by one or more of the wood studs, a horizontal bottom plate

or sill formed by one or more of the wood studs, and vertical wood studs spaced apart and extending between and interconnecting the top plate and the sill.

9. The construction industry has used hangers for connecting structural components (e.g., floor joists) to wall structures for over a century.

10. Traditional hangers for connecting trusses and joists to wall framing include a channel-shaped portion configured to receive the structural component and a connection portion configured for attachment to the top plate of a frame wall.

11. Certain structures, such as multi-family residential structures, require fire separation walls between the units (e.g., apartment units, hotel rooms, and condominiums) to prevent or slow the spread of fires across units.

12. Typically, fire-retardant sheathing, such as gypsum board, is used along the face of the fire separation wall's wood frame to improve the wall's resistance to fire passing through the wall to the adjacent unit.

13. For example, a typical method of achieving a two-hour fire rating for wall framing in the form of wood-framed walls is to use two layers (a double layer) of 5/8-inch-thick Type-X gypsum wallboard on each side of a wood-framed wall. This double layer of fire-retardant sheathing is often required by the building code to be installed on the wood-framed wall from the floor all the way to the next level's subfloor or, for the top level of a structure, to the structure's roof.

14. In using a traditional hanger for connecting a truss or joist to wall framing or a supporting member, the truss or joist is typically butted directly up against the wall framing or supporting member. As a result, cutouts are required in the fire-retardant sheathing for the entire cross-sections of the trusses or joists to allow the trusses or joists to be hung from the wall framing.

15. Such cutouts for an entire cross-section of a truss or joist creates a large discontinuity in the fire-retardant sheathing, thus decreasing the wall's resistance to fire.

16. MiTek's FWH Hangers improve upon the design of traditional hangers with a novel extension that does not require a cutout for the entire cross-section of the joist, yet

incredibly maintains the hanger's load capacity.

17. The novel design of the MiTek FWH Hangers allows for installation prior to mounting sheathing on the wall which in turn allows a building to be completely framed and roofed before the sheathing is installed.

18. The novelty of the design of the MiTek FWH Hangers was shown by, among other things, the MiTek FWH Hangers' commercial success and industry praise.

19. MiTek's FWH Hangers are protected by the Patents-in-Suit.

Patents-In-Suit

A. U.S. Patent No. 11,021,867

20. On June 1, 2021, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 11,021,867 ("the '867 Patent"), entitled "Hanger for Fire Separation Wall." A copy of the '867 Patent is attached as Exhibit A.

21. The '867 Patent claims the benefit of and priority to Provisional Application No.: 61/922,531, filed December 31, 2013; U.S. Patent Application No. 14/555,049, filed November 26, 2014, now U.S. Patent No. 10,024,049; U.S. Patent Application No. 15/675,409, filed August 11, 2017, now U.S. Patent No. 10,184,242; and U.S. Pat. Appl. No. 16/225,517, filed August 11, 2017, filed December 19, 2018, now U.S. Pat. No. 10,316,510.

22. A Certificate of Correction for the '867 Patent issued on December 28, 2021. A copy of the December 28, 2021, Certificate of Correction is attached as Exhibit B.

23. Columbia is the owner of the '867 Patent and holds all rights to sue for past, present, and future infringement of the '867 Patent.

24. MiTek is the exclusive licensee of the '867 Patent.

B. U.S. Patent No. 11,649,626

25. On May 16, 2023, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 11,649,626 ("the '626 Patent"), entitled "Hanger for Fire Separation Wall." A copy of the '626 Patent is attached as Exhibit C.

26. The '626 Patent claims the benefit of and priority to Provisional Application No. 61/922,531, filed December 31, 2013; U.S. Patent Application No. 14/555,049, filed November

26, 2014, now U.S. Patent No. 10,024,049; U.S. Patent Application No. 15/675,409, filed August 11, 2017, now U.S. Patent No. 10,814,242; U.S. Pat. Appl. No. 16/225,517, filed August 11, 2017, filed December 19, 2018, now U.S. Pat. No. 10,316,510 Patent; and U.S. Patent Application No. 16/433,799, now the '867 Patent.

27. Columbia is the owner of the '626 Patent and holds all rights to sue for past, present, and future infringement of the '626 Patent.

28. MiTek is the exclusive licensee of the '626 Patent.

C. Subject Matter of the '867 and '626 Patents

29. The '867 and '626 Patents pertain to hangers that are used for connecting structural components (e.g., trusses, joists, or beams) to fire-separation walls as seen in the figure below.

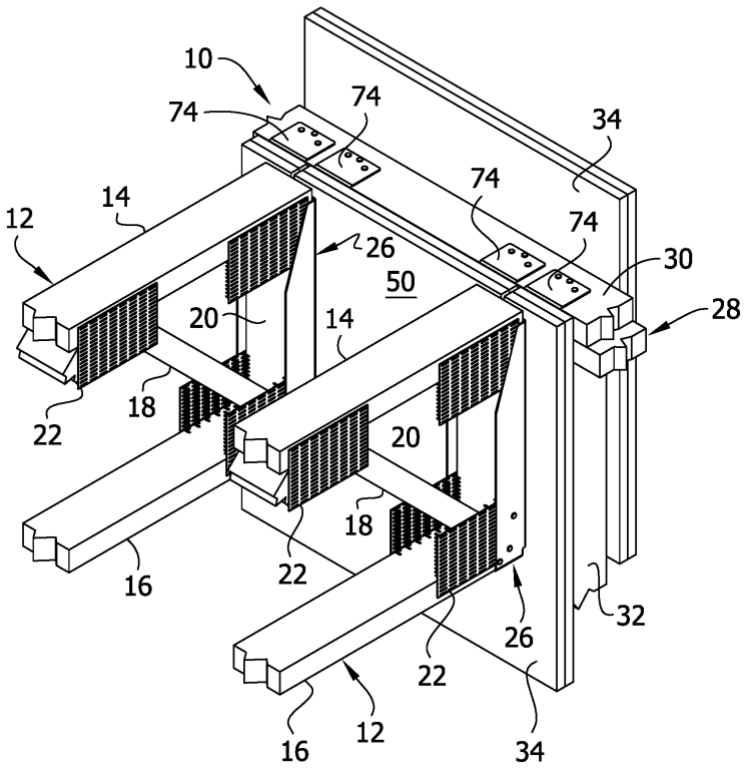


Fig. 1 of the '867 Patent

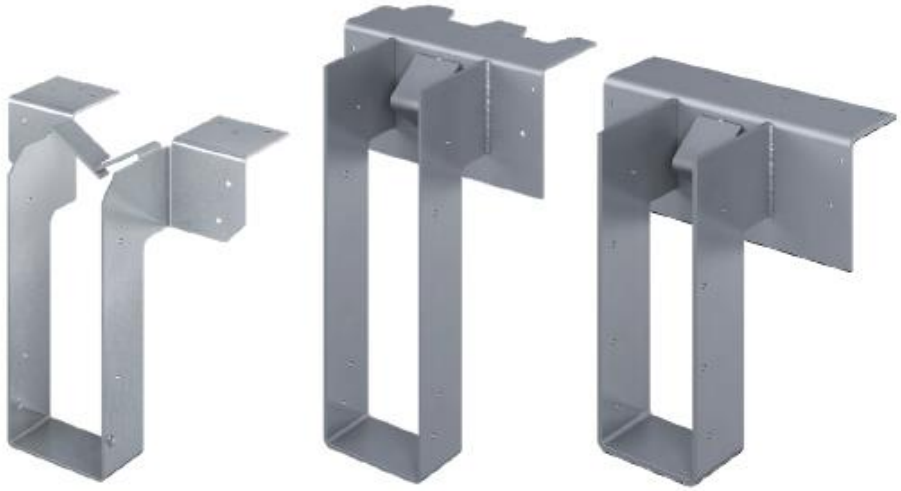
30. The improved hanger includes a novel extension that does not require a cutout for the entire cross-section of the joist, yet incredibly maintains the hanger's load capacity. It does this by extending through the sheathing in a novel way that transfers a portion of the load from

the truss or joist to the back flange of the hanger *and* extends through the drywall in a novel way so as to maintain continuity in the fire wall, which maintains the fire wall's resistance to fire.

Simpson's Infringing Products

31. Simpson has made, used, sold, or offered for sale Strong-Tie Fire Wall Hangers that are adapted for connecting trusses and joist to walls.

32. On information and belief, Simpson's Fire Wall Hangers are available in three models: DGF, DGHF (including skewed versions and offset versions), and DGBF (collectively the "Infringing Products"). The Infringing Products are shown below:



Simpson's Infringement of the '867 and '626 Patents

33. The Infringing Products are designed to connect a structural component to a wall that has sheathing (i.e., dry wall) mounted on it.

34. Claim 13 of the '867 Patent recites:

> The hanger as set forth in claim 1, wherein the connection portion includes a top flange configured to attach to a top plate of the wall, the top flange extending from the back flange.

35. Claim 13 of the '867 Patent depends from Claim 1 and thereby incorporates the limitations recited in Claim 1. Claim 1 of the '867 Patent recites:

> A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:

a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;

a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane, the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and

an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion, each extension flange being configured to extend through the sheathing, each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall.

36. Claim 1 of the '626 Patent recites:

A fire wall hanger for connecting a structural component to a frame wall adapted to have two layers of 5/8-inch-thick drywall mounted thereon to form a fire separation wall, the fire wall hanger comprising:

a channel-shaped portion configured to receive the structural component;

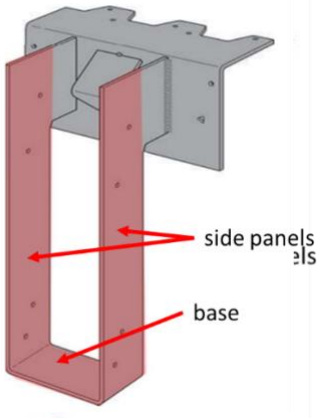
a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and a back flange extending from an edge of the top flange, the back flange arranged to engage a vertical face of the top plate of the frame wall, the back flange having a front surface lying in a back flange plane; and

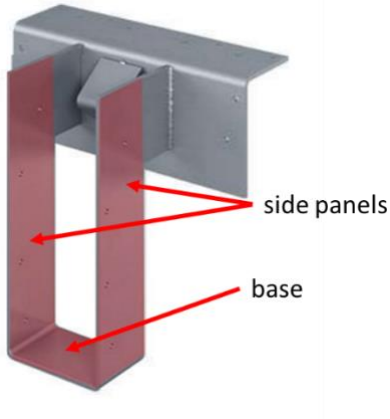
an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion, the extension portion spacing the channel-shaped portion from the back flange plane by a distance sized large enough to permit the two layers of 5/8-inch-thick drywall of the fire separation wall to be received between the channel-shaped portion and the back flange plane;

wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another.

37. Simpson markets the Infringing Products as hangers for connecting structural components (e.g., joists) to a wall adapted to have sheathing—and more specifically two layers of 5/8-inch-thick drywall—mounted thereon. Exhibit D ("The hangers feature enough space for two layers of 5⁄8" gypsum board (drywall) to be slipped into place after the framing is complete.").

38. Each Infringing Product has a channel-shaped portion (highlighted in red in the drawings of the Infringing Products below) configured to receive an end of a structural component such as a joist or truss. Each channel-shaped portion includes a base and side panels.



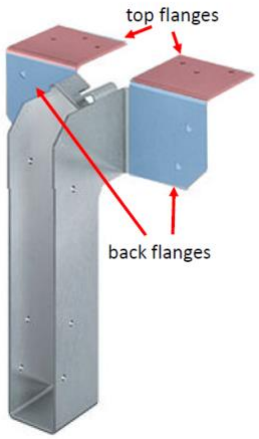


DGF

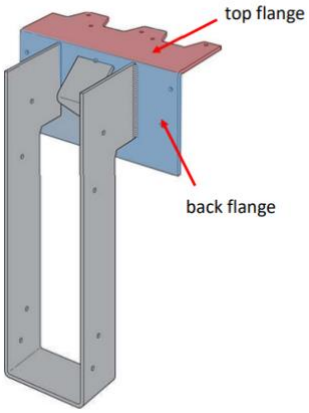
DGHF

DGBF

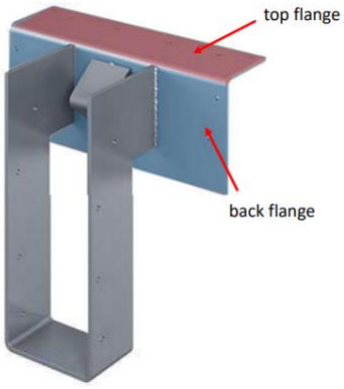
39. Each Infringing Product has a connection portion that includes a top flange(s) configured to attach to and overlie the top plate of a frame wall and a back flange(s) extending from an edge of the top flange(s) that is configured for engaging a vertical face of the top plate of a frame wall.



DGF



DGHF

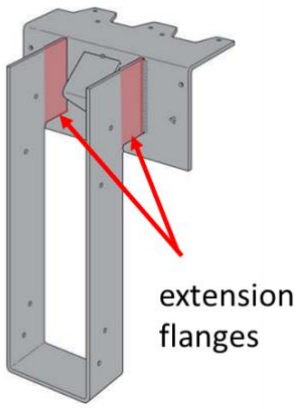


DGBF

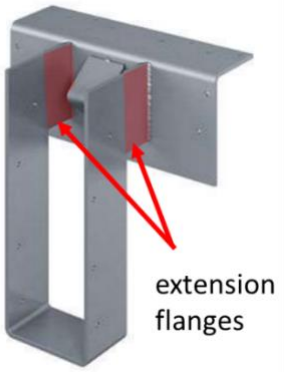
40. Each Infringing Product has an extension portion including first and second extension flanges extending from the channel-shaped portion to the back flange of the connection portion.



DGF



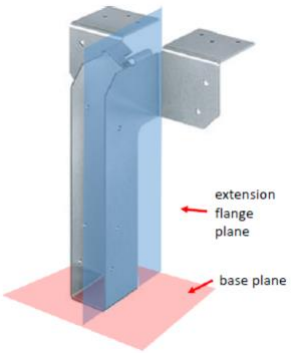
DGHF



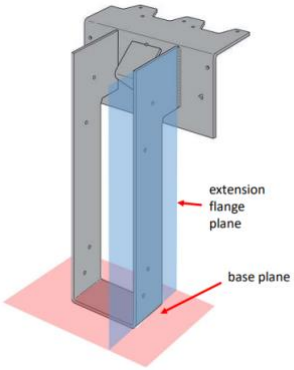
DGBF

41. Each Infringing Product is configured such that the extension flanges would extend through the sheathing (e.g., drywall) when the hangers and sheathing are installed on a wall.

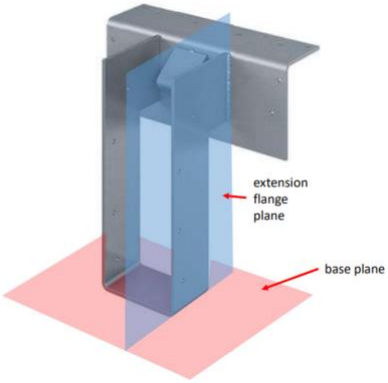
42. Each Infringing Product has at least one extension flange plane that lies within the extent of the extension flange from the channel-shaped portion to the connection portion and which is perpendicular to a plane defined by the upper surface of the base of the channel-shaped portion.



DGF

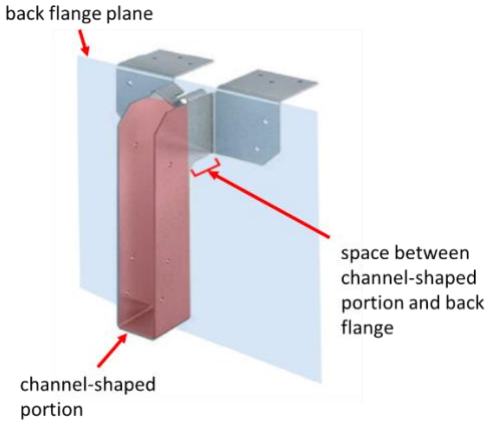


DGHF

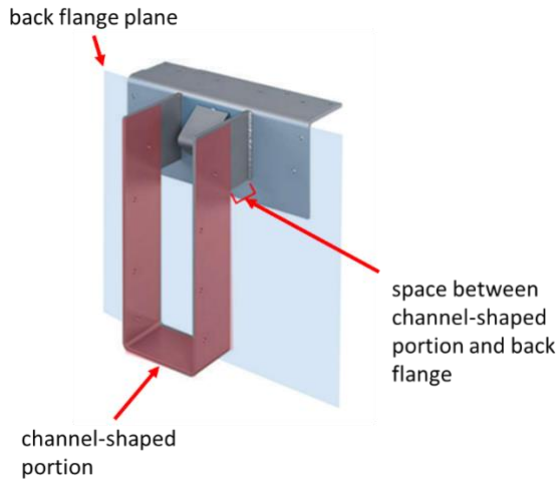


DGBF

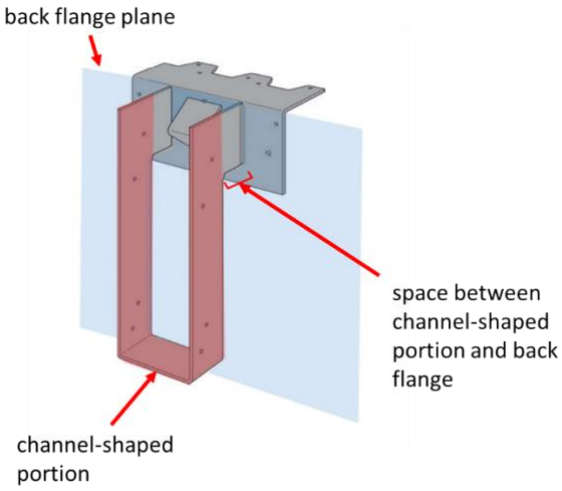
43. The extension portion/extension flanges of the Infringing Products provide a space between the channel-shaped portion and the back flange plane—i.e., the plane defined by the front surface(s) of the back flange(s).



DGF

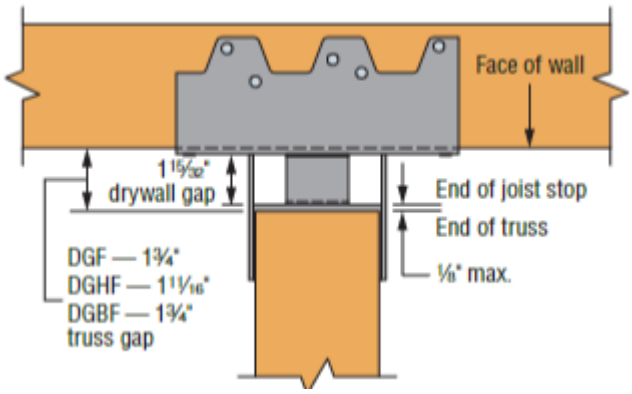


DGHF



DGBF

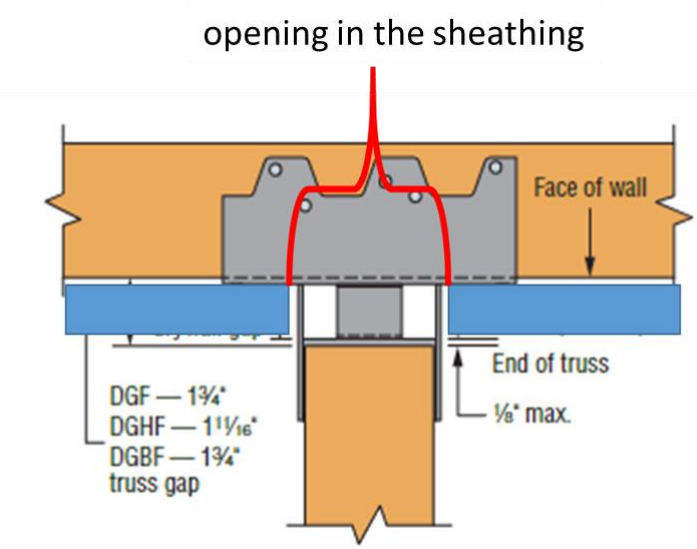
44. The back flange and the channel-shaped portion of the Infringing Products define a space—labeled as a "drywall gap" in the figure excerpted from Simpson's catalog below—sized and shaped to receive two layers of sheathing (e.g., two layers of 5/8" thick sheathing) therein such that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall. Exhibit D ("The hangers feature enough space for two layers of 5⁄8" gypsum board (drywall) to be slipped into place after the framing is complete.").



Top View of the DGHF (representative of DGF and DGBF)

45. By virtue of the hangers not having any moving parts and being constructed of metal, the channel-shaped portion, the extension portion, and the connection portion of the Infringing Products are rigidly fixed with respect to one another. More particularly, the connection portion and channel-shaped portion of the Infringing Products are in a fixed, spaced apart relation relative to one another.

46. The back flanges of the Infringing Products at least partially block the opening in the sheathing when the hanger and sheathing are installed on the wall.



Annotated Top View of the DGHF (representative of DGF and DGBF)

47. The Infringing Products infringe at least claim 13 of the '867 Patent.

48. The Infringing Products infringe at least claim 1 of the '626 Patent.

Simpson's Willful Infringement

49. MiTek released its FWH Hangers in July 2014, which were the subject of a then-pending provisional patent application to which both the '867 and '626 Patents claim priority.

50. By late 2013, or early 2014, Simpson introduced its DU/DHU/DHUTF Drywall Hangers to the market and promoted them as designed for installation on firewalls over two layers of fire-resistant sheathing.

51. Installation of the DU/DHU/DHUTF Drywall Hangers requires installation of the two layers of fire-resistant sheathing prior to installation of the hanger. This required the sheathing to be installed prior to the building being completely framed and roofed.

52. In contrast to Simpson's DU/DHU/DHUTF Drywall Hangers, MiTek's FWH Hangers allowed for installation prior to mounting sheathing on the wall. This allows the building to be completely framed and roofed before the sheathing is installed.

53. Because of the novel, load-transfer design, MiTek's patented FWH Hangers also achieved substantially higher load ratings than Simpson's DU/DHU/DHUTF Drywall Hangers. This permits the MiTek patented FWH Hangers to be used with longer joist spans.

54. MiTek's FWH Hangers received validation by third party evaluators as complying with code requirements. *See* Exhibit E. MiTek's FWH Hangers were well-received by customers and municipalities, and MiTek has gained new customers due to the innovative features of its FHW Hangers. Certain municipalities now require hanger products with similar features and functionality as MiTek's patented FHW Hangers.

55. On the other hand, despite being the market share leader for structural connectors, Simpson lost customers for its own firewall hanger products to MiTek's patented FWH Hangers. In response, Simpson sought to develop a new hanger to compete with MiTek's FWH Hangers.

56. In discussing the development of a predecessor line of Fire Wall Hanger products, Simpson Vice President, Sam Hensen, testified that:

> Although the DHU Hangers were successful in the market, some Simpson customers requested a firewall hanger that could be installed before the drywall, but which would achieve a fire-resistance rating that was closer to the DHU Hanger. Specifically, scheduling conflicts between framing contractors and drywall contractors arose, requiring drywall contractors to come out before the framing was complete so they could put the drywall in place and then come back later to finish the job once framing was complete. As a result, after the DHU Hangers were developed and released, Simpson worked on the design, development, and testing of the products that were released to the market as the DG/DGB/DGH Fire Wall Hangers.

Exhibit F at ¶11.

57. Simpson's DG/DGB/DGH Fire Wall Hangers (the "Predecessor DG Hangers") were developed to compete with MiTek's patented FWH Hangers.

58. Upon information and belief, Simpson copied the novel load-transfer design found in MiTek's FWH Hangers to improve the load capacity of its existing, competing hangers.

59. Upon information and belief, Simpson's Predecessor DG Hangers were released to the market in June 2017.

A. MiTek Asserts Patent Infringement and Simpson Challenges Validity

i. MiTek Asserts Related FWH Hanger Patents

60. In a letter dated December 19, 2018, Columbia's counsel notified Simpson that the claims of the '049 Application were allowed and that Simpson's Predecessor DG Hangers fell within the scope of the allowed claims (U.S. Pat. No. 10,184,242 Patent (the "'242 Patent"), which issued on January 22, 2019). Exhibit G.

61. On April 1, 2019, Simpson released its new line of Fire Wall Hangers—the DGF/DGHF/DGBF product line (i.e., the Infringing Products)—to the market to replace its Predecessor DG Hangers.

62. Columbia filed U.S. Pat. Appl. No. 16/225,517 (the "'517 Application") as a continuation of the '049 Application prior to the issuance of the '242 Patent.

63. In a letter dated May 28, 2019, Columbia's counsel notified Simpson that the claims of the '517 Application had been allowed and that the Infringing Products fell within the scope of the allowed claims (U.S. Pat. No. 10,316,510 Patent (the "'510 Patent"), which issued on June 11, 2019). Exhibit H.

64. With full knowledge of the '510 Patent, Simpson failed to modify the Infringing Products and refused to stop infringing MiTek's '510 Patent.

65. As a result, on August 12, 2019, Columbia filed a lawsuit for patent infringement, *Columbia Insurance Company et al. v. Simpson Strong-Tie Company Inc.*, Case No. 3:19-cv-04683-TSH (N.D. Cal.), claiming that the Infringing Products infringed the '510 Patent.

66. Simpson was provided claim charts demonstrating how the Infringing Products infringed the claims of the '510 Patent.

67. Simpson has never disclosed to Plaintiffs any argument that the Infringing Products are outside of the scope of claims of the '510 Patent.

68. Upon information and belief, Simpson was unwilling or unable to identify an adequate modification to the Infringing Products to design around the scope of the claims of the '510 Patent.

69. Rather than pulling the Infringing Products from the market, Simpson chose to challenge the validity of the '510 Patent.

70. Simpson filed a Petition for Post Grant Review of the '510 Patent on September 5, 2019.

ii. Simpson's Challenge to a Related FWH Hanger Patent

71. As of October 23, 2019, *Columbia Insurance Company et al v. Simpson Strong-Tie Company Inc.*, 3:19-cv-04683-TSH (N.D. Cal.) was stayed pending the resolution the Post Grant Review of the '510 Patent.

72. On March 12, 2020, Post Grant Review of the '510 Patent was instituted in PGR2019-00063.

73. During the PGR2019-00063 Post Grant Review Proceedings, Columbia filed a Contingent Motion to Amend the claims of the '510 Patent if any of the original claims were found invalid. Simpson contested the Contingent Motion to Amend.

74. A Final Written Decision was issued in PGR2019-00063 (the "'510 Decision") on March 11, 2021, in which the original claims of the '510 Patent were found invalid, but a substitute claim was found to be patentable.

75. The Infringing Products are within the scope of the substitute claim of the '510 Patent.

76. On information and belief, Simpson is aware that the Infringing Products are within the scope of the substitute claim of the '510 Patent.

77. The '510 Decision was appealed to the Federal Circuit by both Columbia and Simpson. The Federal Circuit issued a panel decision affirming the '510 Decision of the on March 31, 2023. The Federal Circuit's Mandate issued on May 8, 2023.

78. To date, Simpson has never claimed that the Infringing Products are outside of the scope of the substitute claim of the '510 Patent.

79. The Infringing Products remain on the market, even after the Federal Circuit affirmed the validity of MiTek's substitute claim.

iii. Simpson's Unsuccessful Challenge of the '867 Patent

80. On June 1, 2021, the '867 Patent issued. The '867 Patent was filed as a continuation of the application (U.S. Patent Application No. 16/433,799) that resulted in the previously-challenged '510 Patent.

81. Simpson was monitoring the status and content of the application that resulted in the '867 Patent.

82. Simpson was aware of the claims that issued in the '867 Patent while the application for the '867 Patent was pending.

83. In a letter dated June 25, 2021, Columbia's counsel notified Simpson that the '867 Patent had issued and that Simpson's Fire Wall Hangers infringed the '867 Patent. Exhibit I.

84. Simpson—specifically, but not limited to its current Vice President Sam Hensen—had actual knowledge of the '867 Patent on or around June 25, 2021, and has been aware that the Infringing Products are within the scope of claims 13, 14, 18, 19, and 20 of the '867 Patent at least as early as June 25, 2021.

85. Rather than discontinuing the Infringing Products, Simpson chose to challenge the validity of the '867 Patent at the Patent Trial and Appeal Board ("PTAB").

86. On August 13, 2021, Simpson petitioned for Post Grant Review of the '867

Patent. In its Petition, Simpson asserted six different grounds of invalidity. Of the different grounds of invalidity, only a single ground—an indefiniteness challenge under 35 U.S.C. §112(b)—was directed at the validity of claims 13, 14, 18, 19, and 20 of the '867 Patent. Exhibit J.

87. By failing to challenge on other grounds, Simpson conceded that its anticipation arguments under 35 U.S.C. §102 and obviousness arguments under 35 U.S.C. §103 were inapplicable to claims 13, 14, 18, 19, and 20 of the '867 Patent.

88. On March 17, 2022, the PTAB instituted post grant review proceedings for the '867 Patent in PGR2021-00109. In the Institution Decision, the PTAB found that Simpson failed to demonstrate that it was more likely than not that claims 13, 14, 18, 19, and 20 were invalid pursuant to Simpson's invalidity challenge.[1] Exhibit K at 28 ("we determine that Petitioner does not demonstrate that it is more likely than not that claims 1–15 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness based on these limitations"), 31 ("we determine that Petitioner does not demonstrate that it is more likely than not that claims 16–23 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness based on these limitations").

89. No later than March 17, 2022, Simpson recognized or should have recognized that its arguments challenging claims 13, 14, 18, 19, and 20 were unpersuasive, unreasonable, and disingenuous. Nonetheless, the Infringing Products remained on the market despite the PTAB's preliminary finding that Simpson failed to demonstrate that claims 13, 14, 18, 19, and 20 were invalid.

90. Simpson filed a Reply Brief in PGR2021-00109 on September 1, 2022, which tacitly conceded that its arguments regarding at least claims 18, 19, and 20 were not genuine as it failed to respond to the PTAB's findings that Simpson's arguments regarding indefiniteness of these claims were unpersuasive.

[1] An institution decision on a petition for post-grant review must institute trial on all grounds asserted in the petition—regardless of the PTAB's view of the merit of the challenge. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1355–56 (2018). Accordingly, Simpson's arguments asserting indefiniteness of claims 13, 14, 18, 19, and 20 of the '867 Patent under 35 U.S.C. §112(b) were included in the instituted proceedings even though the PTAB's initial ruling was that these claims were not likely to succeed.

91. A Final Written Decision was issued in PGR2021-00109 on March 15, 2023 (the "'867 Decision"), in which the PTAB found that Simpson failed to demonstrate that claims 13, 14, 18, 19, and 20 of the '867 Patent were unpatentable. Exhibit L at 102 ("Because we find Petitioner *has not* demonstrated by a preponderance of the evidence that these claims are indefinite (see *supra* Section II.D), these original dependent claims 13, 14, and 18–20 stand."). On May 8, 2023 the PTAB denied Simpson's requests for a rehearing and director review.

92. By virtue of Simpson petitioning that the claims were invalid in a post grant review that resulted in a final written decision, Simpson is estopped under 35 U.S.C. § 325(e) from challenging the validity of claims 13, 14, 18, 19, and 20 of the '867 Patent on any ground that Simpson raised or reasonably could have raised during PGR2021-00109.

93. The Infringing Products remain on the market despite the '867 Decision.

94. To date, Simpson has never disclosed to Plaintiffs any argument that the Infringing Products are outside of the scope of claims 13, 14, 18, 19, or 20 of the '867 Patent.

95. Simpson's knowledge of the '867 Patent, tacit concession of validity, and continued sale of the Infringing Products makes its infringement deliberate and intentional.

B. Simpson Was Aware of the '626 Patent—and its Claims—Prior to Issuance

96. On May 16, 2023, the '626 Patent issued. The '626 Patent was filed as a continuation of the application (U.S. Patent Application No. 17/235,349) that resulted in the previously-challenged '867 Patent.

97. Simpson was monitoring the status and content of the application that resulted in the '626 Patent.

98. Simpson was aware of the claims that issued in the '626 Patent while the application for the '626 Patent was pending.

99. Simpson was aware that the '626 Patent would issue in advance of its May 16, 2023, issuance date.

100. Simpson, through its counsel, sent MiTek's counsel a communication regarding the '626 Patent, and potential litigation, prior to its May 16, 2023, issue date.

101. Simpson had actual knowledge of the '626 Patent as of at least May 16, 2023.

102. The Infringing Products are within the scope of multiple claims of the '626 Patent.

103. Simpson was aware that the Infringing Products would be within the scope of claims of the '626 Patent in advance of its May 16, 2023, issuance.

104. The Infringing Products remain on the market after the May 16, 2023, issue date of the '626 Patent.

105. Simpson's knowledge of the '626 Patent and continued sale of the Infringing Products makes its infringement deliberate and intentional.

C. Simpson Actively Monitors MiTek's FWH Patent Filings

106. Simpson was aware of MiTek's then-existing patent applications related to its FWH Hangers when it developed its competing Predecessor DG Hangers.

107. Simpson personnel, including its current Vice President Mr. Hensen, receive internet-based news alerts (e.g., Google Alerts) regarding MiTek product offerings and have received such alerts pertaining to MiTek's FWH Hangers and associated intellectual property.

108. Simpson personnel have also utilized non-work e-mail accounts to subscribe to news feeds directly from MiTek so they can receive, in an inconspicuous manner, news alerts related to MiTek's FWH Hangers directly from MiTek.

109. Simpson monitors MiTek patent filings.

110. Simpson has monitored MiTek patent filings for at least the past 8 years.

111. Simpson monitors MiTek patent filings related to MiTek's FWH Hanger product line.

112. Simpson has monitored MiTek patent filings related to MiTek's FWH Hanger product line for at least the past 8 years.

113. Simpson was aware of the pending, and allowed, claims found in MiTek's FWH Hanger patent filings—including the claims for the '867 and '626 Patents.

114. Simpson monitored, and was aware of, the pending and allowed claims found in MiTek's FWH Hanger patent filings—including the claims for the '867 and '626 Patents—prior to the issuance of those patents.

115. Mr. Hensen acknowledged that "[p]rior to Simpson's release of the DG Hangers,

Simpson was aware of MiTek's FWH Hanger and the fact that Plaintiffs had filed a patent application covering the FWH Hanger" and that "[i]n developing the [Predecessor DG Hangers], Simpson was careful to design around Plaintiffs' then-pending patent application, U.S. Pat. Appl. 14/555,049 (the "'049 Application")." Exhibit F at ¶14.

COUNT I

Infringement of U.S. Patent No. 11,021,867

116. Plaintiffs incorporate by reference Paragraphs 1 through 115 above, as if fully set forth herein.

117. The Infringing Products infringe at least claims 13 and 18 of the '867 Patent.

118. Simpson directly infringes, literally or under the doctrine of equivalents, at least claims 13 and 18 of the '867 Patent under 35 U.S.C. § 271(a) by making, using, selling, or offering for sale the Infringing Products within the United States.

119. Simpson was objectively aware of, and had knowledge of, the '867 Patent at least as early as June 25, 2021.

120. Simpson acted with knowledge of the '867 Patent despite an objectively high likelihood that its actions constituted infringement of at least one valid and enforceable claim of the '867 Patent, and Simpson knew or should have known that its actions constituted an unjustifiably high risk of infringement of at least one valid and enforceable claim of the '867 Patent.

121. Simpson's infringement of the '867 Patent has been knowing, willful, deliberate, and intentional.

122. Simpson's infringement and behavior was egregious, wanton, malicious, and in bad faith.

123. As a direct and proximate result of Simpson's acts of infringement, Plaintiffs have suffered and continue to suffer damages and irreparable harm.

124. Plaintiffs are without an adequate remedy at law and will be irreparably harmed if the Court does not enter an order enjoining Simpson from infringing the '867 Patent.

COUNT II

Infringement of U.S. Patent No. 11,649,626

125. Plaintiffs incorporate by reference Paragraphs 1 through 124 above, as if fully set forth herein.

126. The Infringing Products infringe at least claim 1 of the '626 Patent.

127. Simpson directly infringes, literally or under the doctrine of equivalents, at least claim 1 of the '626 Patent under 35 U.S.C. § 271(a) by making, using, selling, or offering for sale the DGF, DGHF, and DGBF models of Simpson's Fire Wall Hangers within the United States.

128. Simpson was objectively aware of, and had knowledge of, the '626 Patent as of at least May 16, 2023, but no later than the date it is served with this Complaint.

129. Simpson acted with knowledge of the '626 Patent despite an objectively high likelihood that its actions constituted infringement of at least one valid and enforceable claim of the '626 Patent, and Simpson knew or should have known that its actions constituted an unjustifiably high risk of infringement of at least one valid and enforceable claim of the '626 Patent.

130. At the very least, Simpson will be acting with knowledge of the '626 Patent and will or should know that its actions constitute an unjustifiably high risk of infringement of at least one valid and enforceable claim of the '626 Patent should it continue making, using, selling, or offering for sale the Infringing Products within the United States following receipt of service of this Complaint.

131. Simpson's infringement of the '626 Patent has been knowing, willful, deliberate, and intentional.

132. Simpson's infringement and behavior is egregious, wanton, malicious, and in bad faith.

133. As a direct and proximate result of Simpson's acts of infringement, Plaintiffs have suffered and continue to suffer damages and irreparable harm.

134. Plaintiffs are without an adequate remedy at law and will be irreparably harmed if the Court does not enter an order enjoining Simpson from infringing the '626 Patent.

Prayer for Relief

WHEREFORE, Plaintiffs Columbia and MiTek request that the Court enter judgment for Plaintiffs, and against Defendant Simpson, and respectfully pray that the Court enter an order:

A. Finding that Defendant Simpson has infringed U.S. Patent No. 11,021,867 under 35 U.S.C. § 271(a);

B. Finding that Defendant Simpson has infringed U.S. Patent No. 11,649,626 under 35 U.S.C. § 271(a);

C. Finding that Defendant Simpson's infringement has been willful;

D. Enjoining Defendant Simpson and its respective officers, agents, servants, employees, and attorneys, and all of those persons in active concert or participation with any of them from directly or indirectly infringing any claim of U.S. Patent No. 11,021,867;

E. Enjoining Defendant Simpson and its respective officers, agents, servants, employees, and attorneys, and all those persons in active concert or participation with any of them from directly or indirectly infringing any claim of U.S. Patent No. 11,649,626;

F. Awarding compensatory damages to Plaintiffs under 35 U.S.C. § 284;

G. Trebling the damage award under 35 U.S.C. § 284;

H. Awarding Plaintiffs pre-judgment and post-judgment interest;

I. Finding this to be an exceptional case under 35 U.S.C. § 285 and awarding Plaintiffs their reasonable attorneys' fees and expenses in this action;

J. Awarding Plaintiffs their costs in this action; and

K. Awarding such other and further relief as the Court deems just and proper.

Jury Demand

Under Rule 38(b) of the Federal Rules of Civil Procedure, Columbia and MiTek demand a trial by jury of all issues so triable.

Dated: May 17, 2023

Respectfully Submitted,

By: /s/ Duane H. Mathiowetz

Duane H. Mathiowetz (CA# 111831)
PRACTUS, LLP 201 Spear Street, Suite 1100
San Francisco, CA 94105
Phone: 415-501-0350
Email: duane.mathiowetz@practus.com

B. Scott Eidson (Pro Hac Vice TBF)
John R. Schroeder (Pro Hac Vice TBF)
Julie C. Scheipeter (Pro Hac Vice TBF)
Judith Araujo (Pro Hac Vice TBF)
Zachary T. Buchheit (Pro Hac Vice TBF)
STINSON LLP
7700 Forsyth Blvd., Suite 1100
St. Louis, MO 63105
Phone: 314-863-0800
Email: scott.eidson@stinson.com
Email: john.schroeder@stinson.com
Email: julie.scheipeter@stinson.com
Email: judith.araujo@stinson.com
Email: zachary.buchheit@stinson.com

EXHIBIT A

US011021867B2

(12) **United States Patent**
Brekke et al.

(10) **Patent No.: US 11,021,867 B2**
(45) **Date of Patent: Jun. 1, 2021**

(54) **HANGER FOR FIRE SEPARATION WALL**

(71) Applicant: **Columbia Insurance Company**, Omaha, NE (US)

(72) Inventors: **Steven Brekke**, Lakeville, MN (US); **Mark R. Rolf**, Fredericksburg, VA (US)

(73) Assignee: **Columbia Insurance Company**, Omaha, NE (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **16/433,799**

(22) Filed: **Jun. 6, 2019**

(65) **Prior Publication Data**

US 2019/0284794 A1 Sep. 19, 2019

Related U.S. Application Data

(63) Continuation of application No. 16/225,517, filed on Dec. 19, 2018, now Pat. No. 10,316,510, which is a continuation of application No. 15/675,409, filed on Aug. 11, 2017, now Pat. No. 10,184,242, which is a (Continued)

(51) **Int. Cl.**
E04B 1/26 (2006.01)

(52) **U.S. Cl.**
CPC ***E04B 1/2612*** (2013.01)

(58) **Field of Classification Search**
CPC E04B 1/2612; E04B 1/2608; E04B 1/2604; E04B 1/945; E04B 1/94; E04B 1/26; E04B 2001/2644; E04B 2001/2652; E04B 2001/2676; E04B 2001/2415; E04B 2001/2684; E04B 5/12; E04B 5/14; E04B 7/045; B21D 53/56; Y10T 403/4605;
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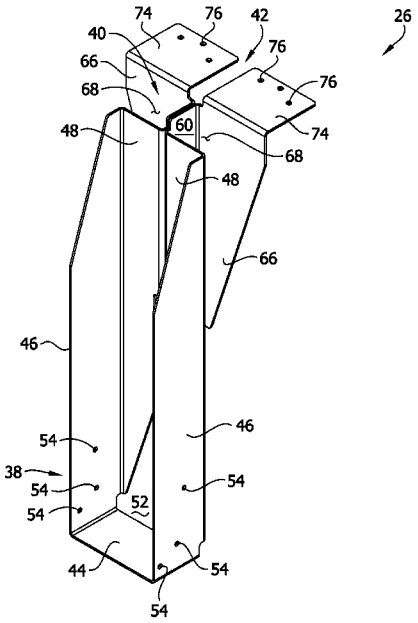
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Primary Examiner — James M Ference
(74) *Attorney, Agent, or Firm* — Stinson LLP

(57) **ABSTRACT**

A hanger for connecting a structural component to a wall that can have sheathing mounted thereon either before or after the hanger is connected to the wall. The hanger includes a channel-shaped portion configured to receive the structural component. An extension portion extends from the channel-shaped portion and is configured to extend through the sheathing to engage the wall at a first location. A connection portion is configured for attachment to the wall at a second location spaced from the first location.

23 Claims, 43 Drawing Sheets



Related U.S. Application Data

continuation of application No. 14/555,049, filed on Nov. 26, 2014, now Pat. No. 10,024,049.

(60) Provisional application No. 61/922,531, filed on Dec. 31, 2013.

(58) **Field of Classification Search**
CPC Y10T 403/3921; Y10T 403/4602; Y10T 29/49623
See application file for complete search history.

(56) **References Cited**

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FIG. 1

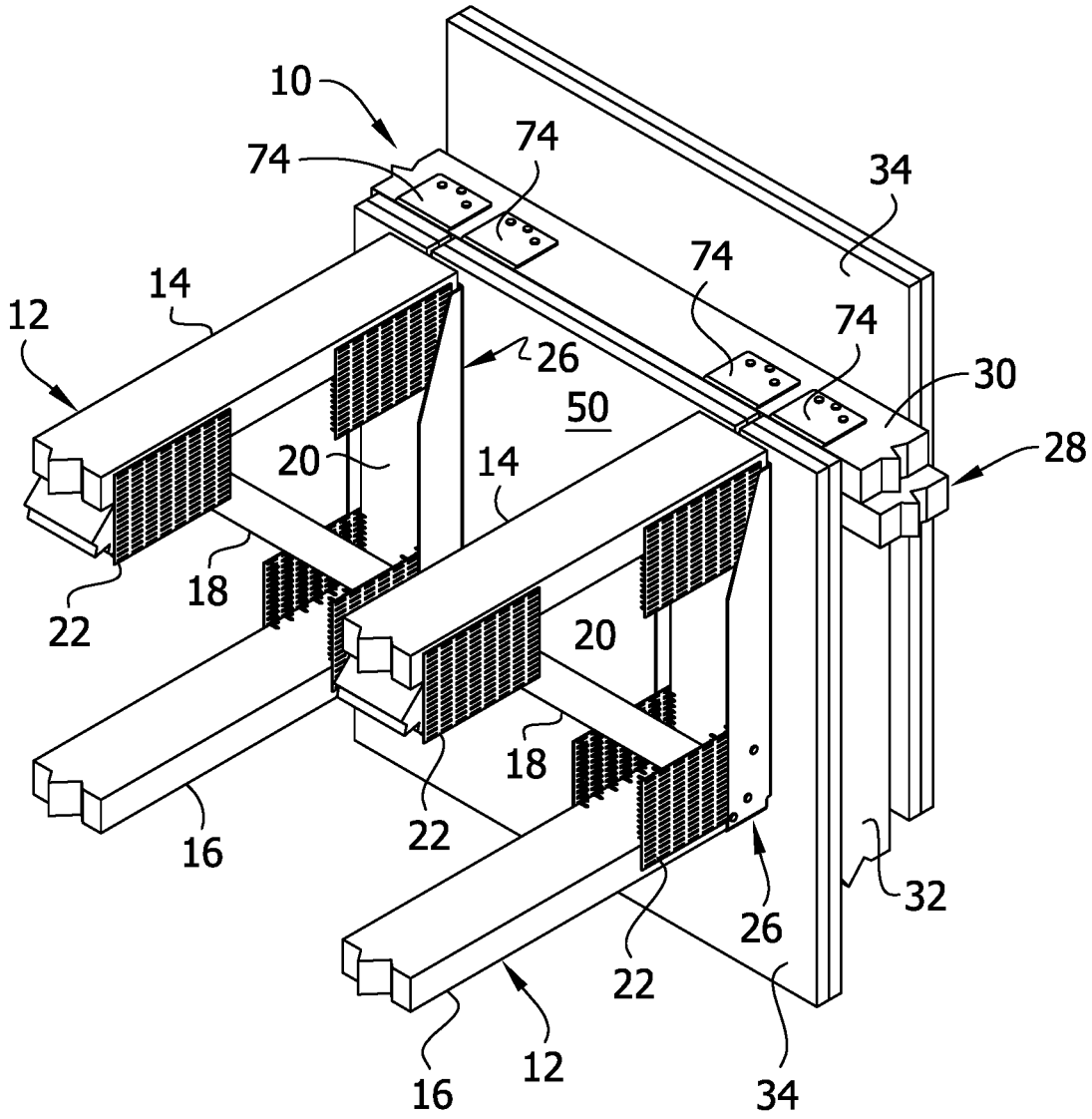

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FIG. 2

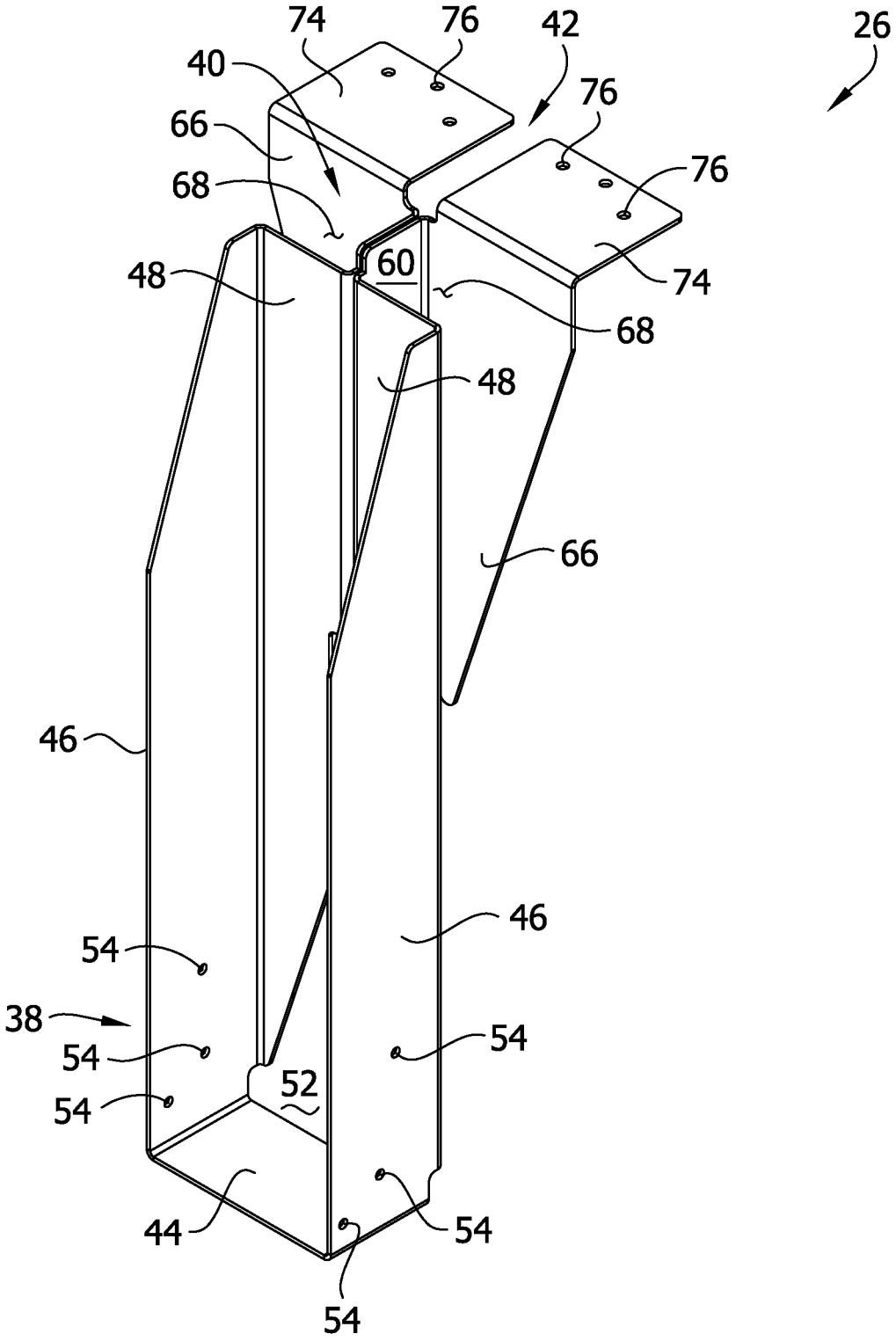

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FIG. 2A

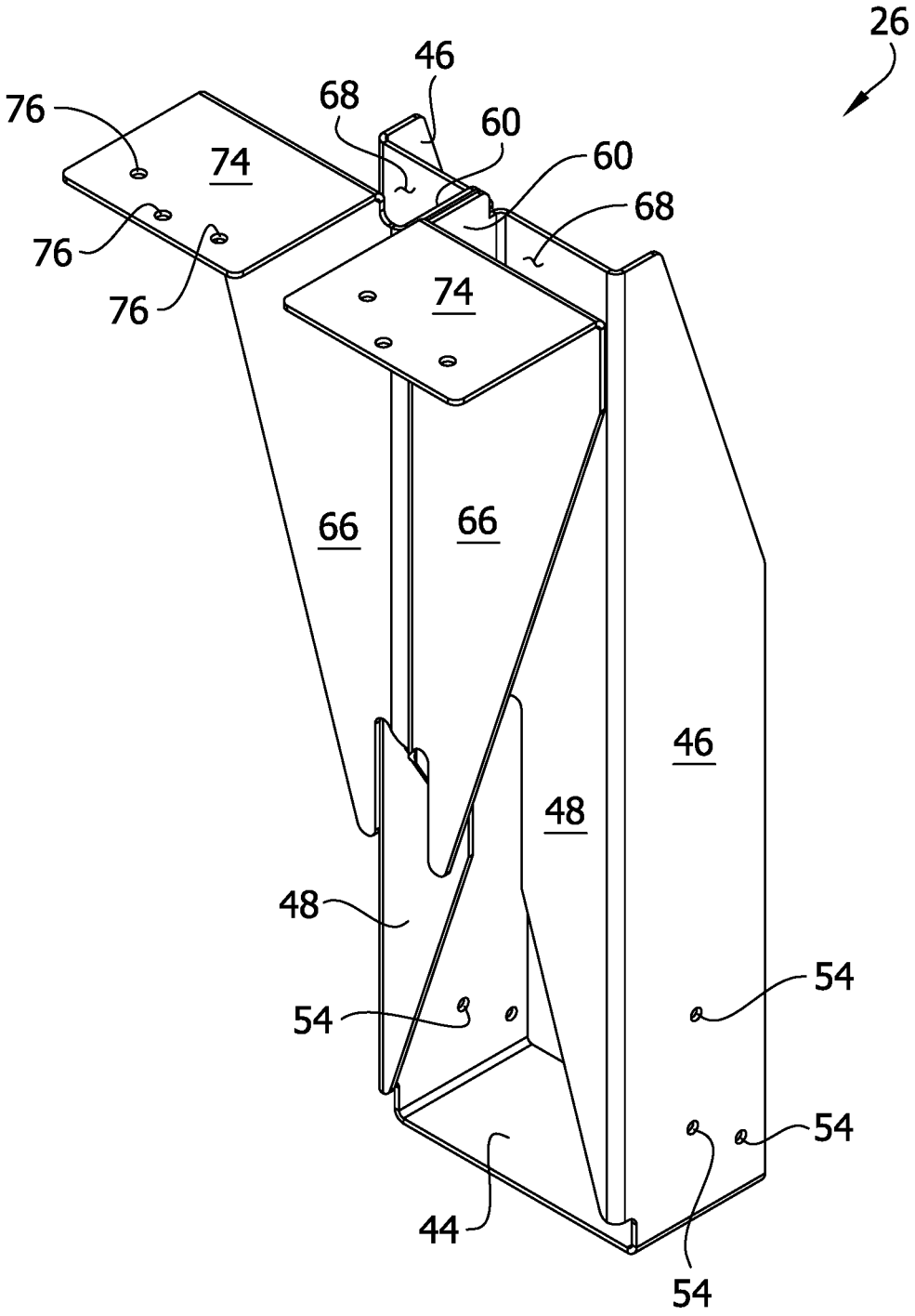


FIG. 3

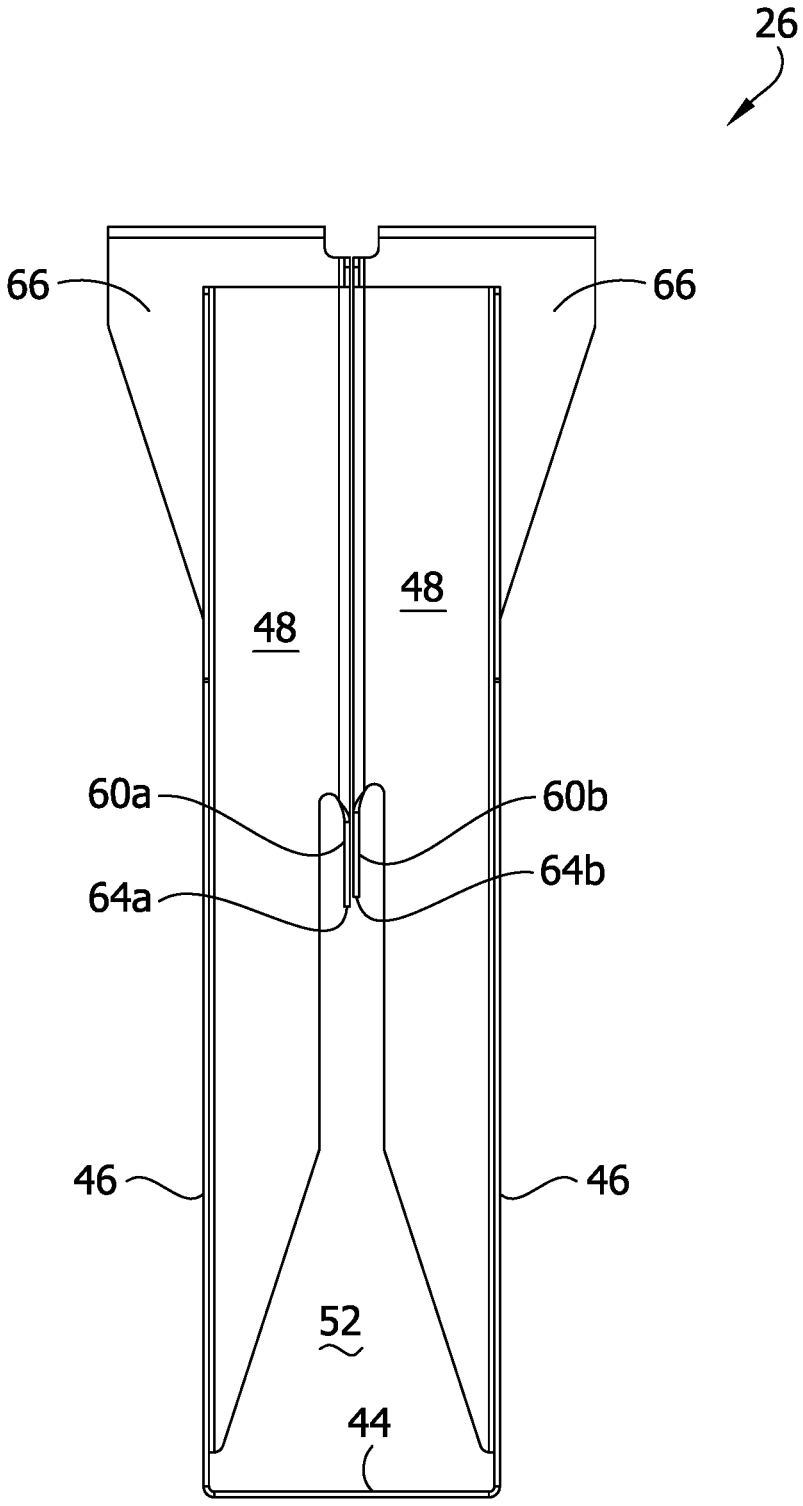


FIG. 4

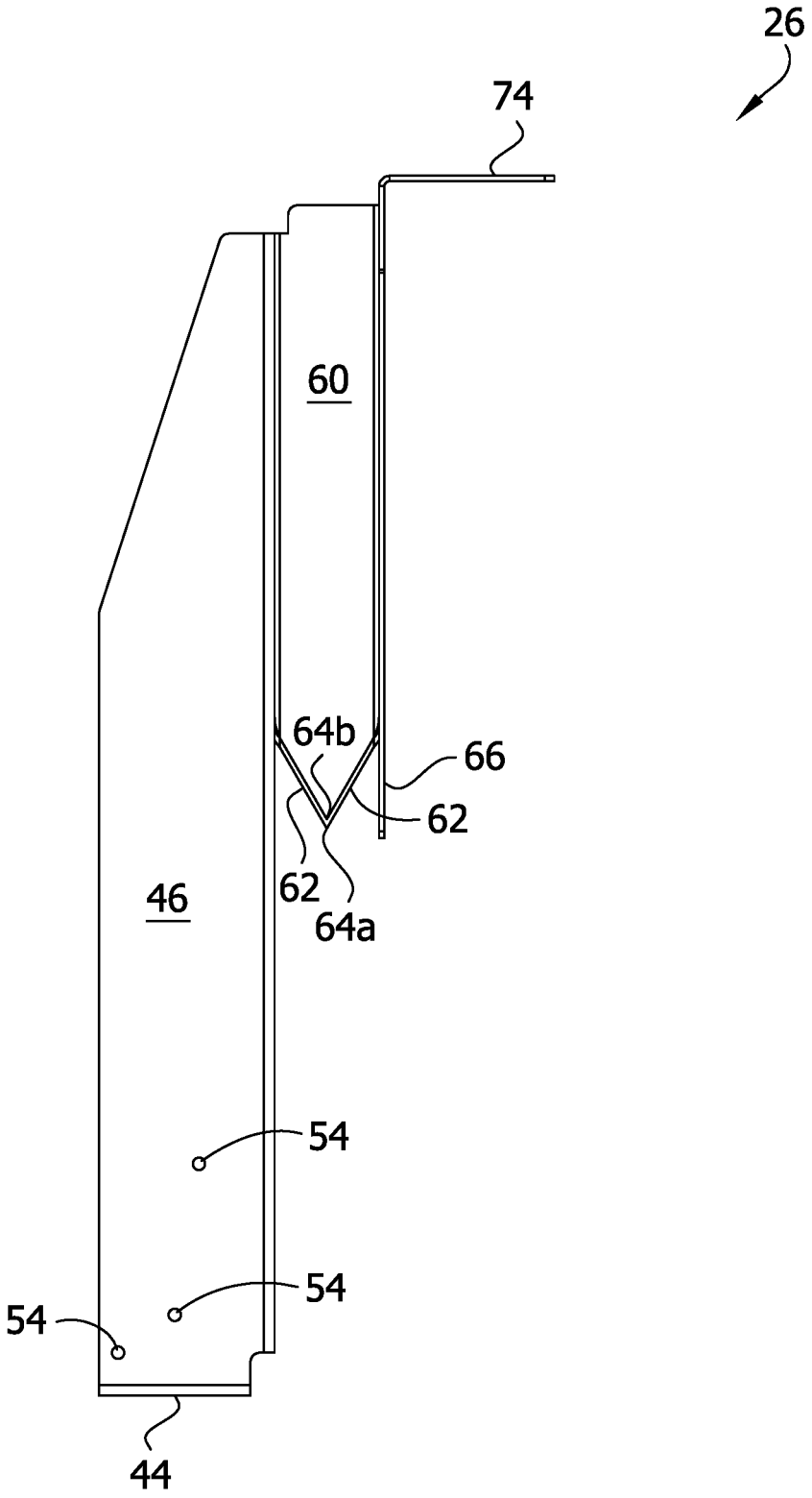


FIG. 5

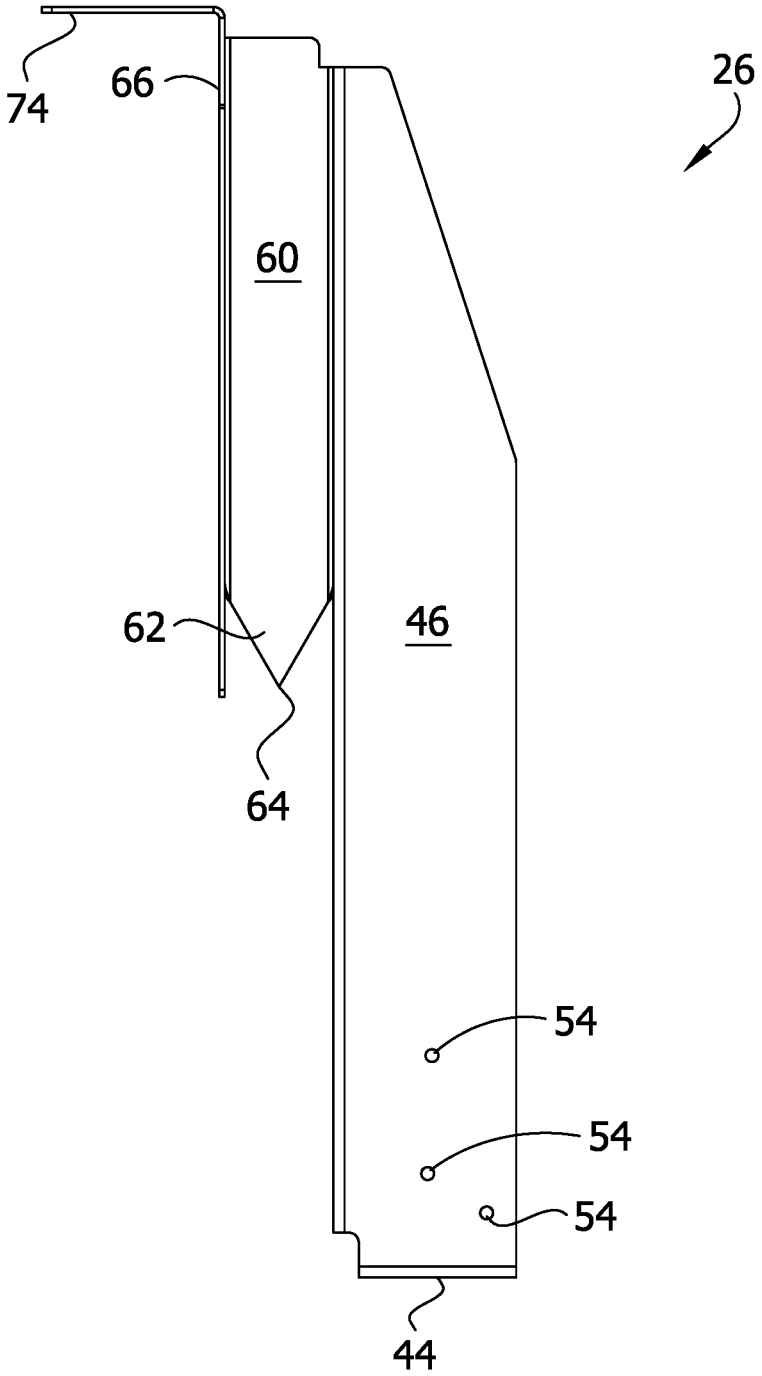


FIG. 6

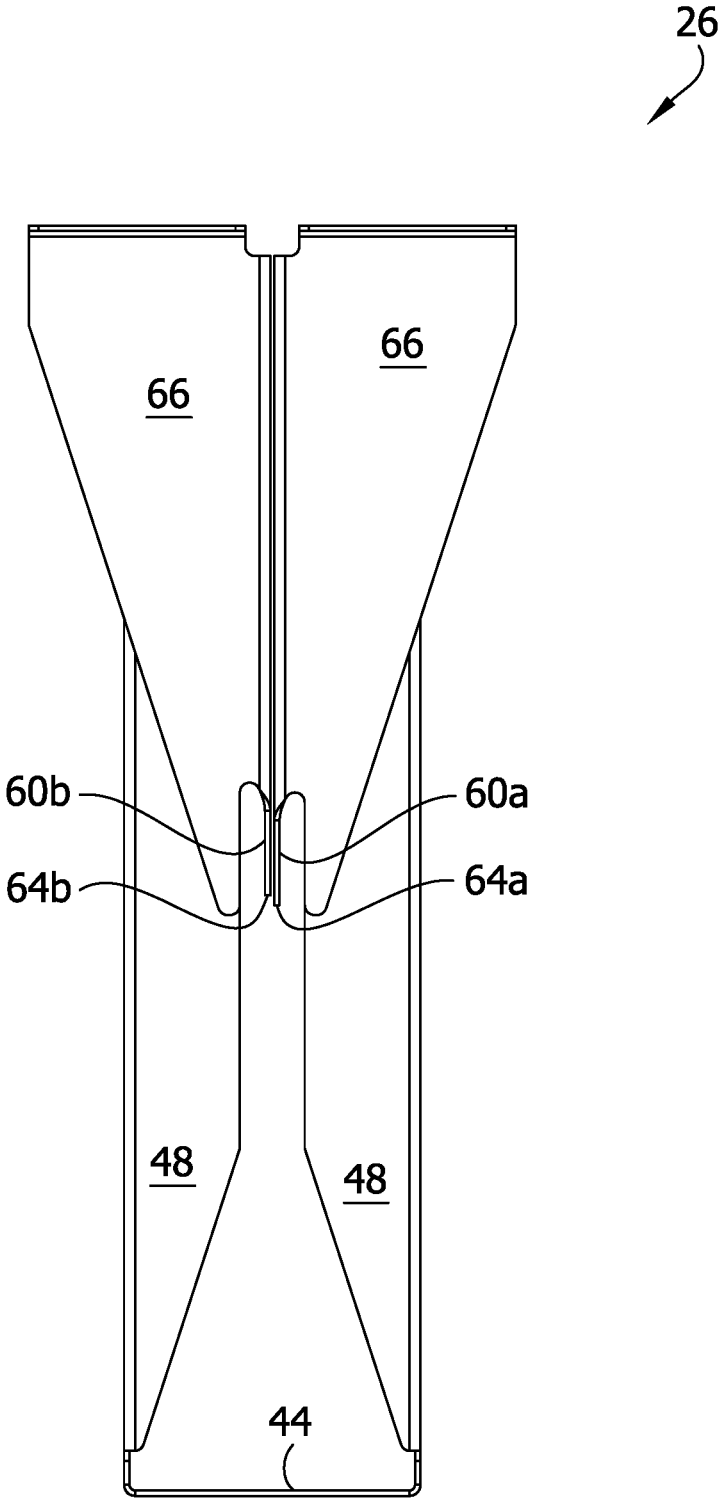


FIG. 7

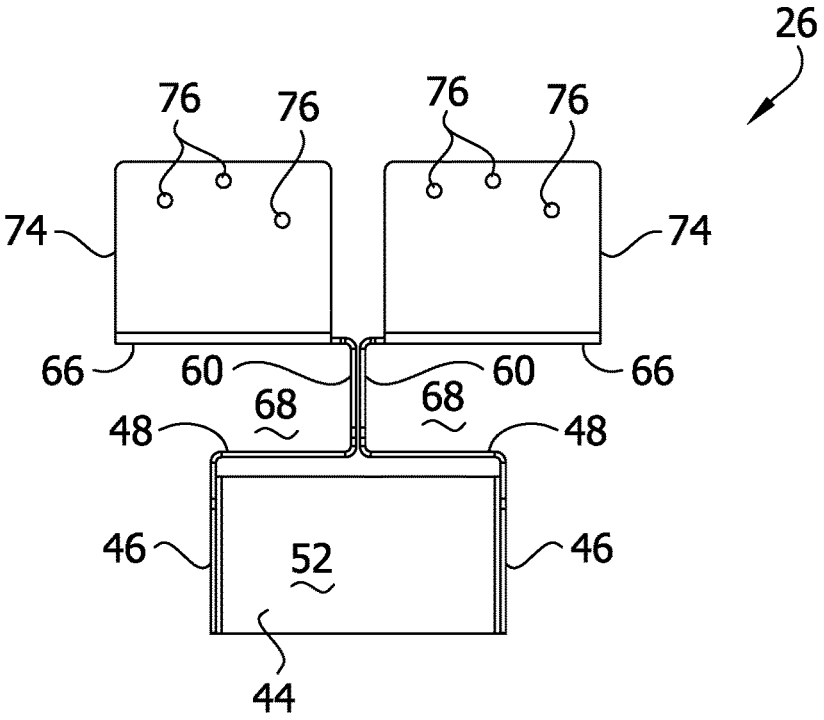

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FIG. 8

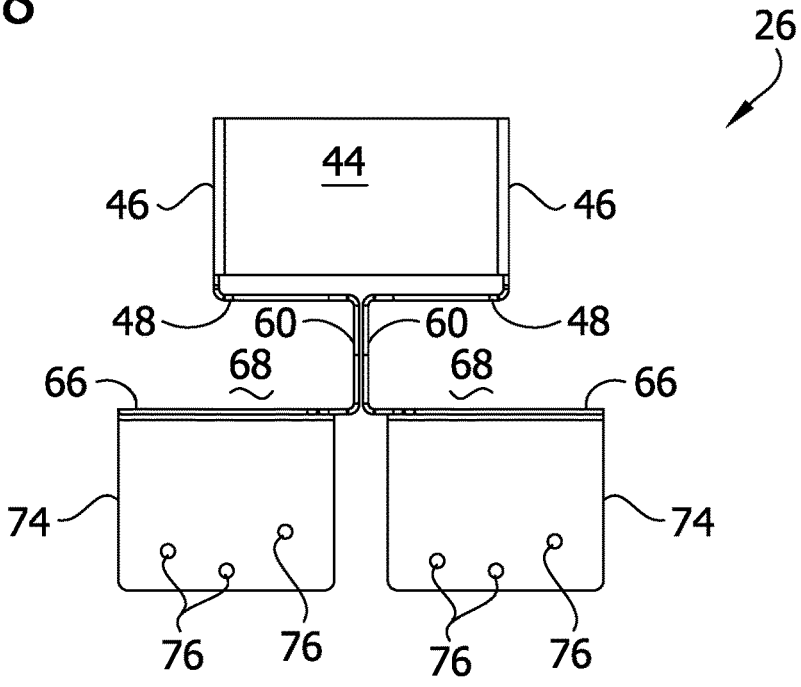

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FIG. 9

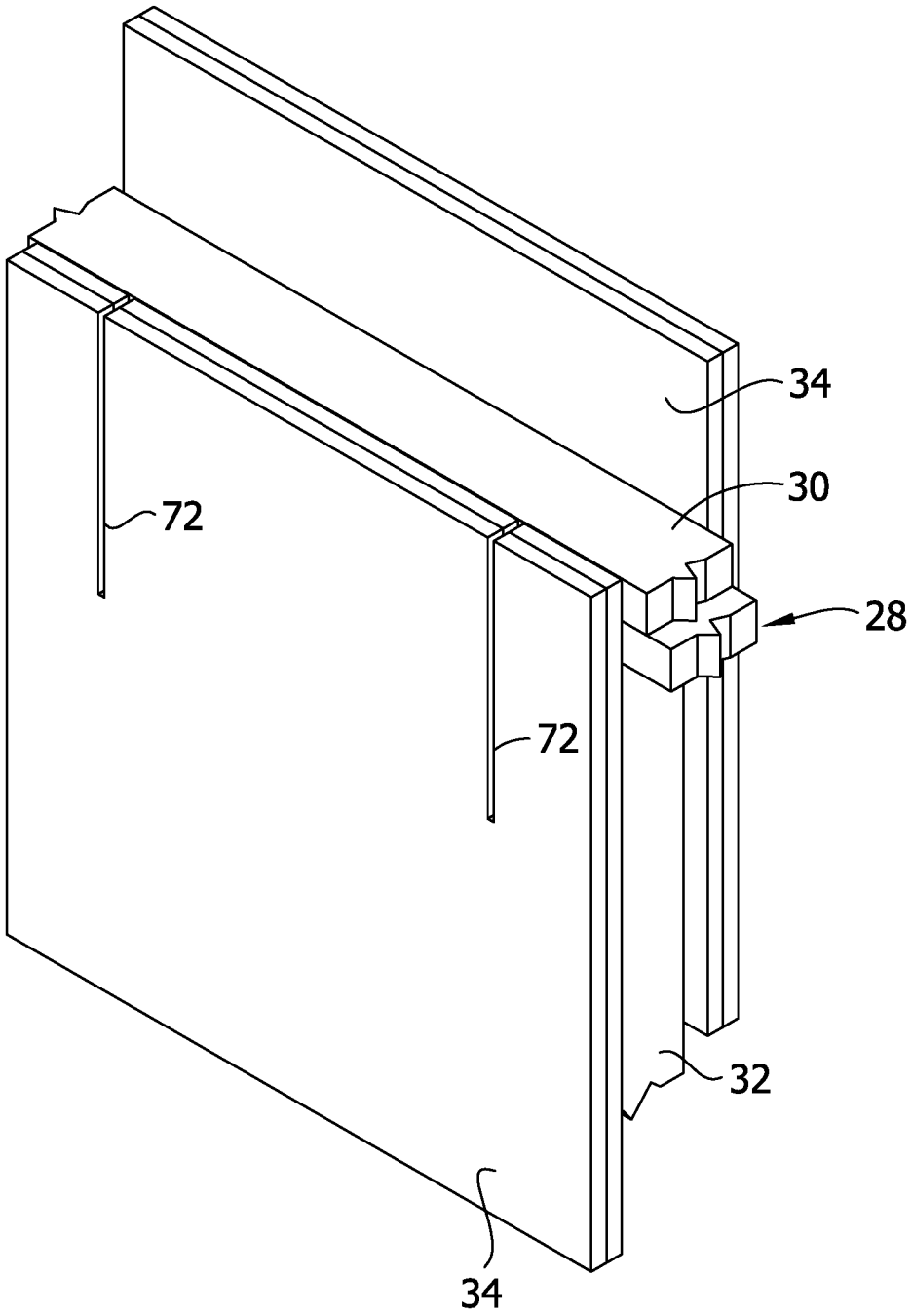


FIG. 10

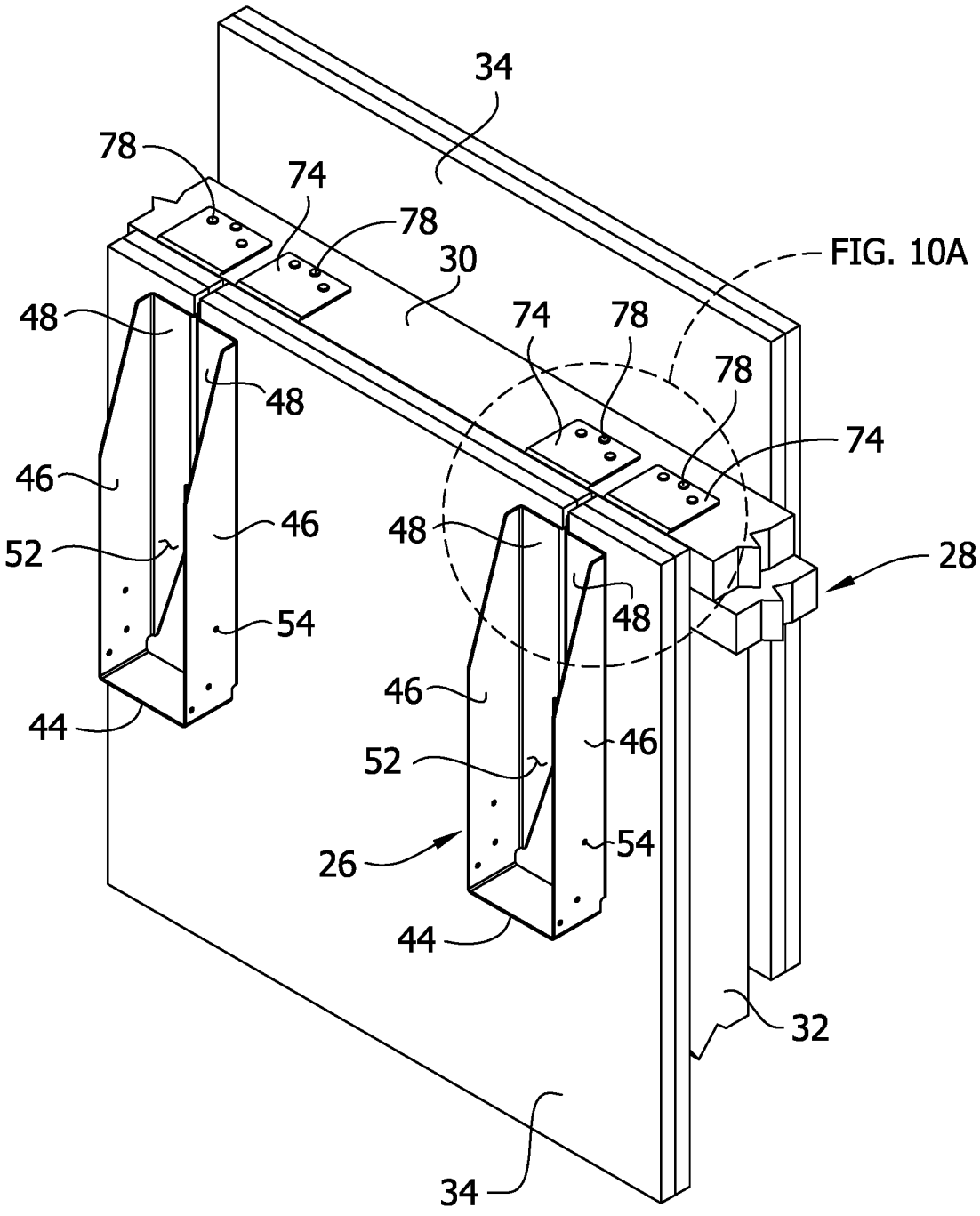
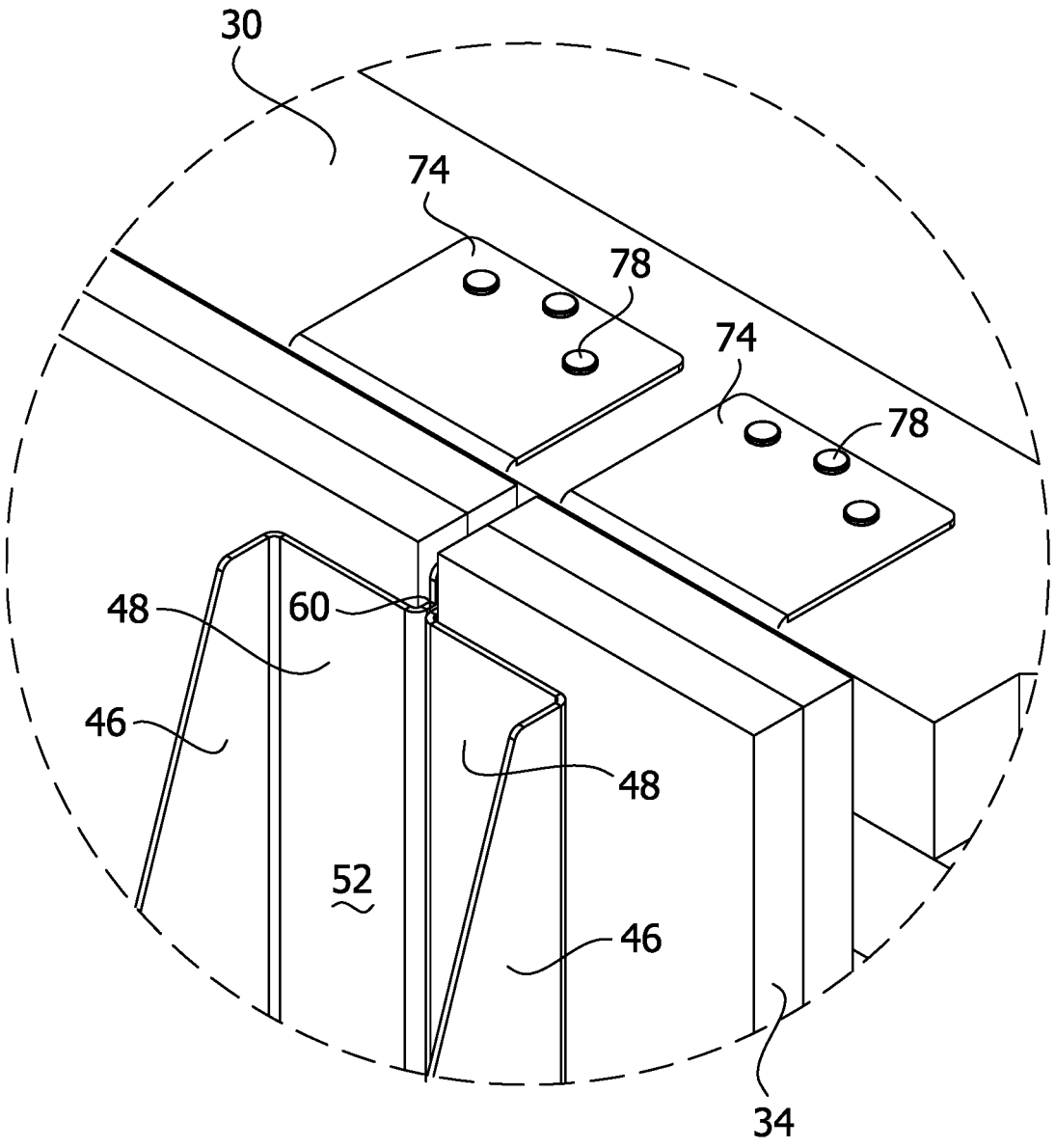

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FIG. 10A
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FIG. 10A



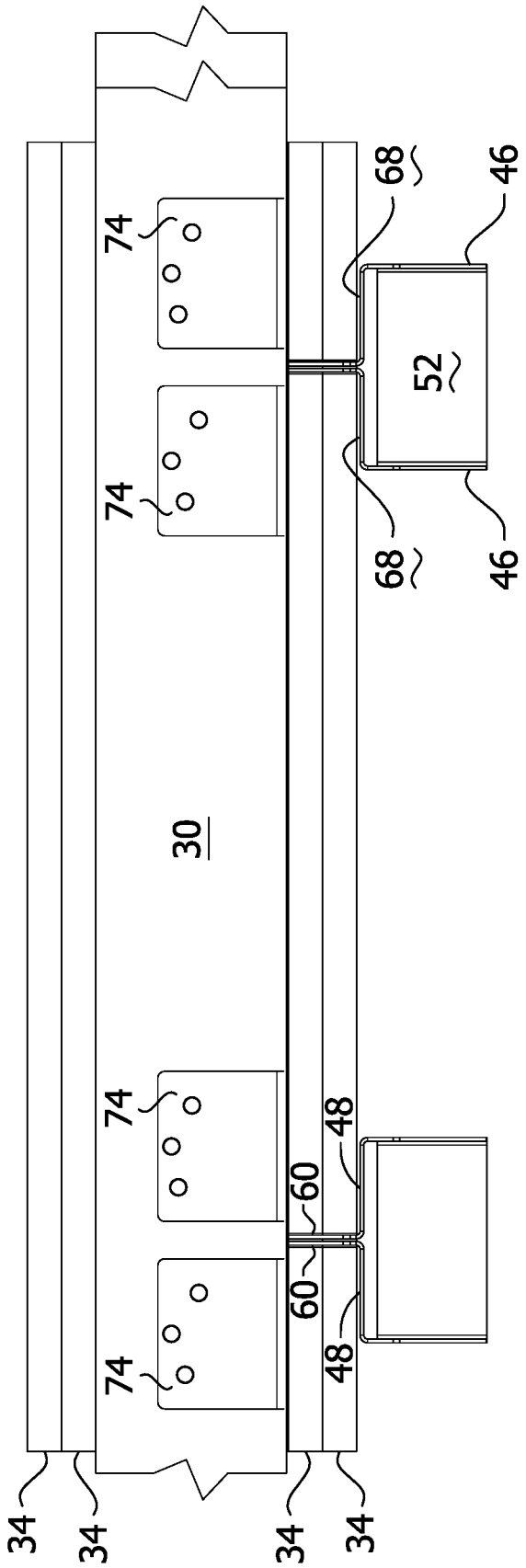
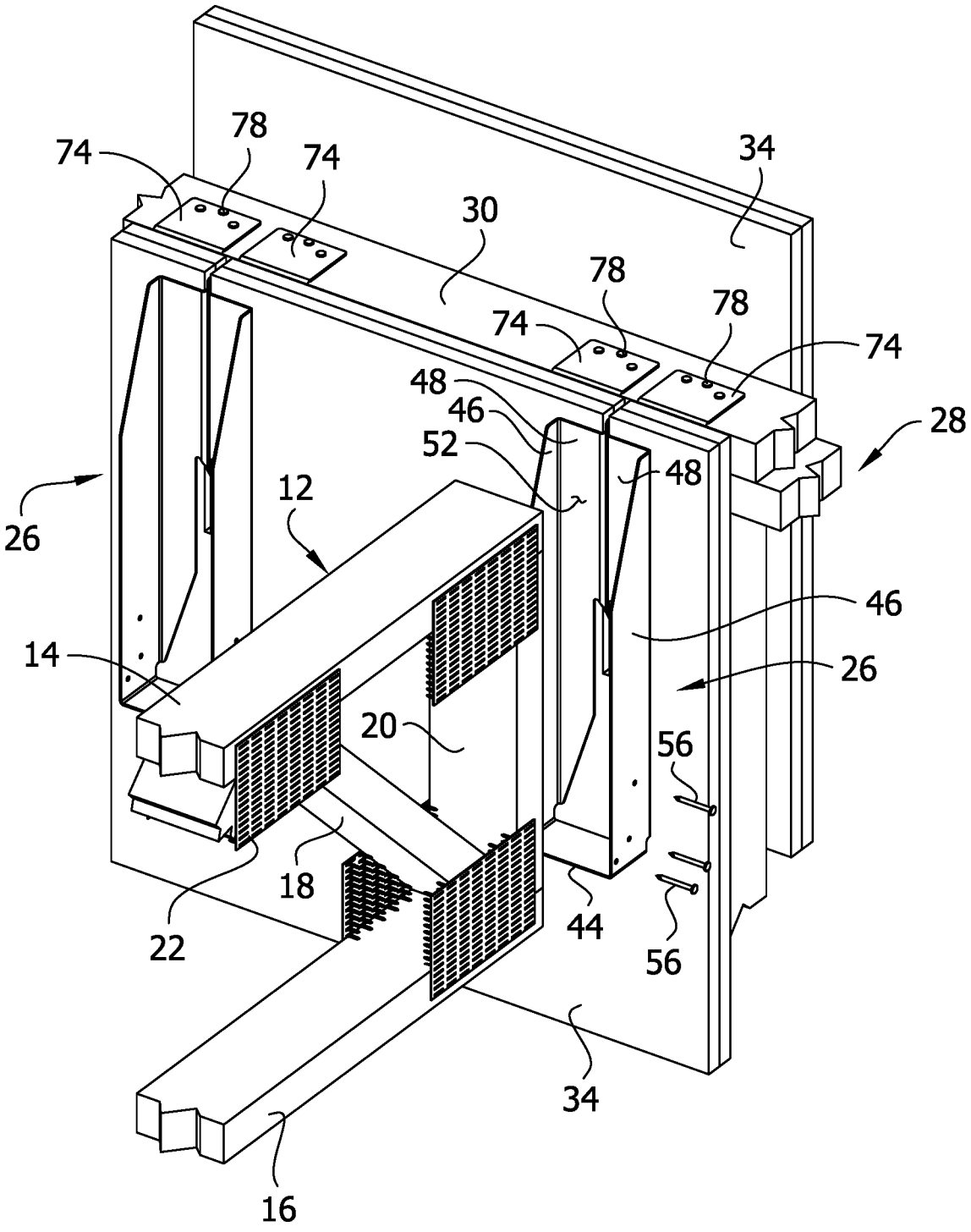


FIG. 11

FIG. 12


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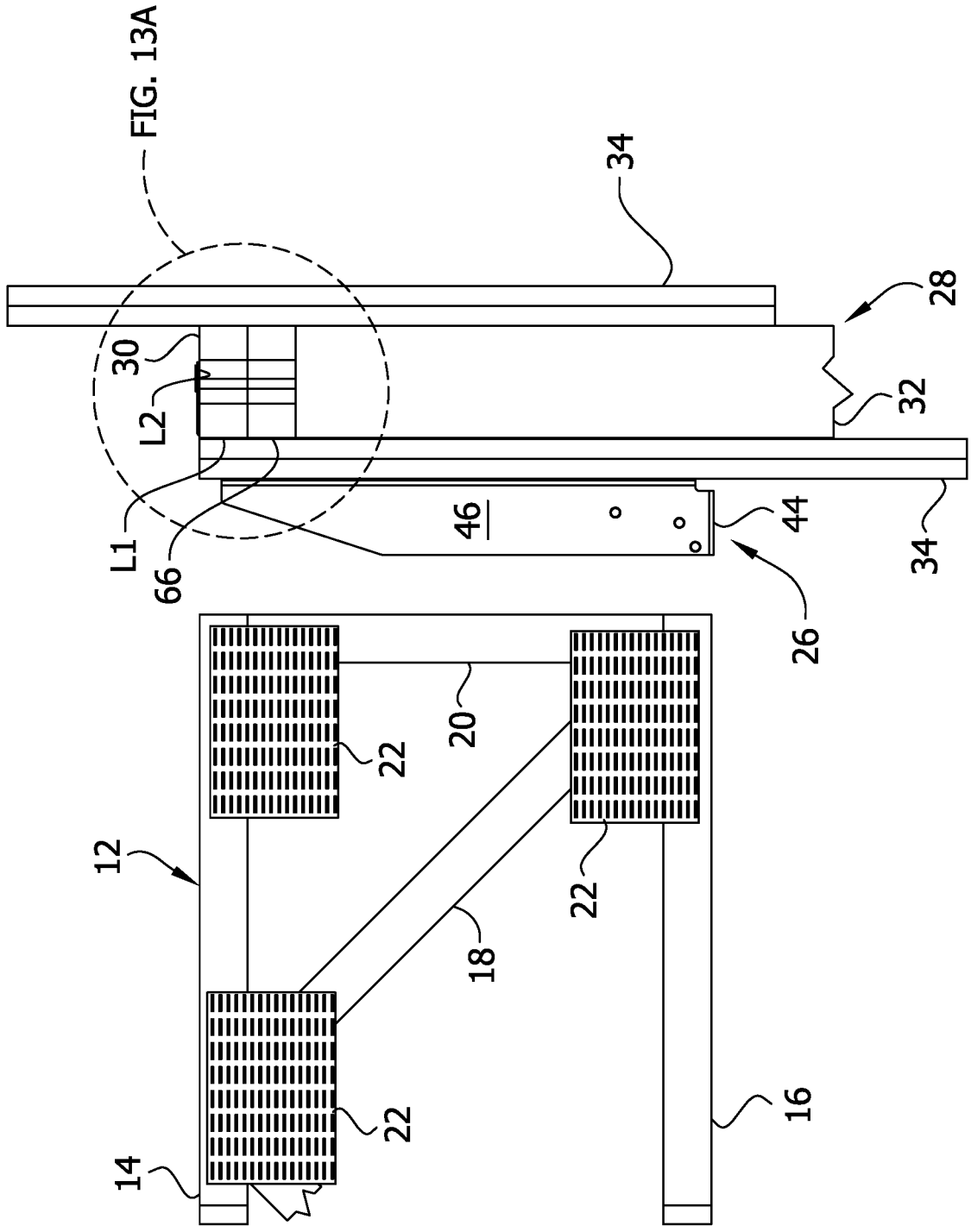


FIG. 13

FIG. 13A

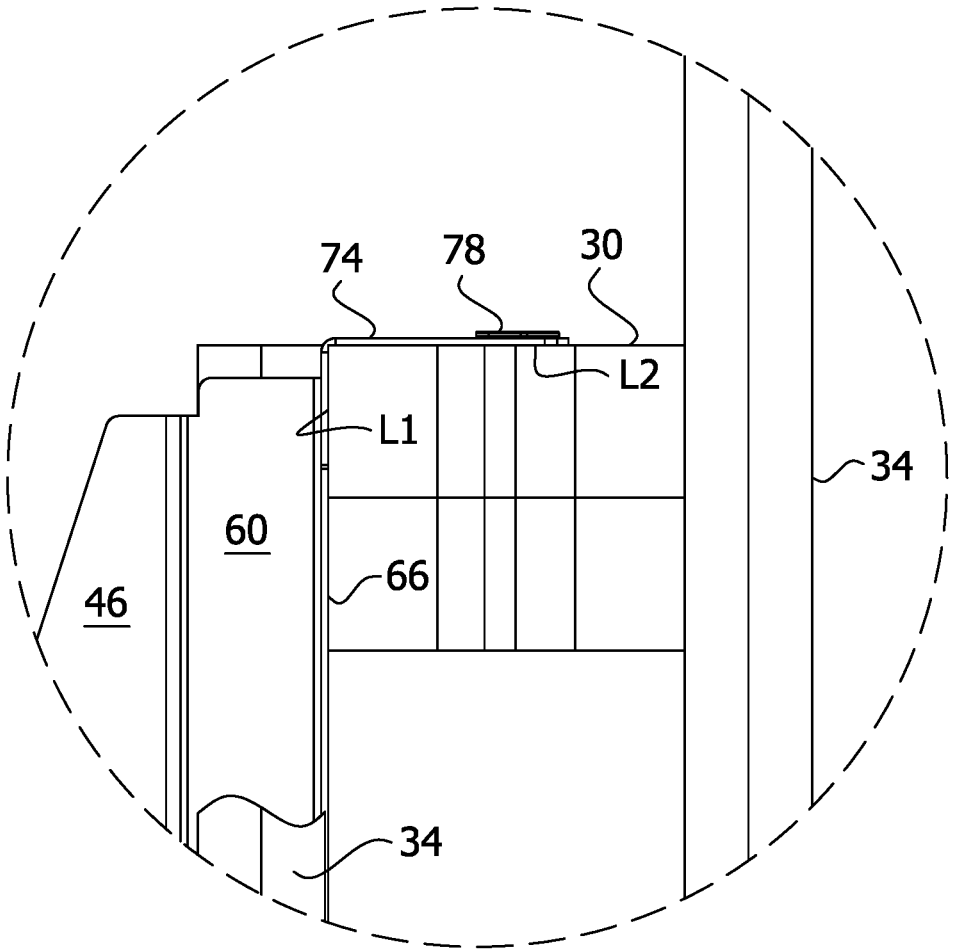


FIG. 14

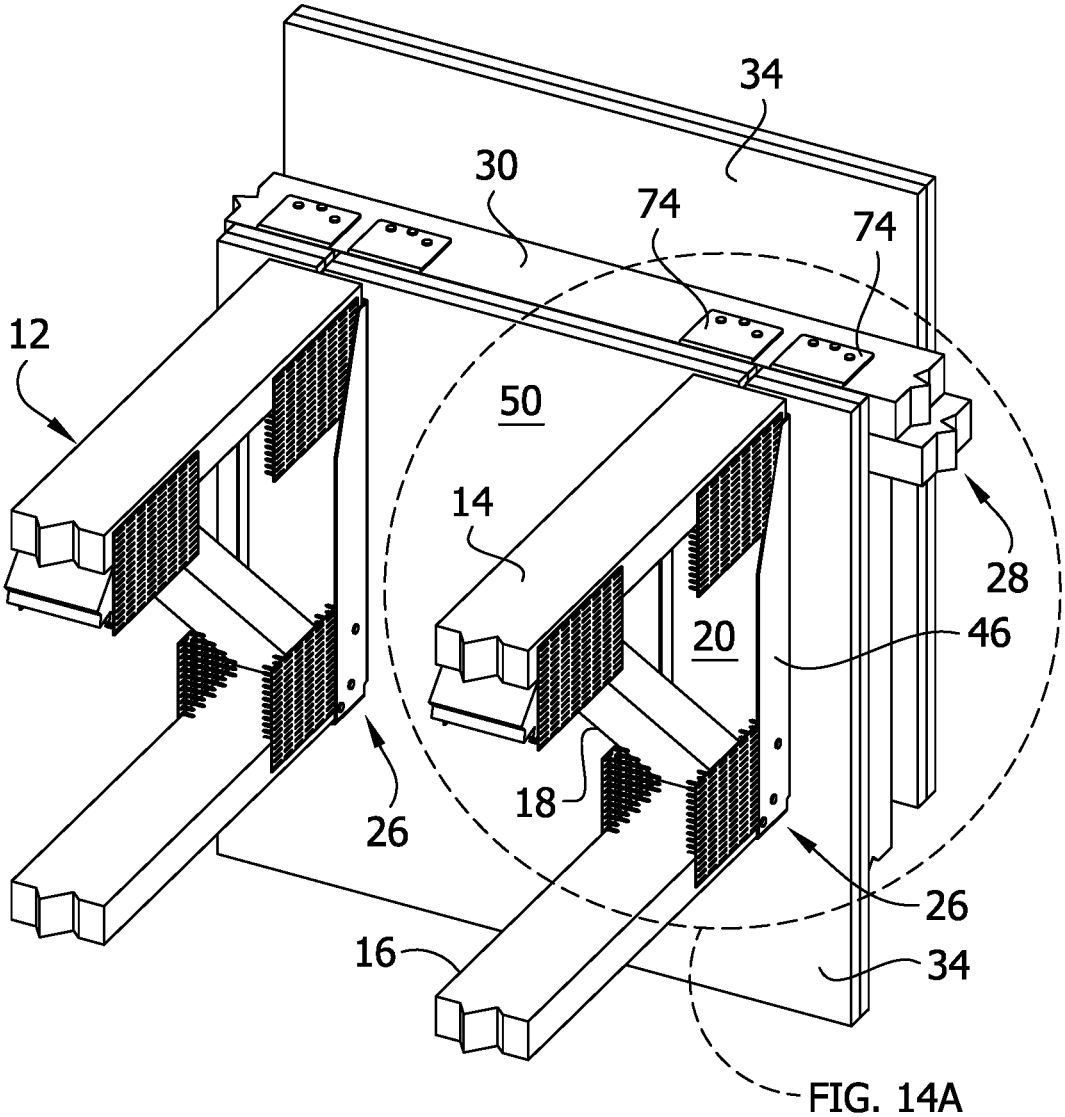


FIG. 14A

FIG. 14A

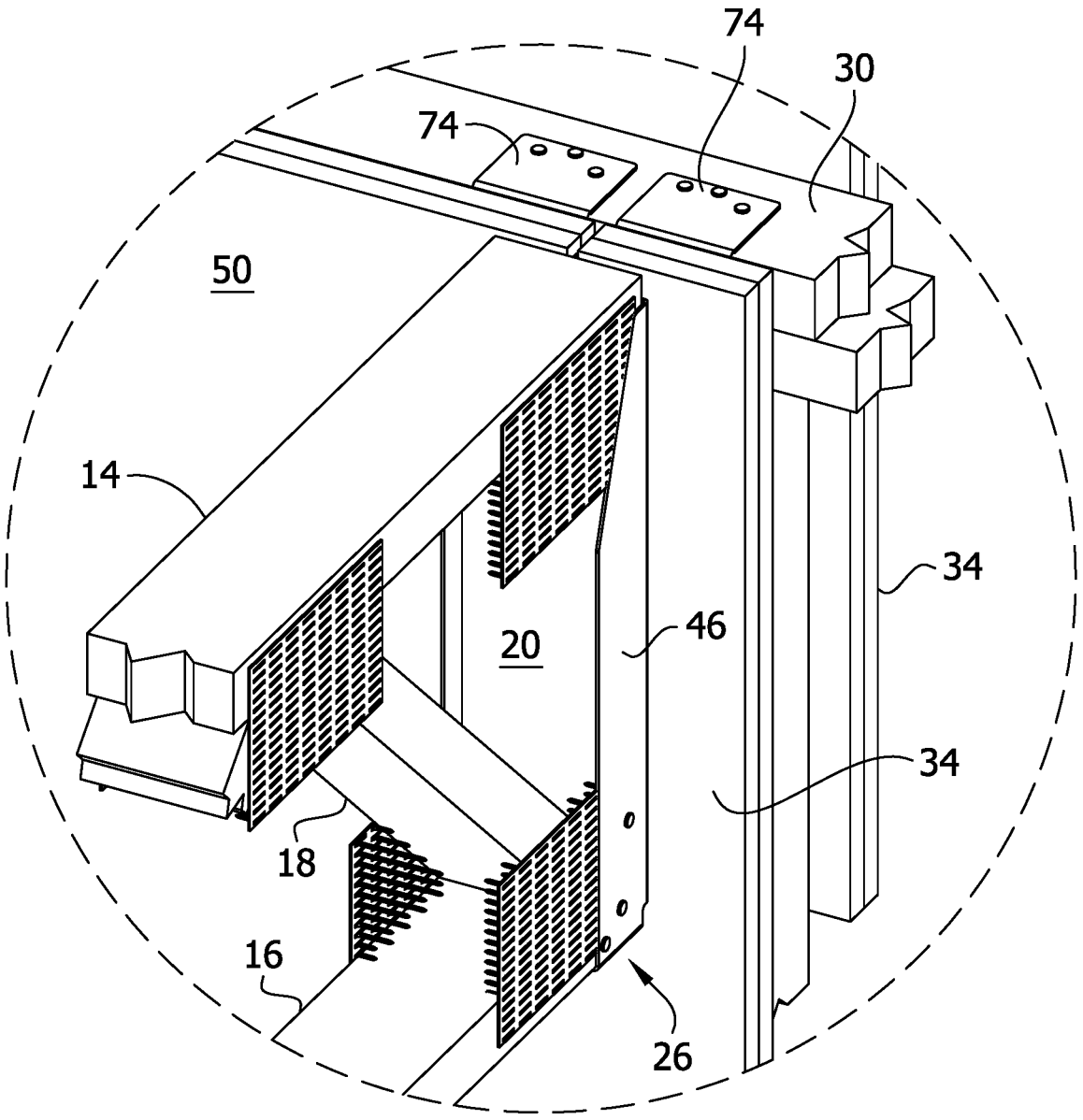


FIG. 15

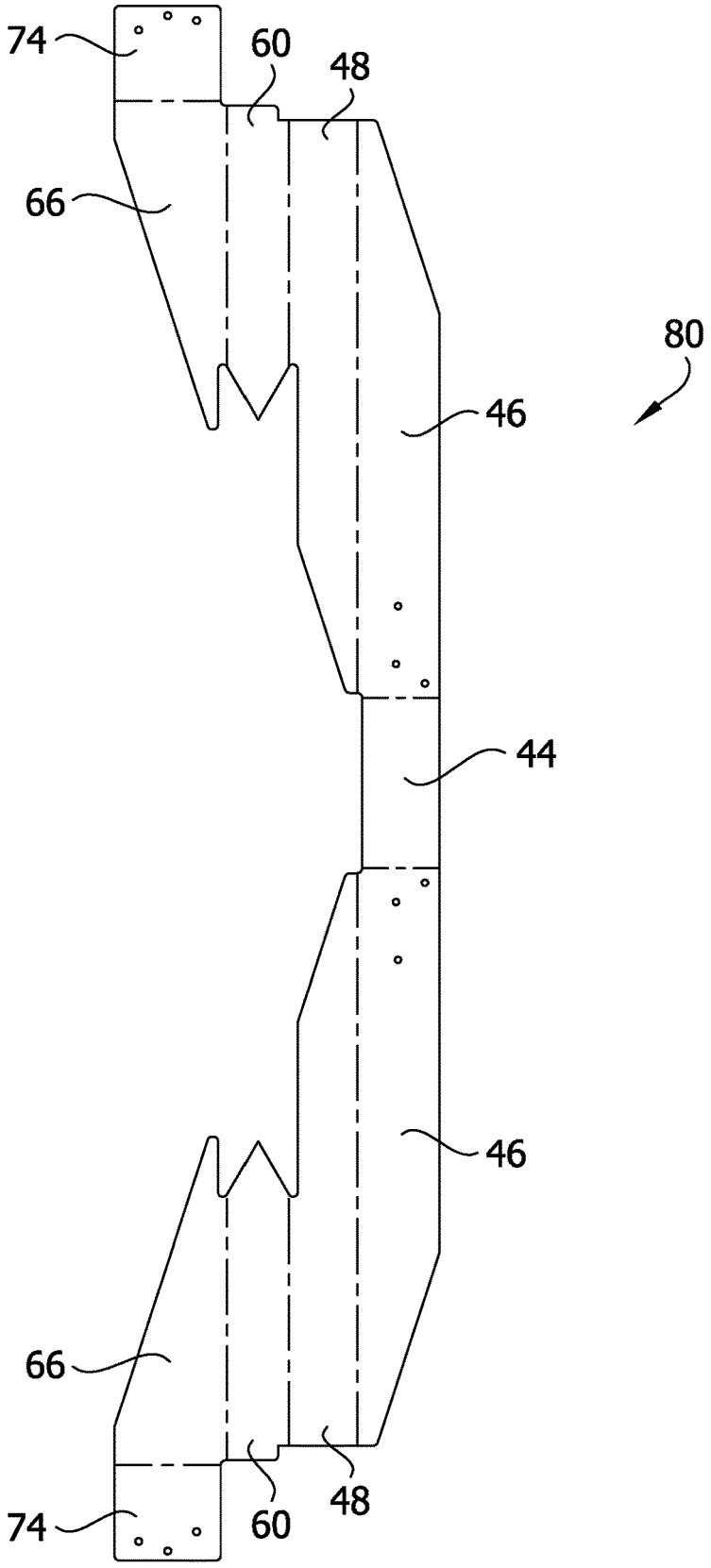


FIG. 16

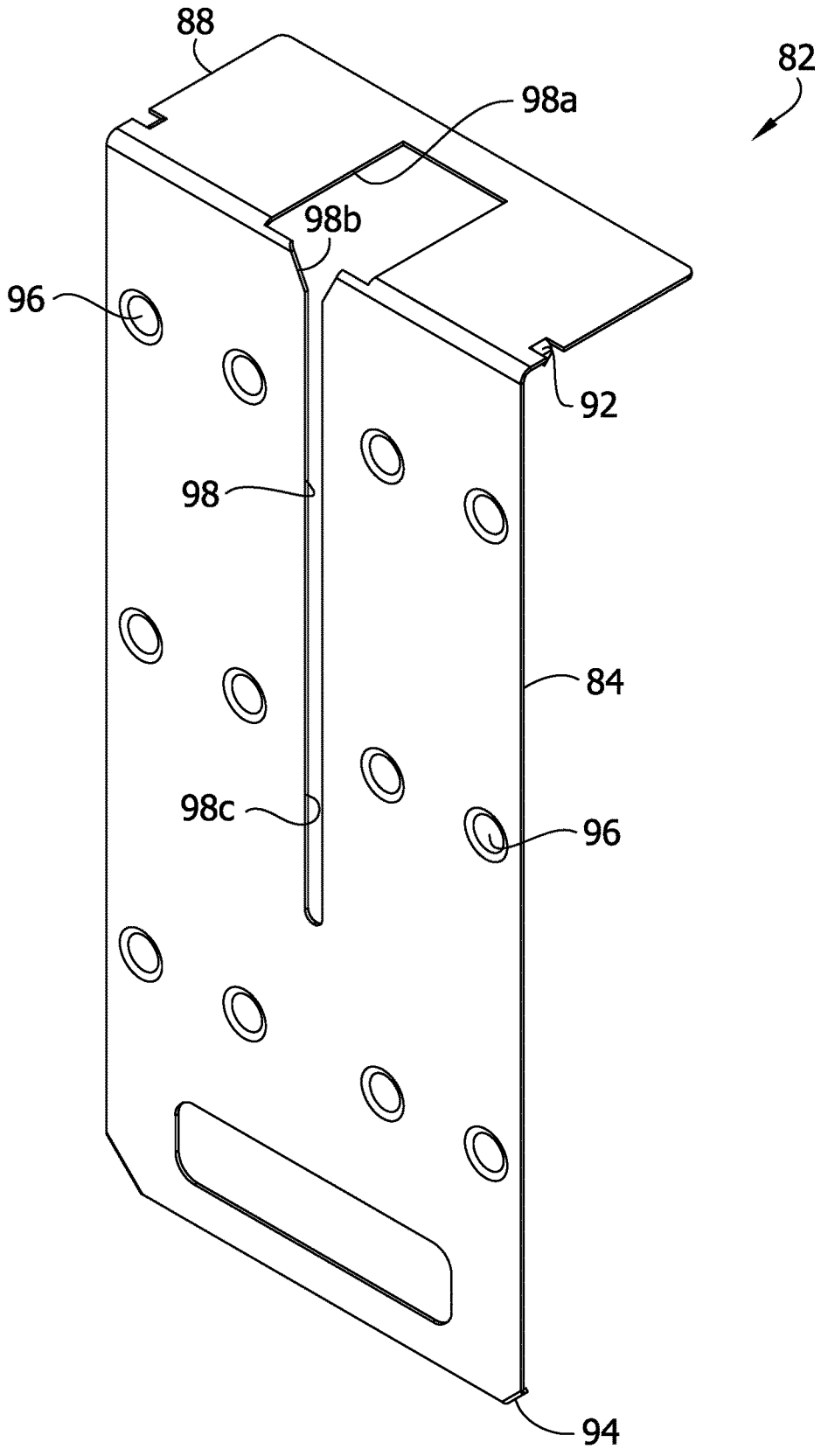


FIG. 17

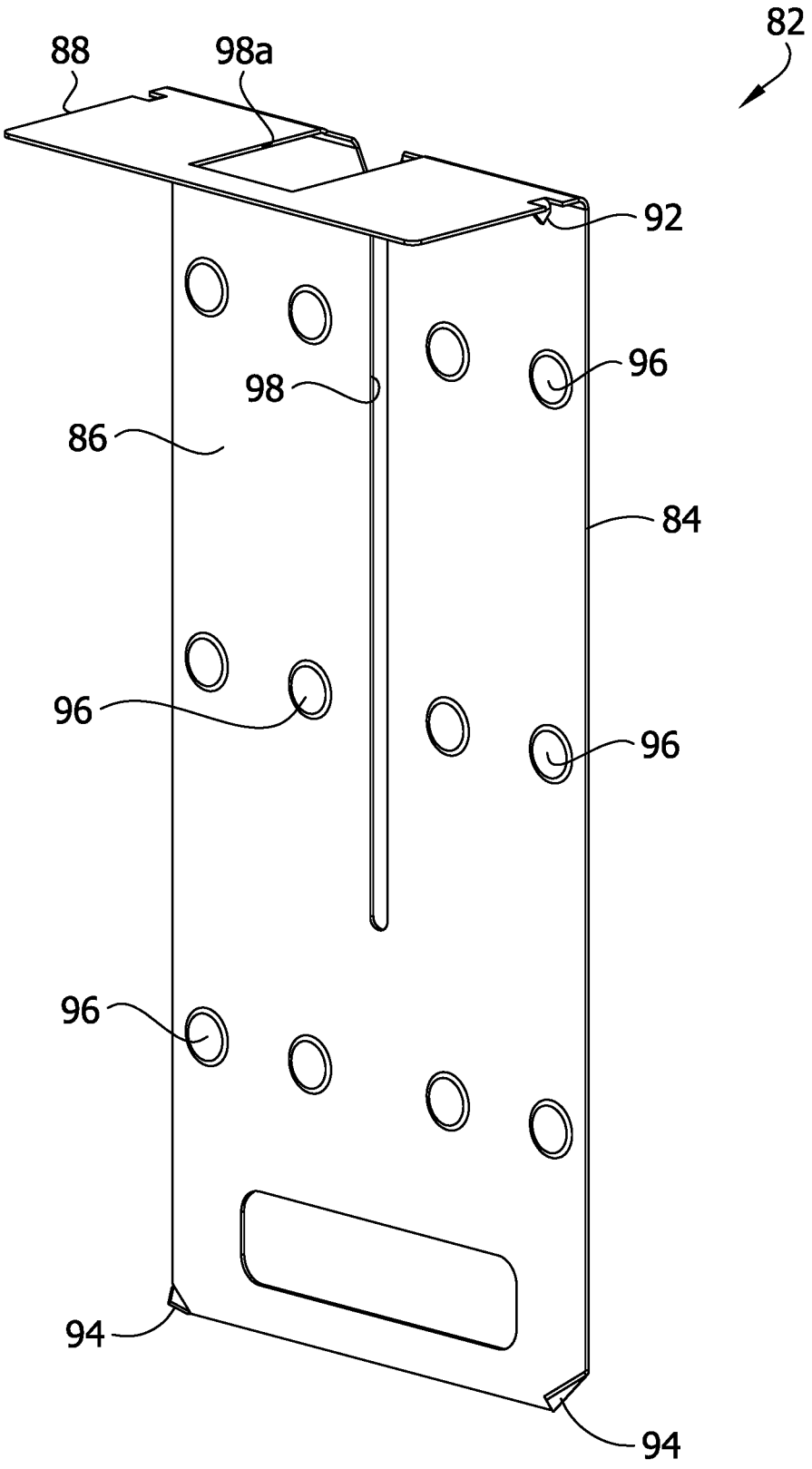


FIG. 18

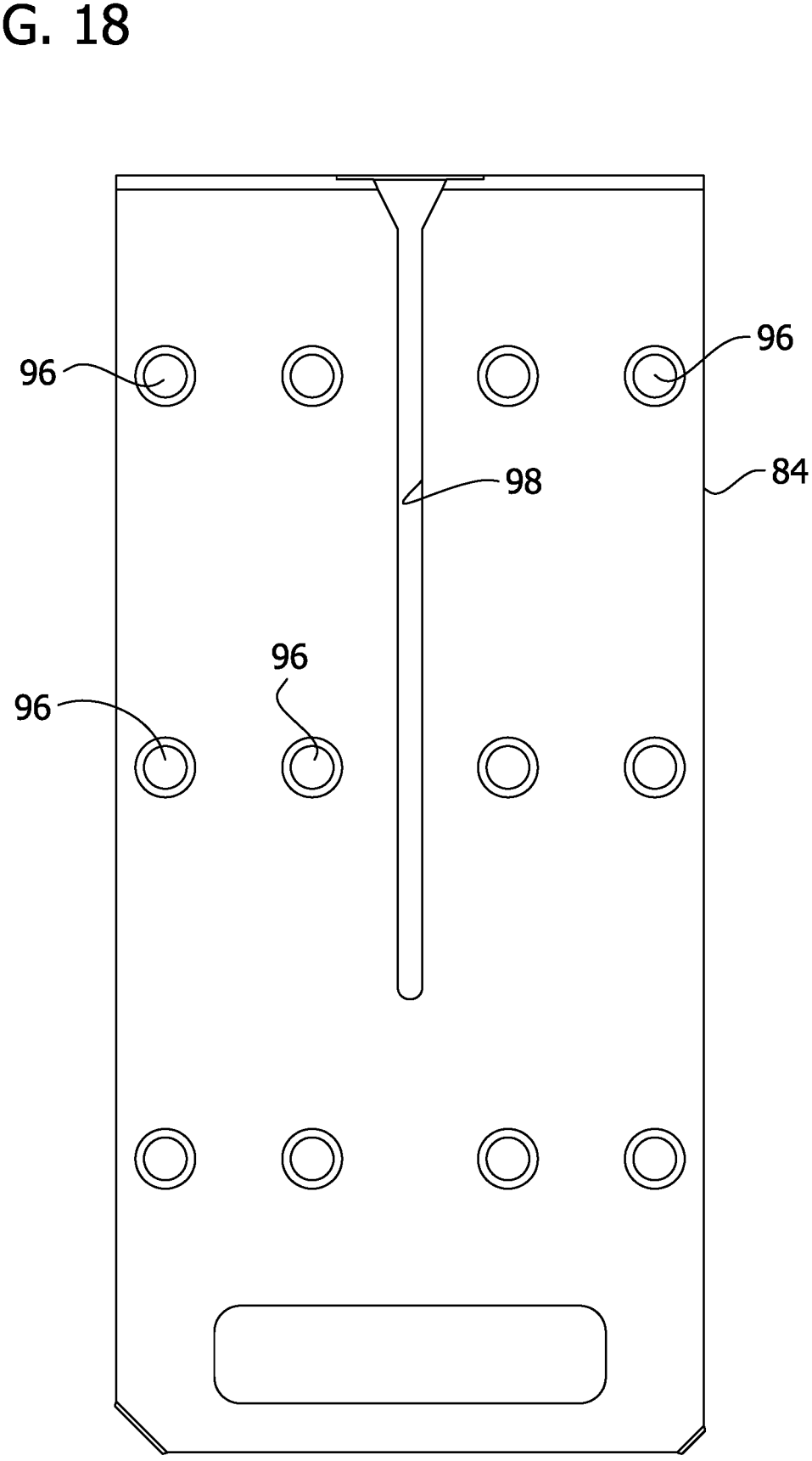


FIG. 19

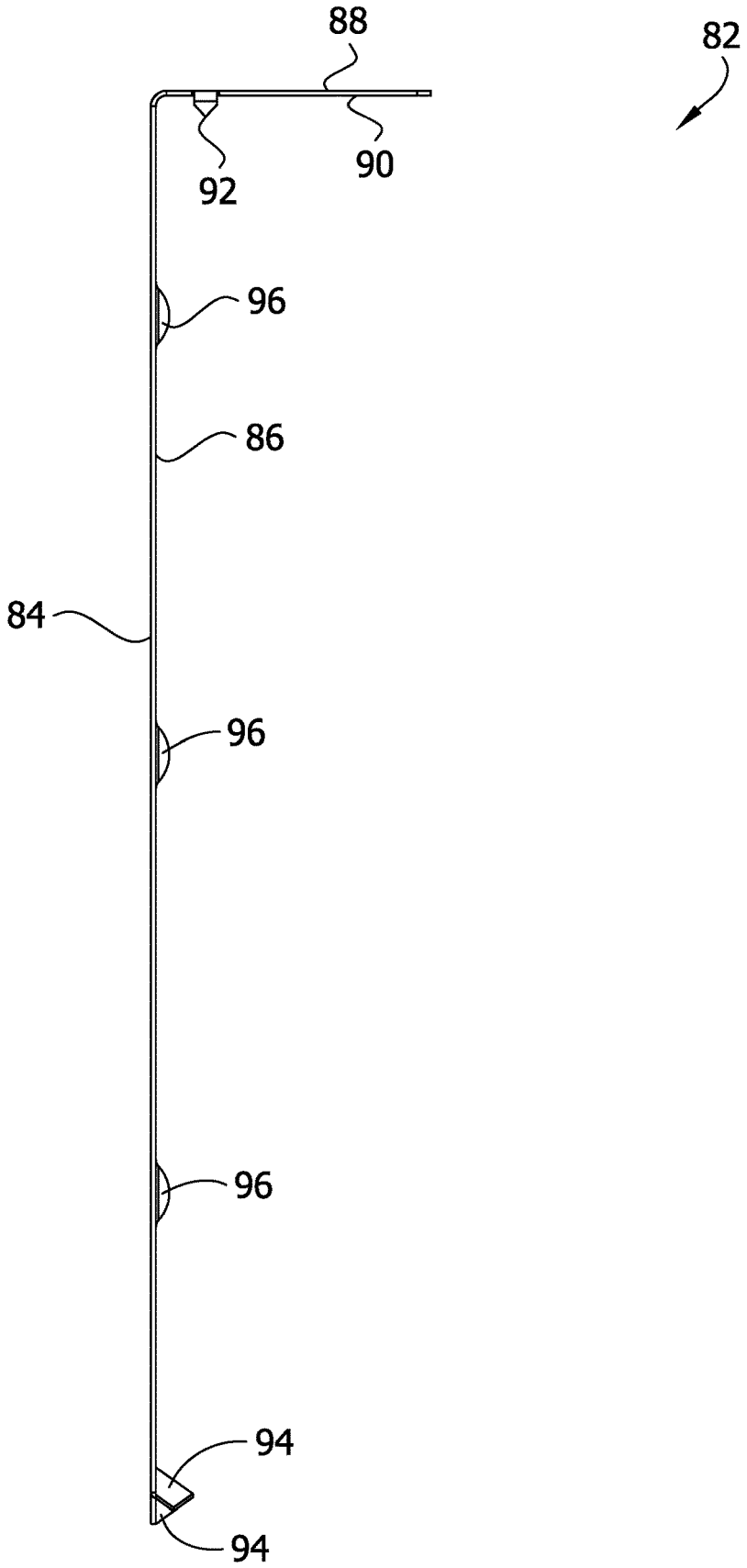


FIG. 20

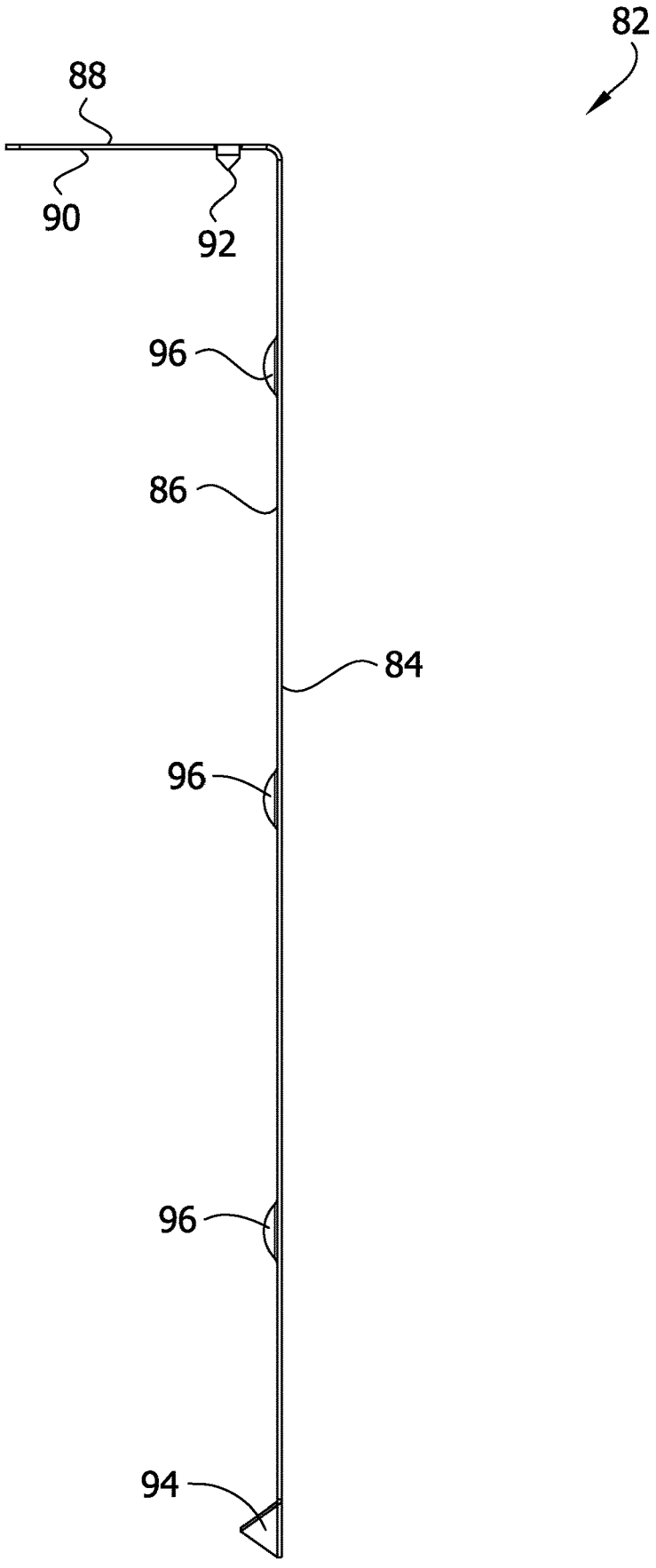
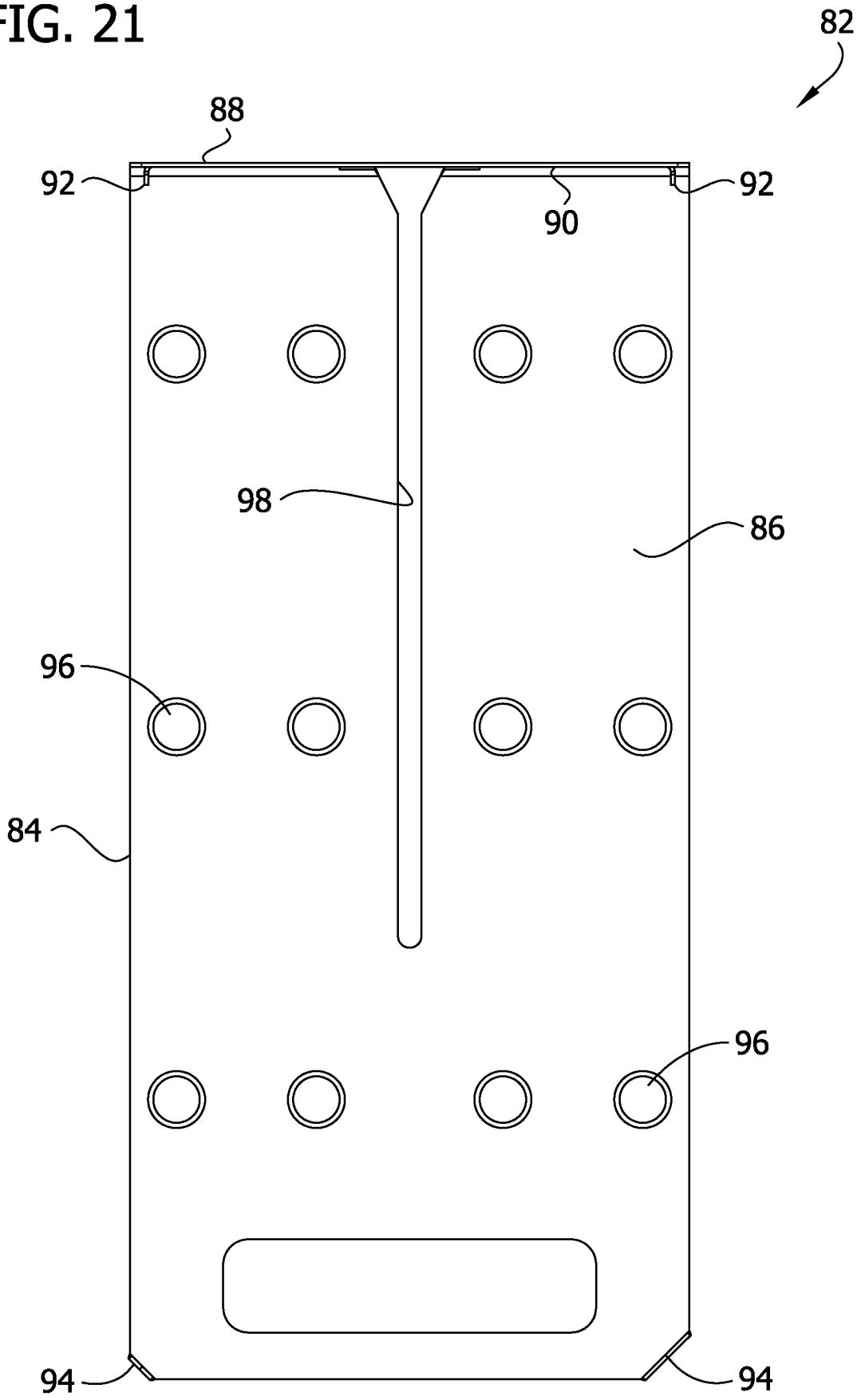


FIG. 21



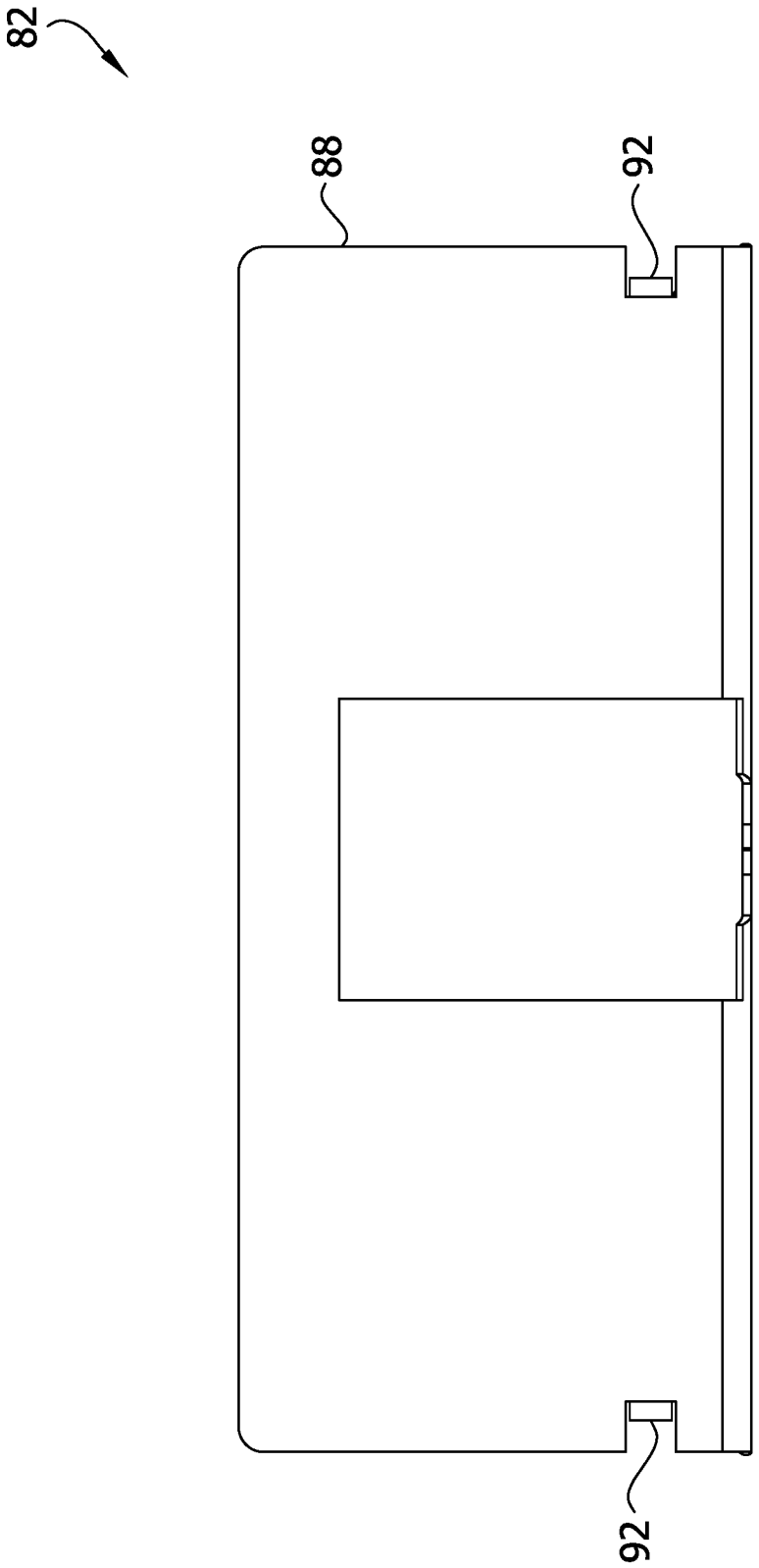


FIG. 22

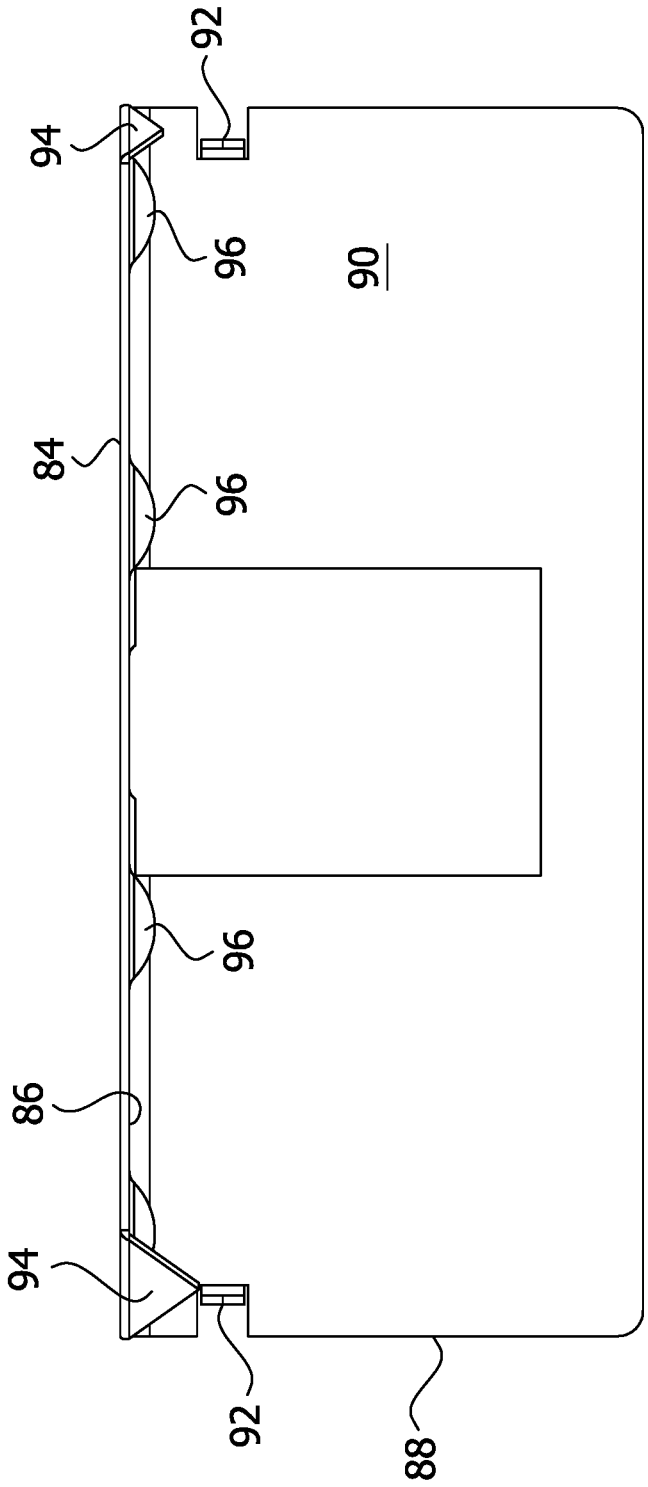


FIG. 23

FIG. 24

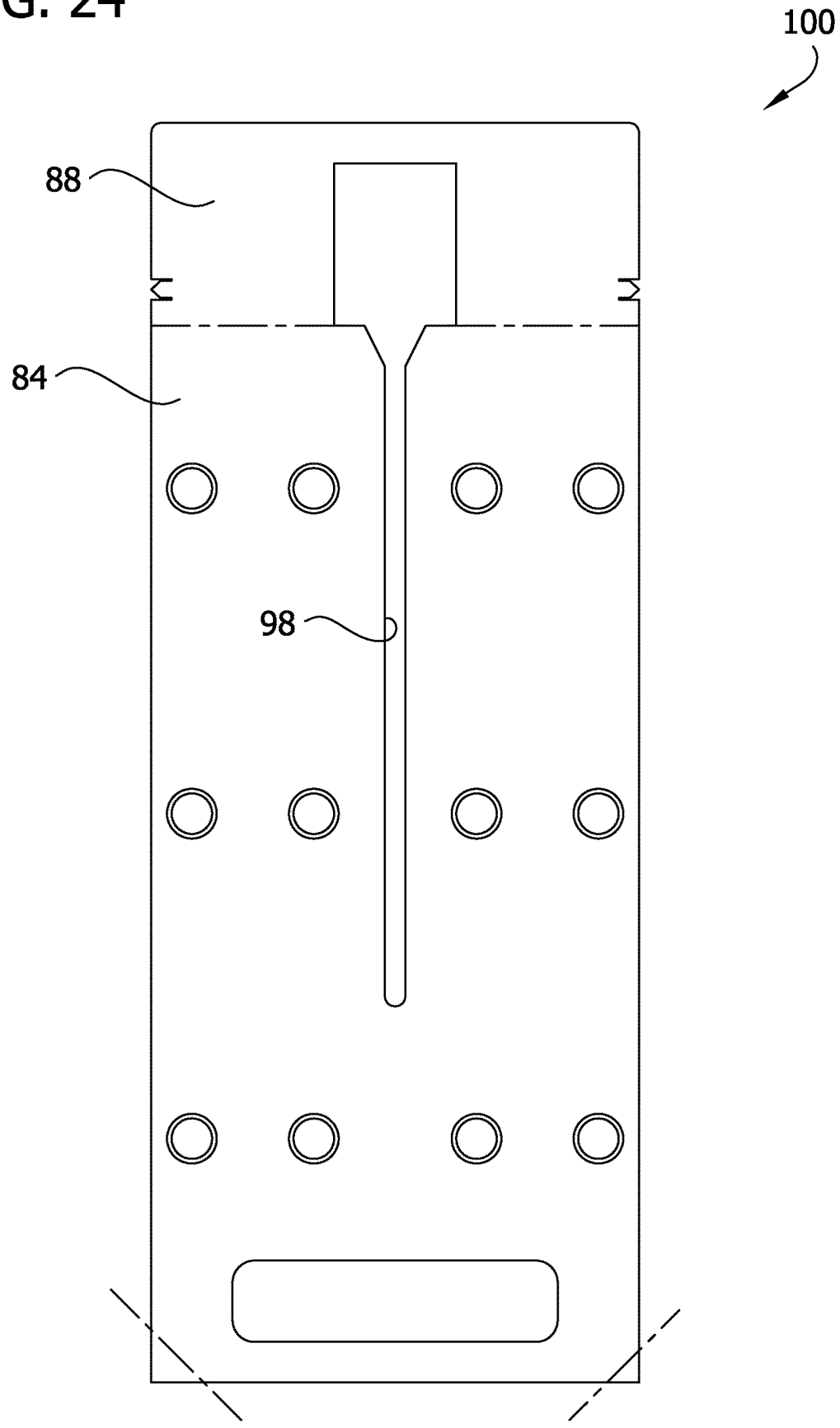


FIG. 25

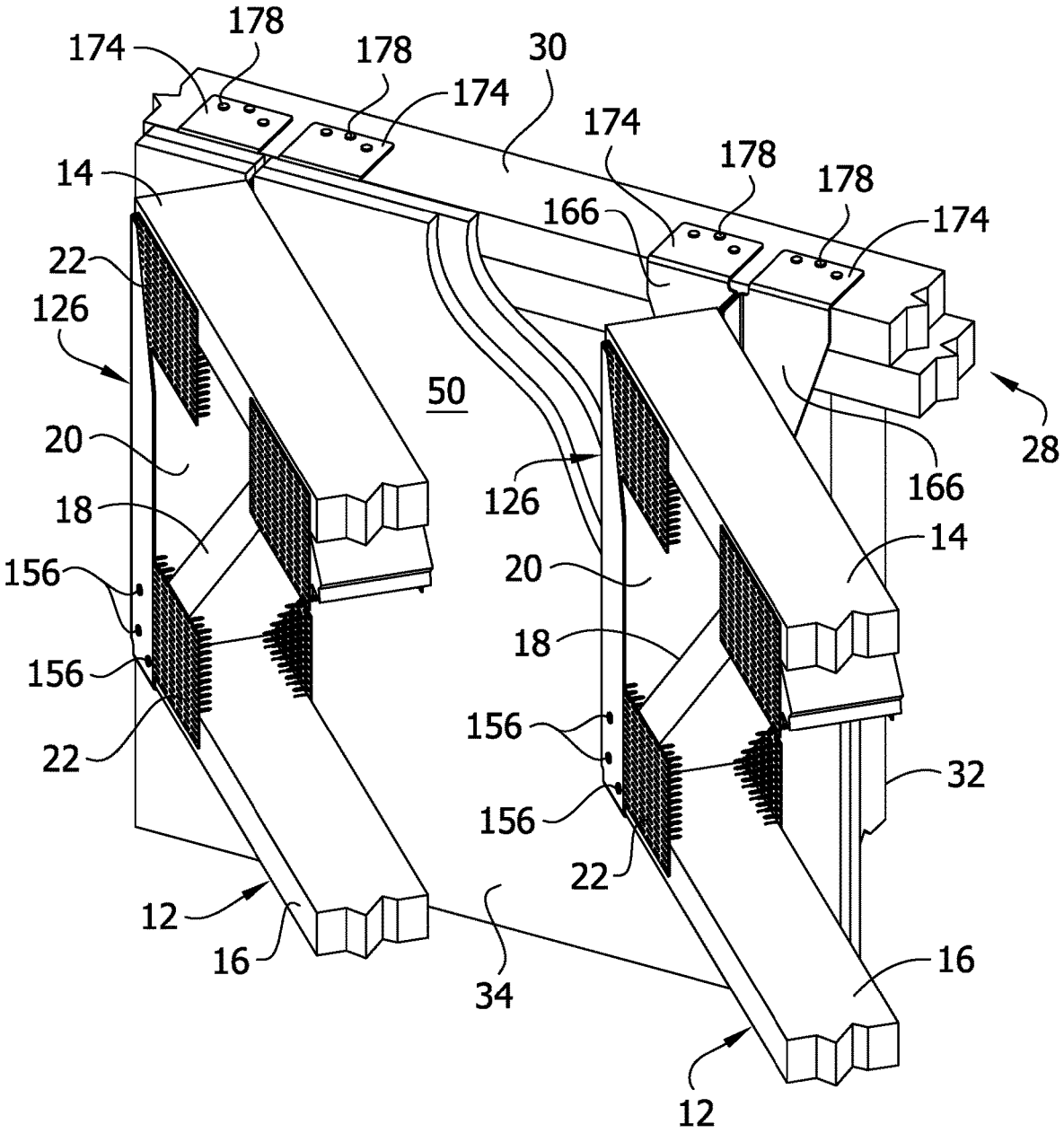

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FIG. 26

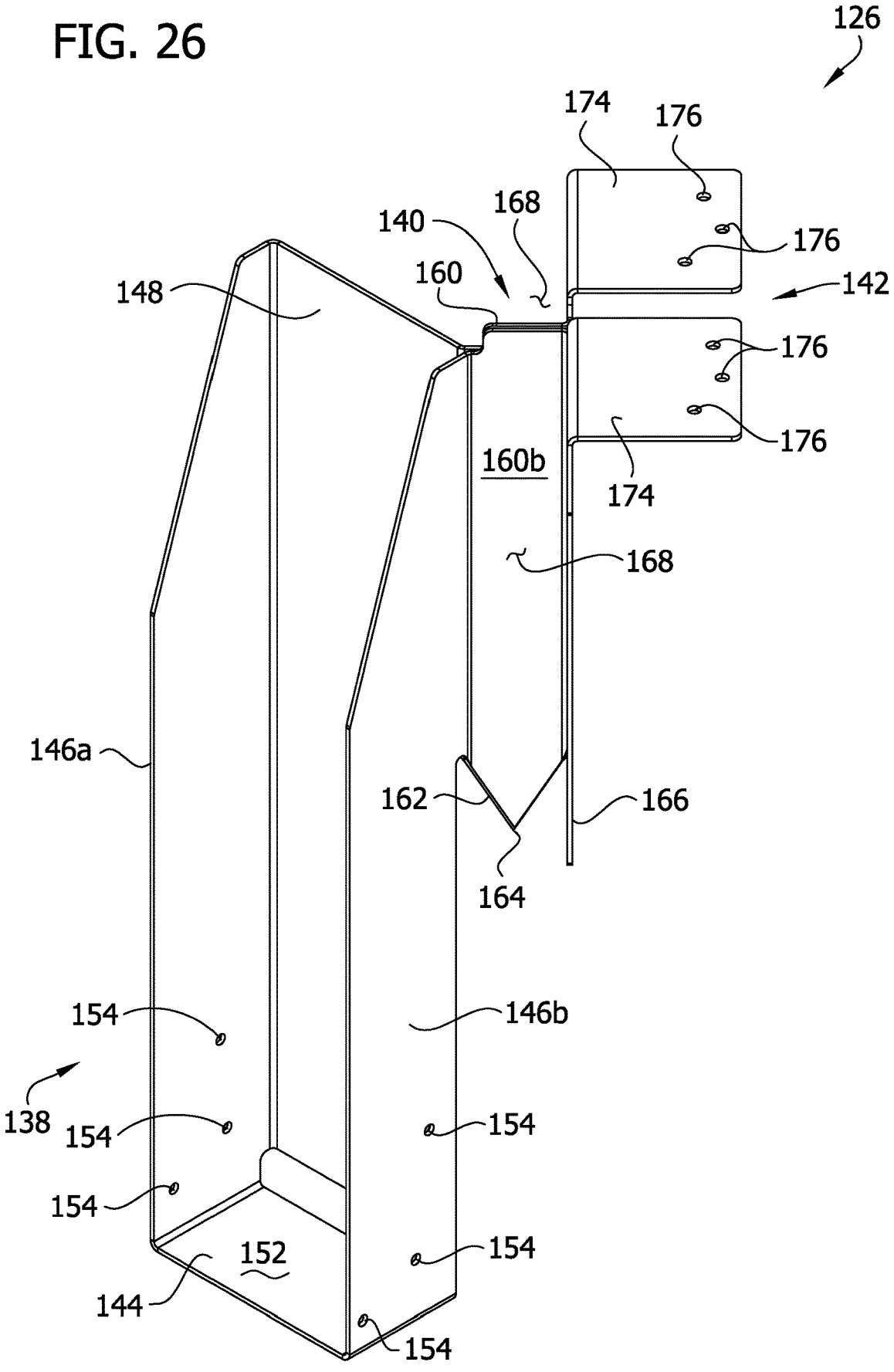

126
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FIG. 27

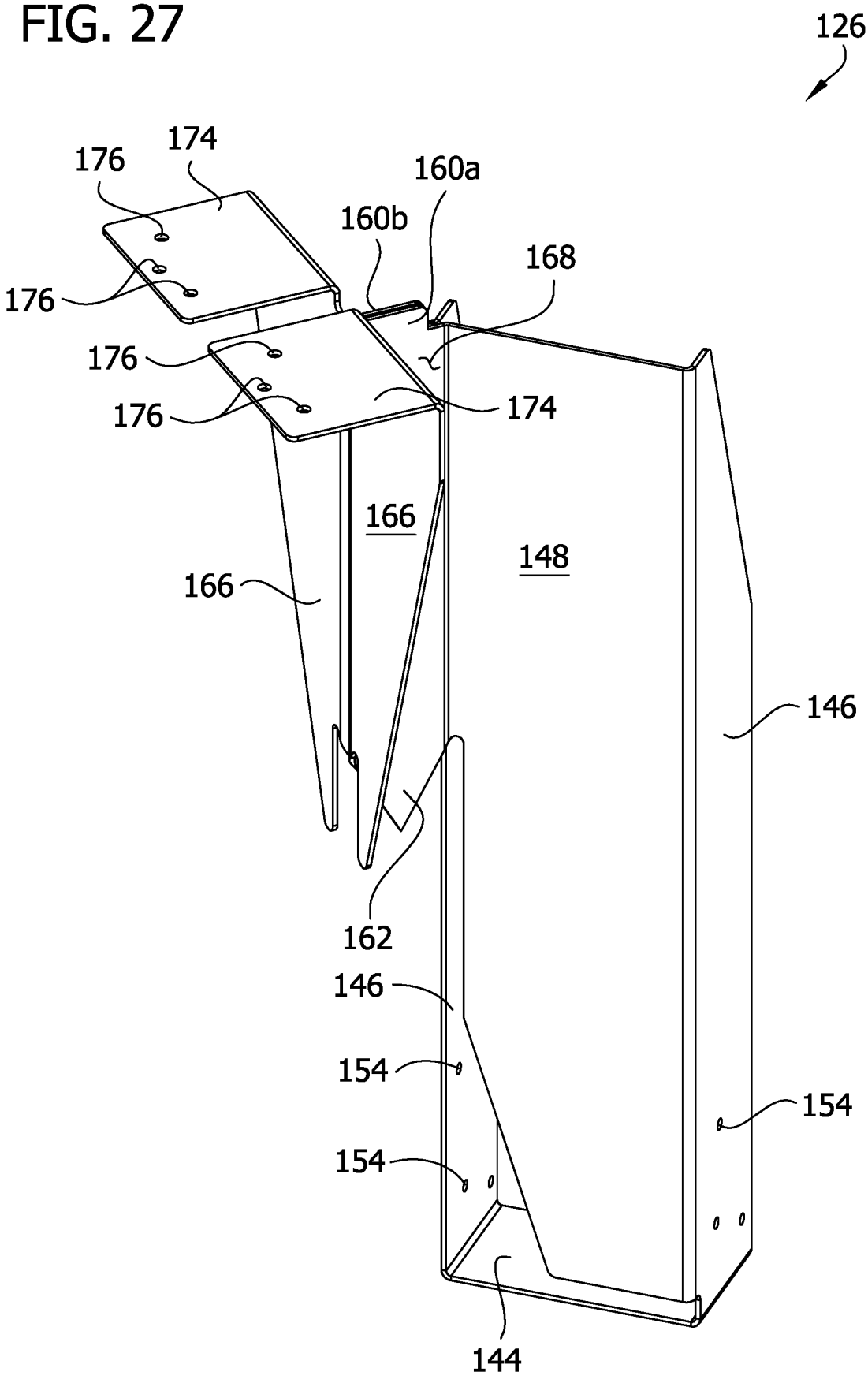

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FIG. 28

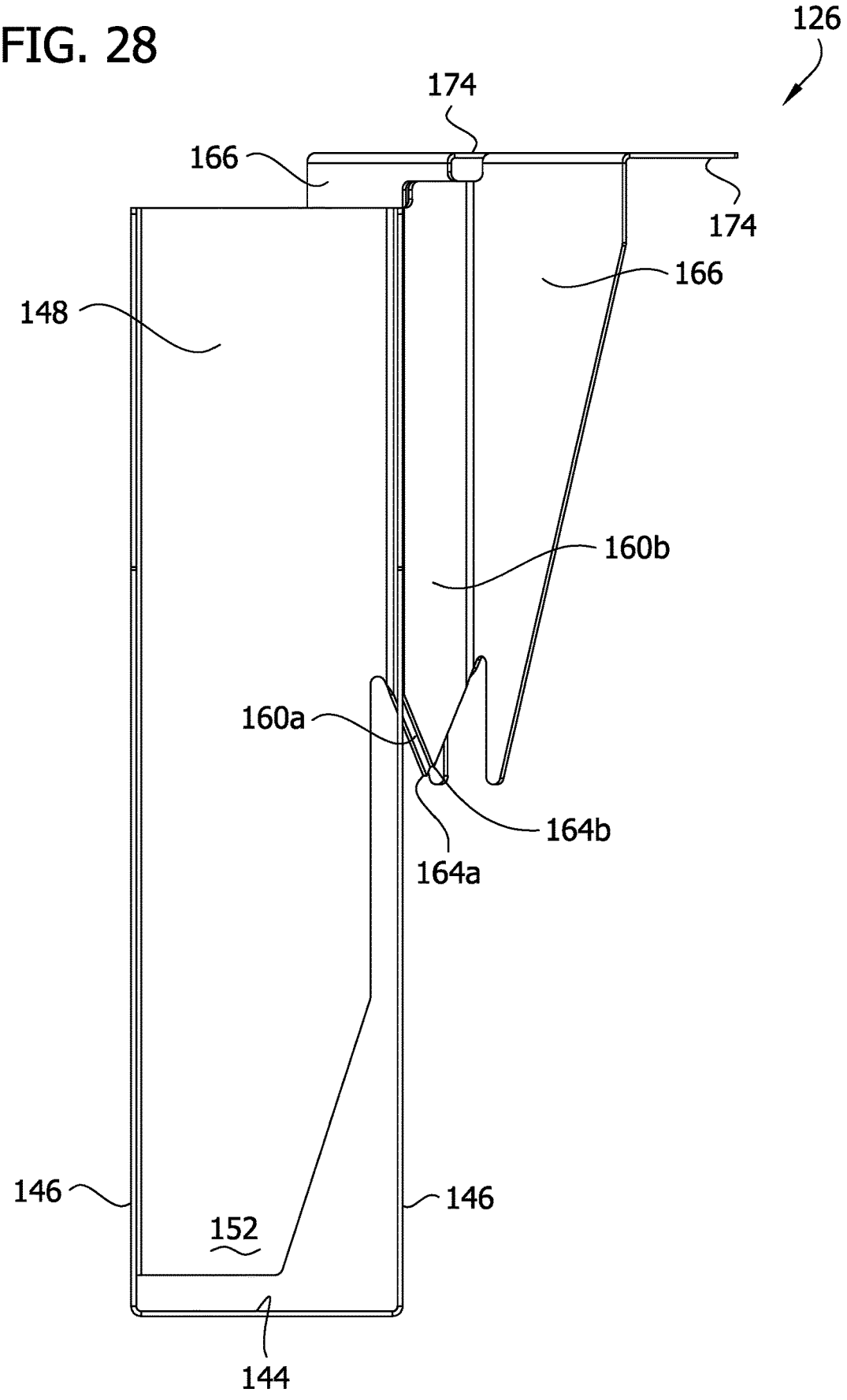


FIG. 29

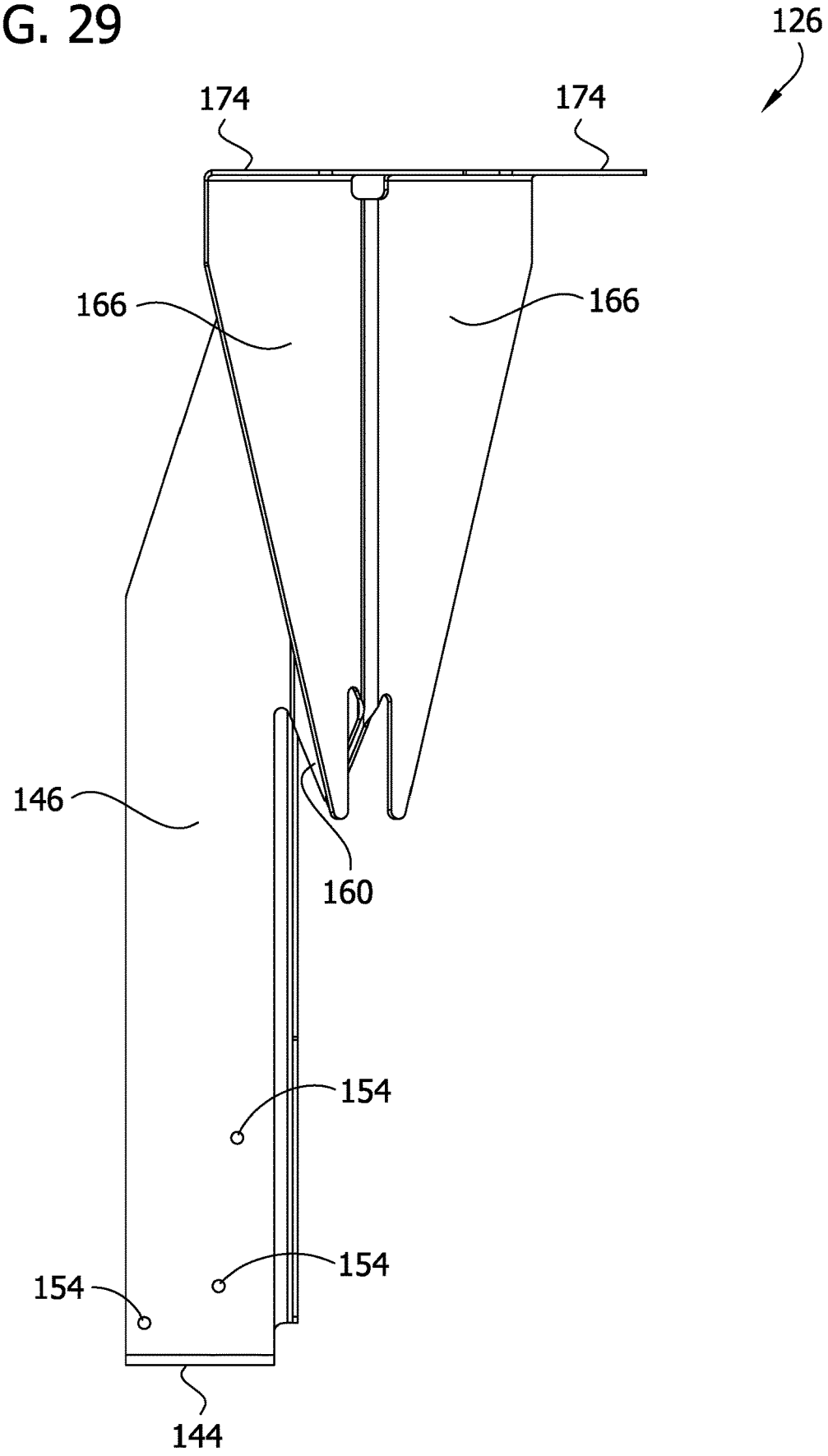


FIG. 30

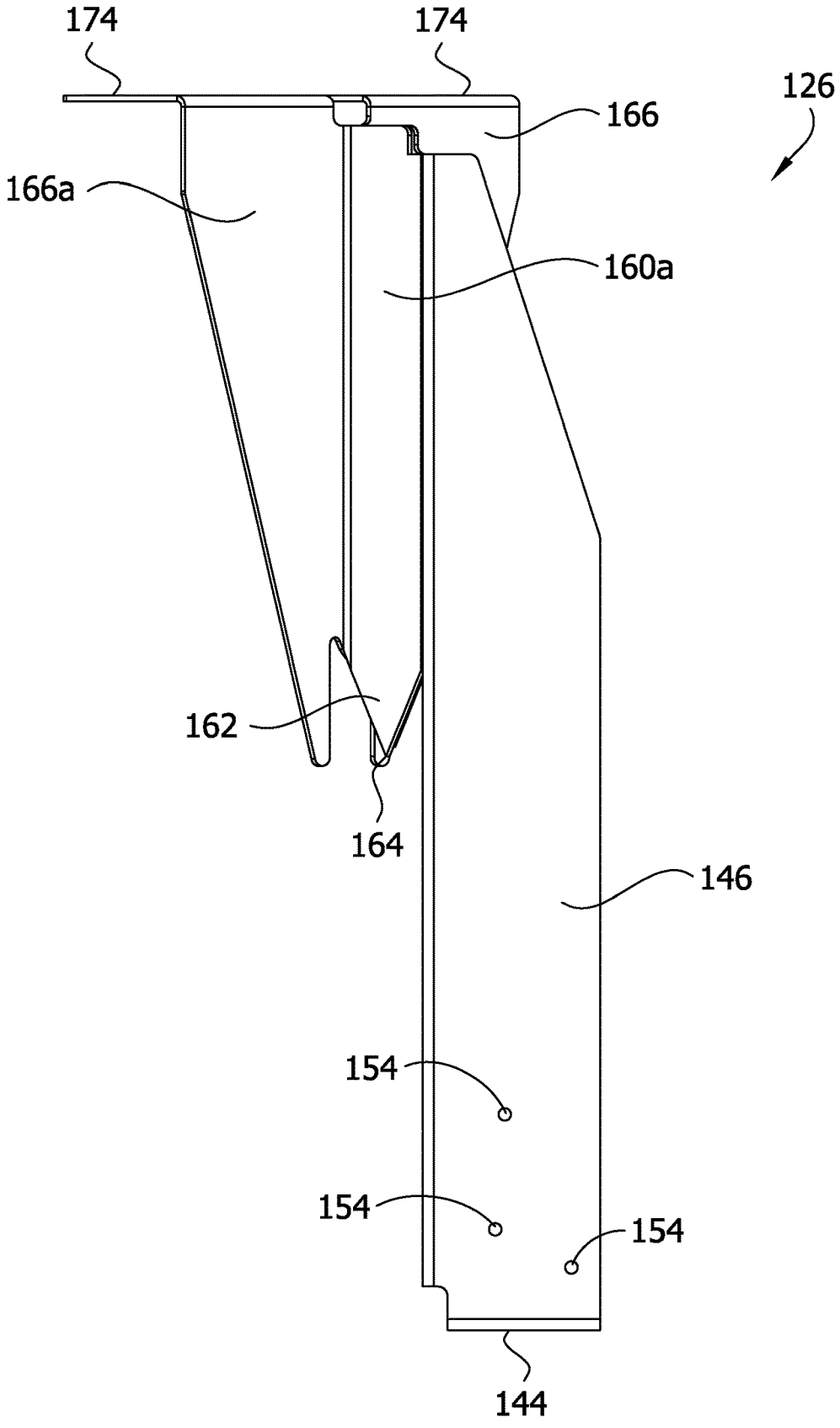
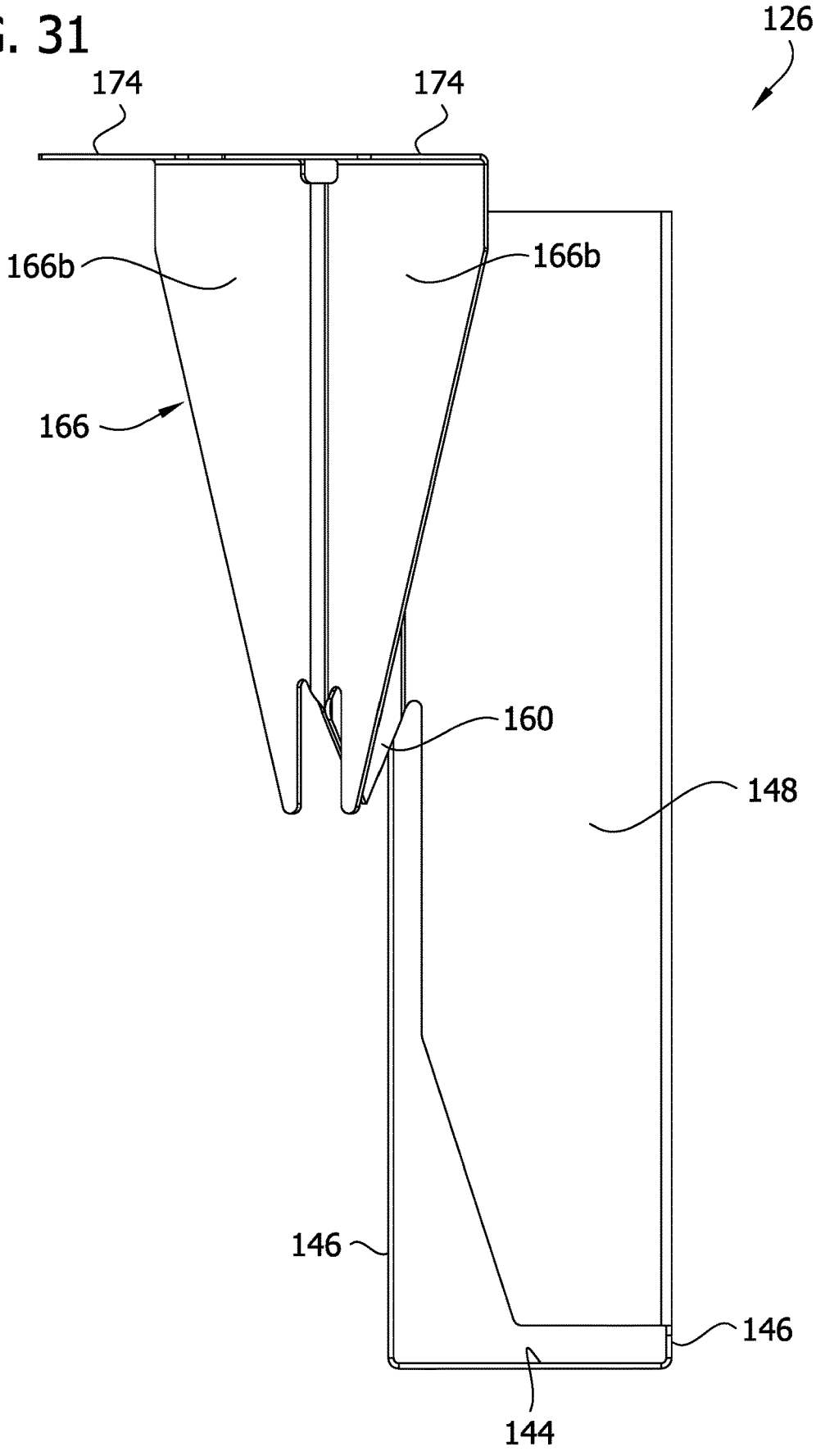


FIG. 31



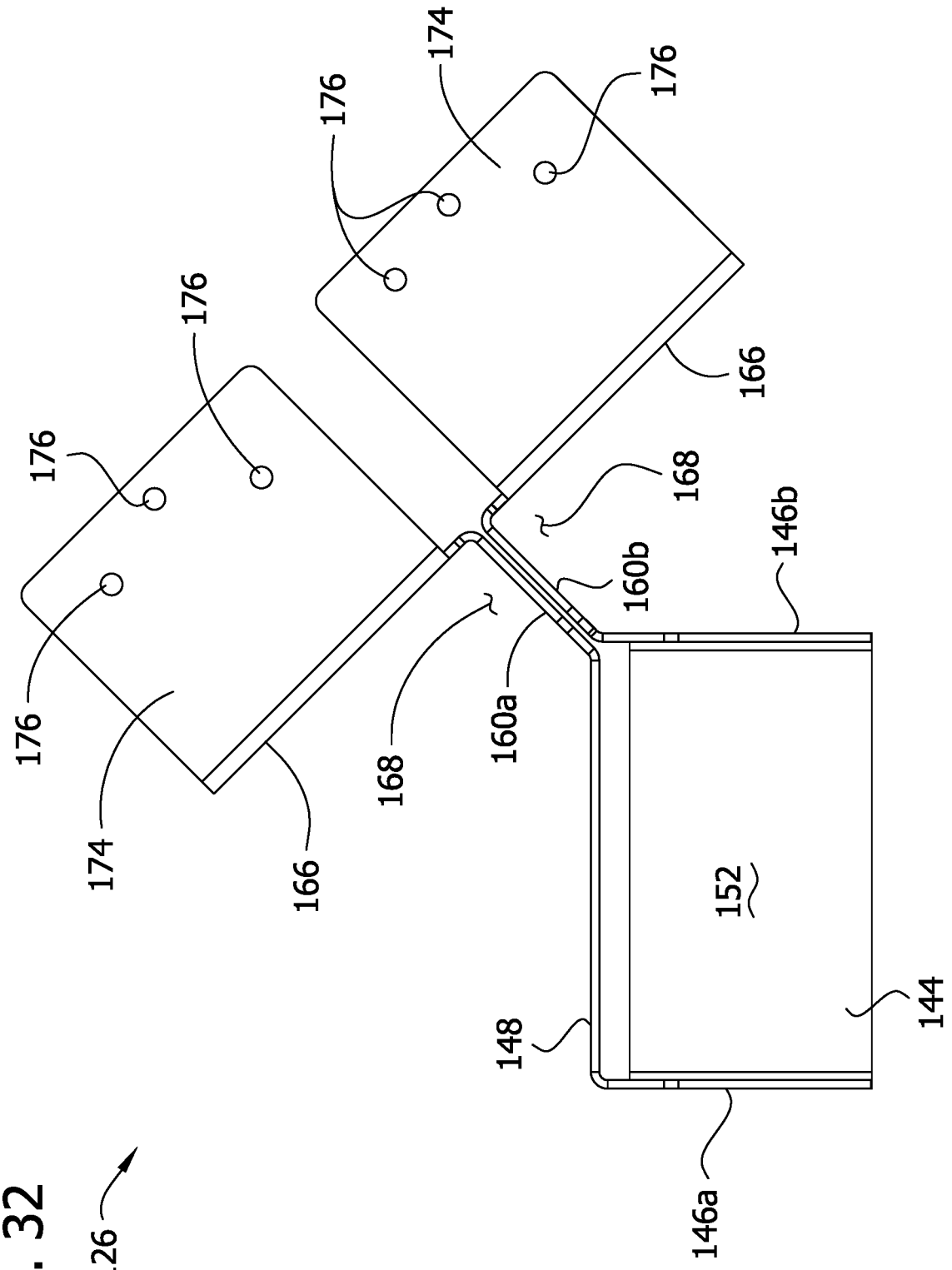


FIG. 32

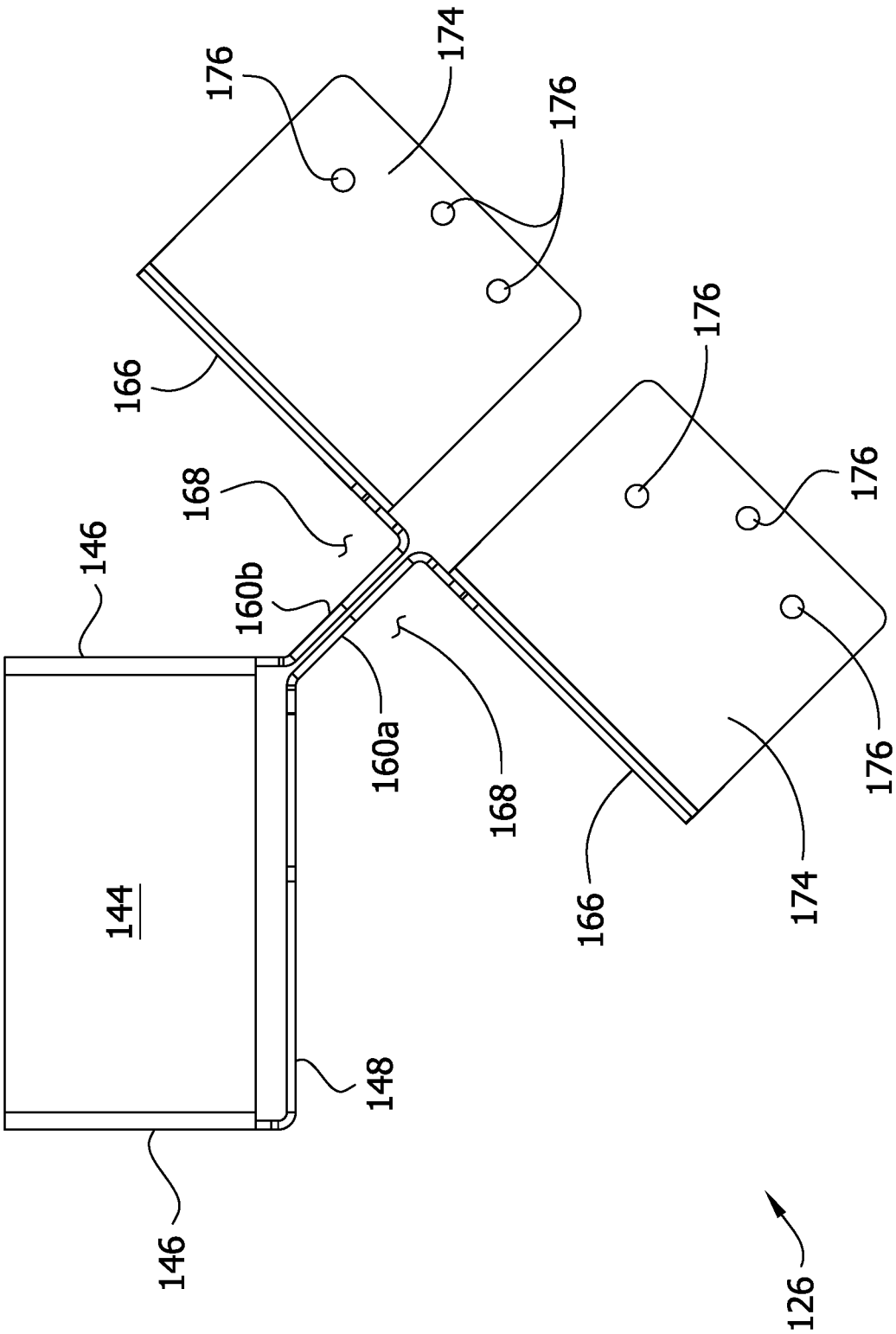

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FIG. 33

FIG. 34

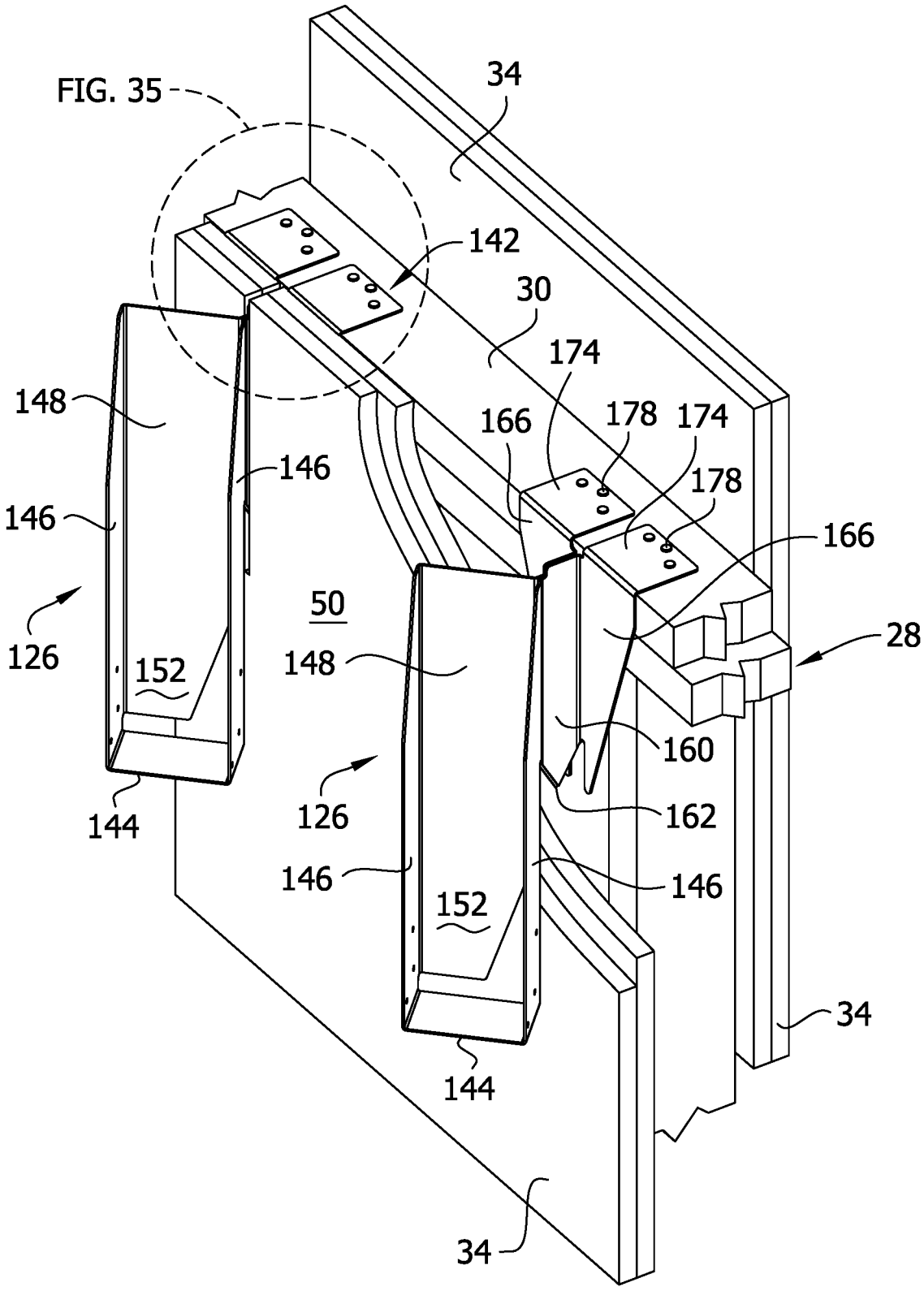
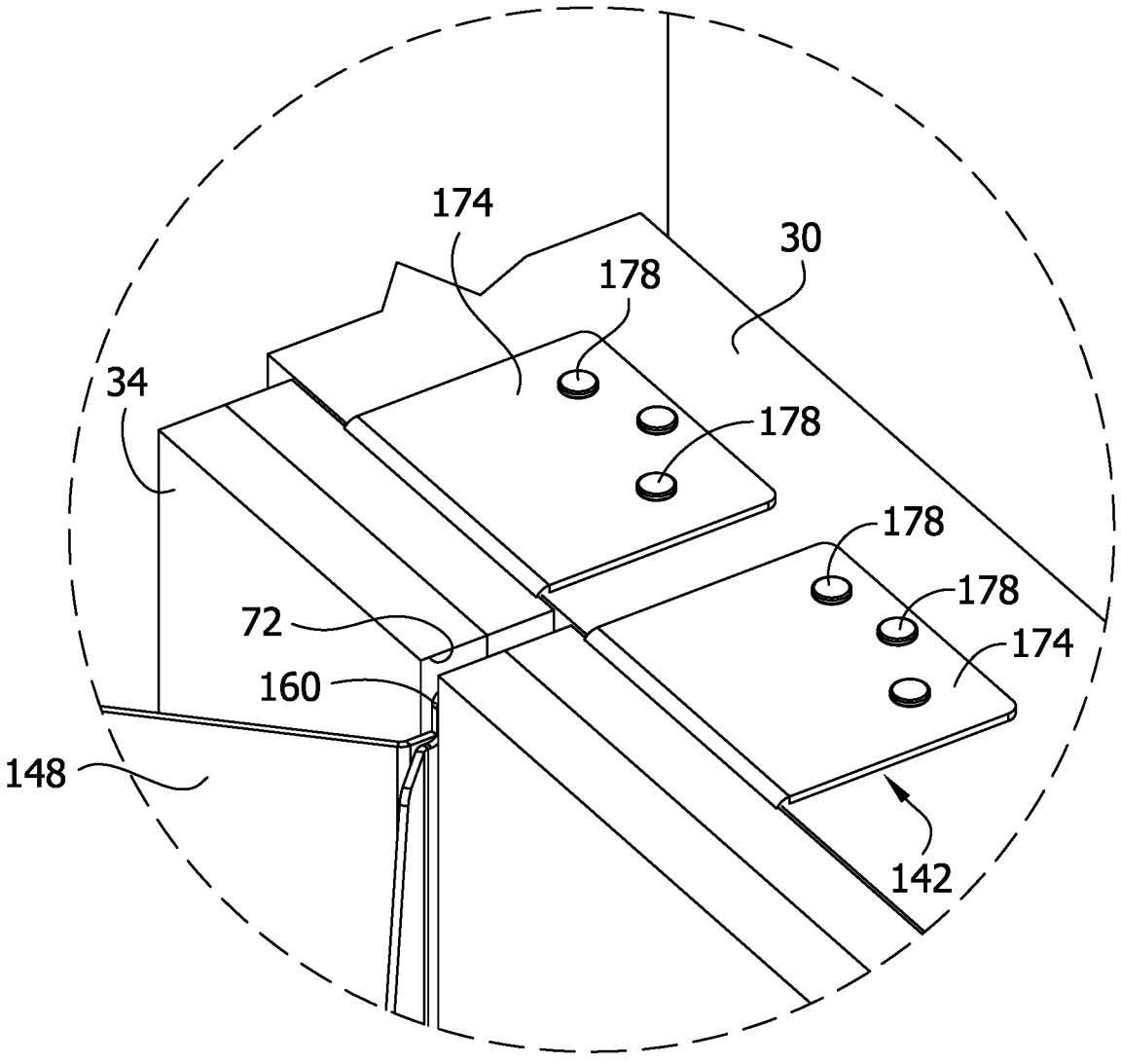

FIG. 35
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FIG. 35



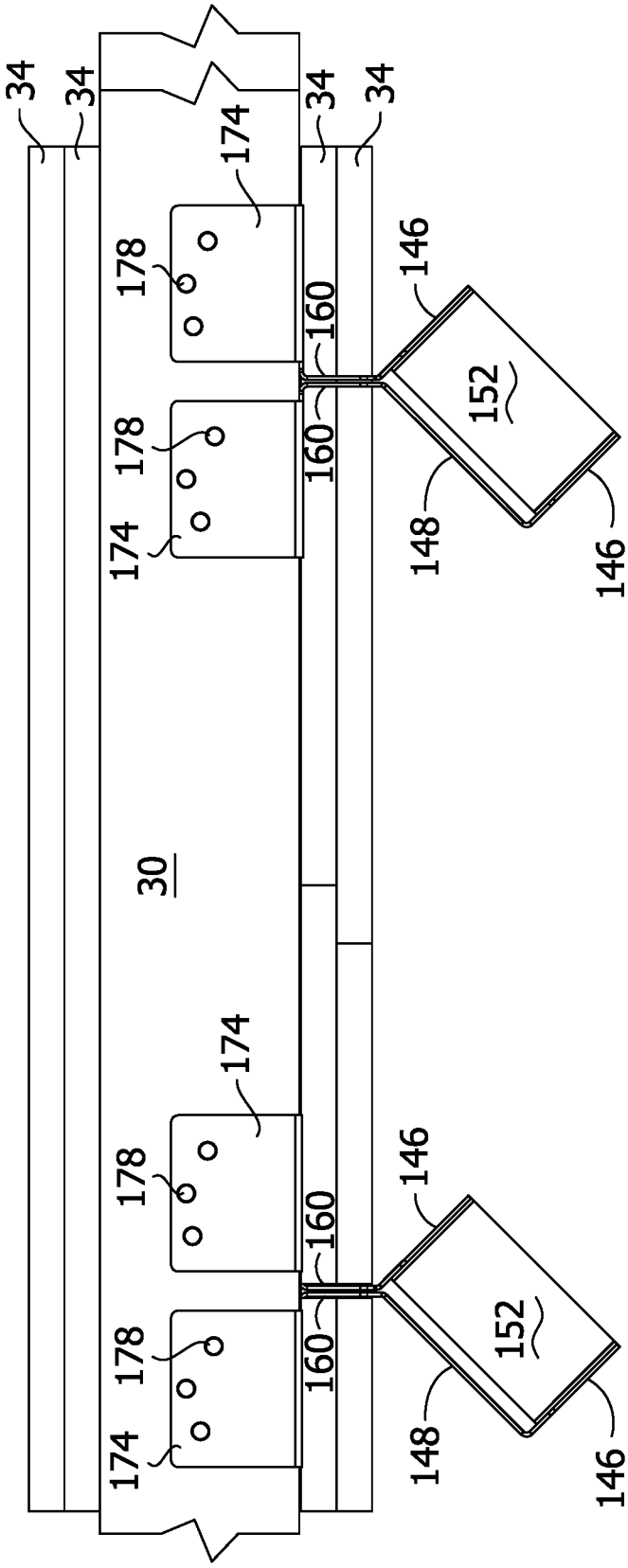

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FIG. 36

FIG. 37

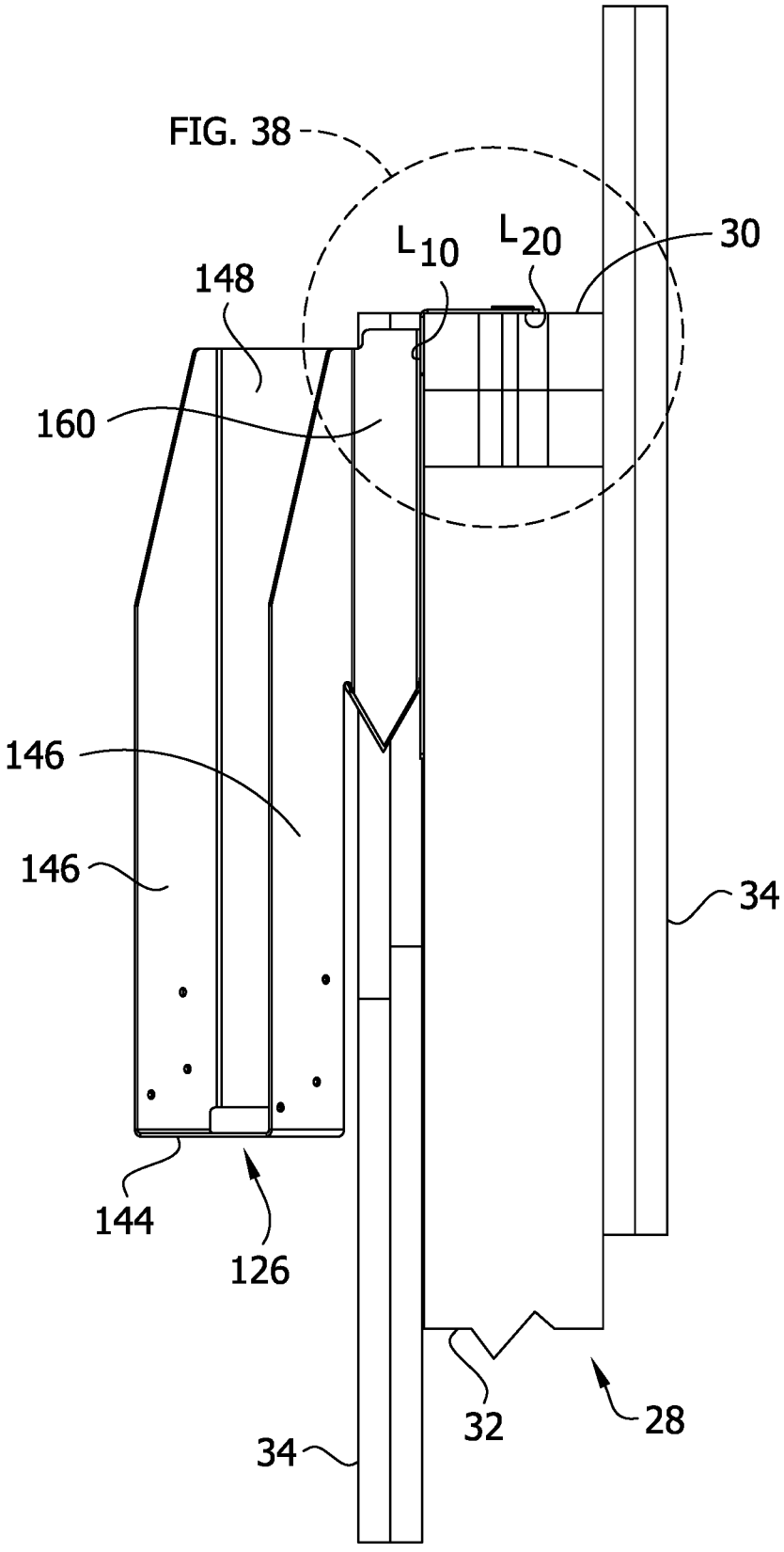
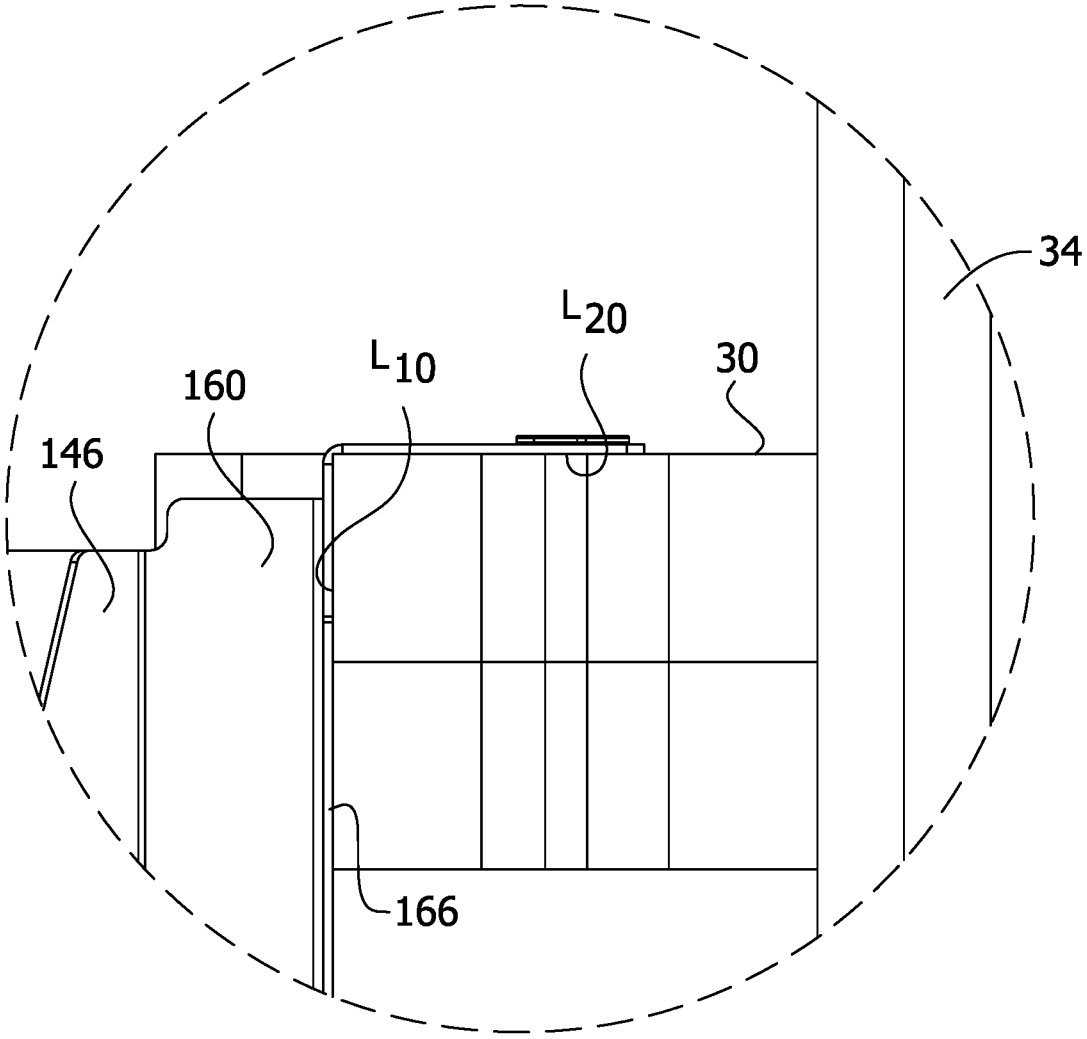


FIG. 38



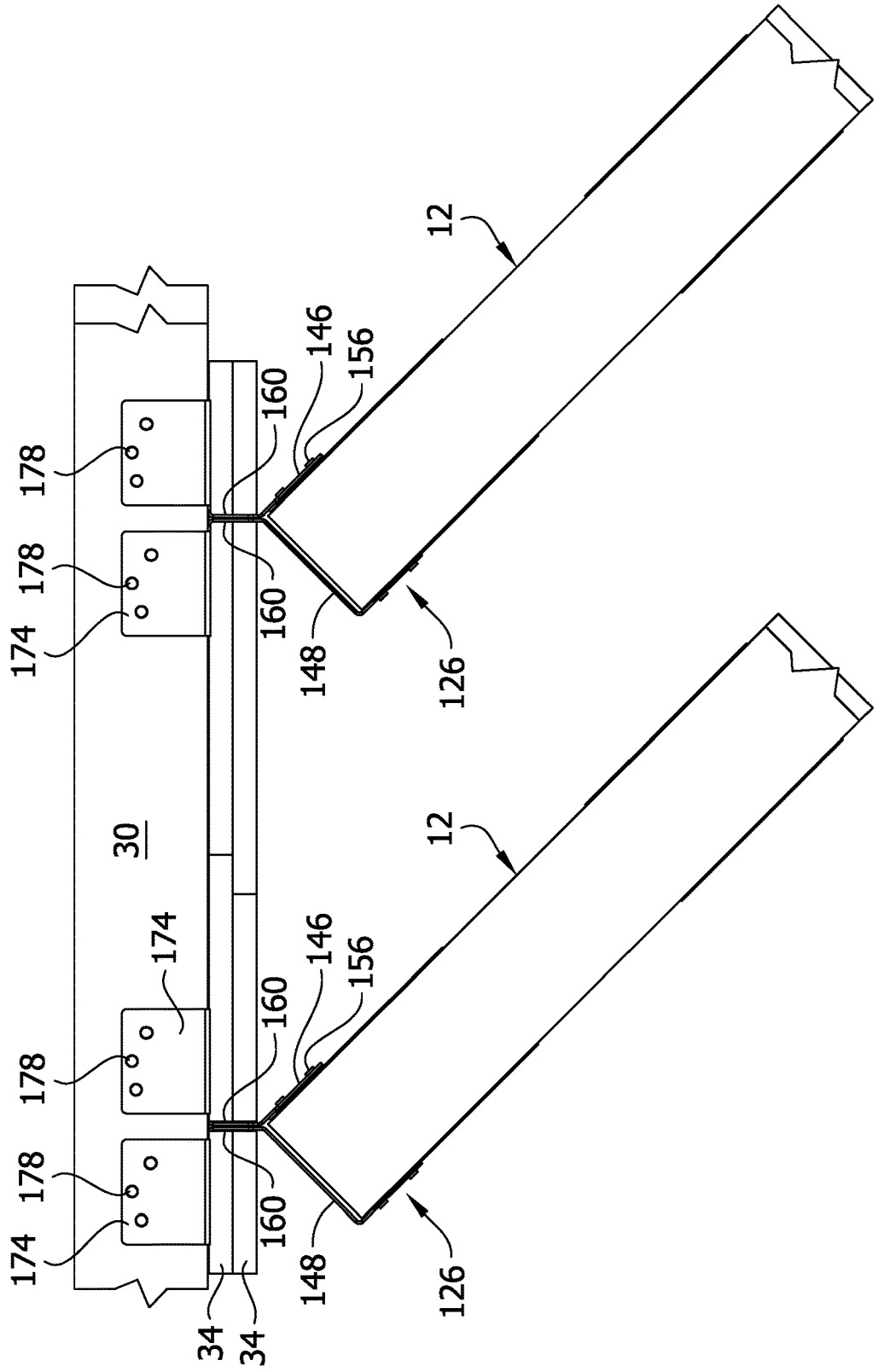
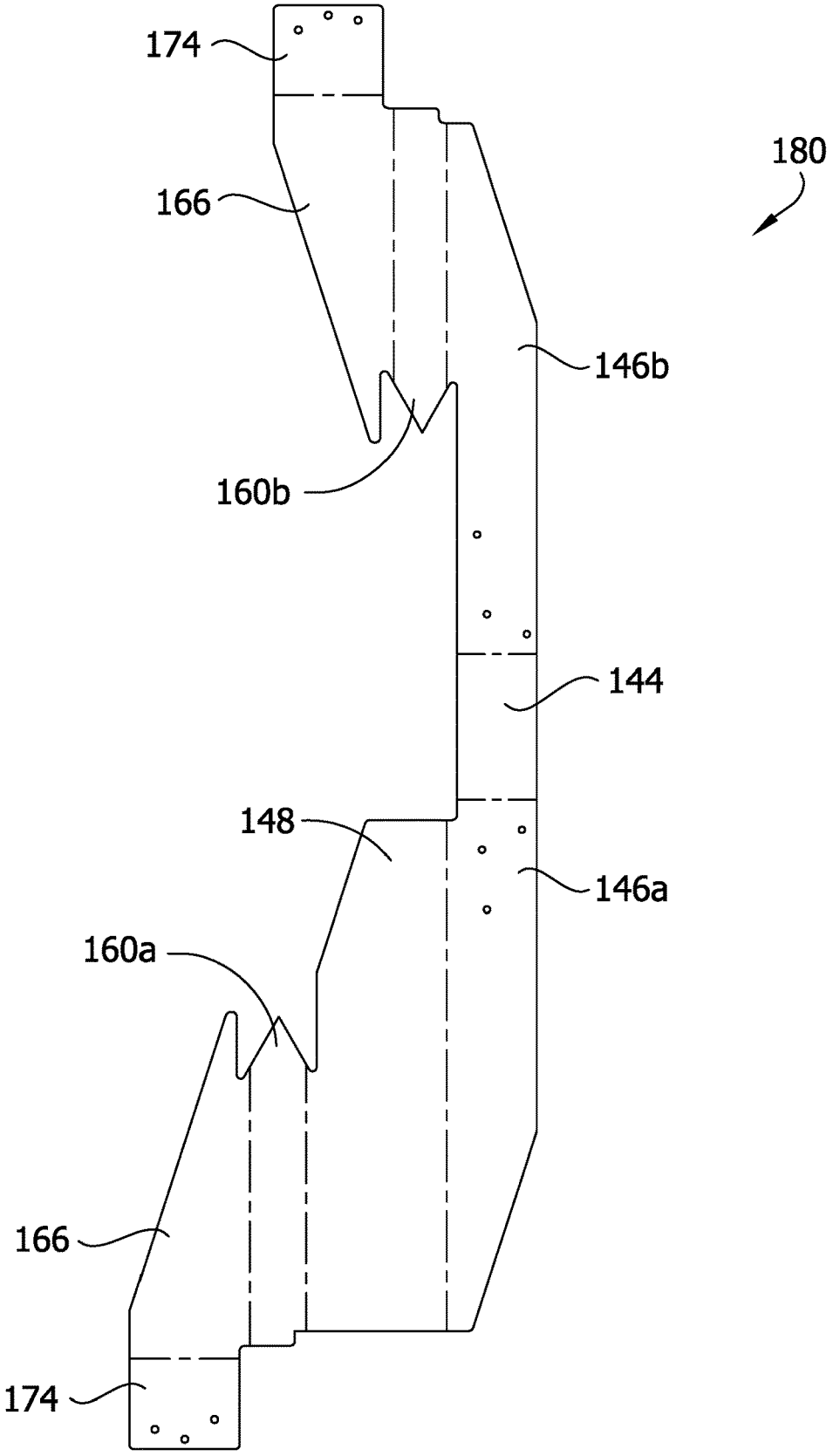

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FIG. 39

FIG. 40



HANGER FOR FIRE SEPARATION WALL

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation of U.S. application Ser. No. 16/225,517, filed Dec. 19, 2018, now U.S. Pat. No. 10,316,510, which is a continuation of U.S. application Ser. No. 15/675,409, filed Aug. 11, 2017, now U.S. Pat. No. 10,184,242, which is a continuation of U.S. application Ser. No. 14/555,049, filed Nov. 26, 2014, now U.S. Pat. No. 10,024,049, which claims priority to U.S. Provisional Application No. 61/922,531, filed Dec. 31, 2013, the entirety of which are incorporated herein by reference.

FIELD OF THE INVENTION

The present invention generally relates to connections for structures, and more specifically, a truss hanger for connecting a truss to a wall including fire retardant sheathing.

BACKGROUND

The use of fire separation walls in structures, such as in multifamily housing, is commonplace. Often, fire separation is required to be continuous along the walls between adjoining units to prevent fire from spreading between the adjoining units in a multifamily structure. For some types of construction, the building codes also require exterior walls to be fire rated. Typically, gypsum board is used as a fire retardant sheathing along these walls. Floor trusses or joists are attached to or hung from the walls including the gypsum board, but cannot be hung from the gypsum board itself. The trusses or joists must therefore be attached to the wall framing. A cutout for the entire cross section of the truss leaves a large discontinuity in the fire retardant sheathing. However, building codes require that the fire separation wall maintain a certain fire resistant rating. Thus, the integrity of the fire retardant sheathing should be maintained and interruptions of the sheathing kept to a minimum.

SUMMARY

In one aspect of the present invention, a hanger for connecting a structural component to a wall having sheathing mounted thereon includes a channel-shaped portion configured to receive the structural component. The channel shaped portion includes a bottom wall, side walls extending from opposite edges of the bottom wall and a back wall. The bottom wall, side walls and back wall are sized and arranged to receive an end of the structural component for supporting the end of the structural component. A connection portion includes a top flange extending away from the back wall of the channel-shaped portion in a direction opposite to the bottom wall of the channel-shaped portion. The top flange is configured for attachment to a top surface of a top plate of the wall. The connection portion further includes a back flange extending from an edge of the top flange in a direction toward the bottom wall of the channel-shaped portion. The back flange of the connection portion faces the back wall of the channel-shaped portion and the back flange and back wall define a space sized to receive the sheathing between the back flange and the back wall. An extension portion extends from the channel-shaped portion to the connection portion and interconnects the channel-shaped portion and the connection portion. The extension portion separates the back wall of the channel-shaped portion from the back flange of the connection portion to define the space sized to receive the sheathing.

In another aspect pf the present invention a hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon generally comprises a channel-shaped portion configured to receive the structural component. An extension portion extends from the channel-shaped portion and is configured to extend through the sheathing to engage the wall at a first location. The extension portion includes extension flanges extending from the channel-shaped portion forming a bend between each extension flange and the channel-shaped portion. Each of the extension flanges is configured to extend through the sheathing. A connection portion is fixed in position relative to the channel-shaped portion such that that channel-shaped portion does not rotate relative to the connection portion. The connection portion is configured for attachment to the wall at a second location spaced from the first location. The extension flanges define planar surfaces disposed in opposed face-to-face relation between the connection portion and the channel-shaped portion.

In another aspect of the present invention, a truss hanger for connecting a truss to a wall adapted to have fire resistant sheathing mounted thereon generally comprises a channel-shaped portion configured to receive the truss. The channel-shaped portion includes a base sized and shaped for receiving a truss chord of the truss thereon, side panels extending upward from the base, and a back panel. The back panel extends orthogonally from one of the side panels. An extension portion extends from the channel-shaped portion and is configured to extend through the fire resistant sheathing. The extension portion includes extension flanges. Each of the extension flanges extends away from the base of the channel-shaped portion. A connection portion includes a top flange extending away from the back panel of the channel-shaped portion in a direction opposite to the base of the channel-shaped portion. The top flange is configured for attachment to a top surface of a top plate of the wall. The connection portion further includes a back flange extending from an edge of the top flange in a direction toward the base of the channel-shaped portion.

A hanger for connecting a structural component to a wall having sheathing mounted thereon generally comprises a channel-shaped portion configured to receive the structural component. An extension portion is configured to be disposed at least partially in the sheathing. A connection portion is configured for attachment to the wall.

Other objects and features will be in part apparent and in part pointed out hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary perspective of adjacent floor trusses connected to a wall having fire retardant sheathing by truss hangers that extend through the sheathing;

FIG. **2** is a perspective of a truss hanger according to a first embodiment of the present invention;

FIG. **2**A is a rear perspective of the truss hanger;

FIG. **3** is a front elevation thereof;

FIG. **4** is a right side elevation thereof;

FIG. **5** is a left side elevation thereof;

FIG. **6** is a rear elevation thereof;

FIG. **7** is a top plan thereof;

FIG. **8** is a bottom plan thereof;

FIG. **9** is a perspective of a wall having fire retardant sheathing with a slot cut in the sheathing to receive the truss hanger;

FIG. **10** is the perspective of FIG. **9**, but showing two of the truss hangers mounted thereon;

FIG. **10**A is an enlarged fragmentary perspective of FIG. **10**;

FIG. **11** is a top plan of FIG. **10**, illustrating the truss hanger extending through the fire retardant sheathing;

FIG. **12** is a perspective similar to FIG. **10**, but showing a floor truss positioned for mounting in the truss hanger;

FIG. **13** is a side elevation of FIG. **12**;

FIG. **13**A is an enlarged fragmentary perspective of FIG. **13** with a portion of the fire retardant sheathing broken away;

FIG. **14** is the perspective of FIG. **10**, but showing floor trusses mounted in the truss hangers;

FIG. **14**A is an enlarged fragmentary perspective of FIG. **14**;

FIG. **15** is a top view of a stamped metal blank for forming a truss hanger according to the present invention;

FIG. **16** is a perspective of a slot template for use in cutting the slot in the sheathing to receive the truss hanger;

FIG. **17** is a rear perspective of the slot template;

FIG. **18** is a front elevation thereof;

FIG. **19** is a right side elevation thereof;

FIG. **20** is a left side elevation thereof;

FIG. **21** is a rear elevation thereof;

FIG. **22** is a top plan thereof;

FIG. **23** is a bottom plan thereof;

FIG. **24** is a front view of a stamped metal blank for forming the slot template;

FIG. **25** is a fragmentary perspective of adjacent floor trusses connected at an angle to a wall having fire retardant sheathing by truss hangers of a second embodiment that extend through the sheathing;

FIG. **26** is a perspective of one of the truss hangers of FIG. **25**;

FIG. **27** is a rear perspective thereof;

FIG. **28** is a front elevation thereof;

FIG. **29** is a right side elevation thereof;

FIG. **30** is a left side elevation thereof;

FIG. **31** is a rear elevation thereof;

FIG. **32** is a top plan thereof;

FIG. **33** is a bottom plan thereof;

FIG. **34** is a perspective of a wall and the two truss hangers mounted thereon with parts broken away;

FIG. **35** is an enlarged fragmentary perspective of FIG. **34**;

FIG. **36** is a top plan of FIG. **34**, illustrating the truss hangers extending through the fire retardant sheathing;

FIG. **37** is a side elevation of FIG. **34**;

FIG. **38** is an enlarged fragment of FIG. **37**;

FIG. **39** is a top plan similar to FIG. **36**, but showing a floor truss mounted in each truss hanger; and

FIG. **40** is a front view of a stamped metal blank for forming a truss hanger according to the present invention.

Corresponding reference characters indicate corresponding parts throughout the drawings.

DETAILED DESCRIPTION

Referring to FIG. **1**, a first embodiment of a connection system for a fire separation wall is shown generally at **10**. Floor trusses generally indicated at **12** each include truss members (broadly, "wooden structural members") including a top chord **14**, a bottom chord **16**, and web members **18** joining the top and bottom chords. Each floor truss also includes end members **20** at each end joining the top and bottom chords **14**, **16** (only one end of each truss is shown). The truss members can be joined by nail plates **22** or by any other suitable fastening structure. The number and orientations of the web members **18** and chords **14**, **16** may vary from the illustrated embodiment without departing from the scope of the invention, as a truss hanger **26** according to the present invention is readily applicable to other truss configurations (e.g. a roof truss). Moreover, the hanger **26** may be used to connect structural components other than trusses to a wall or other part of a structure. The hanger can be used to support other wood framing members such as solid sawn or structural composite lumber.

As seen in FIG. **1**, a wall **28** includes a top member or plate **30** and support members or studs **32** (only one stud may be seen in FIG. **1**). As illustrated, the top plate **30** is formed by two 2×4's in stacked relation. Fire retardant sheathing **34** is mounted on both sides of the wall **28**, as illustrated. In one embodiment, the fire retardant sheathing is gypsum board, such as two layers of ⅝" gypsum board mounted on each side of the wall **28** as illustrated, although other configurations of fire retardant sheathing are within the scope of the present invention. Other wall configurations, including different wall constructions and materials, are within the scope of the present invention. For example, the truss hangers **26** can be used with any wall assembly or fire-rated wall assembly, such as a 2-hour fire-resistive wall assembly. The floor trusses **12** are mounted on the wall **28** adjacent the fire retardant sheathing **34** by the truss hangers **26**. The truss hangers **26** extend through a narrow slot in the fire retardant sheathing **34** to maintain the integrity and fire retardant characteristics of the fire separation wall.

Referring to FIGS. **2-8**, the truss hanger **26** includes a channel-shaped portion **38**, an extension portion **40**, and a connection portion **42**. The channel-shaped portion **38** is configured to receive the floor truss **12**. The channel-shaped portion **38** includes a seat or base **44** and a pair of side panels **46** extending upward from the base. When installed, the base **44** is generally horizontal, and the side panels **46** extend generally vertical from the base. A back panel **48** extends from each of the side panels **46**. Each back panel **48** is generally perpendicular to both the side panels **46** and the base **44**. When installed, each back panel **48** extends generally parallel to an interior face **50** of the fire retardant sheathing **34**. The base **44**, side panels **46**, and back panels **48** form a channel **52** configured to receive the floor truss **12**.

As seen in FIGS. **1** and **12-14**A, the floor truss **12** is received in the channel **52** to attach the floor truss to the wall **28**. The bottom chord **16** of the floor truss **12** engages and rests upon (i.e., is supported by) the base **44**. The end member **20** of the floor truss **12** is positioned against the back panels **48** between the side panels **46**. The truss hanger **26** includes fastening structure for attaching the floor truss **12** to the truss hanger. Fastening structure can be of any type known in the art for attaching a connector to a wooden structural member, such as nailing teeth (not shown) struck from the material of the hanger. In the illustrated embodiment, the fastening structure comprises a hole to allow for insertion of a fastening member. More specifically, in one embodiment the fastening structure comprises nail holes **54** in the side panels **46** of the truss hanger **26**, and the fastening member comprises a nail **56** (see FIG. **12**). In the illustrated embodiment, nail holes **54** are positioned on each of the side panels **46** so that nails **56** can be inserted into both the bottom chord **16** and the end member **20** of the floor truss **12** to attach the hanger **26** to the floor truss **12**.

Referring again to FIGS. **2-8**, the extension portion **40** includes two extension flanges **60** configured to extend through the fire retardant sheathing **34**. Each flange **60** extends from one of the back panels **48**. The flanges **60** are positioned in opposed, face-to-face relation, and preferably engage each other along a juncture. Each flange **60** extends generally perpendicular from the corresponding back panel **48** and generally parallel to the side panels **46**. At a bottom edge, each flange **60** includes a driving point **62**. Each of the driving points **62** is generally triangular and includes a pointed tip **64**. As seen in FIGS. **3** and **6**, the tips **64** of the driving points **62** are vertically offset from each other. As illustrated, the tip **64***a* of one flange **60***a* extends vertically below the tip **64***b* of the other flange **60***b*. In one embodiment, the tips **64** are vertically offset from each other about ⅛", although other configurations are within the scope of the present invention, such as tips that are aligned or tips that are offset a smaller or larger amount.

A back flange **66** extends from each of the extension flanges **60**. Each back flange **66** extends generally perpendicular from the extension flange **60** and is oriented generally parallel to the back panels **48**. Referring to FIG. **13**A, the back flanges **66** engage the wall **28** at a first location L_1, which in the illustrated embodiment is a vertical face of the top plate **30** of the wall. The back panels **48**, extension flanges **60**, and back flanges **66** form a pair of sheathing channels **68**. Each sheathing channel **68** is configured to receive a portion of the fire retardant sheathing **34** to secure the sheathing between the hanger **26** and the wall **28**. As seen in FIG. **7**, the sheathing channels **68** extend generally perpendicular to the truss-receiving channel **52**.

As seen in FIGS. **10**A and **11**, the extension flanges **60** extend through a slot **72** in the fire retardant sheathing **34**. Preferably, the slot has an area less than or equal to 6 square inches, and the gap between the extension flanges **60** and the edge of the slot **72** is less than or equal to ⅛". The driving points **62** extend down into the sheathing **34** to further secure the sheathing between the hanger **26** and the wall **28**. A portion of the fire retardant sheathing **34** extends into each sheathing channel **68** and is secured between the back panels **48** and the back flanges **66**.

In one embodiment, the slot **72** in the fire retardant sheathing **34** can be made using a slot template **82** (FIGS. **16-24**). The slot template **82** includes a vertical panel **84** having a rear face **86** configured to engage the interior face **50** of the fire retardant sheathing **34** and a horizontal panel **88** having a bottom face **90** configured to engage a top face of the sheathing. The horizontal panel **88** extends generally perpendicular from the vertical panel **84**. The slot template **82** is configured to be quickly fixed in position on the sheathing **34** for use in cutting the slot **72** to receive the truss hanger **26**. Portions of the slot template **82** are configured to be pressed into the sheathing **34** to locate the template on the sheathing and retain the template in position for cutting the slot **72**. In the illustrated embodiment, the horizontal panel includes prongs **92** that are bent downward for insertion into the top face of the sheathing **34**. Bottom corners **94** of the vertical panel **84** are bent rearward for insertion into the interior face **50** of the sheathing **34**. The prongs **92** and the corners **94** are inserted into the sheathing **34** to retain the template **82** in position for cutting the slot **72**. In addition, the vertical panel **84** optionally includes dimples **96** extending toward the rear face **86** of the vertical panel **84**. The dimples **96** ensure the vertical panel **84** remains slightly spaced from the interior face **50** of the sheathing **34** so the template **82** can be easily removed from the sheathing after the slot **72** is cut.

The template **82** includes a guide slot **98** to guide a cutting tool in cutting the slot **72** in the sheathing **34**. The guide slot **98** extends from a top edge of the vertical panel **84** to a location spaced from a bottom edge of the vertical panel. As illustrated, the guide slot **98** includes a wide, rectangular portion **98***a* in the horizontal panel **88** to ease insertion of a cutting tool into the guide slot. A converging portion **98***b* of the slot **98** in the vertical panel **84** transitions from the wide portion **98***a* to a narrow lower portion **98***c* of the slot. This facilitates entry of the cutting tool into the narrow portion **98***c*. The narrow portion **98***c* of the guide slot **98** is dimensioned to facilitate cutting the slot **72** in the sheathing **34** to a size configured to receive the extension flanges **60** of the truss hanger **26**.

As seen in FIG. **24**, the template **82** described above can be formed as one piece from a metal blank **100** that is stamped from a sheet metal roll and bent into shape. In one embodiment, the template **82** is stamped from 16 gauge steel, although other thicknesses (e.g., 12-18 gauge) and other suitable materials are within the scope of the present invention.

In use, the template **82** is placed on the sheathing **34** in a selected location for a slot **72**. The template can be used to cut the slot **72** in the sheathing **34** either before or after the sheathing is mounted on the wall **28**. The prongs **92** and corners **94** are inserted into the sheathing **34** by tapping with a hand or striking with a hammer or other blunt instrument. Once the template **82** is secured in position on the sheathing **34**, a cutting tool (e.g., a drywall cutout tool) is inserted into the guide slot **98** to cut a slot **72** in the sheathing at the location of the guide slot. In one embodiment, a drywall cutout tool with a ⅛" or ¼" spiral bit is used to cut the slot **72**, although other cutting tools are within the scope of the present invention. After the slot **72** is cut in the sheathing **34**, the template **82** is removed from the sheathing. The sheathing **34** is then configured to receive the truss hanger **26**.

Referring again to FIGS. **2-8**, the connection portion of the hanger includes a pair of connector tabs **74** extending from the back flanges **66**. Each connector tab **74** extends generally perpendicular from one of the back flanges **66**. The connector tabs **74** are generally horizontal when the hanger **26** is installed. The connector tabs **74** are configured to engage an upper surface of the top plate **30** of the wall **28** at a second location L**2** spaced from the first location L_1. The connector tabs **74** can be used to attach the truss hanger **26** to the wall, thereby hanging the floor trusses **12** from the wall. As seen in FIG. **1**, the connector tabs **74** extend over a portion of the top plate **30** of the wall **28**. Each connector tab **74** includes fastening structure, such as nail holes **76**, for insertion of a fastening member, such as nails **78** (see FIGS. **10** and **10**A), to attach the hanger **26** to the wall **28**. In the illustrated embodiment, each connector tab **74** includes three nail holes **76**. Other configurations are within the scope of the present invention, such as a different number of nail holes, or alternate fastening structure such as nailing teeth or other appropriate structure for fastening the hanger to the wall.

The base **44** and back flanges **66** of the truss hanger **26** cooperate to stabilize the truss hanger **26** and protect the fire retardant sheathing **34** under the loads transferred from the truss **12** to the wall **28** by way of the hanger. The channel **52** that receives an end portion of the truss **12** is spaced to the interior of the wall **28** and more particularly to the interior of the second location L**2** where the connector tabs **74** are attached to an upper surface of the top plate **30**. The vertically downward load of the truss **12** applied to the base **44** of the truss hanger **26** urges the truss hanger **26** to pivot

so that the base would move toward the wall **28**, which could damage the fire retardant sheathing **34** and pry out the nails **78** connecting the connector tabs **74** to the upper surface of the top plate **30**. However, this motion is resisted by the engagement of the back flanges **66** with the interior vertical face of the top plate **30** at the first location L_1. Thus, there is a force couple between the base **44** of the hanger **26** carrying the vertical load of the truss **12** and the back panels **48** of the hanger (via engagement of the back flanges **66** with the top plate **30**) engaging the end face of the truss. Accordingly, the truss hanger **26** and truss **12** are stable with minimal disruption of the fire retardant sheathing **34**, even though the truss is held at a distance from the wall **28** by the truss hanger.

As seen in FIG. **15**, a truss hanger **26** as described above can be formed as one piece from a metal blank **80** that is stamped from a sheet metal roll and bent into shape. In one embodiment, the truss hanger **26** is stamped from 12-14 gauge steel, although other suitable materials are within the scope of the present invention. The configuration of the truss hanger **26** of the present invention allows a lighter gauge metal to be used.

In use, the truss hanger **26** is positioned in the slot **72** of the fire retardant sheathing **34** mounted on the wall **28**. As seen in FIGS. **9-14**A, one method of using the truss hanger **26** includes cutting the slot **72** in the fire retardant sheathing **34** (either before or after the sheathing is mounted on the wall). In one embodiment, the slot **72** can be cut using the slot template **82** (either before or after the sheathing **34** is mounted to the wall **28**). The slot can be any suitable length, and in one embodiment is about 10 inches long. The truss hanger **26** is then positioned against the fire retardant sheathing **34** so that the extension flanges **60** extend through the slot **72**. In one embodiment, the hanger **26** is slid downward into place so that the extension flanges **60** extend through the slot **72**, the back flanges **66** are positioned adjacent the wall **28**, and the fire retardant sheathing **34** is positioned in the sheathing channels **68** between the back flanges and the back panels **48**. The hanger connector tabs **74** are fastened to the top plate **30** of the wall **28** by any suitable means, such as by inserting nail **78** through the nail holes **76**. Then, a truss member, e.g. truss bottom chord **16**, is positioned in the truss channel **52** of the hanger **26** (see FIG. **1**), thereby securing the floor truss **12** to the wall **28**. The truss hanger **26** is then fastened to the truss **12** by any suitable means, such as by inserting nails **56** through the nail holes **54** in each side panel **46** of the hanger. The hanger **26** is thus secured to both the truss **12** and the wall **28**, with the fire retardant sheathing **34** secured between the hanger and the wall.

In another embodiment, the truss hangers **26** can be installed without pre-forming the slot **72** in the fire retardant sheathing **34**. More particularly, each hanger **26** can be driven into the sheathing **34**. The driving point **62** of the hanger **26** is positioned against a top edge of the fire retardant sheathing. The hanger **26** is then driven downward into the sheathing **34**, led by the pointed tip **64**. The hanger **26** continues to be driven into the gypsum boards until the connector tabs **74** engage the upper surface of the top plate **30**. In this way, the hanger **26** forms the slot in the sheathing **34**.

In still another embodiment, the truss hangers **26** can be installed on the wall **28** before the sheathing **34** is mounted on the wall. This simplifies construction by allowing the building to be completely framed and roofed before requiring the sheathing **34** to be installed. Trade workers (e.g., mechanical, electrical) therefore have complete access to the wall cavity to install components without interference from the sheathing **34**. The truss hanger **26** is positioned against the wall **28** such that the back flanges **66** engage the wall and the connector tabs **74** engage the top plate **30**. The connector tabs **74** are fastened to the top plate **30** of the wall by any suitable means, such as by inserting nails **78** through nail holes **76**. Then, a truss **12** is positioned in the truss channel **52** of the hanger **26**. The truss hanger is fastened to the truss **12** by any suitable means, such as by inserting nails **56** through the nail holes **54** in each side panel **46** of the hanger **26**. The floor truss **12** is thereby secured to the hanger **26** and the wall **28**, and access to the wall cavity remains unhindered by sheathing. Subsequently, the sheathing **34** can be mounted on the wall **28** by moving the sheathing upward into place so that the extension flanges **60** of the hanger **26** extend through the slot **72** of the sheathing and the sheathing is positioned in the sheathing channels **68** between the back flanges **66** and the back panels **48**.

Referring to FIGS. **25-40**, a second embodiment of a truss hanger **126** for use in mounting the floor truss **12** to the wall **28** is illustrated. The truss hanger **126** is similar to the truss hanger **26** described above, with differences as pointed out herein. Where the truss hanger **26** is configured for mounting the floor truss **12** generally orthogonal to the wall **28**, the truss hanger **126** is configured for mounting the floor truss **12** in a skewed position relative to the wall.

Referring to FIGS. **26-33**, the truss hanger **126** includes a channel-shaped portion **138**, an extension portion **140**, and a connection portion **142**. The channel-shaped portion **138** is configured to receive the floor truss **12**. The channel-shaped portion **138** is configured to support the floor truss **12** at a non-orthogonal angle relative to the wall **28**. In this skewed embodiment, the channel-shaped portion **138** is offset from the extension portion **140**. The channel-shaped portion **138** includes a seat or base **144** and a pair of side panels **146** extending upward from the base. When installed, the base **144** is generally horizontal, and the side panels **146** extend generally vertical from the base. A back panel **148** extends from one of the side panels **146***a* toward the opposing side panel **146***b*. The back panel **148** is generally perpendicular to both the side panels **146** and the base **144**. When installed, the back panel **148** extends at a non-orthogonal angle (e.g., about 45°) to the interior face **50** of the fire retardant sheathing **34**. The base **144**, side panels **146**, and back panel **148** form a channel **152** configured to receive the floor truss **12**. Other configurations are within the scope of the present invention. For example, the truss hanger **126** can be configured to support the floor truss **12** at a range of different angles with respect to the wall **28**.

As seen in FIGS. **25** and **39**, the floor truss **12** is received in the channel **152** to attach the floor truss to the wall **28** at a skewed angle. The bottom chord **16** of the floor truss **12** engages and rests upon (i.e., is supported by) the base **144**. The end member **20** of the floor truss **12** is positioned against the back panel **148** between the side panels **146**. The truss hanger **126** includes fastening structure for attaching the floor truss **12** to the truss hanger. Fastening structure can be of any type known in the art for attaching a connector to a wooden structural member, such as nailing teeth (not shown) struck from the material of the hanger. In the illustrated embodiment, the fastening structure comprises a hole to allow for insertion of a fastening member. More specifically, in one embodiment the fastening structure comprises nail holes **154** in the side panels **146** of the truss hanger **126** (see, FIG. **26**), and the fastening member comprises a nail **156** (see, FIG. **25**). In the illustrated embodiment, nail holes **154** are positioned on each of the side panels **146** so that nails

156 can be inserted into both the bottom chord 16 and the end member 20 of the floor truss 12 to attach the hanger 126 to the floor truss.

Referring again to FIGS. 26-33, the extension portion 140 includes two extension flanges 160 configured to extend through the fire retardant sheathing 34. One of the flanges 160*a* extends from the back panel 148. The other flange 160*b* extends from the side panel 146*b*. The flanges 160 are positioned in opposed, face-to-face relation, and preferably engage each other along a juncture. At a bottom edge, each flange 160 includes a driving point 162. Each of the driving points 162 is generally triangular and includes a pointed tip 164. As seen in FIG. 28, the tips 164 of the driving points 162 are vertically offset from each other. As illustrated, the tip 164*a* of one flange 160*a* extends vertically below the tip 164*b* of the other flange 160*b*. In one embodiment, the tips 164 are vertically offset from each other about ⅛", although other configurations are within the scope of the present invention, such as tips that are aligned or tips that are offset a smaller or larger amount.

A back flange 166 extends from the extension flange 160 generally perpendicular from the extension flange. Referring to FIG. 38, the back flange 166 engages the wall 28 at a first location L_{10}, which in the illustrated embodiment is a vertical face of the top plate 30 of the wall behind the fire retardant sheathing 34. The back flange 166 comprises a back flange portion 166*a* bent from the extension flange 160*a* and a back flange portion 166*b* bent from the extension flange 160*b*. The back panel 148, side panel 146*b*, extension flanges 160, and back flange 166 form a pair of sheathing channels 168 (see, FIG. 32). Each sheathing channel 168 is configured to receive a portion of the fire retardant sheathing 34.

As seen in FIGS. 34-36, the extension flanges 160 extend through the slot 72 in the fire retardant sheathing 34. Preferably, the slot has an area less than or equal to 6 square inches, and the gap between the extension flanges 60 and the edge of the slot 72 is less than or equal to ⅛". The driving points 162 extend down into the sheathing 34 to engage the sheathing and further secure the sheathing between the hanger 126 and the wall 28. A portion of the fire retardant sheathing 34 extends into each sheathing channel 168 and is secured against the back flange 166.

Referring again to FIGS. 26-33, the connection portion 142 of the hanger 126 includes a pair of connector tabs 174 extending from the back flange portions 166*a*, 166*b*. Each connector tab 174 extends generally perpendicular from a respective one of the back flanges 166*a*, 166*b*. The connector tabs 174 are generally horizontal when the hanger 126 is installed. The connector tabs 174 are configured to overlie and engage an upper surface of the top plate 30 of the wall 28 at a second location L_{20} spaced from the first location L_{10} (see, FIGS. 37 and 38). The connector tabs 174 can be used to attach the truss hanger 126 to the wall 28, thereby hanging the floor trusses 12 from the wall. As seen in FIG. 25, the connector tabs 174 extend over a portion of the top plate 30 of the wall 28. Each connector tab 174 includes fastening structure, such as nail holes 176, for insertion of a fastening member, such as nails 178 (see FIGS. 34 and 35), to attach the hanger 126 to the wall 28. In the illustrated embodiment, each connector tab 174 includes three nail holes 176. Other configurations are within the scope of the present invention, such as a different number of nail holes, or alternate fastening structure such as nailing teeth or other appropriate structure for fastening the hanger to the wall.

The base 144 and back flanges 166 cooperate to stabilize the truss hanger 126 and protect the fire retardant sheathing 34 from exposure to the loads transferred from the truss 12 to the wall 28 by way of the truss hanger 126. The channel 152 that receives an end portion of the truss 12 is spaced to the interior of the wall 28 and more particularly to the interior of the second location L_{20} where the connector tabs 174 are attached to an upper surface of the top plate 30 (see FIG. 38). The vertically downward load of the truss 126 applied to the base 144 of the truss hanger 126 urges the truss hanger to pivot so that the base would move toward the wall 28, which could damage the fire retardant sheathing 34 and pry out the nails 178 connecting the connector tabs 174 to the upper surface of the top plate 30. However, this motion is resisted by the engagement of the back flanges 166 with the interior vertical face of the top plate 30 at the first location L_{10}. Thus, there is a force couple between the base 144 and back panel 148 of the hanger 126 (via engagement of the back flanges 166 with the top plate 30) engaging the end fact of the truss. Accordingly, the truss hanger 126 and truss 12 are stable with minimal disruption of the fire retardant sheathing 34, even though the truss is held at a distance from the wall 28.

As seen in FIG. 40, a truss hanger 126 as described above can be formed as one piece from a metal blank 180 that is stamped from a sheet metal roll and bent into shape. Parts of the blank 180 are labelled with reference numerals corresponding to the various parts of the formed truss hanger 126. In one embodiment, the truss hanger 126 is stamped from 12-14 gauge steel, although other suitable materials are within the scope of the present invention. The configuration of the truss hanger 126 of the present invention allows a lighter gauge metal to be used.

The truss hanger 126 is used as described above with reference to the truss hanger 26. In use, the truss hanger 126 is positioned in the slot 72 of the fire retardant sheathing 34 mounted to the wall 28. One method of using the truss hanger 126 includes cutting the slot 72 in the fire retardant sheathing (either before or after the sheathing is mounted on the wall). In one embodiment, the slot 72 can be cut using the slot template 82 (either before or after the sheathing 34 is mounted to the wall 28). The slot 72 can be any suitable length, and in one embodiment is about 10 inches long. The truss hanger 126 is then positioned against the fire retardant sheathing 34 so that the extension flanges 160 extend through the slot 72. In one embodiment, the hanger 126 is slid downward into place so that the extension flanges 160 extend through the slot 72, the driving point 162 engages the fire retardant sheathing 34, the back flange 166 is positioned adjacent the wall 28, and the fire retardant sheathing is positioned in the sheathing channels 168 of the hanger. The hanger connector tabs 174 are fastened to the top plate 30 of the wall 28 by driving nails 178 through the nail holes 176 into the top plate 30. Then, a truss member, e.g. truss bottom chord 16 is positioned in the truss channel 152 of the hanger 126. Nails 156 are driven through holes 154 in the side panels 146 to secure the floor truss 12 to the wall 28. The hanger 126 is thus secured to both the truss 12 and the wall 28, with the fire retardant sheathing 34 between the hanger and the wall.

In another embodiment, the truss hangers 126 can be installed without pre-forming the slot 72 in the fire retardant sheathing 34. More particularly, each hanger 126 can be driven into the sheathing 34. The pointed tip 164 of the driving point 162 of the hanger 126 is positioned against a top edge of the fire retardant sheathing 34. The hanger 126 is then driven downward into the sheathing 34, led by the pointed tip 164. The hanger 126 continues to be driven into the gypsum boards until the connector tabs 174 engage the

upper surface of the top plate **30**. In this way, the hanger **126** forms the slot in the sheathing **34**.

In another embodiment, the truss hangers **126** can be installed on the wall **28** before the sheathing **34** is mounted on the wall. This simplifies construction by allowing the building to be completely framed and roofed before requiring the sheathing **34** to be installed. Trade workers (e.g., mechanical, electrical) therefore have complete access to the wall cavity to install components without interference from the sheathing **34**. The truss hanger **126** is positioned against the wall **28** such that the back flange **166** engages the wall and the connector tabs **174** engage the top plate **30**. The connector tabs **174** are fastened to the top plate **30** of the wall by any suitable means, such as by inserting nails **178** through nail holes **176**. Then, a truss **12** is positioned in the truss channel **152** of the hanger **126**. The truss hanger **126** is fastened to the truss **12** by any suitable means, such as by inserting nails **156** through the nail holes **154** in each side panel **146** of the hanger. The floor truss **12** is thereby secured to the hanger **126** and the wall **28**, and access to the wall cavity remains unhindered by sheathing. Subsequently, the sheathing **34** can be mounted on the wall **28** by moving the sheathing upward into place so that the extension flanges **160** of the hanger **126** extend through the slot **72** of the sheathing and the sheathing is positioned in the sheathing channels **168** of the hanger.

The truss hanger **26**, **126** permits a floor truss **12** to be secured to a wall **28** through fire retardant sheathing **34** with minimal interruption to the sheathing. Installation of the truss hanger minimally disrupts the continuity of the sheathing and therefore does not reduce the fire resistive rating of a fire rated assembly. The extension flanges **60**, **160** extend through the fire retardant sheathing **34** so that the sheathing is interrupted only by the slot **72** required to receive the flanges. The back flanges **66**, **166** engage the wall **28** behind the sheathing **34** to stabilize the hanger **26**, **126** and protect the sheathing. The truss hanger **26**, **126** can be mounted on a wall already having sheathing mounted thereon, or can be mounted on a wall before the sheathing (i.e., the sheathing does not have to be mounted on the wall before the truss hanger), thereby simplifying construction. The truss hanger **26**, **126** can be formed from a metal blank **80**, **180**, which reduces the number of parts required to hang the floor truss **12** and simplifies the manufacturing process.

In an independent test performed by an outside firm, the truss hanger was installed as part of a wall assembly including 2×6 wood studs, 24" on center, with two layers of ⅝" Type X gypsum attached to each side. The gypsum board included a slot to accommodate the hanger. The hanger was fixed to the top plate of the wall with six **10***d* common nails in the connector tabs. The cavities in the wall were filled with mineral wool insulation. The testing was performed per ASTM E814 which subjected the specimen to the time/temperature curve prescribed in ASTM E119 for a period of two hours, followed by a hose stream test. As a result of this testing, the outside firm reported that when installed on one side of a maximum 2 hour fire-rated wall assembly, the penetration of the truss hanger through the gypsum board will not reduce the fire resistive rating of the 2 hour fire resistive assembly.

Having described the invention in detail, it will be apparent that modifications and variations are possible without departing from the scope of the invention defined in the appended claims.

When introducing elements of the present invention or the preferred embodiments(s) thereof, the articles "a", "an", "the" and "said" are intended to mean that there are one or more of the elements. The terms "comprising", "including" and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above products without departing from the scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:

a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;

a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane, the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and

an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion, each extension flange being configured to extend through the sheathing, each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall.

2. The hanger as set forth in claim **1**, wherein each of the first and second extension flanges are planar.

3. The hanger as set forth in claim **2**, 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.

4. The hanger as set forth in claim **2**, wherein the first and second extension flanges each include an upper free edge.

5. The hanger as set forth in claim **1**, wherein the first and second extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing.

6. The hanger as set forth in claim **1**, wherein a portion of the channel-shaped portion is in an opposed, spaced apart relation with the back flange.

7. The hanger as set forth in claim **1**, wherein the back flange has a front surface lying in a back flange plane and wherein the hanger further comprises a stop configured to engage the end of the structural component to space the end of the structural component from the back flange plane by a distance sized large enough to permit the sheathing to be received between the end of the structural component and the back flange plane.

8. The hanger as set forth in claim 7, wherein the stop is configured to space the end of the structural component from the back plane by a distance sized large enough to permit two layers of 5/8 inch thick sheathing to be received between the end of the structural component and the back flange plane.

9. The hanger as set forth in claim 7, wherein the stop comprises back panels extending toward each other.

10. The hanger as set forth in claim 1, wherein the first and second extension flanges are parallel to one another.

11. The hanger as set forth in claim 1, further comprising connections between the first and second extension flanges and the channel-shaped portion, locations of the connections being spaced apart from a lower end of the channel-shaped portion where the base of the channel-shaped is located.

12. The hanger as set forth in claim 1, wherein the back flange has a front surface lying in a back flange plane and the first and second extension flanges space the channel-shaped portion from the back flange plane by a distance sized large enough to permit two layers of 5/8 inch thick sheathing to be received between the channel-shaped portion and the back flange plane.

13. The hanger as set forth in claim 1, wherein the connection portion includes a top flange configured to attach to a top plate of the wall, the top flange extending from the back flange.

14. The hanger as set forth in claim 13, wherein the top flange is connected to the channel-shaped portion by way of the back flange and the extension portion.

15. The hanger as set forth in claim 1, wherein the wall is a frame wall having a top plate having a vertical dimension, and wherein the back flange has a vertical dimension greater than the vertical dimension of the top plate.

16. A hanger to connect a joist to a frame wall adapted to have sheathing mounted thereon so that an interior side of the sheathing faces the frame wall and an exterior side of the sheathing faces away from the frame wall, the frame wall including a wooden upper plate and wooden studs extending down from the upper plate, the hanger comprising:

a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component and side panels extending upward from the base;

a connection portion configured for attachment to the frame wall, the connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall, the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and

first and second extension flanges interconnecting the connection portion and the channel-shaped portion and holding the connection portion and channel-shaped portion in spaced apart relation to each other, the first and second extension flanges being configured to extend through an opening in the sheathing to the wall frame, the back flange, the first and second extension flanges and the channel-shaped portion defining a sheathing space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing, the back flange being sized and arranged to at least partially block the opening in the sheathing to reduce the exposure of the wooden top plate and wooden studs to an exterior through the opening in the sheathing.

17. The hanger as set forth in claim 16, wherein the first and second extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing.

18. The hanger as set forth in claim 16, wherein the connection portion includes a top flange configured to overlie an upper surface of the top plate, the back flange extending down from the top flange.

19. The hanger as set forth in claim 18, wherein the top flange and back flange are connected to each other by a bend.

20. The hanger as set for thin claim 19, wherein the side panels have rearward edges lying in a rear edge plane, each of the first and second extension flanges lying in an extension flange plane, the extension flange planes being generally perpendicular to the rear edge plane.

21. The hanger as set forth in claim 16, wherein the back flange has a front surface lying in a back flange plane and wherein the hanger further comprises a stop configured to engage the end of the structural component to space the end of the structural component from the back flange plane by a distance sized large enough to permit the sheathing to be received between the end of the structural component and the back flange plane.

22. The hanger as set forth in claim 21, wherein the stop is configured to space the end of the structural component from the back plane by a distance sized large enough to permit two layers of 5/8 inch thick sheathing to be received between the end of the structural component and the back flange plane.

23. The hanger as set forth in claim 22, wherein the stop comprises back panels extending toward each other.

* * * * *

EXHIBIT B

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 11,021,867 B2
APPLICATION NO. : 16/433799
DATED : June 1, 2021
INVENTOR(S) : Brekke

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

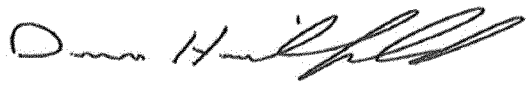
Column 12, Claim 5, Line 56:
Add --a wall assembly including the wall and-- after the phrase 'rating of';

Column 13, Claim 11, Line 15:
Add --portion-- after the term 'channel-shaped';

Column 13, Claim 16, Line 34:
Replace "joist" with --structural component--;

Column 14, Claim 17, Line 22:
Add --a wall assembly including the frame wall and-- after the phrase 'rating of'.

Signed and Sealed this
Twenty-eighth Day of December, 2021



Drew Hirshfeld
Performing the Functions and Duties of the
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office

EXHIBIT C

US011649626B2

(12) **United States Patent**
Brekke et al.

(10) **Patent No.: US 11,649,626 B2**
(45) **Date of Patent: May 16, 2023**

(54) **HANGER FOR FIRE SEPARATION WALL**

(71) Applicant: **Columbia Insurance Company**, Omaha, NE (US)

(72) Inventors: **Steven Brekke**, Lakeville, MN (US); **Mark R. Rolf**, Fredericksburg, VA (US)

(73) Assignee: **COLUMBIA INSURANCE COMPANY**, Omaha, NE (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 75 days.

(21) Appl. No.: **17/235,349**

(22) Filed: **Apr. 20, 2021**

(65) **Prior Publication Data**

US 2021/0238841 A1 Aug. 5, 2021

Related U.S. Application Data

(63) Continuation of application No. 16/433,799, filed on Jun. 6, 2019, now Pat. No. 11,021,867, which is a continuation of application No. 16/225,517, filed on Dec. 19, 2018, now Pat. No. 10,316,510, which is a continuation of application No. 15/675,409, filed on Aug. 11, 2017, now Pat. No. 10,184,242, which is a

(Continued)

(51) **Int. Cl.**
E04B 1/26 (2006.01)

(52) **U.S. Cl.**
CPC ***E04B 1/2612*** (2013.01)

(58) **Field of Classification Search**
CPC E04B 1/2612; E04B 1/2608; E04B 1/2604; E04B 1/945; E04B 1/94; E04B 1/26; E04B 2001/2644; E04B 2001/2652; E04B 2001/2676; E04B 2001/2415; E04B 2001/2684; E04B 5/12; E04B 5/14; E04B 7/045; B21D 53/56; Y10T 403/4605; Y10T 403/3921; Y10T 403/4602; Y10T 29/49623

See application file for complete search history.

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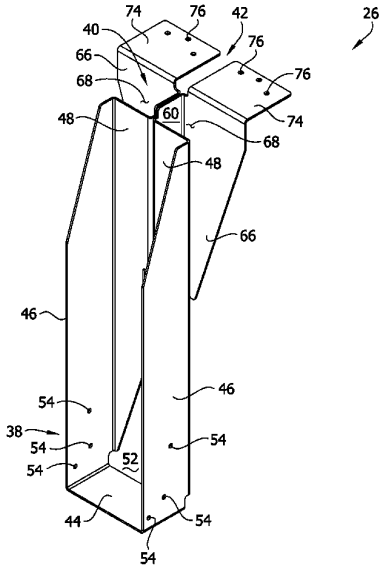
(Continued)

Primary Examiner — James M Ference
(74) *Attorney, Agent, or Firm* — Stinson LLP

(57) **ABSTRACT**

A hanger for connecting a structural component to a wall that can have sheathing mounted thereon either before or after the hanger is connected to the wall. The hanger includes a channel-shaped portion configured to receive the structural component. An extension portion extends from the channel-shaped portion and is configured to extend through the sheathing to engage the wall at a first location. A connection portion is configured for attachment to the wall at a second location spaced from the first location.

105 Claims, 43 Drawing Sheets



Related U.S. Application Data

continuation of application No. 14/555,049, filed on Nov. 26, 2014, now Pat. No. 10,024,049.

(60) Provisional application No. 61/922,531, filed on Dec. 31, 2013.

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FIG. 1

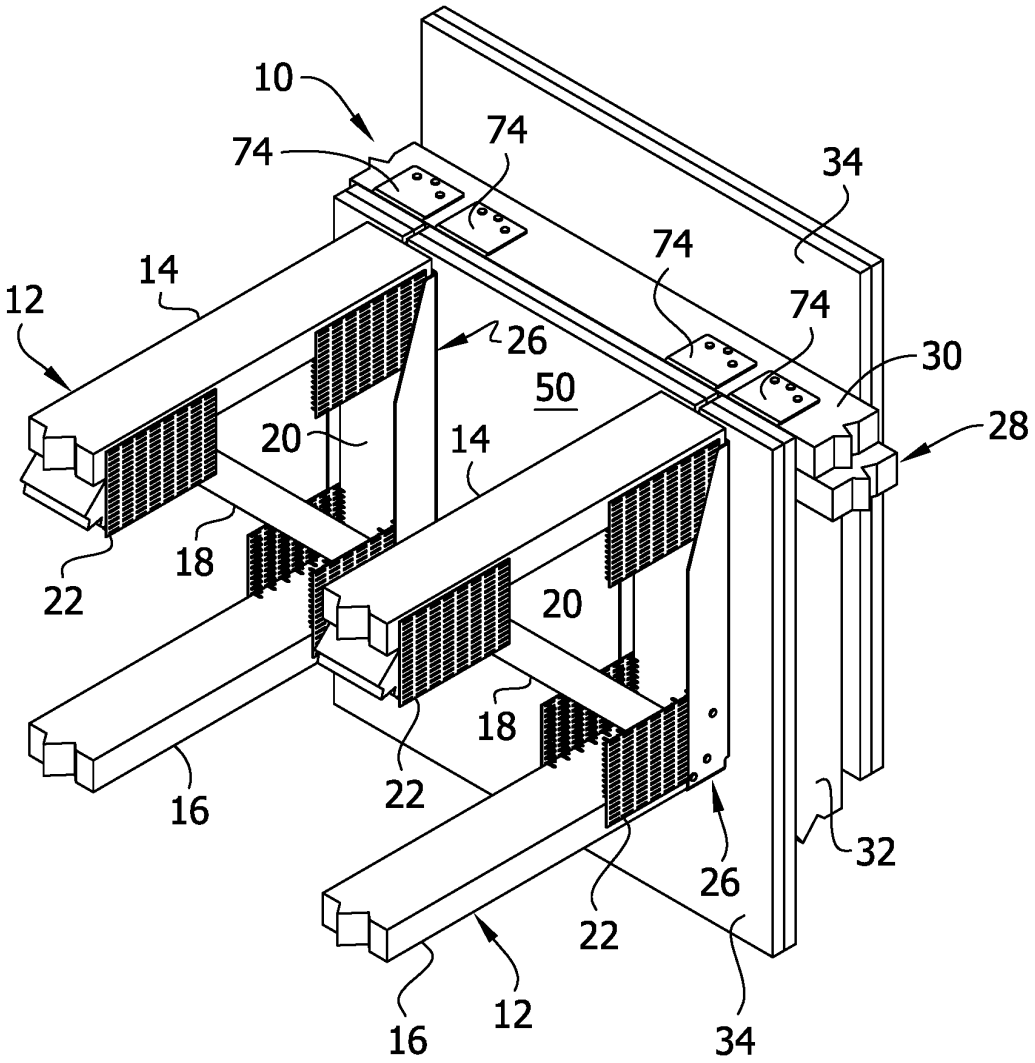

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FIG. 2

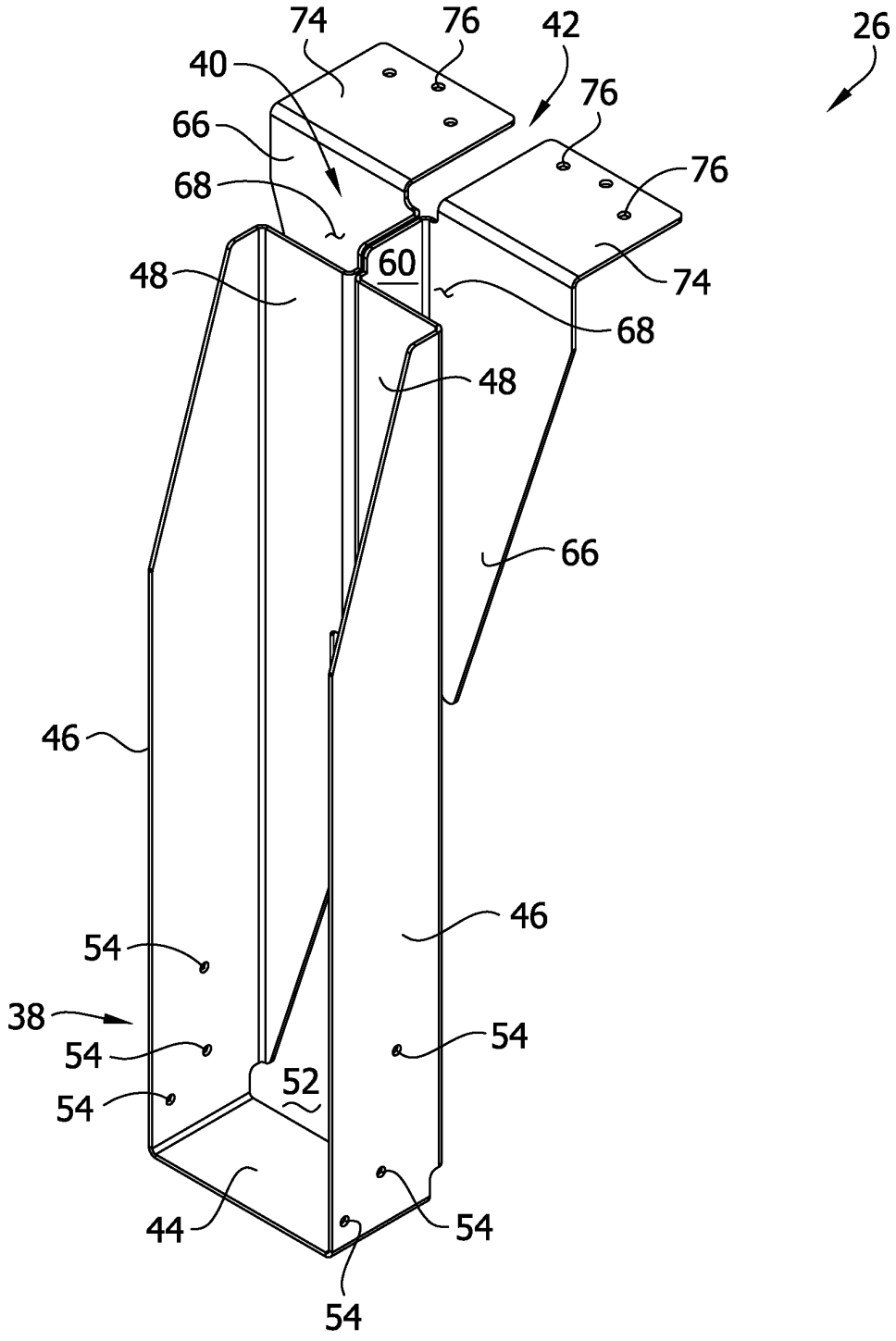

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FIG. 2A

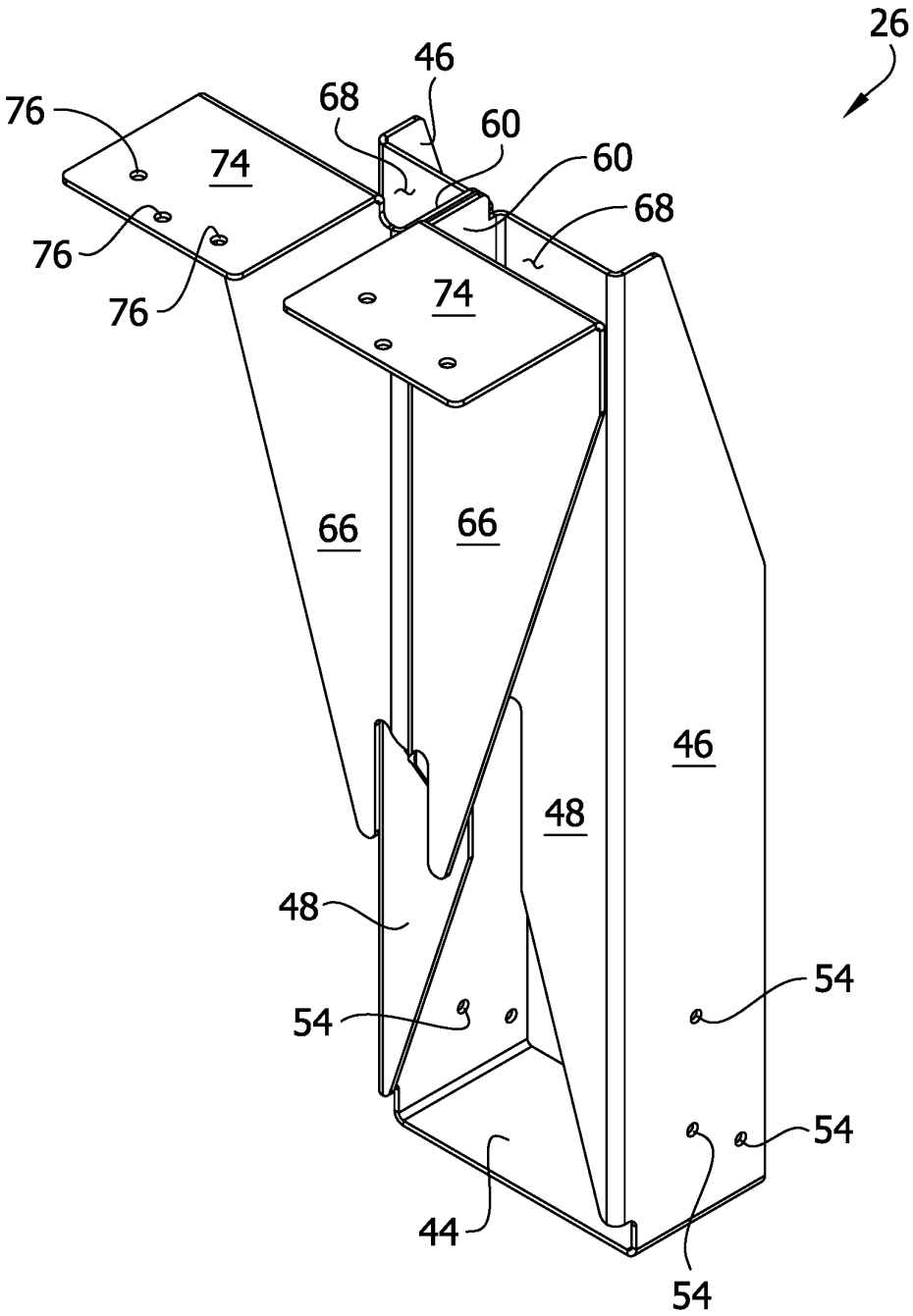


FIG. 3

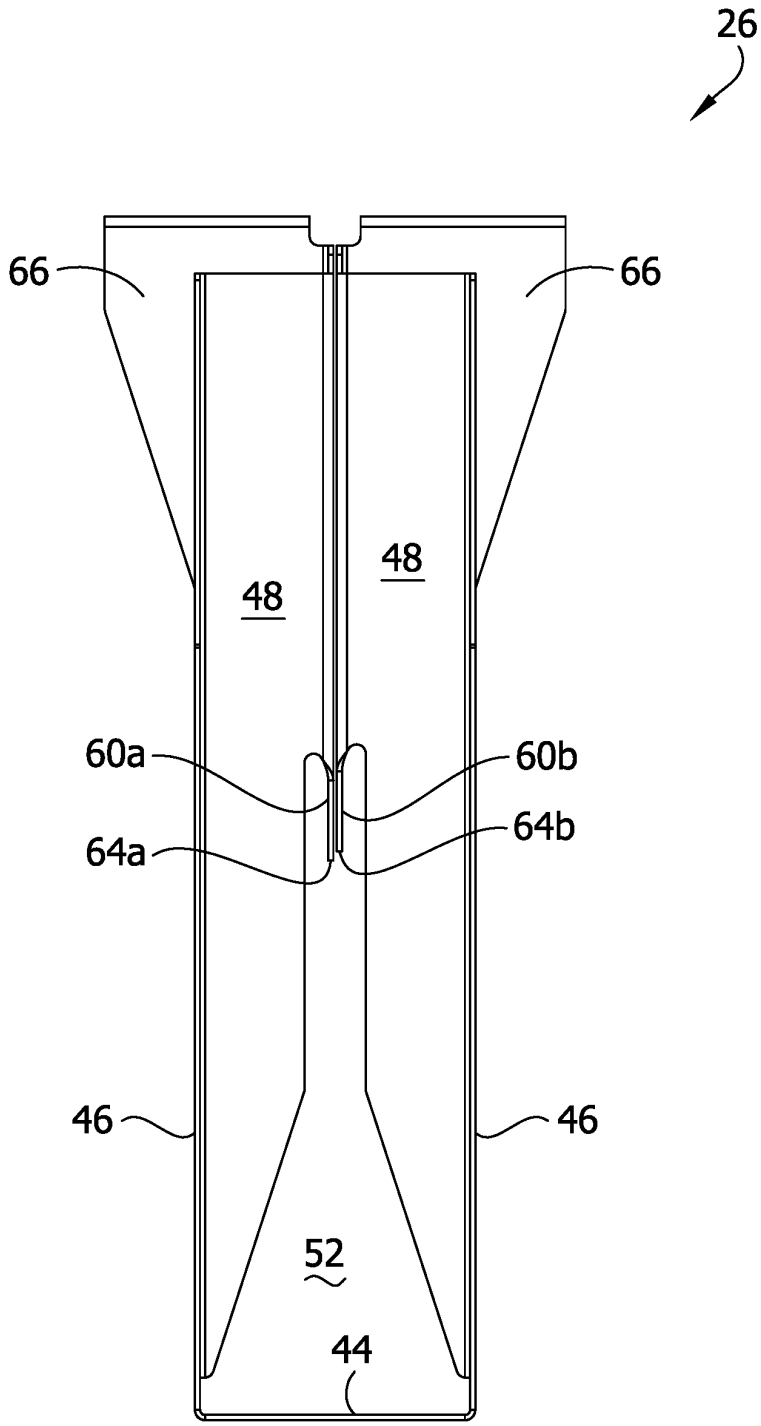


FIG. 4

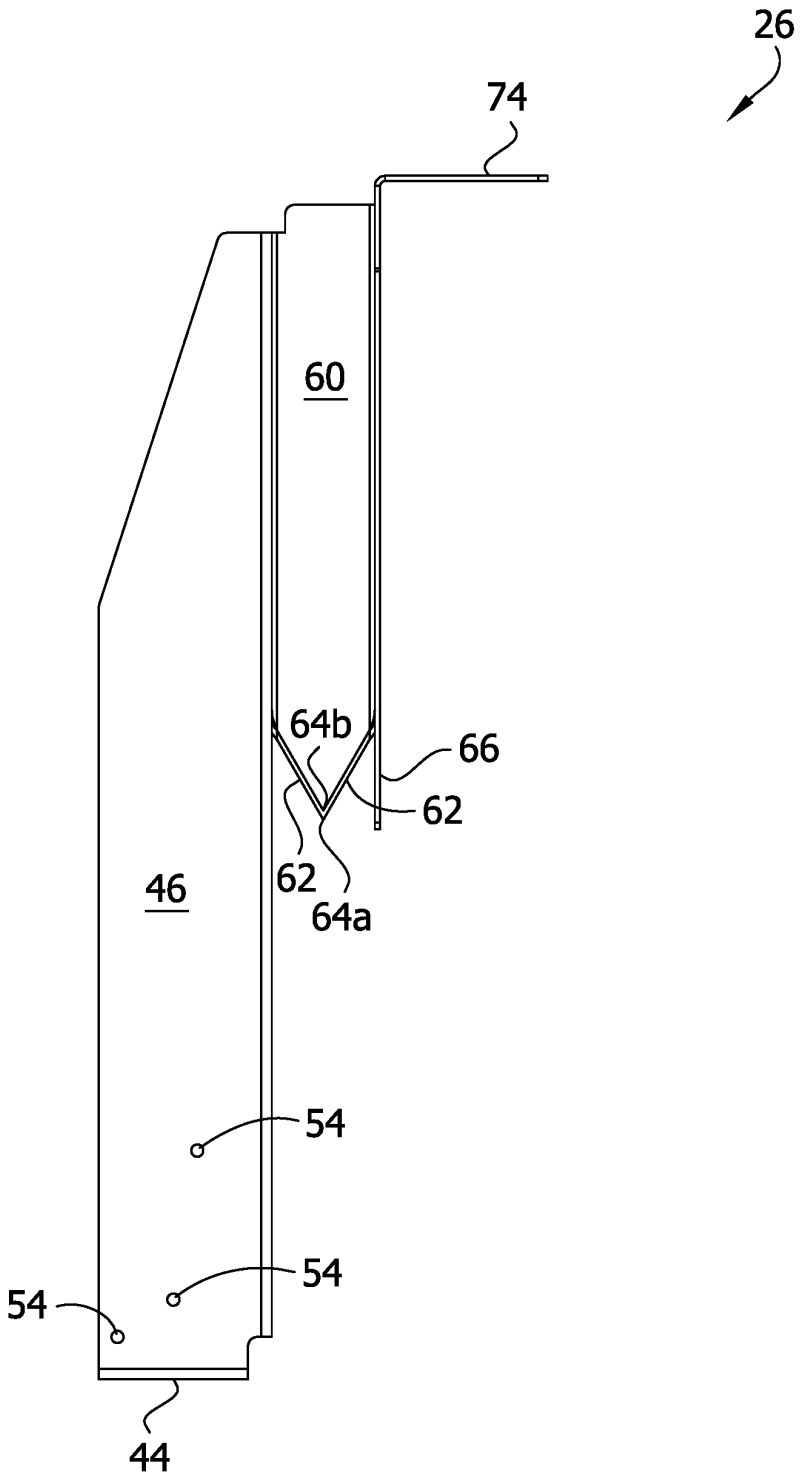


FIG. 5

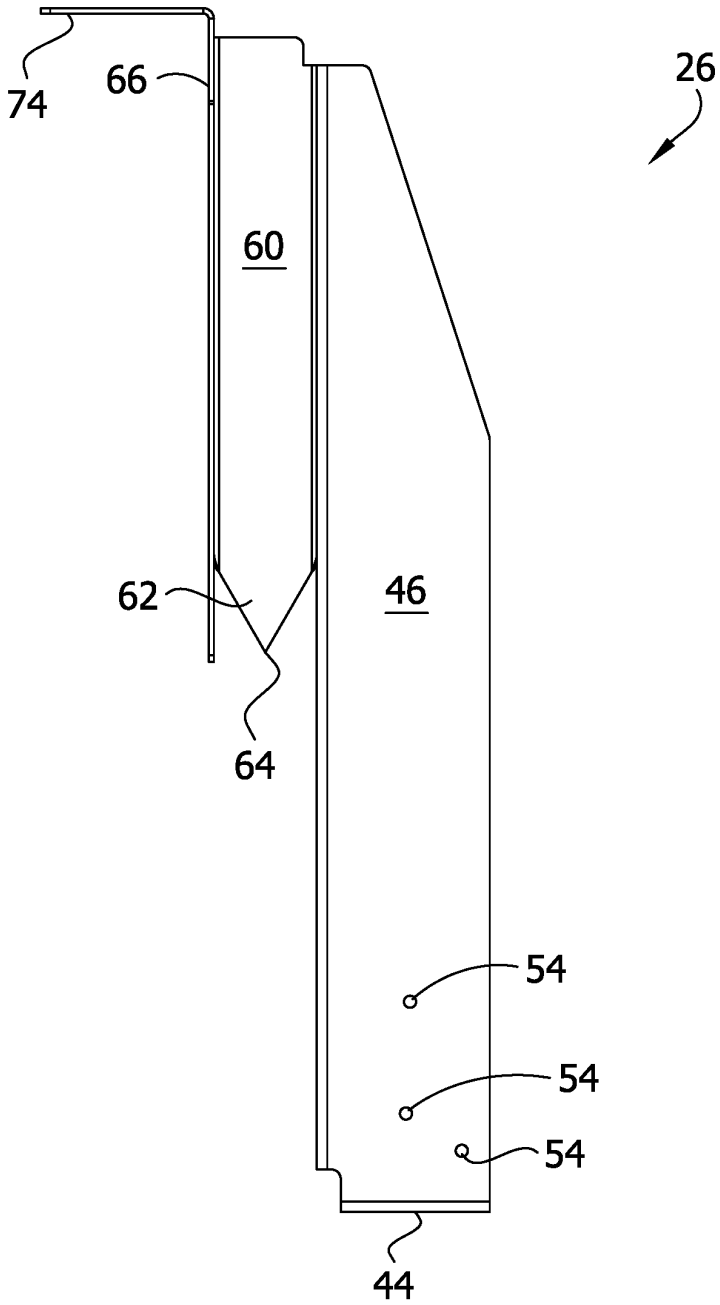


FIG. 6

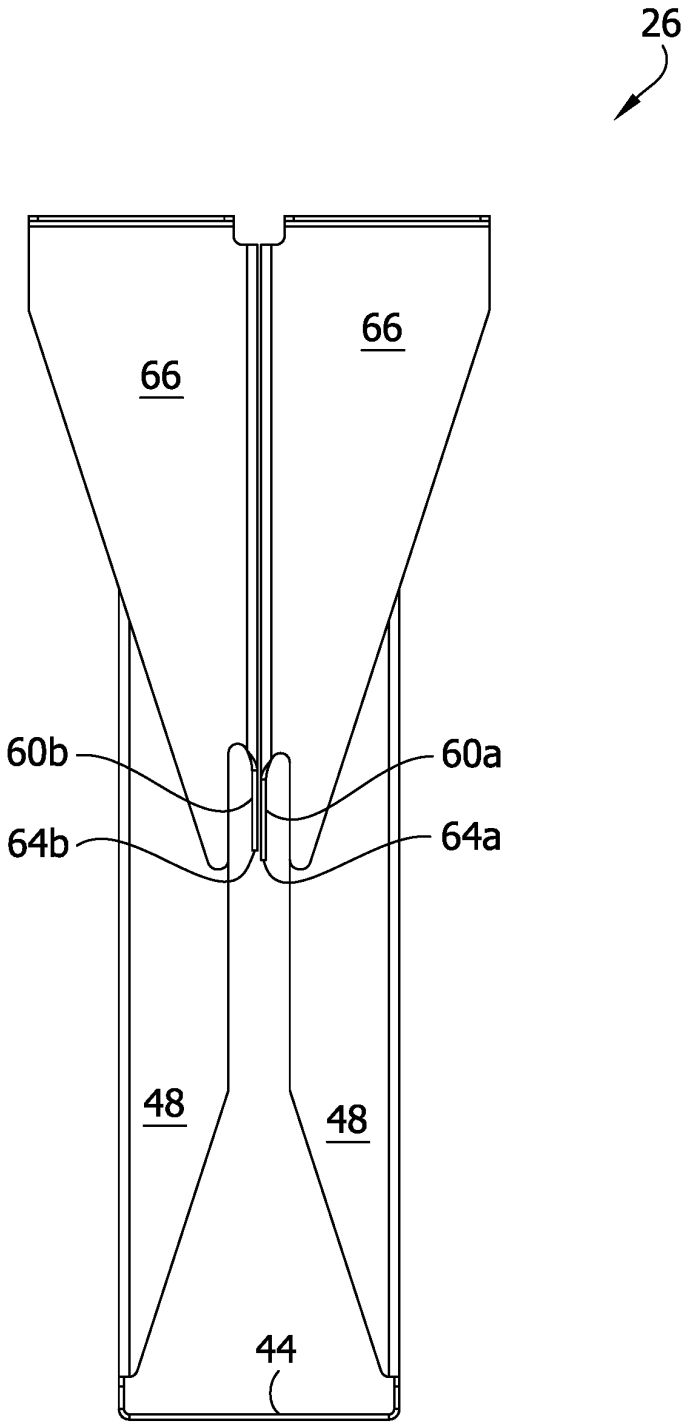


FIG. 7

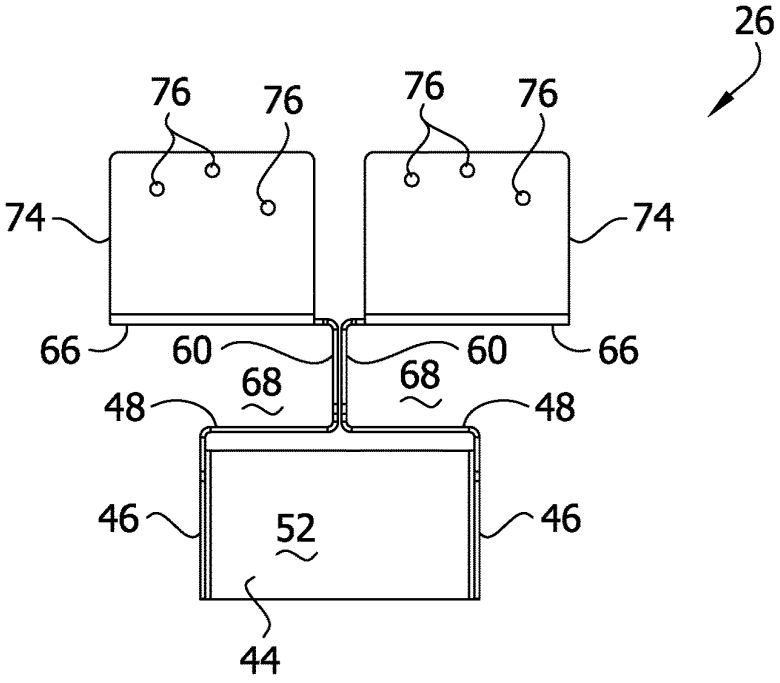

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FIG. 8

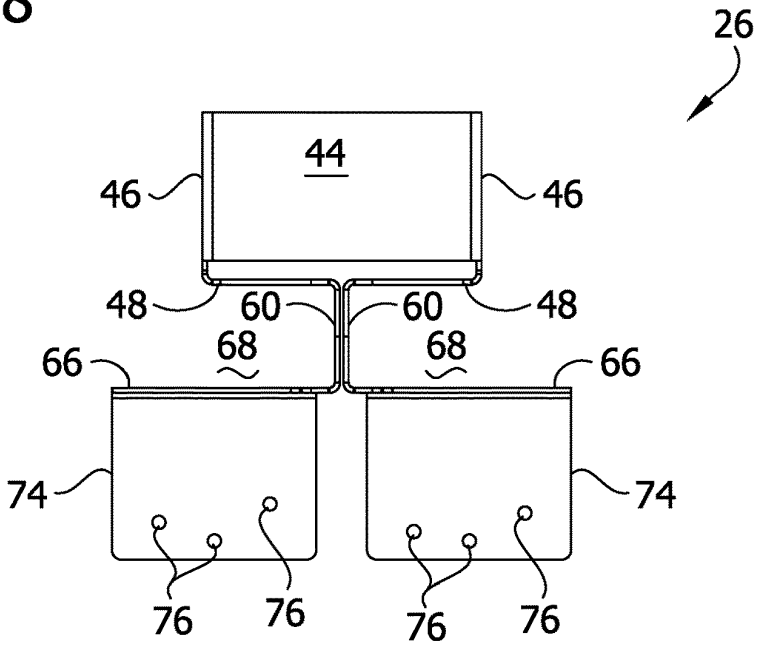

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FIG. 9

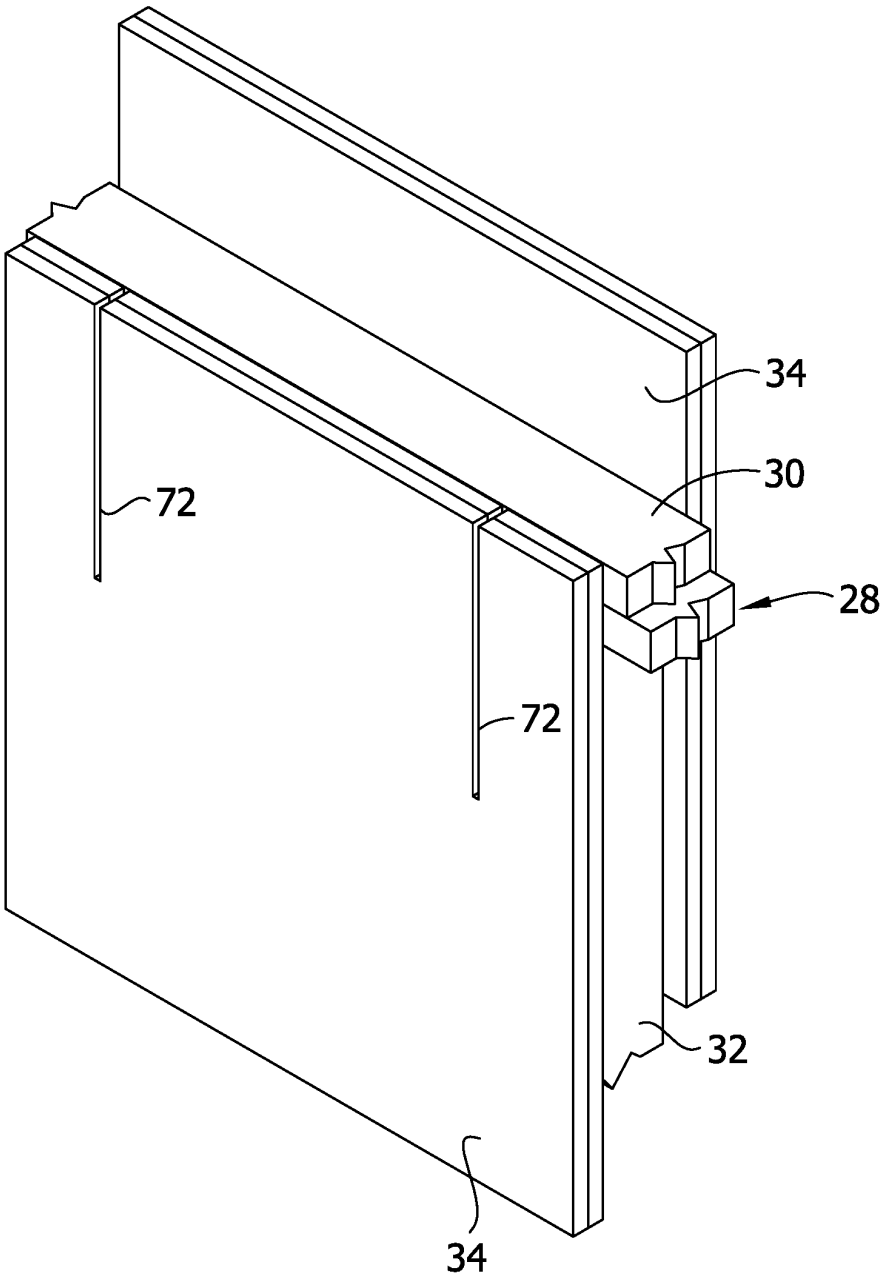


FIG. 10

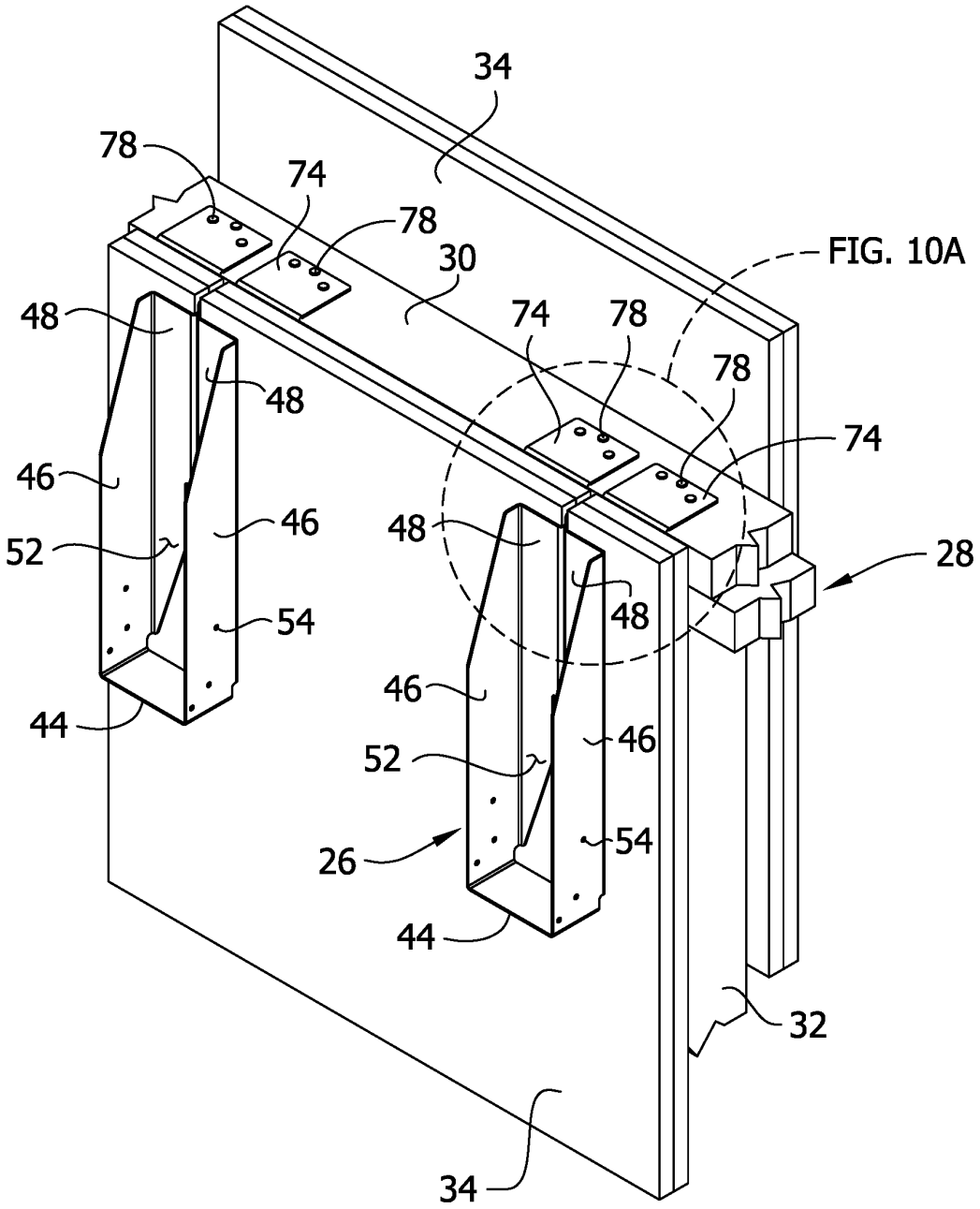
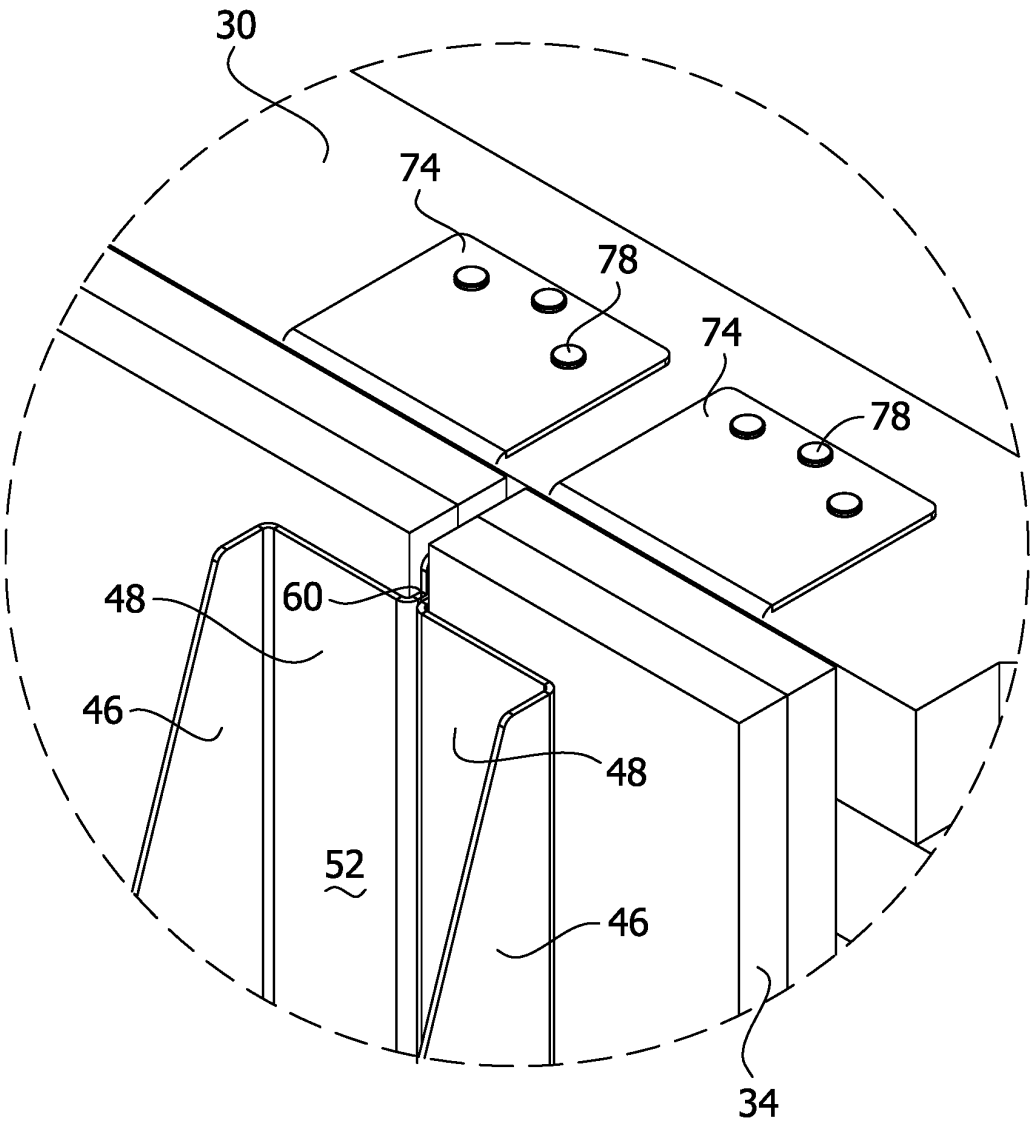

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FIG. 10A
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FIG. 10A



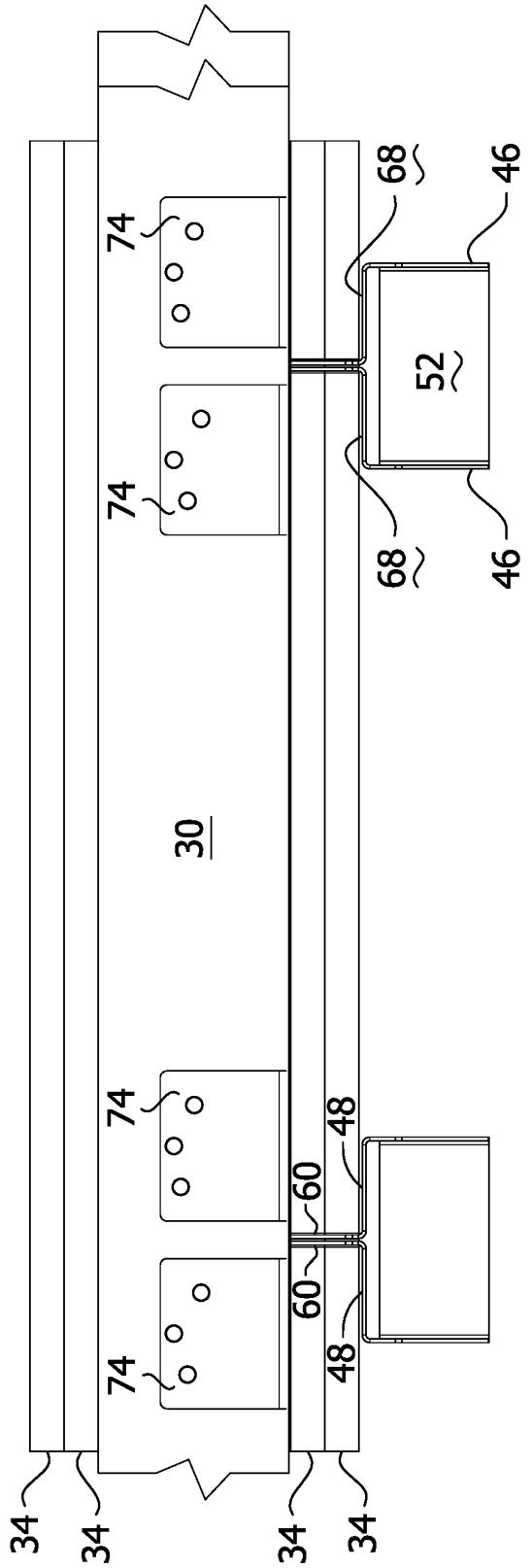
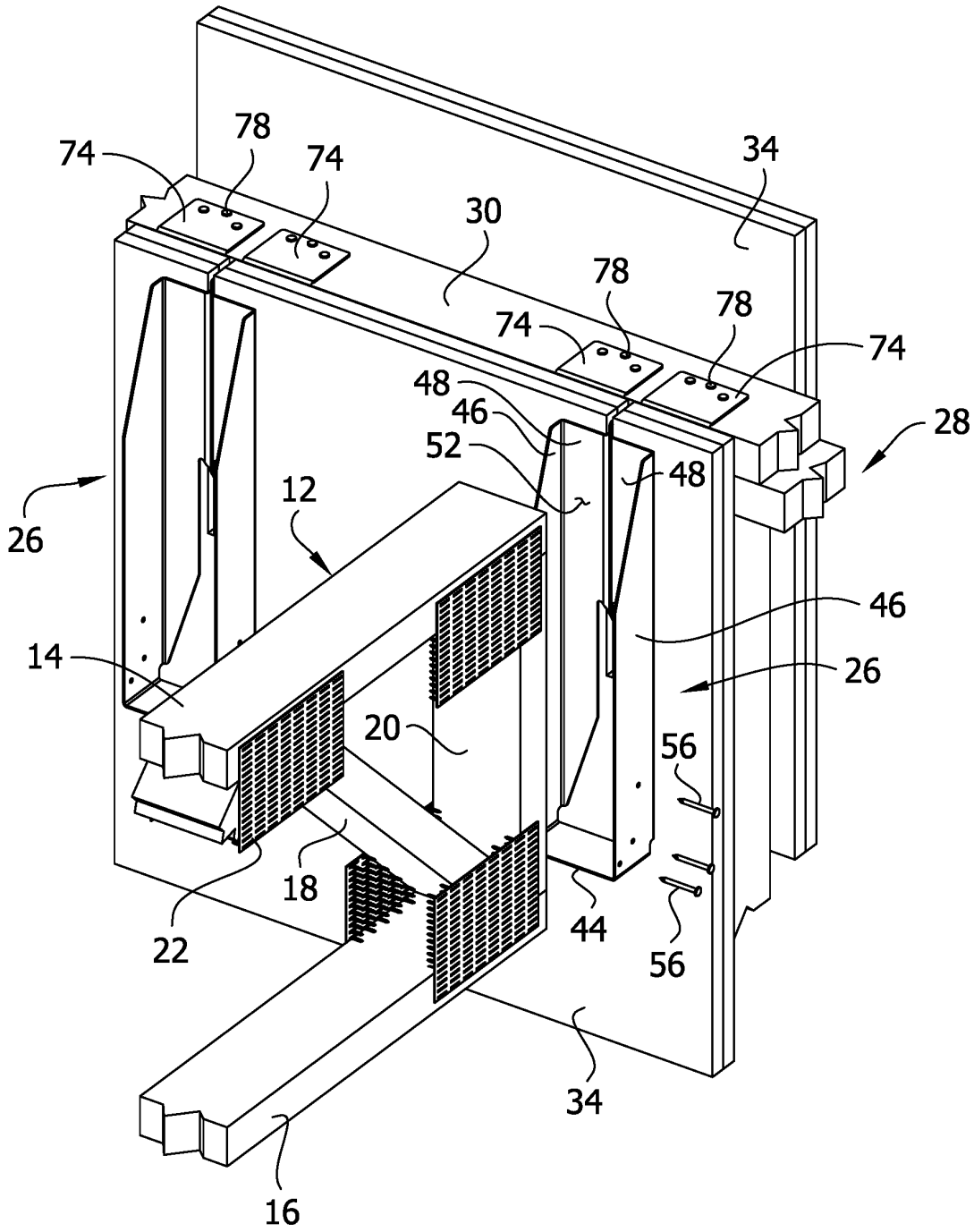


FIG. 11

FIG. 12


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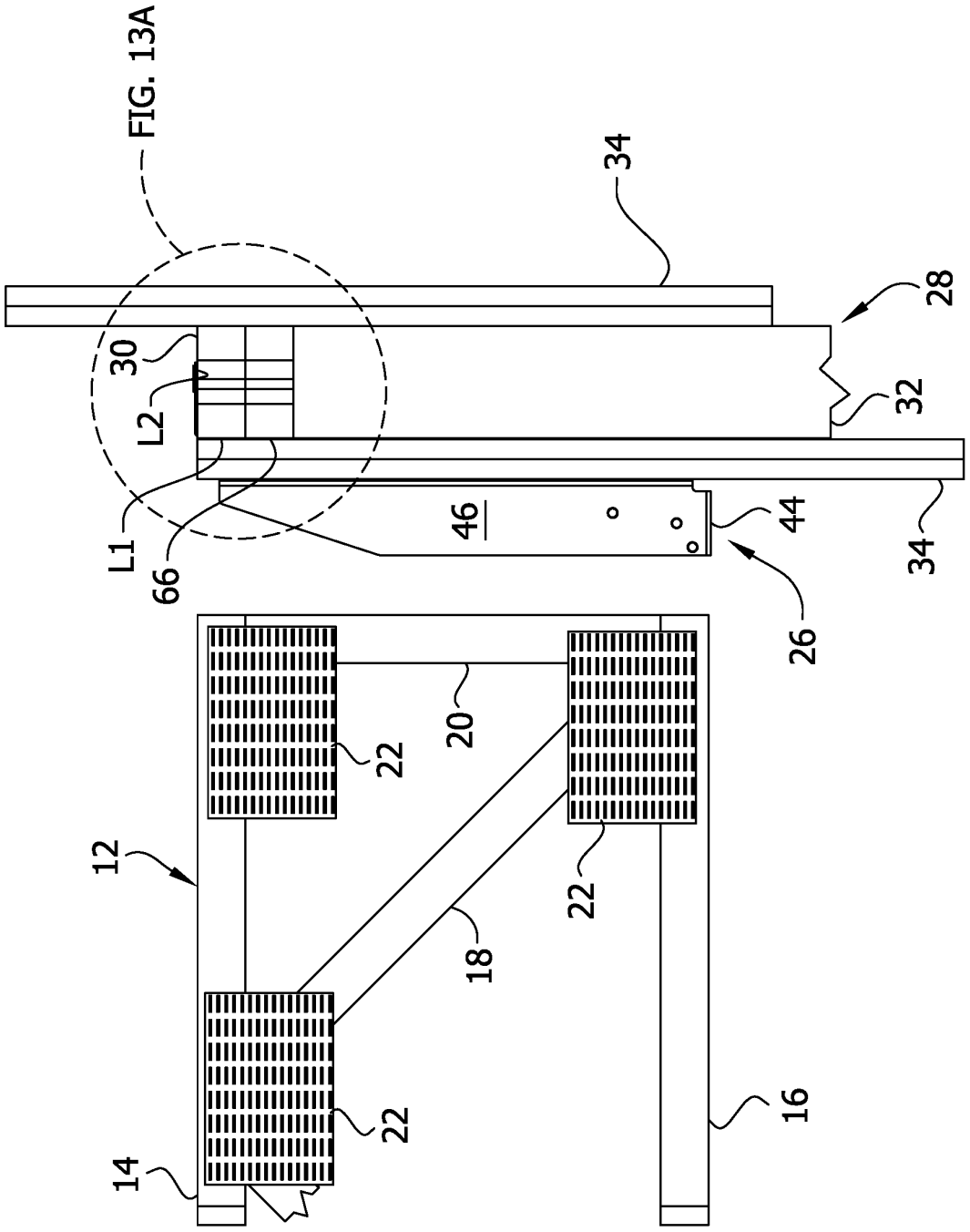


FIG. 13

FIG. 13A

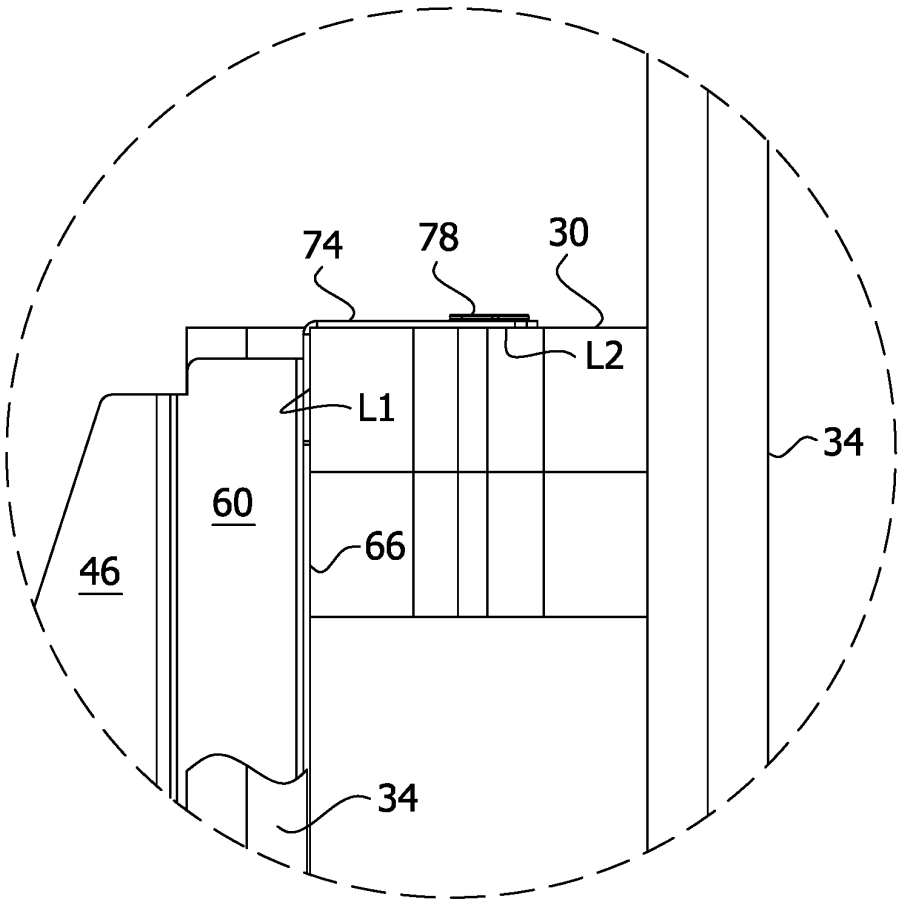


FIG. 14

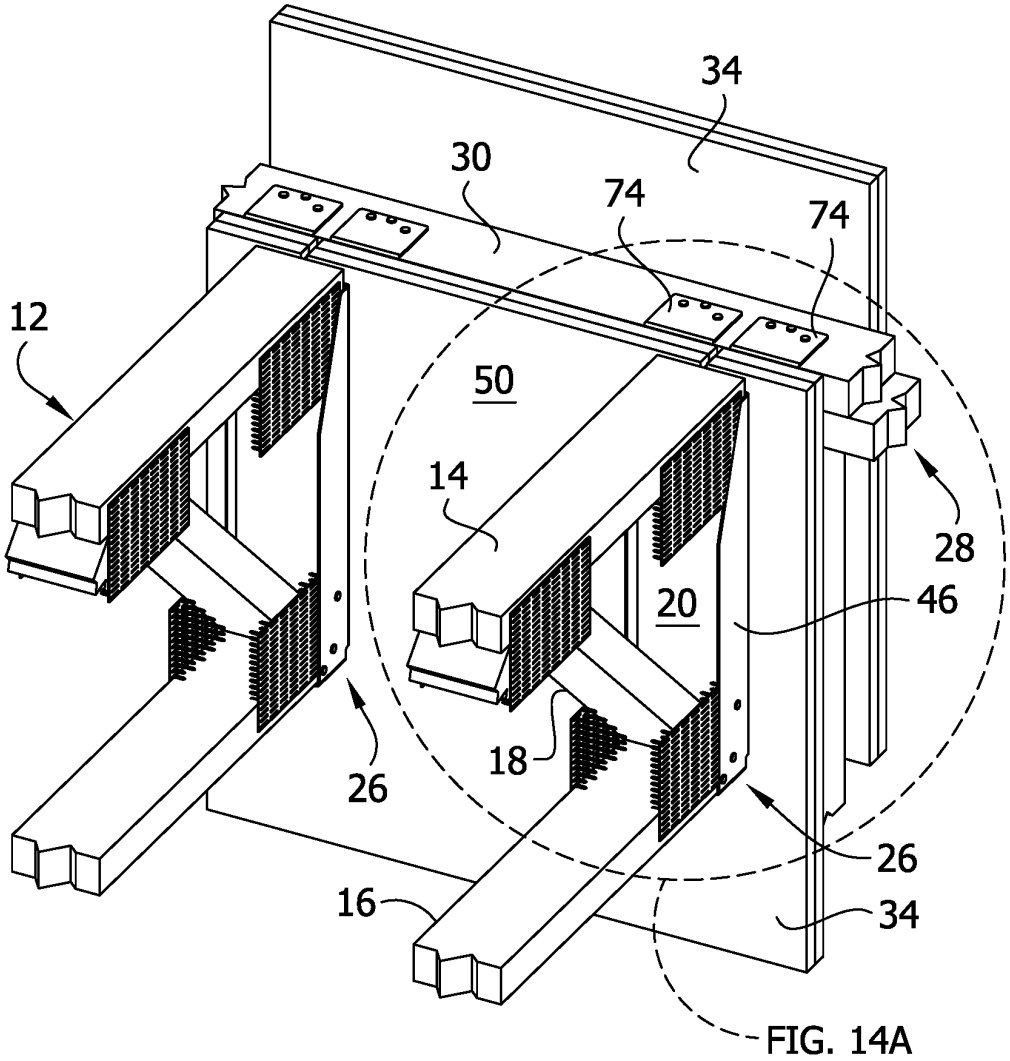


FIG. 14A

FIG. 14A

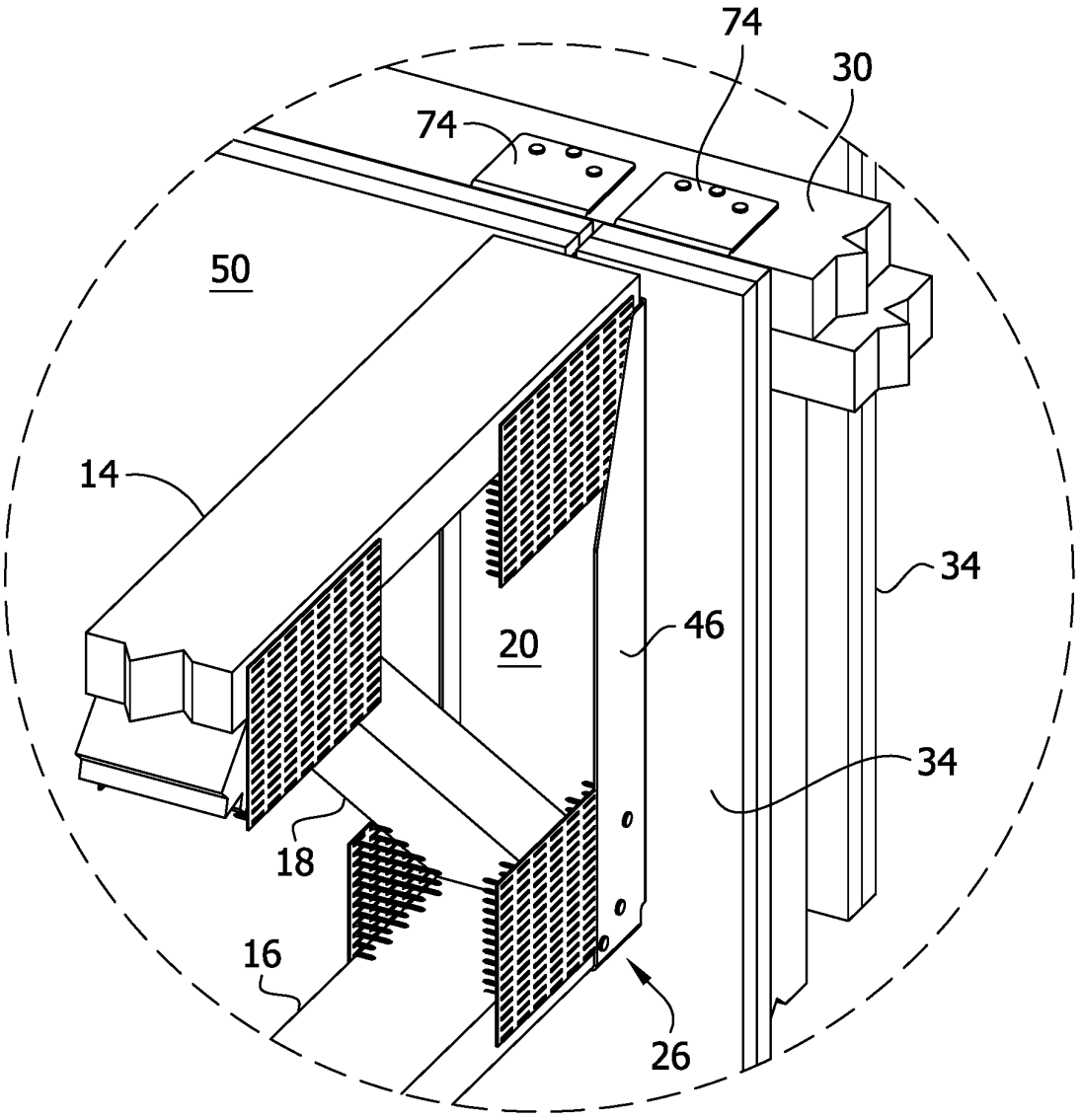


FIG. 15

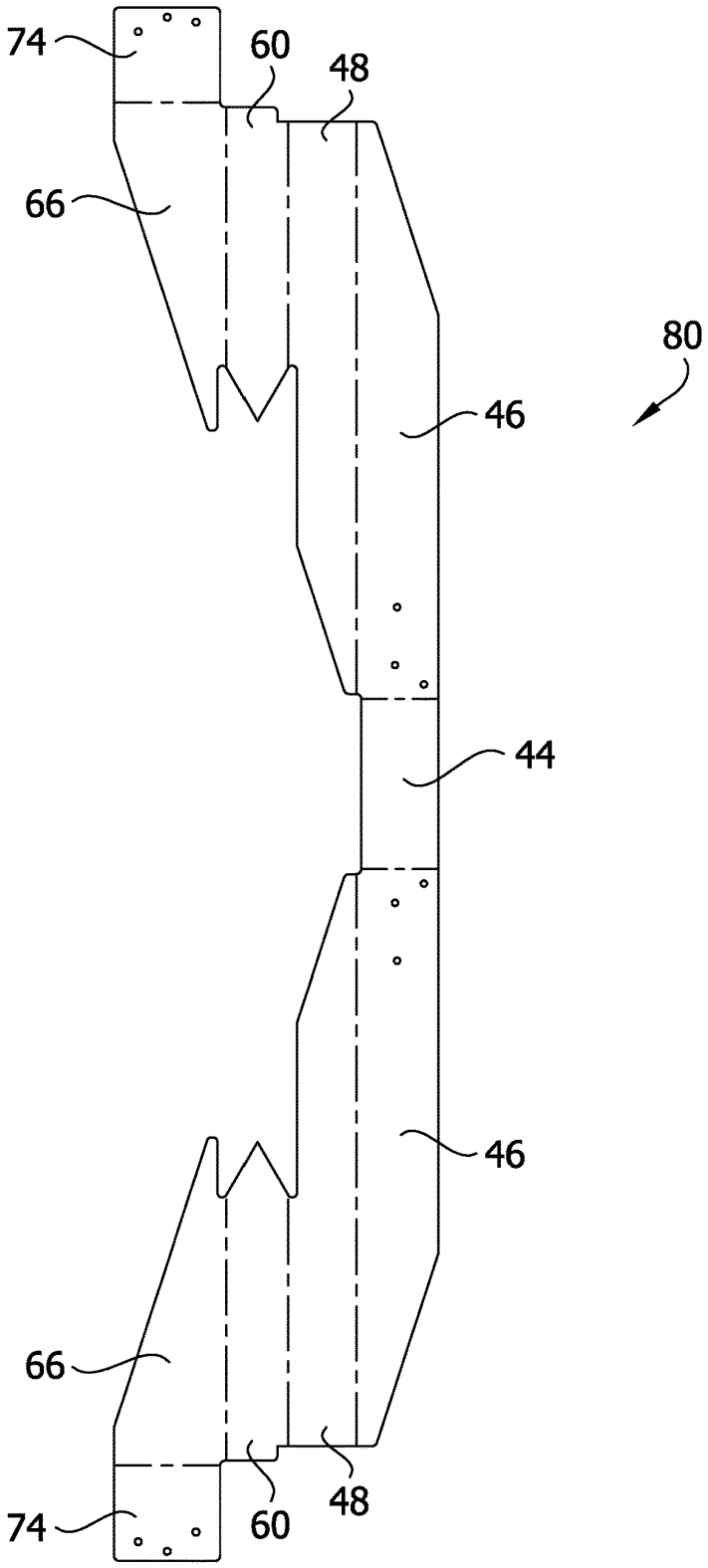


FIG. 16

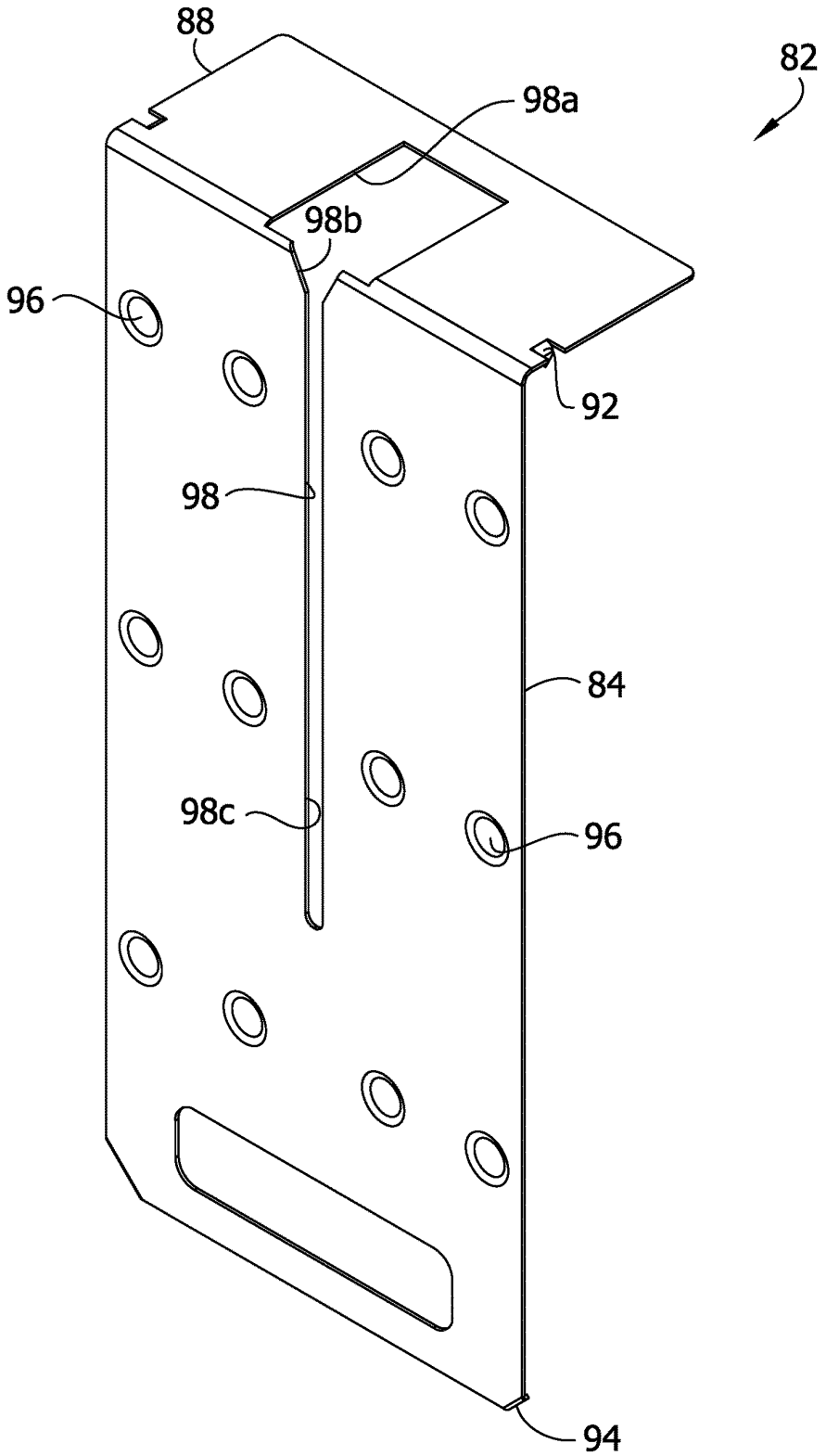


FIG. 17

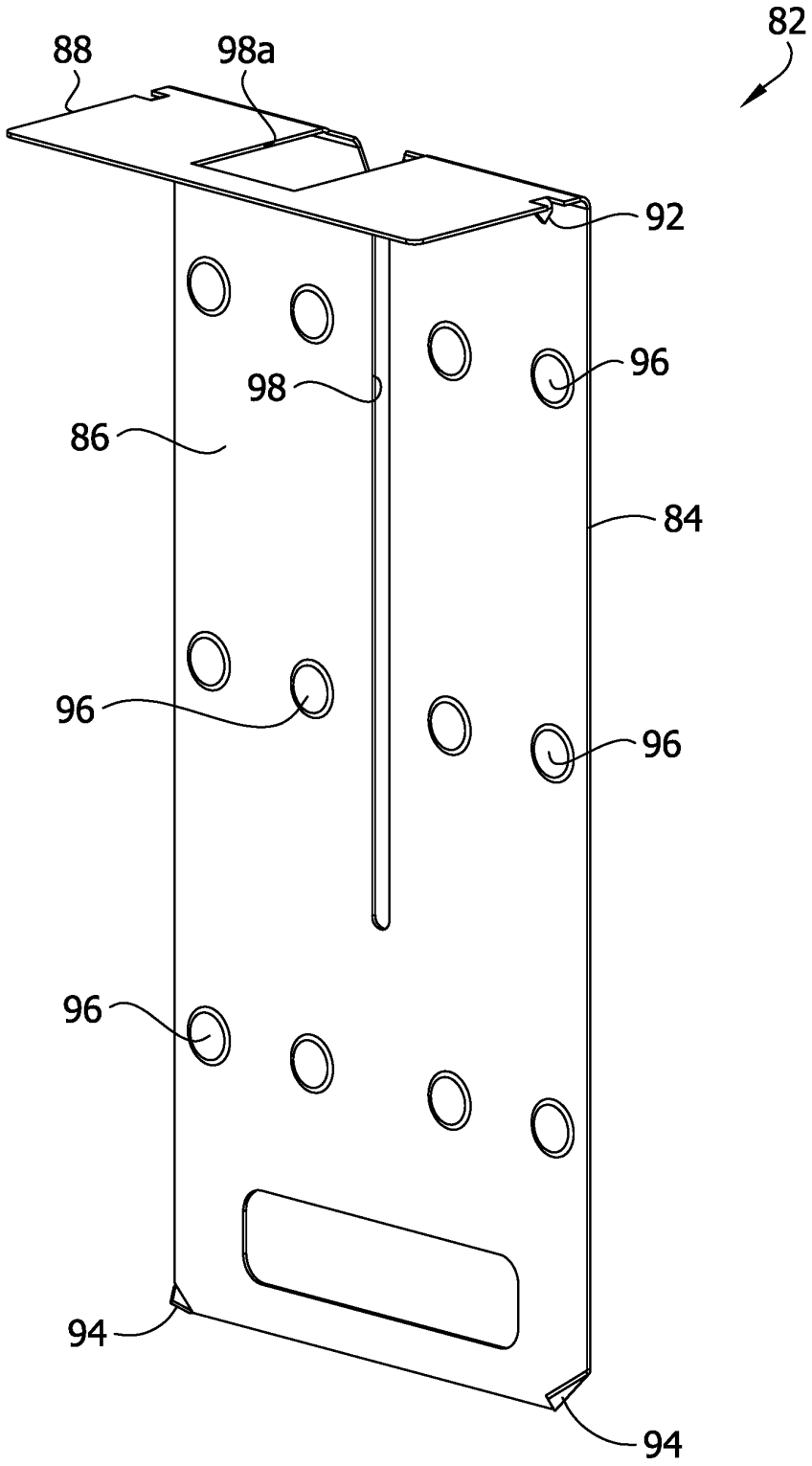


FIG. 18

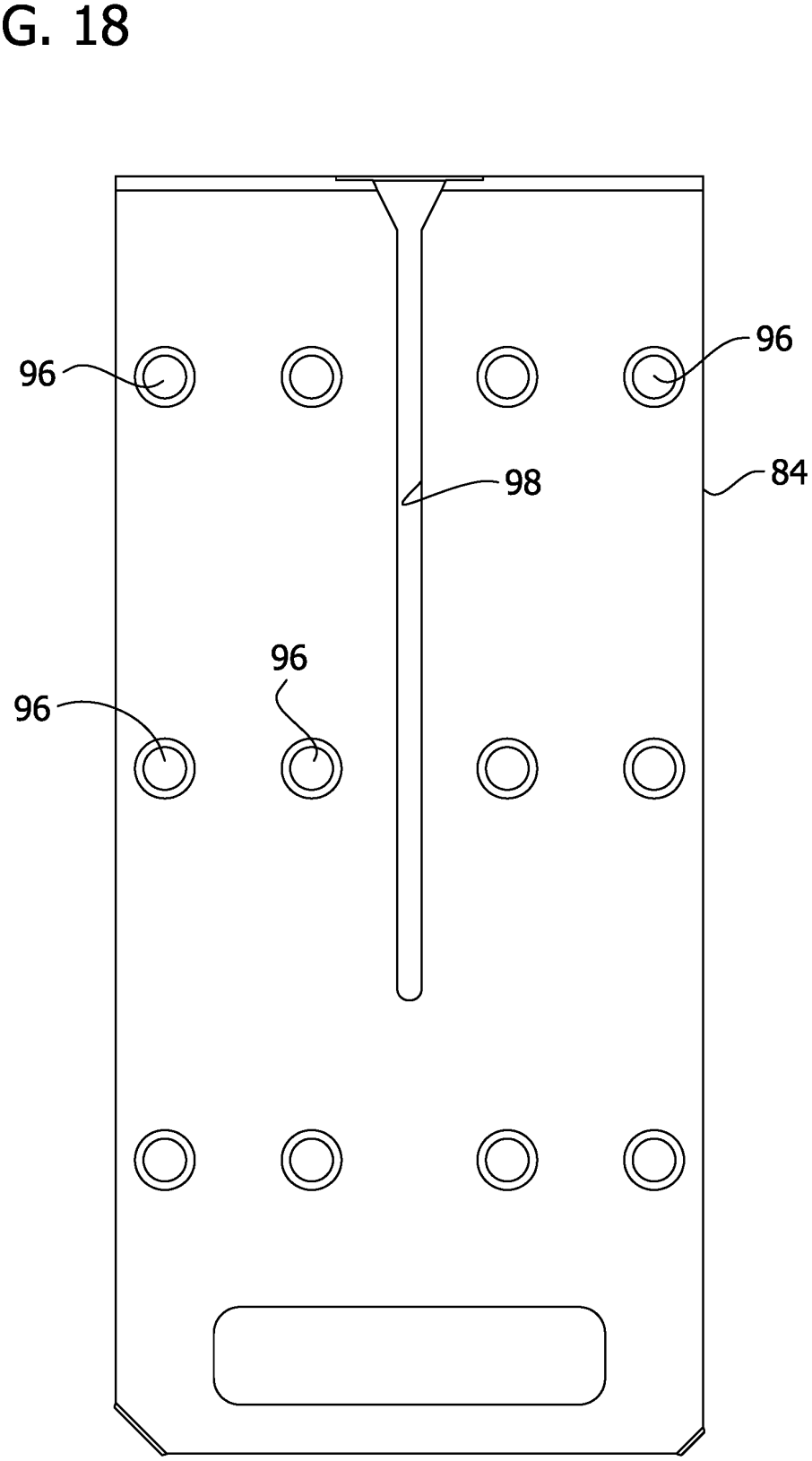


FIG. 19

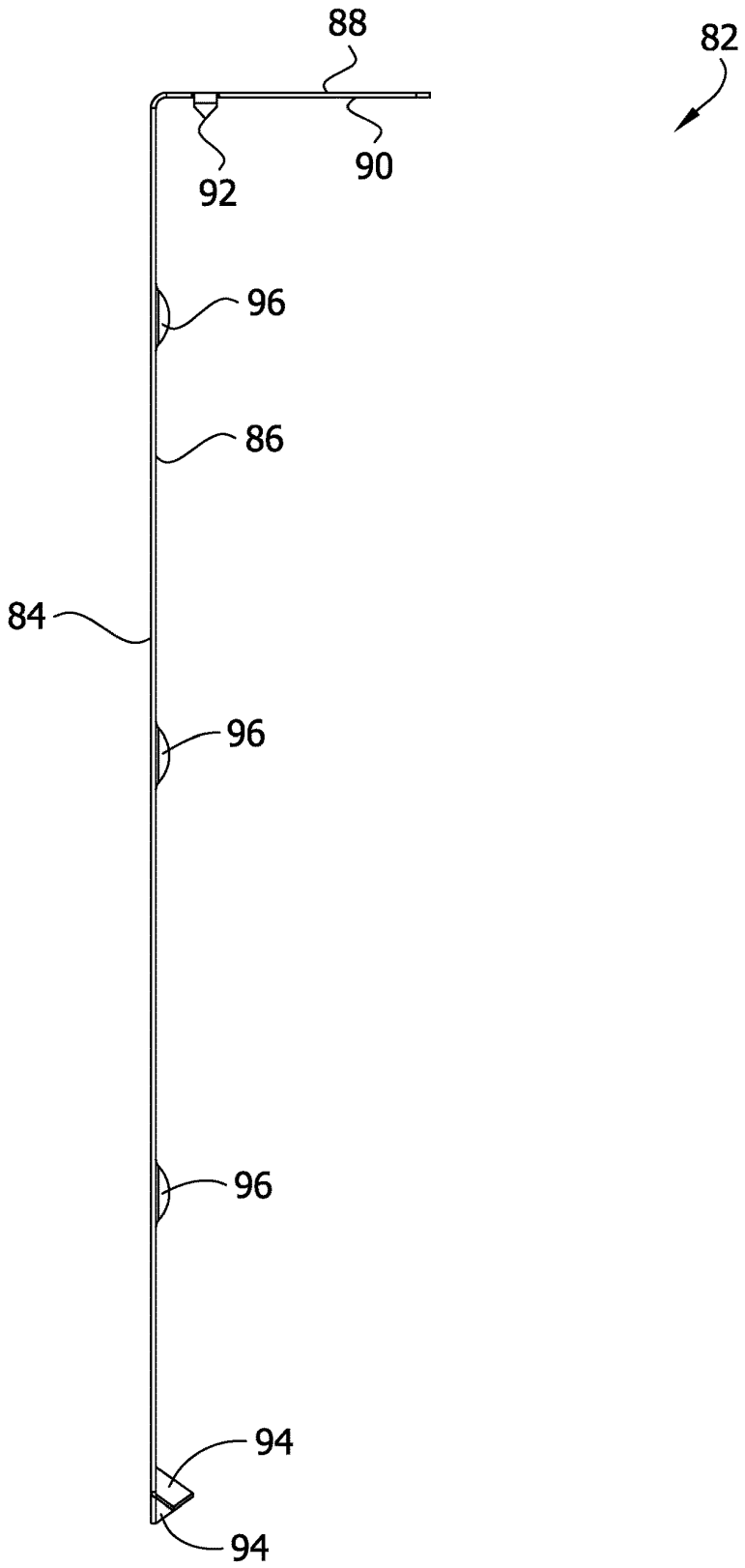


FIG. 20

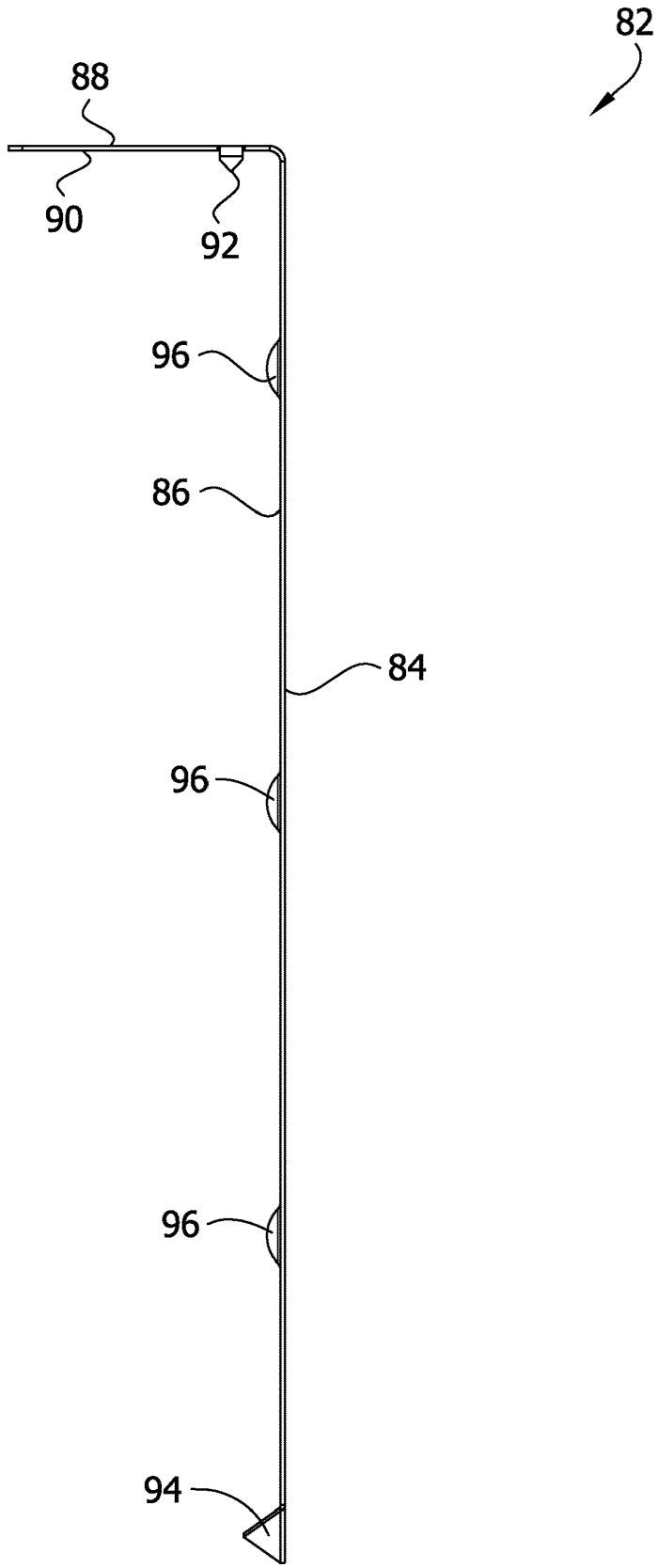
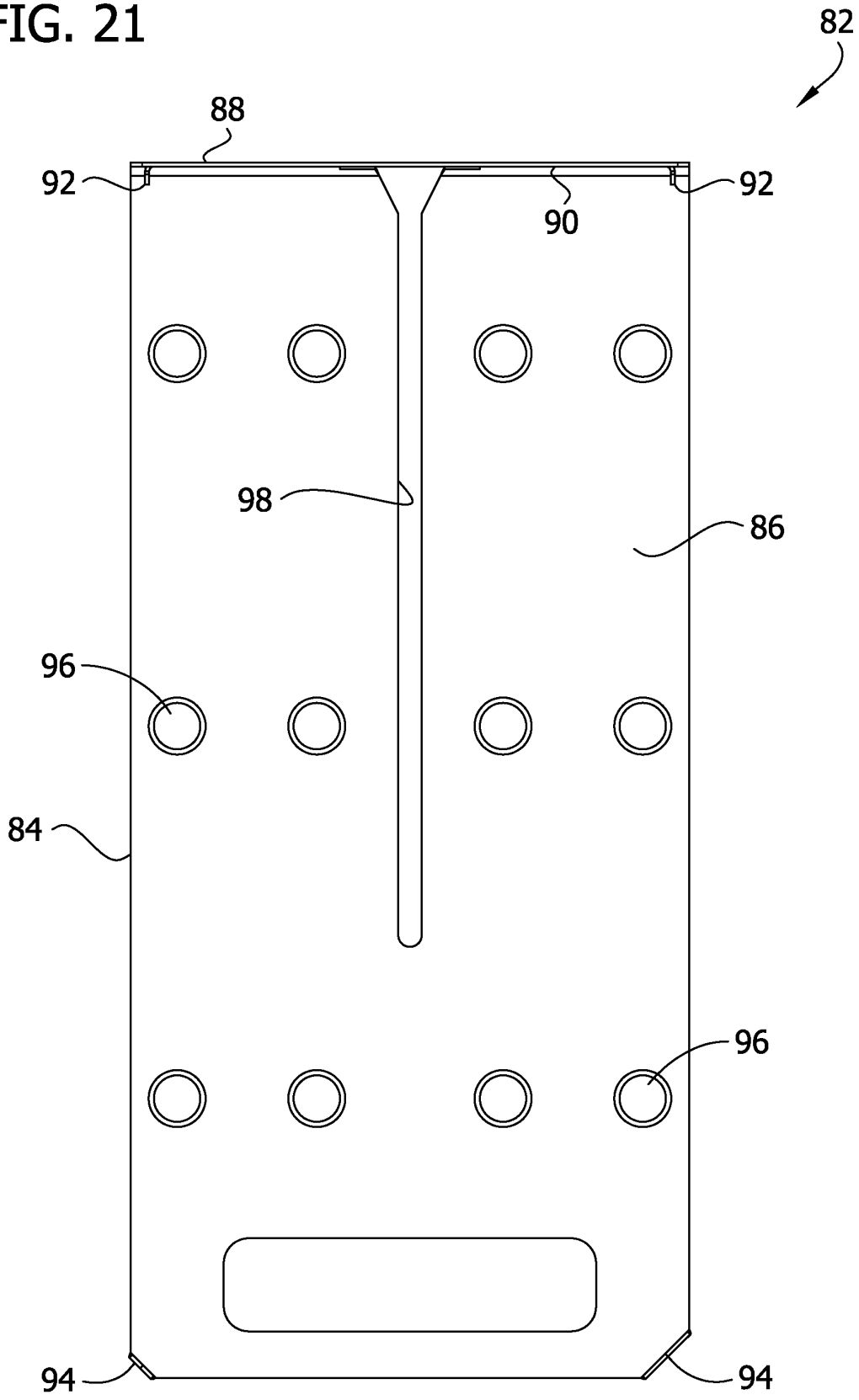


FIG. 21



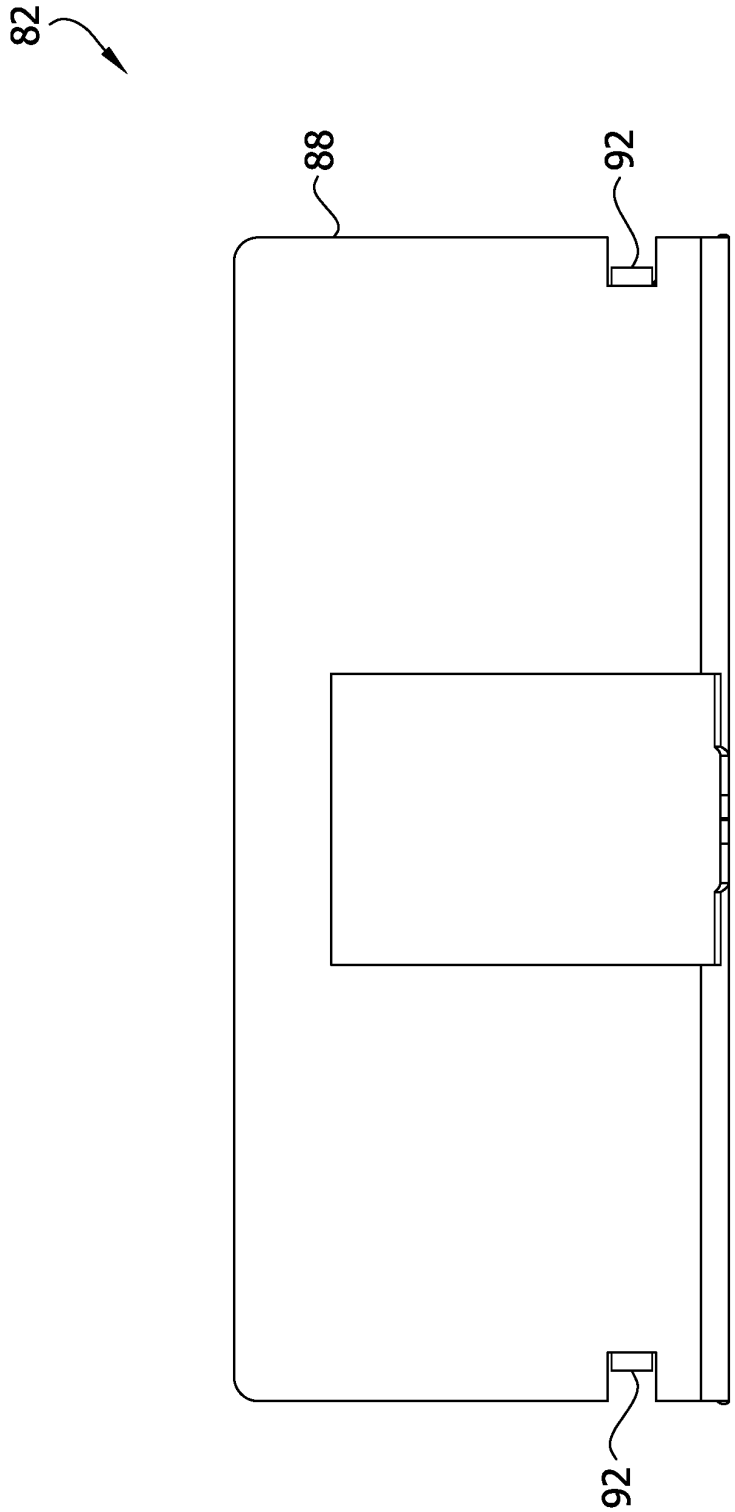


FIG. 22

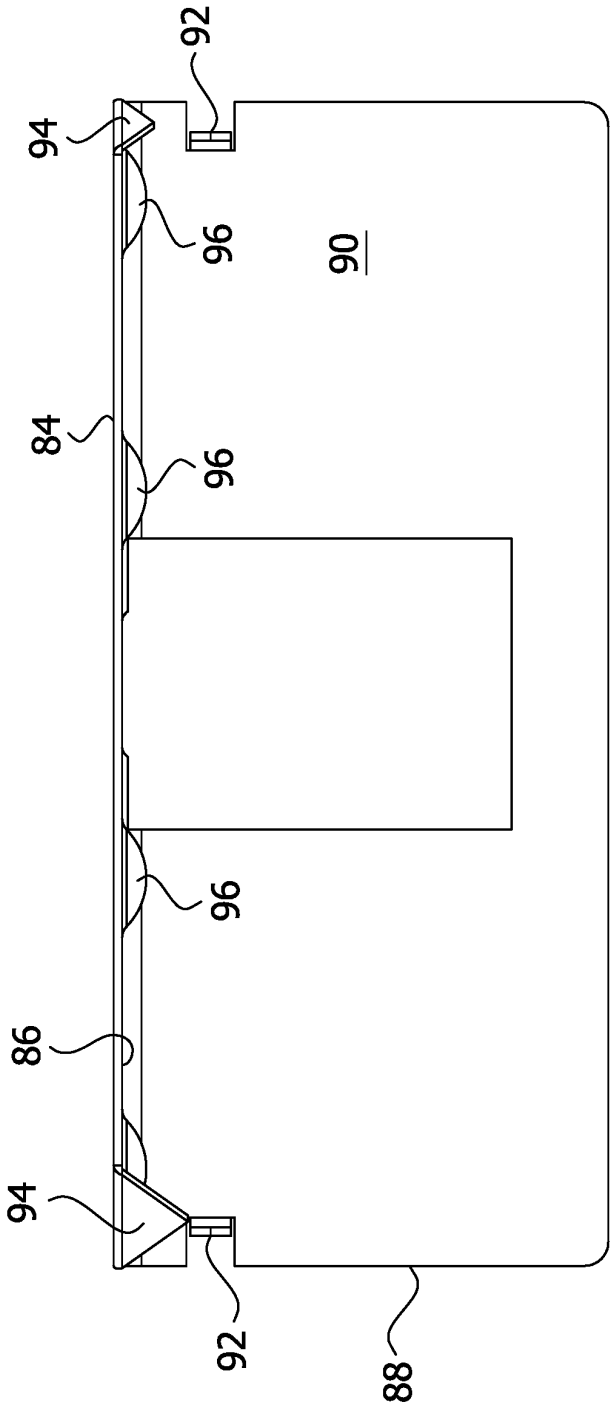


FIG. 23

FIG. 24

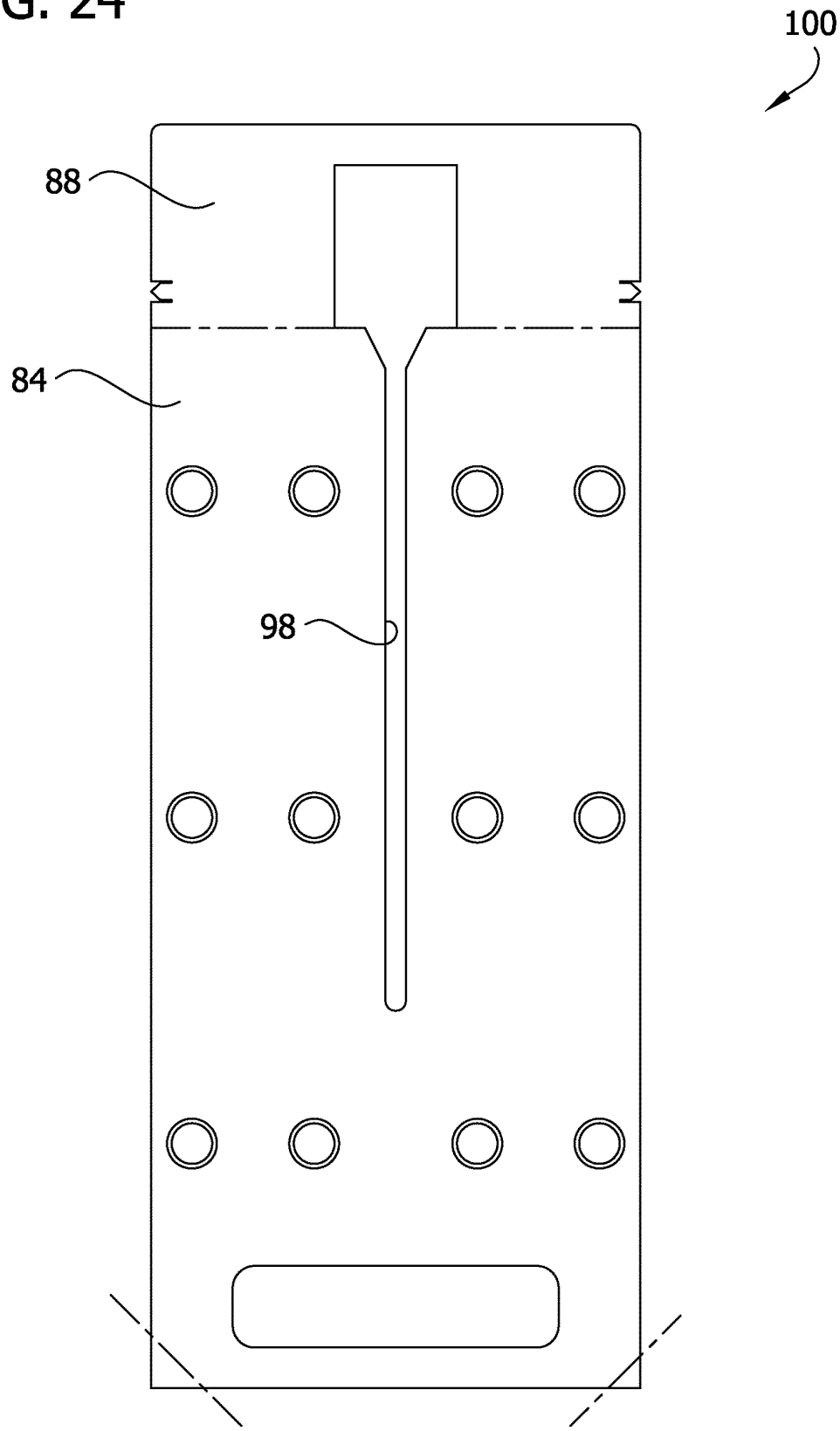


FIG. 25

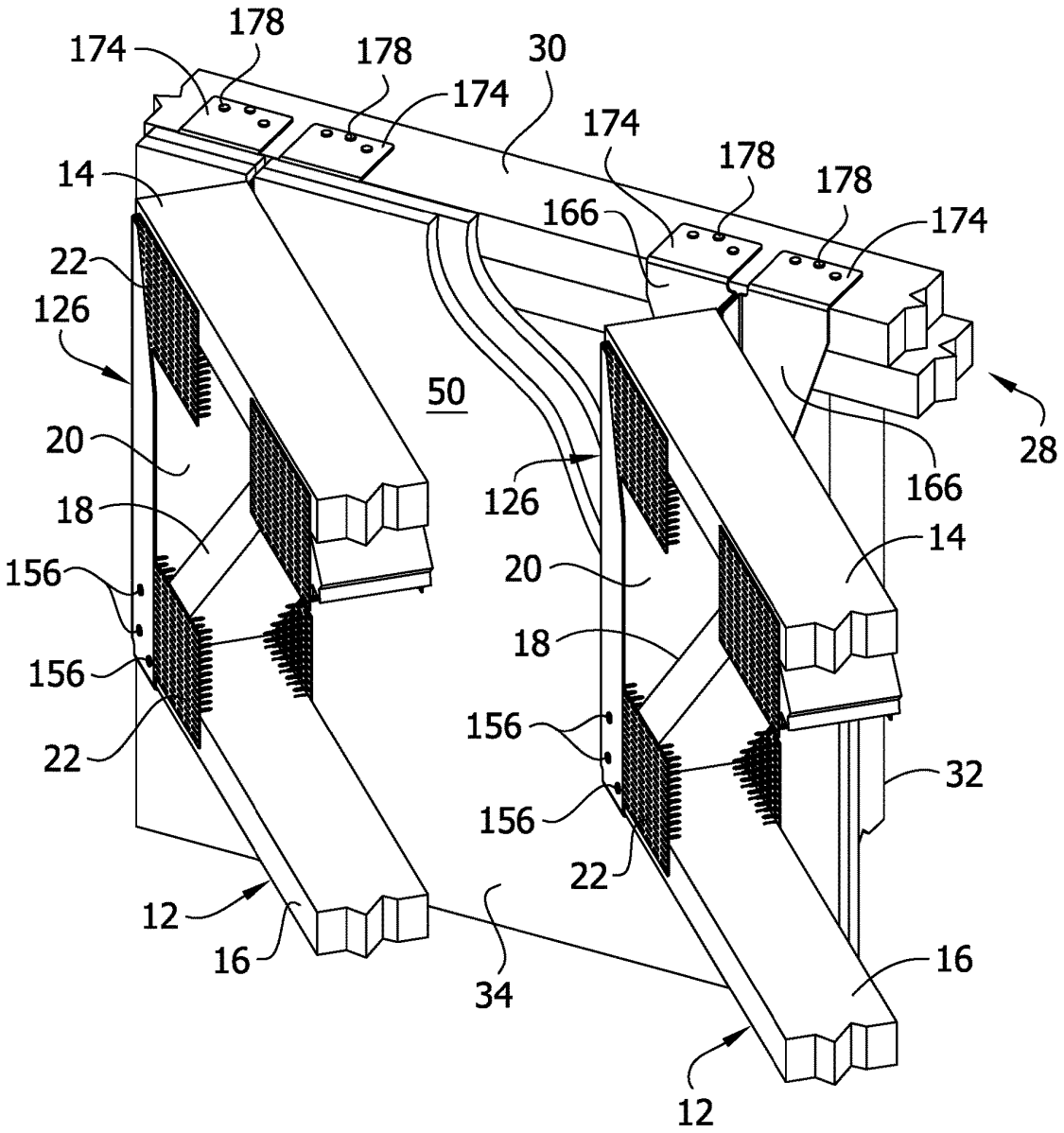

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FIG. 26

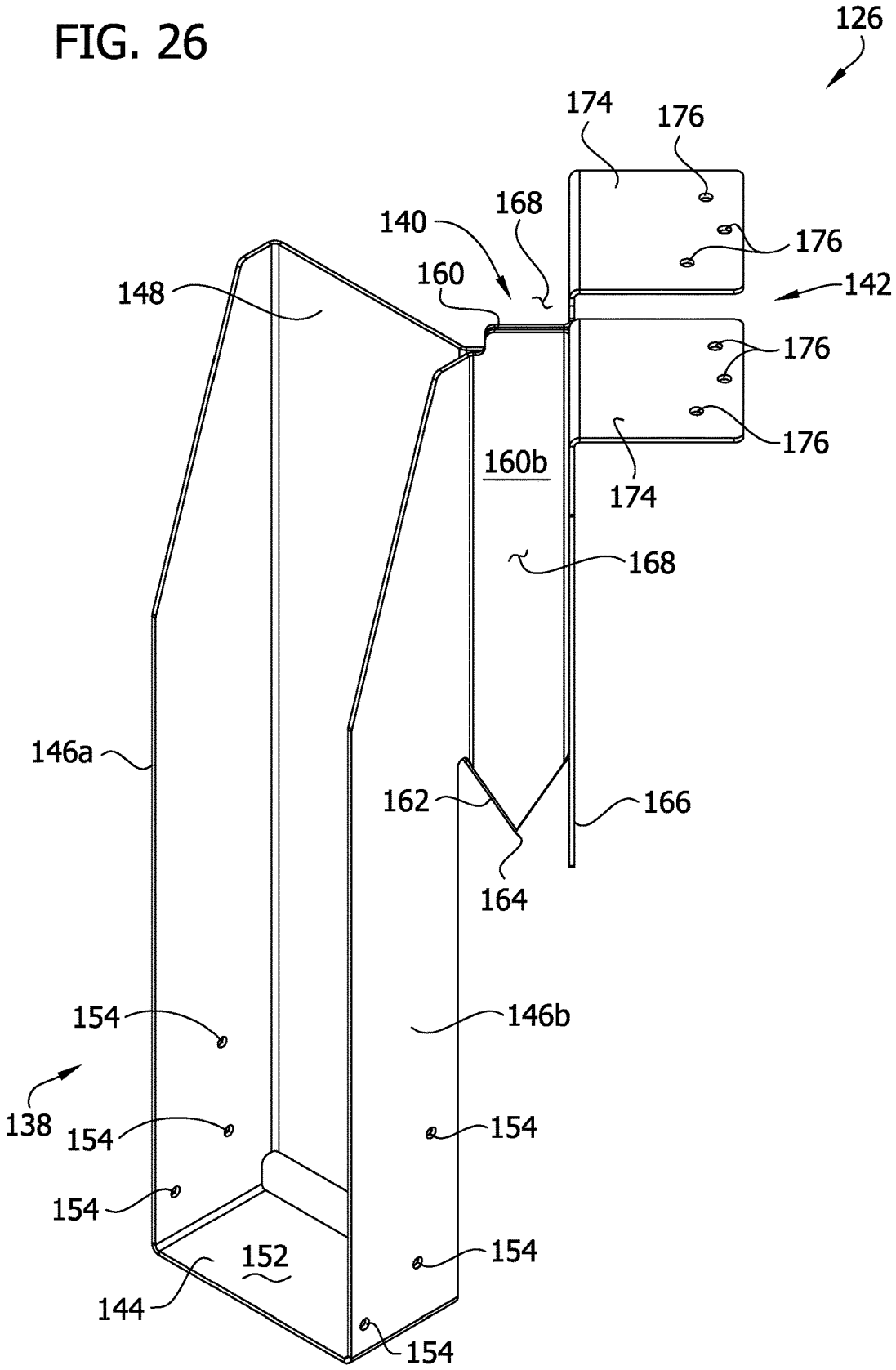

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FIG. 27

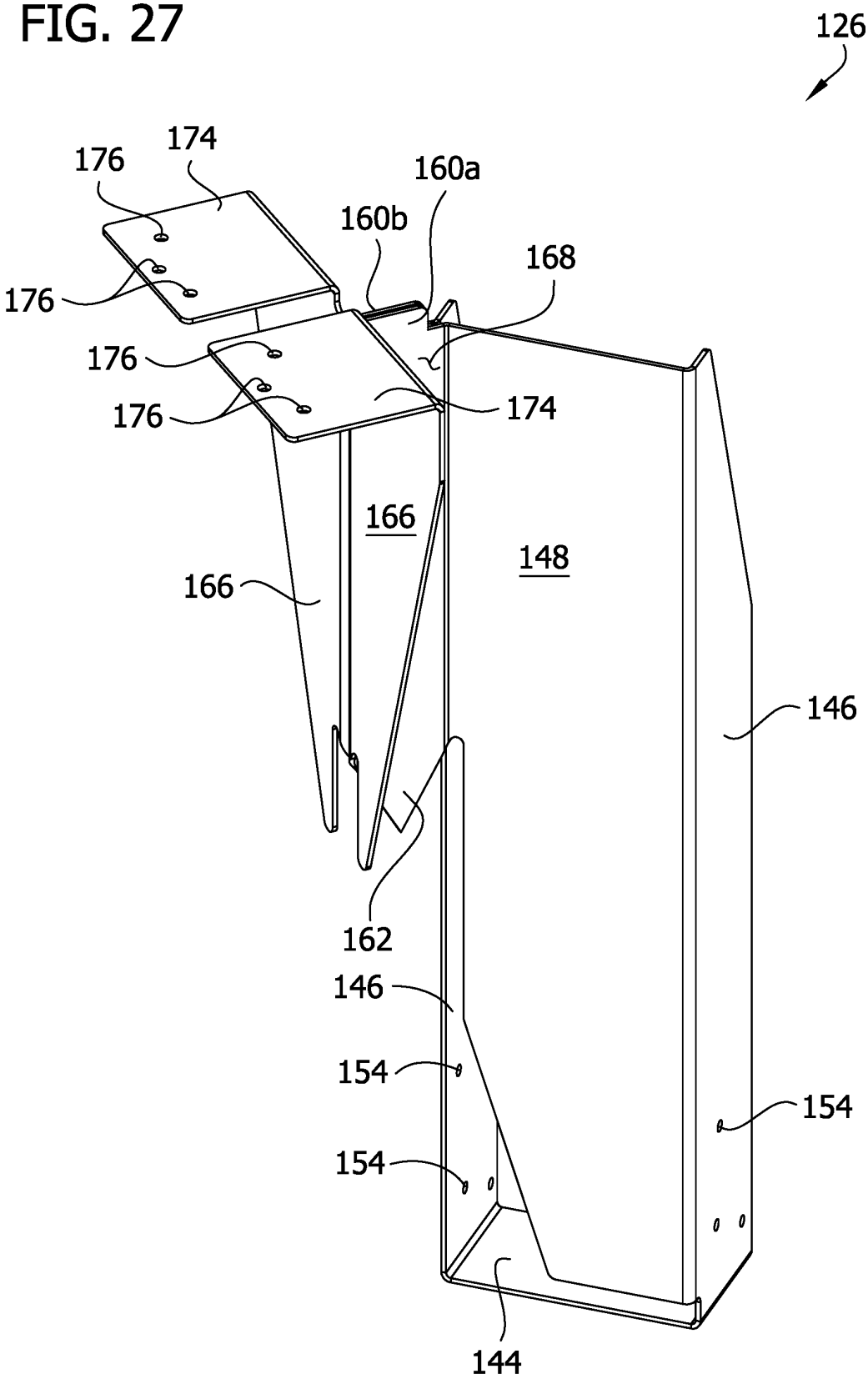

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FIG. 28

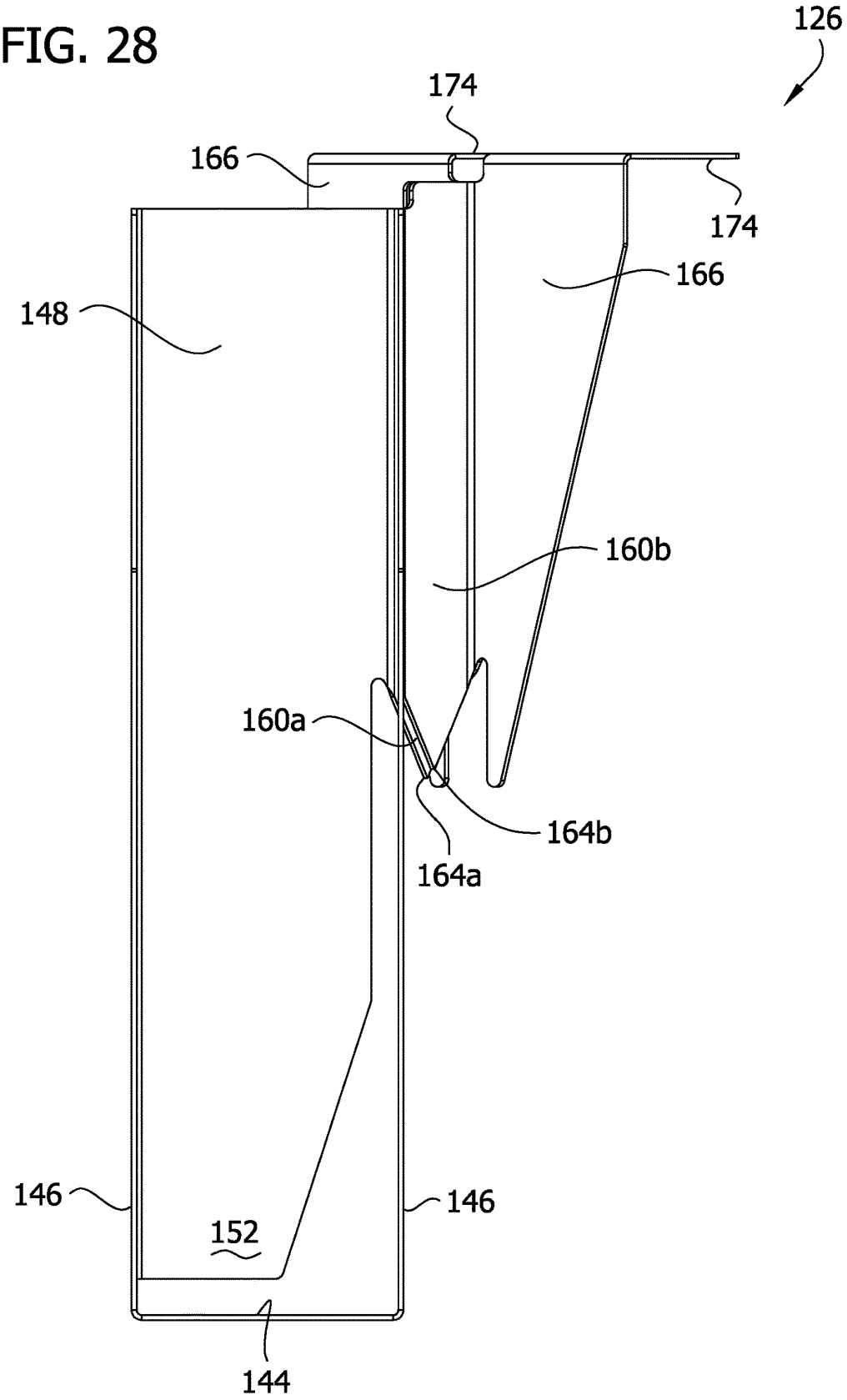


FIG. 29

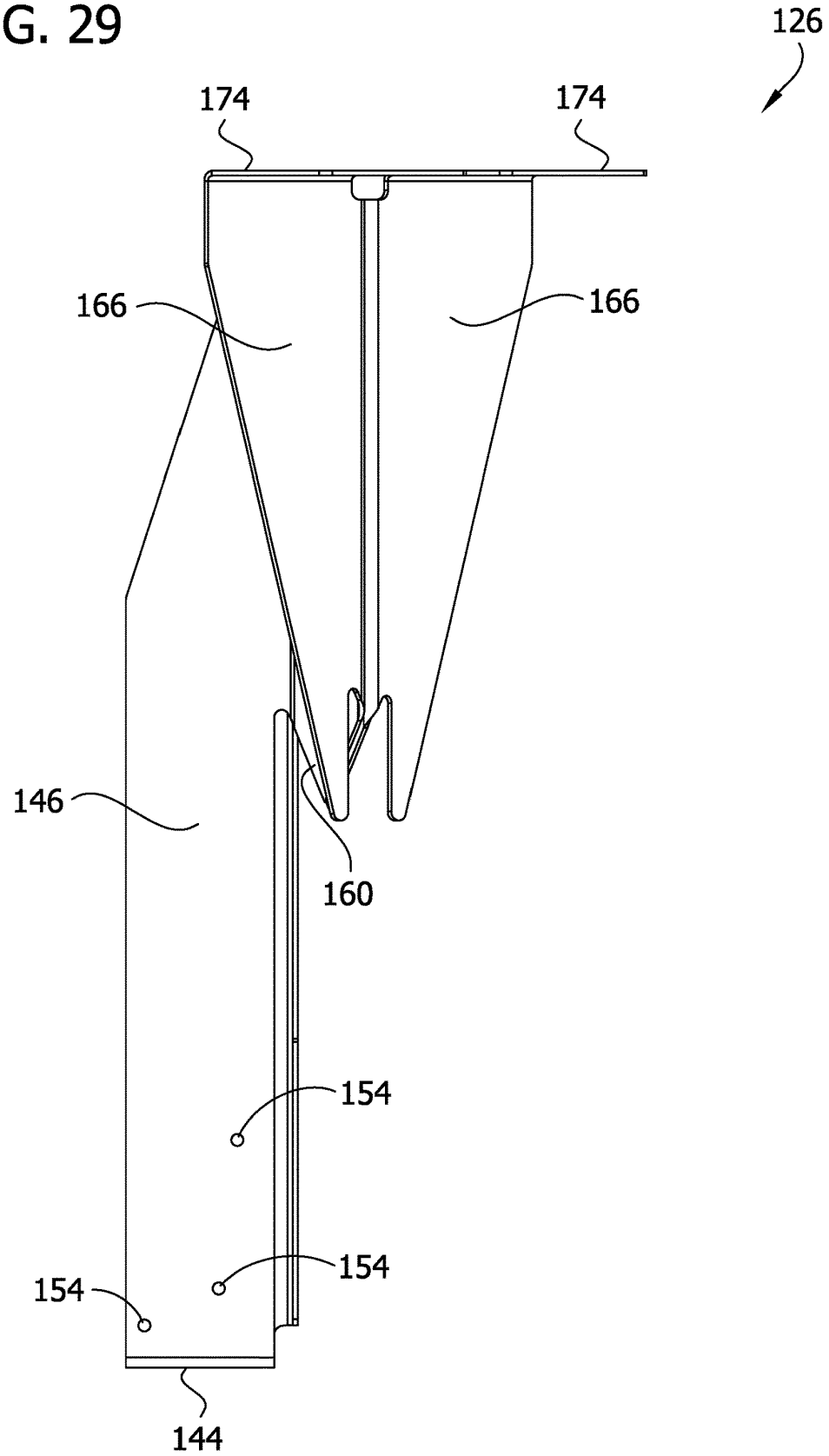


FIG. 30

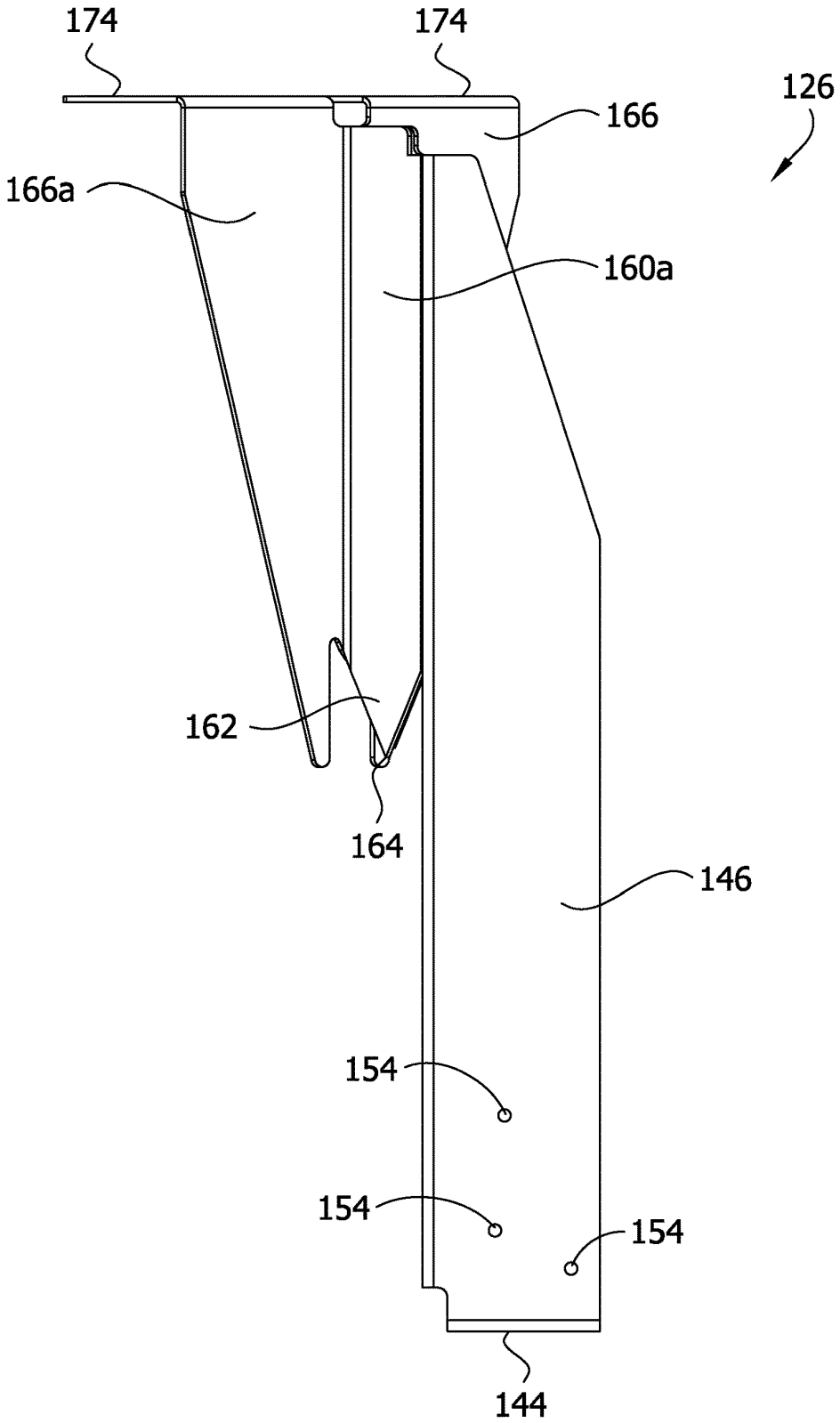
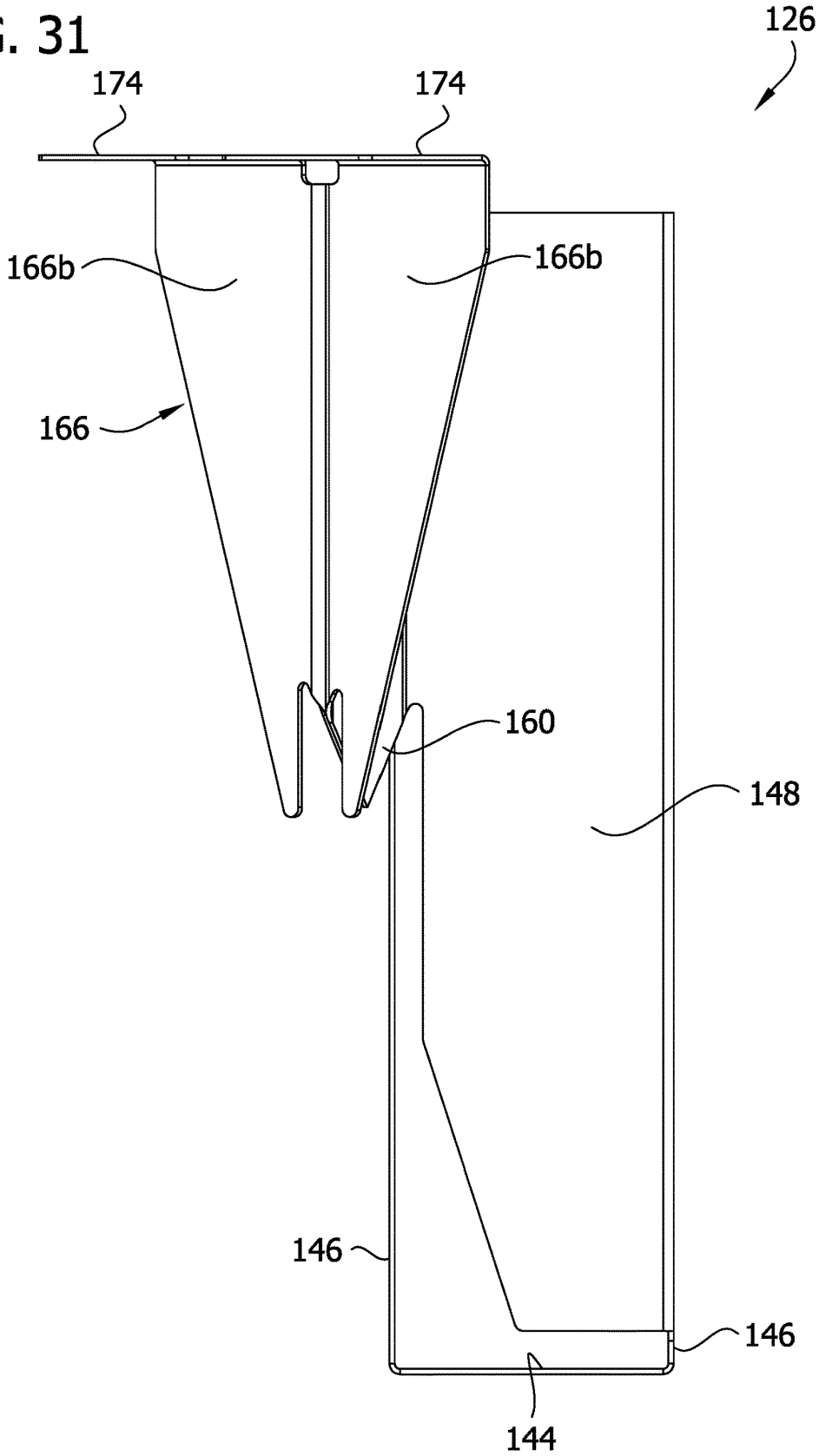


FIG. 31



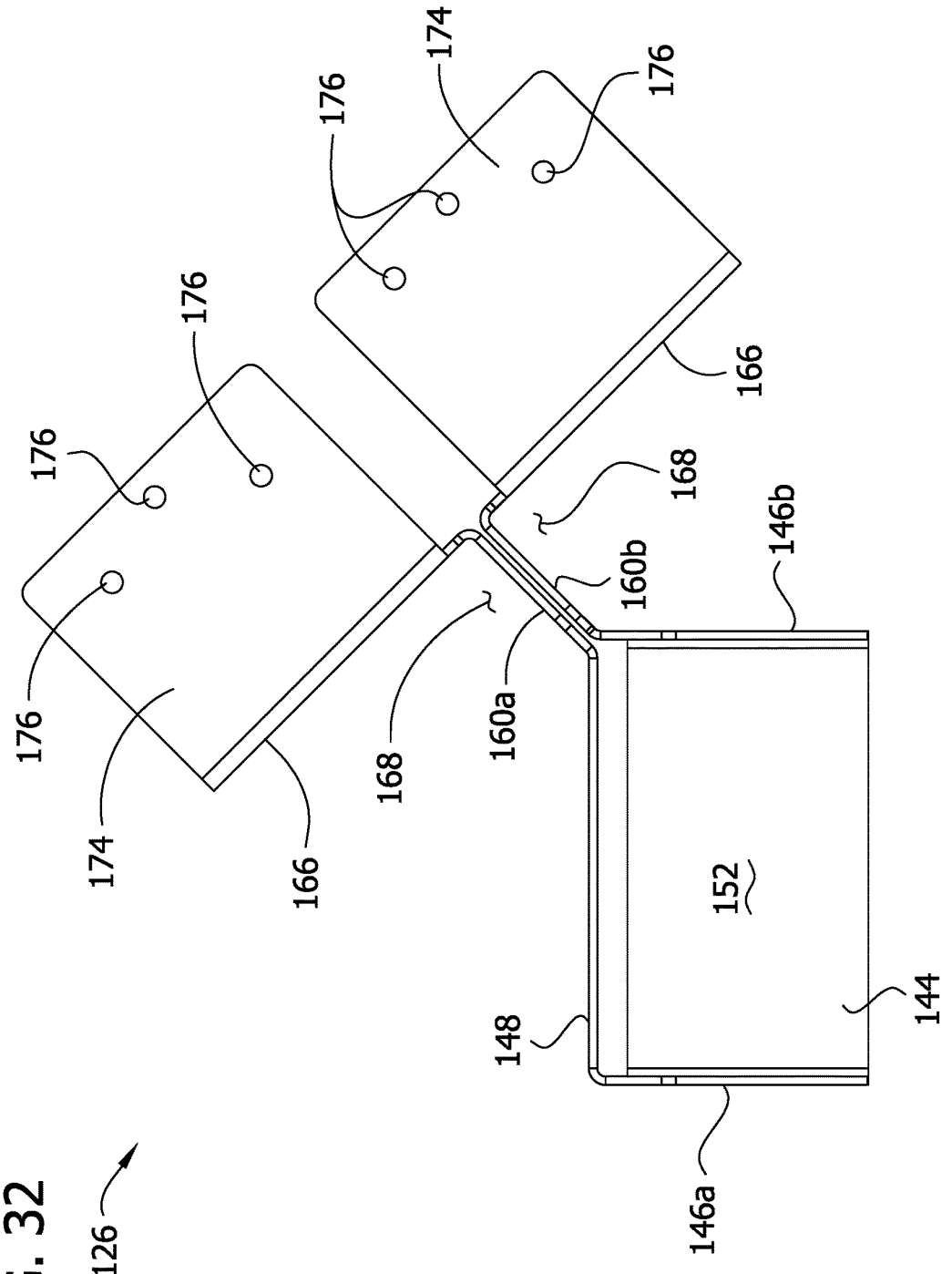


FIG. 32

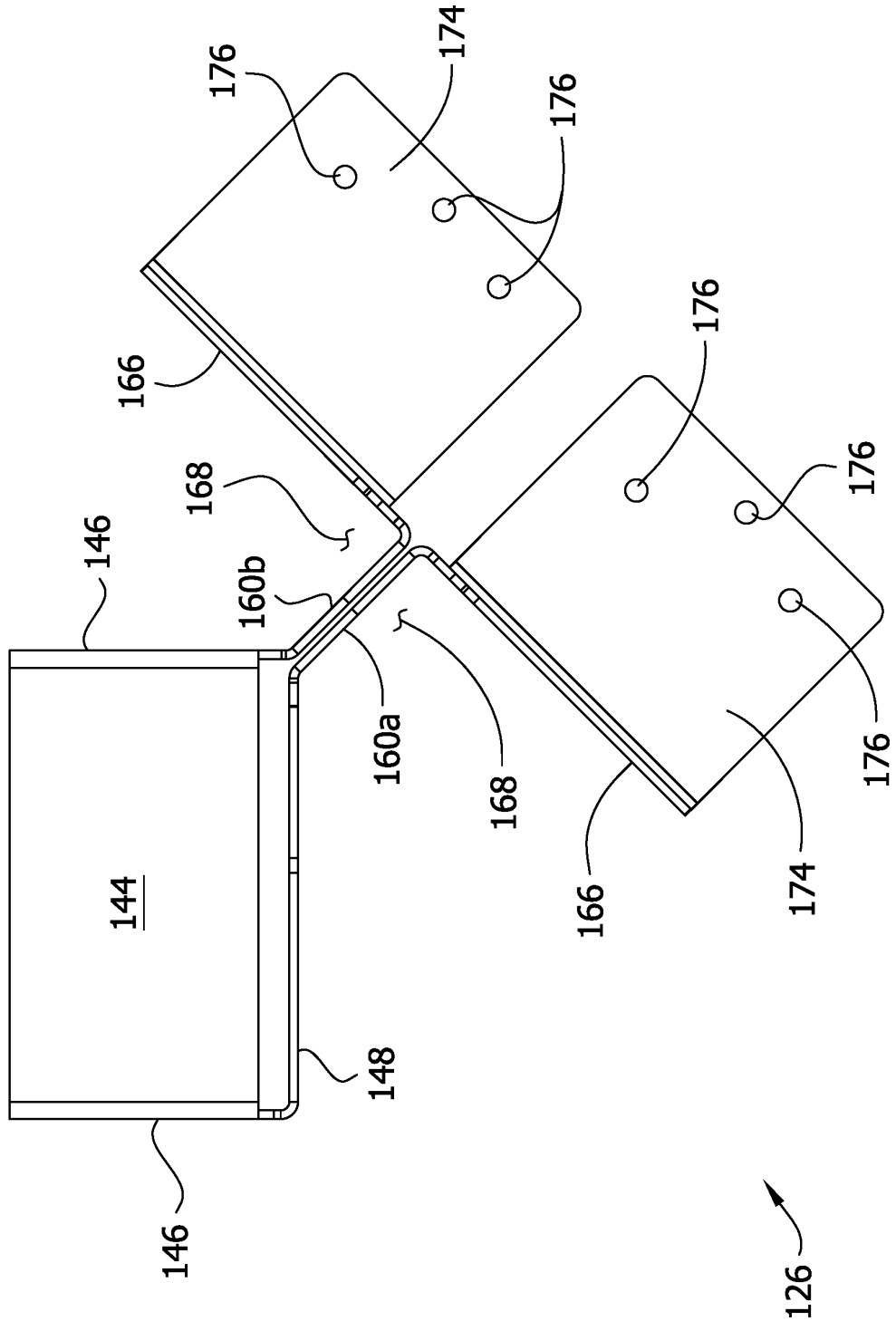

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FIG. 33

FIG. 34

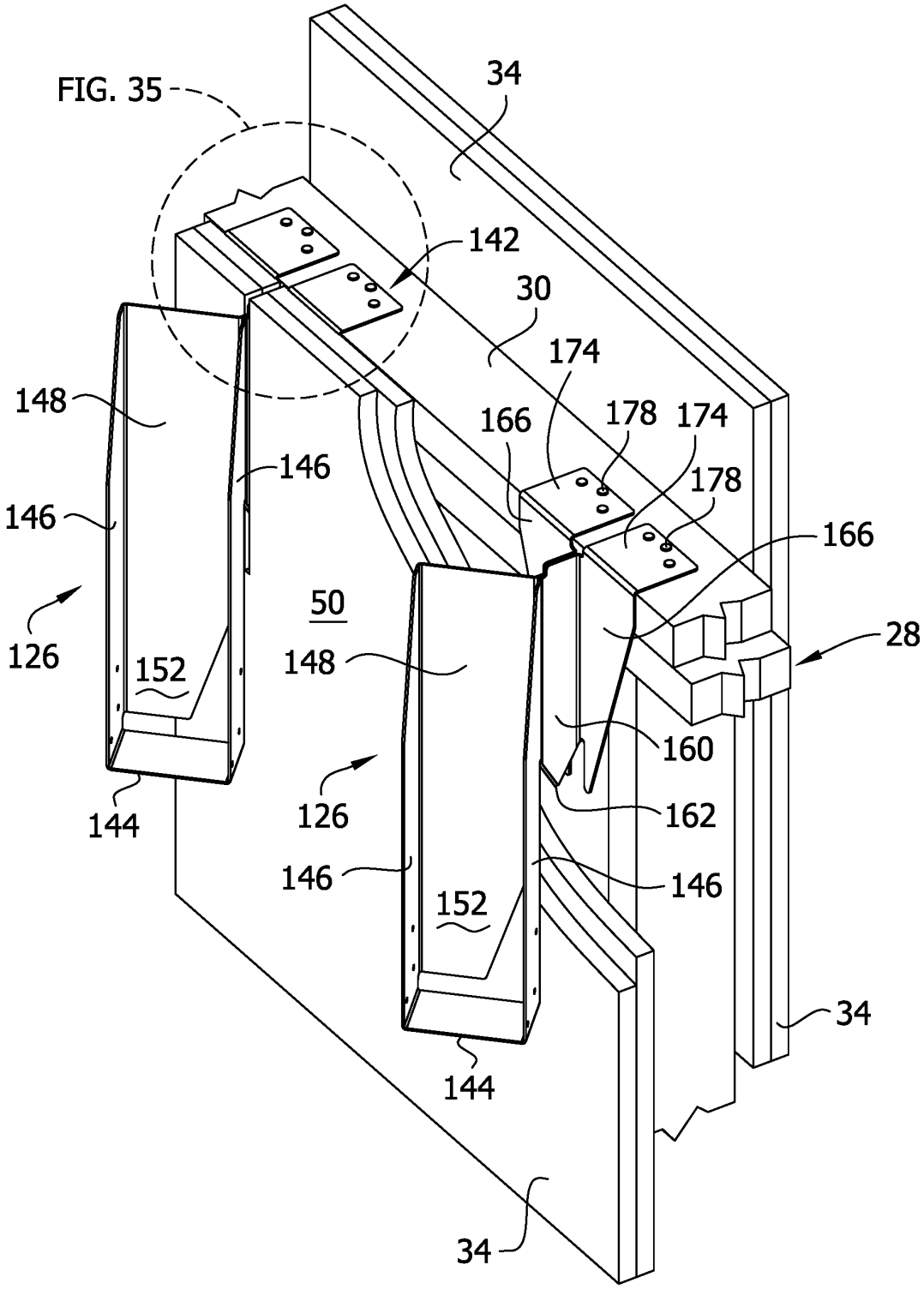
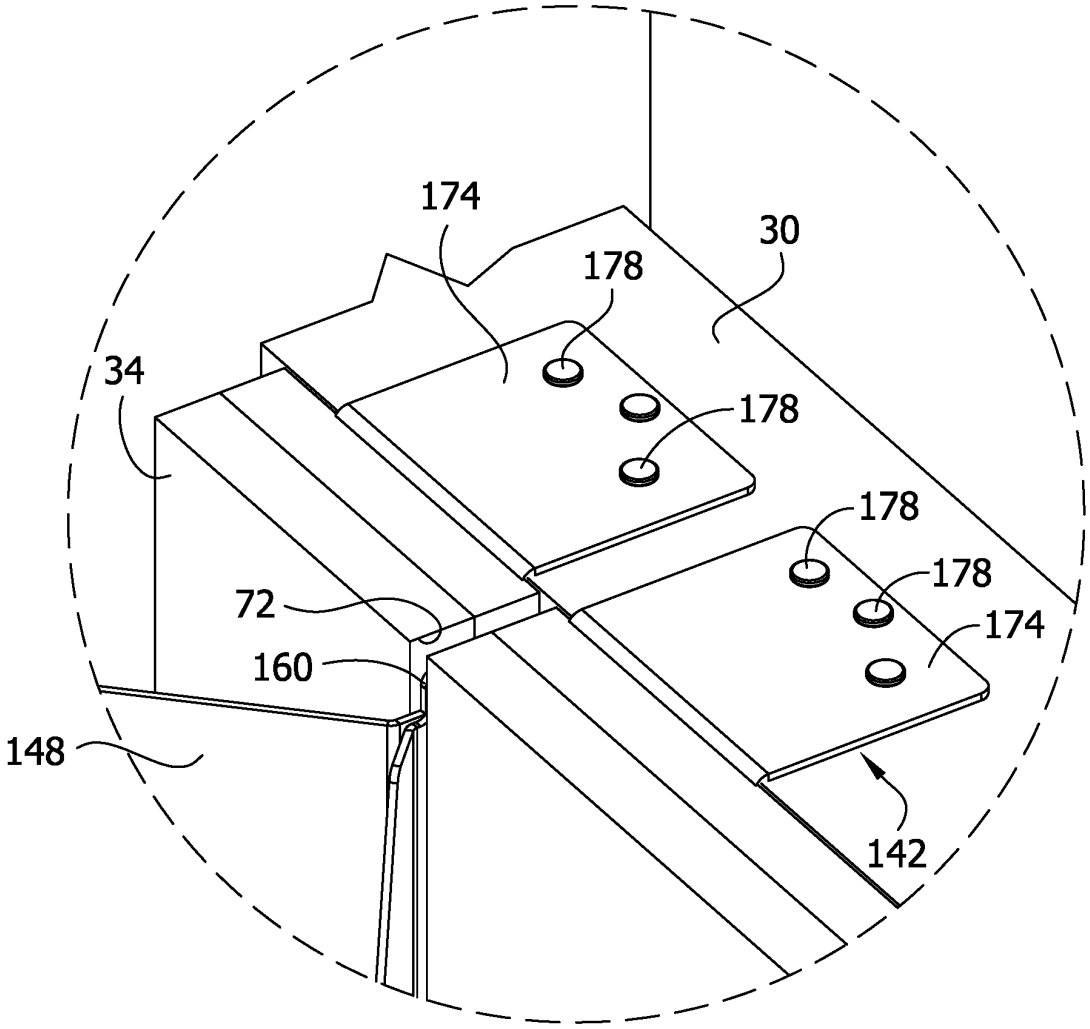

FIG. 35
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FIG. 35



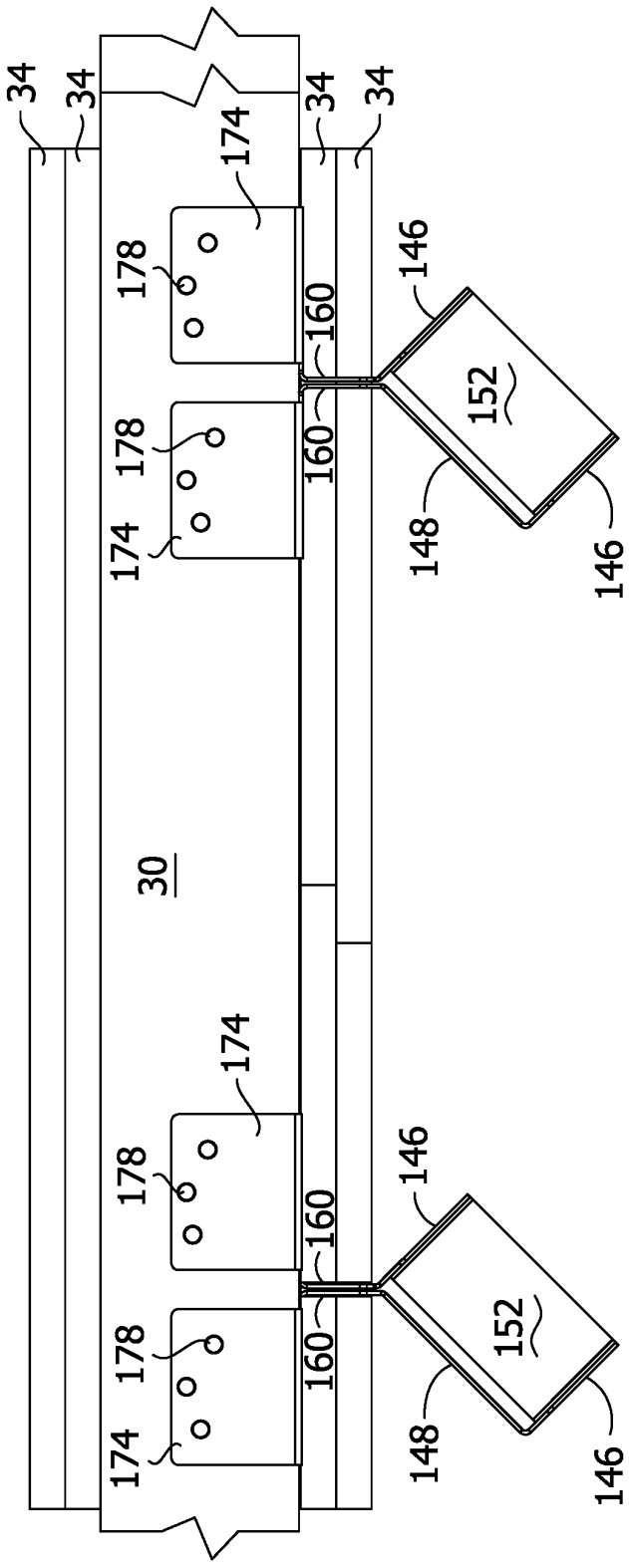

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FIG. 36

FIG. 37

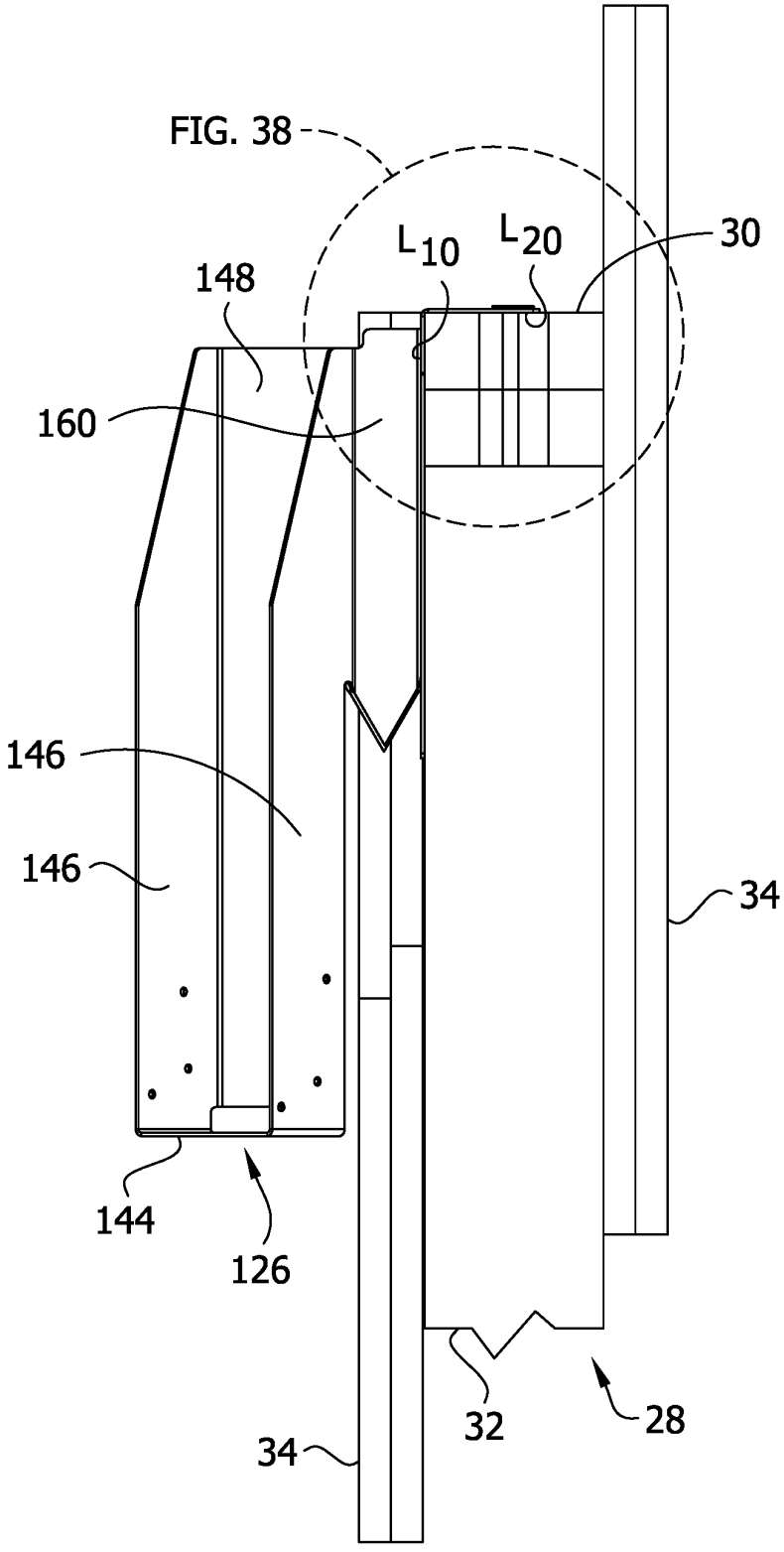
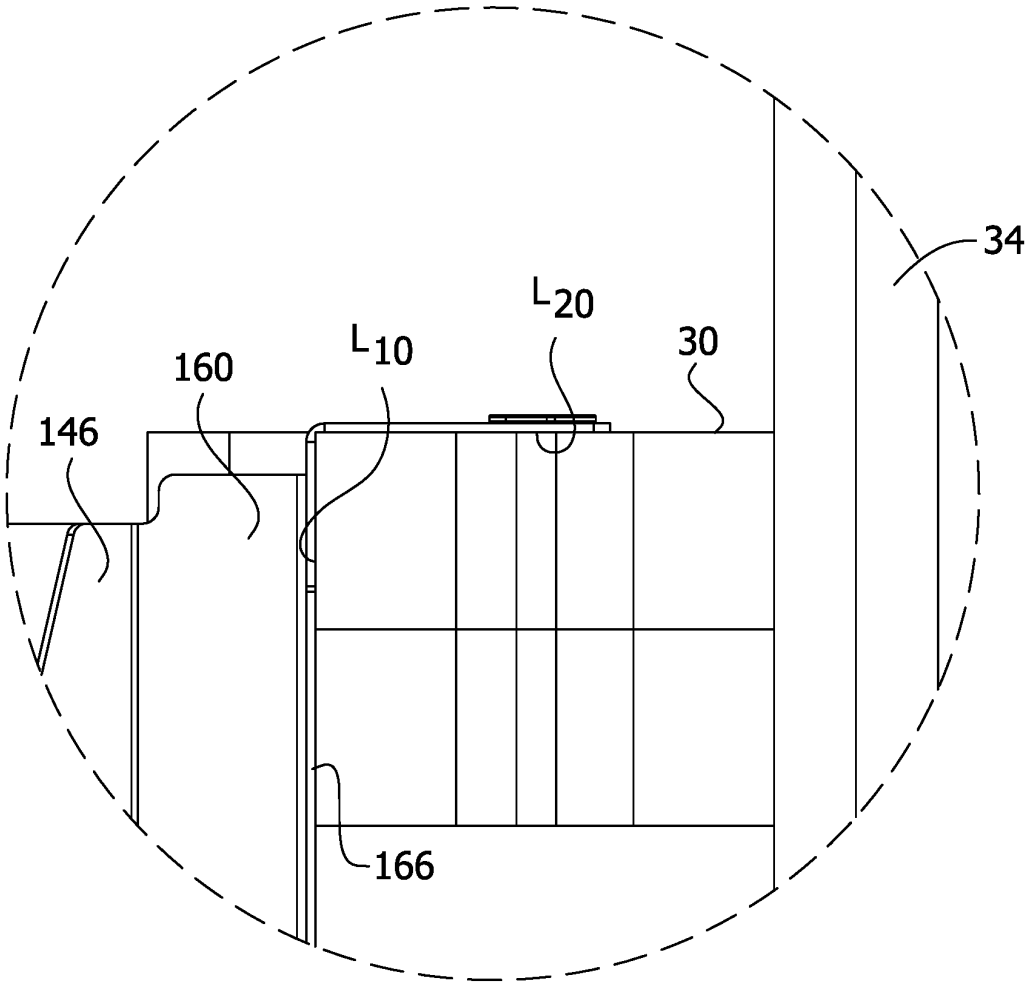


FIG. 38



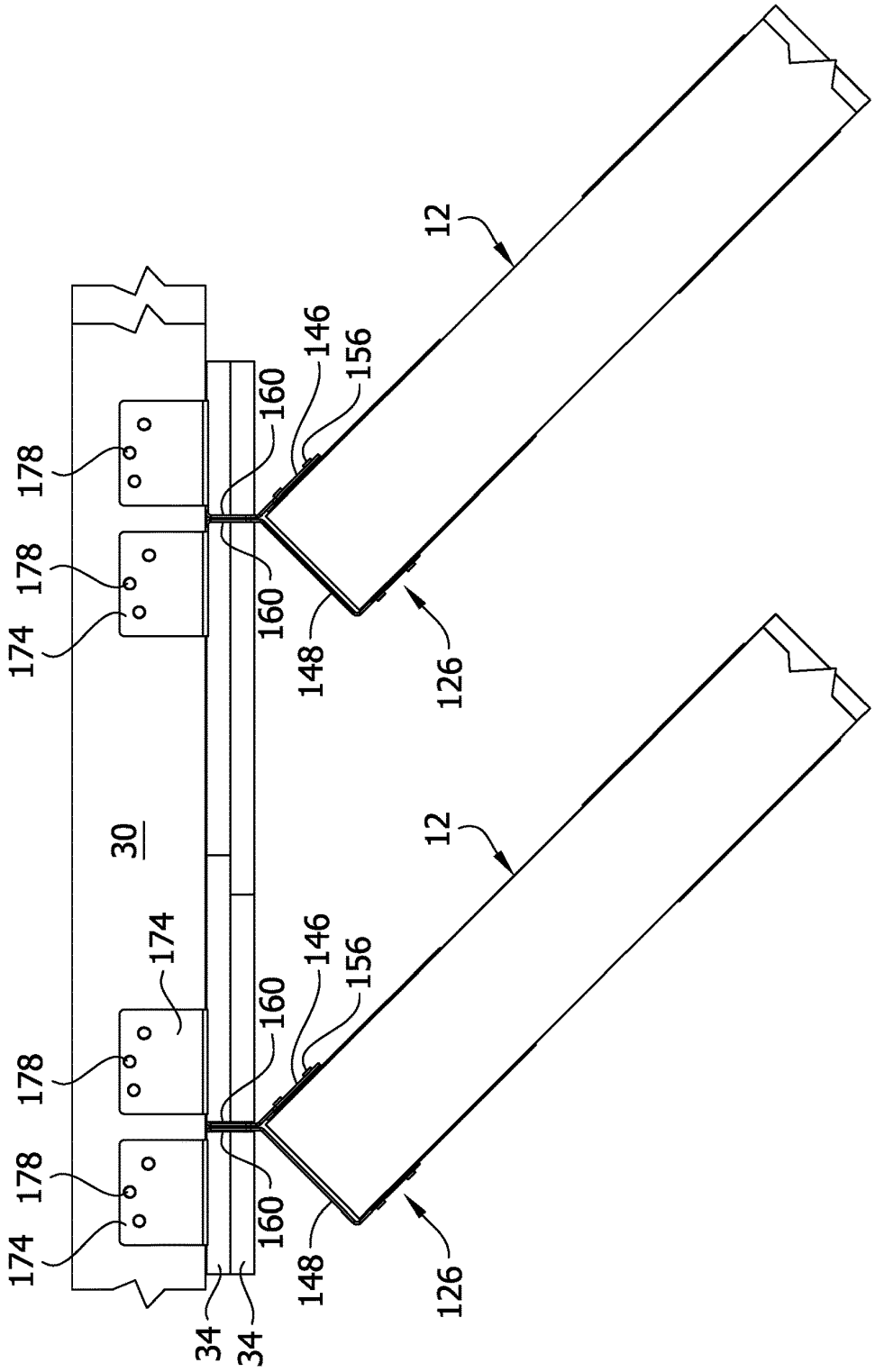
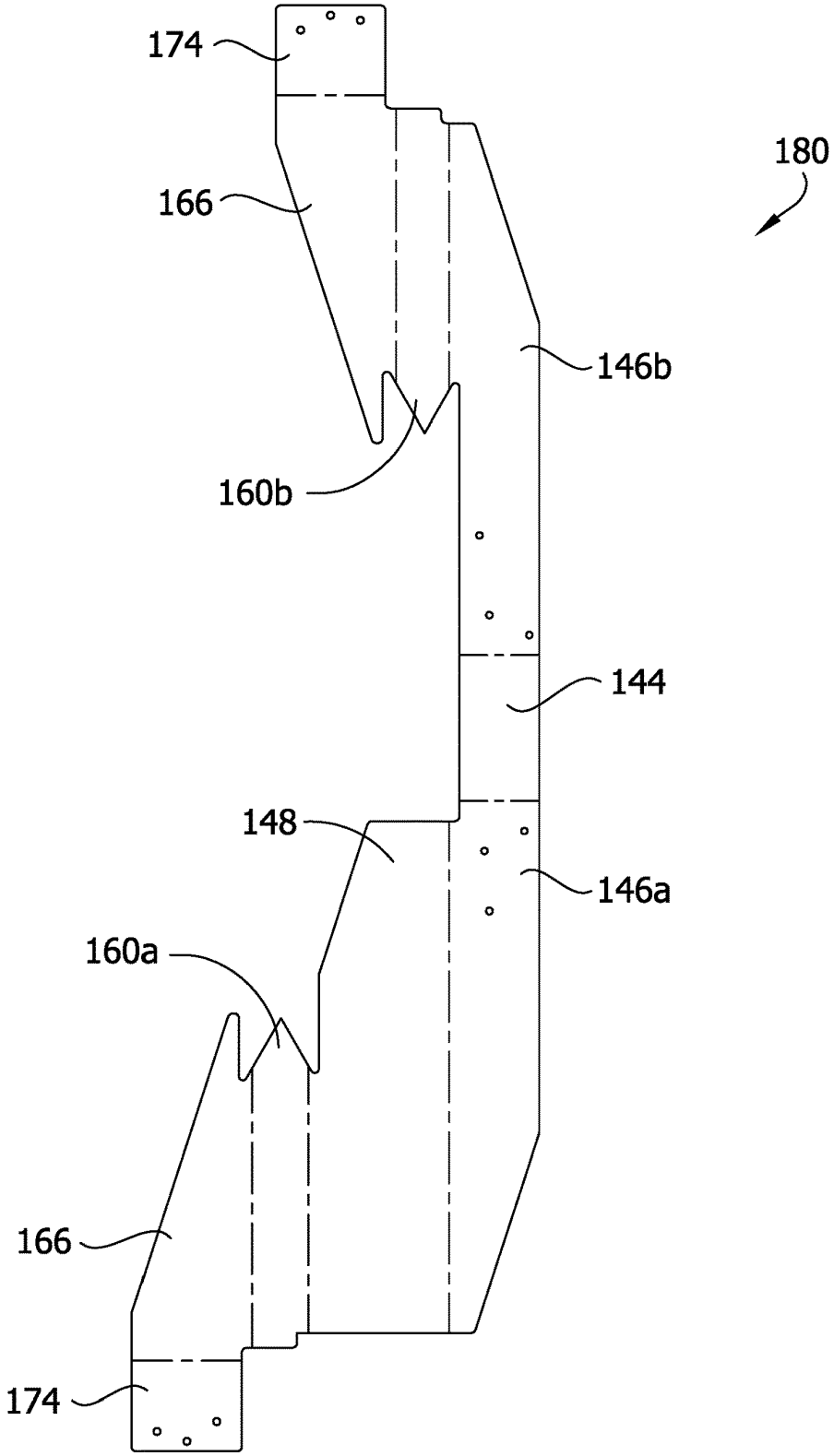

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FIG. 39

FIG. 40



HANGER FOR FIRE SEPARATION WALL

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 16/433,799, filed Jun. 6, 2019, which is a continuation of U.S. application Ser. No. 16/225,517, filed Dec. 19, 2018, now U.S. Pat. No. 10,316,510, which is a continuation of U.S. application Ser. No. 15/675,409, filed Aug. 11, 2017, now U.S. Pat. No. 10,184,242, which is a continuation of U.S. application Ser. No. 14/555,049, filed Nov. 26, 2014, now U.S. Pat. No. 10,024,049, which claims priority to U.S. Provisional Application No. 61/922,531, filed Dec. 31, 2013, the entirety of which are incorporated herein by reference.

FIELD OF THE INVENTION

The present invention generally relates to connections for structures, and more specifically, a truss hanger for connecting a truss to a wall including fire retardant sheathing.

BACKGROUND

The use of fire separation walls in structures, such as in multifamily housing, is commonplace. Often, fire separation is required to be continuous along the walls between adjoining units to prevent fire from spreading between the adjoining units in a multifamily structure. For some types of construction, the building codes also require exterior walls to be fire rated. Typically, gypsum board is used as a fire retardant sheathing along these walls. Floor trusses or joists are attached to or hung from the walls including the gypsum board, but cannot be hung from the gypsum board itself. The trusses or joists must therefore be attached to the wall framing. A cutout for the entire cross section of the truss leaves a large discontinuity in the fire retardant sheathing. However, building codes require that the fire separation wall maintain a certain fire resistant rating. Thus, the integrity of the fire retardant sheathing should be maintained and interruptions of the sheathing kept to a minimum.

SUMMARY

In one aspect of the present invention, a hanger for connecting a structural component to a wall having sheathing mounted thereon includes a channel-shaped portion configured to receive the structural component. The channel shaped portion includes a bottom wall, side walls extending from opposite edges of the bottom wall and a back wall. The bottom wall, side walls and back wall are sized and arranged to receive an end of the structural component for supporting the end of the structural component. A connection portion includes a top flange extending away from the back wall of the channel-shaped portion in a direction opposite to the bottom wall of the channel-shaped portion. The top flange is configured for attachment to a top surface of a top plate of the wall. The connection portion further includes a back flange extending from an edge of the top flange in a direction toward the bottom wall of the channel-shaped portion. The back flange of the connection portion faces the back wall of the channel-shaped portion and the back flange and back wall define a space sized to receive the sheathing between the back flange and the back wall. An extension portion extends from the channel-shaped portion to the connection portion and interconnects the channel-shaped portion and the connection portion. The extension portion separates the back wall of the channel-shaped portion from the back flange of the connection portion to define the space sized to receive the sheathing.

In another aspect pf the present invention a hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon generally comprises a channel-shaped portion configured to receive the structural component. An extension portion extends from the channel-shaped portion and is configured to extend through the sheathing to engage the wall at a first location. The extension portion includes extension flanges extending from the channel-shaped portion forming a bend between each extension flange and the channel-shaped portion. Each of the extension flanges is configured to extend through the sheathing. A connection portion is fixed in position relative to the channel-shaped portion such that that channel-shaped portion does not rotate relative to the connection portion. The connection portion is configured for attachment to the wall at a second location spaced from the first location. The extension flanges define planar surfaces disposed in opposed face-to-face relation between the connection portion and the channel-shaped portion.

In another aspect of the present invention, a truss hanger for connecting a truss to a wall adapted to have fire resistant sheathing mounted thereon generally comprises a channel-shaped portion configured to receive the truss. The channel-shaped portion includes a base sized and shaped for receiving a truss chord of the truss thereon, side panels extending upward from the base, and a back panel. The back panel extends orthogonally from one of the side panels. An extension portion extends from the channel-shaped portion and is configured to extend through the fire resistant sheathing. The extension portion includes extension flanges. Each of the extension flanges extends away from the base of the channel-shaped portion. A connection portion includes a top flange extending away from the back panel of the channel-shaped portion in a direction opposite to the base of the channel-shaped portion. The top flange is configured for attachment to a top surface of a top plate of the wall. The connection portion further includes a back flange extending from an edge of the top flange in a direction toward the base of the channel-shaped portion.

A hanger for connecting a structural component to a wall having sheathing mounted thereon generally comprises a channel-shaped portion configured to receive the structural component. An extension portion is configured to be disposed at least partially in the sheathing. A connection portion is configured for attachment to the wall.

Other objects and features will be in part apparent and in part pointed out hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary perspective of adjacent floor trusses connected to a wall having fire retardant sheathing by truss hangers that extend through the sheathing;

FIG. **2** is a perspective of a truss hanger according to a first embodiment of the present invention;

FIG. **2A** is a rear perspective of the truss hanger;

FIG. **3** is a front elevation thereof;

FIG. **4** is a right side elevation thereof;

FIG. **5** is a left side elevation thereof;

FIG. **6** is a rear elevation thereof;

FIG. **7** is a top plan thereof;

FIG. **8** is a bottom plan thereof;

FIG. **9** is a perspective of a wall having fire retardant sheathing with a slot cut in the sheathing to receive the truss hanger;

FIG. **10** is the perspective of FIG. **9**, but showing two of the truss hangers mounted thereon;

FIG. **10**A is an enlarged fragmentary perspective of FIG. **10**;

FIG. **11** is a top plan of FIG. **10**, illustrating the truss hanger extending through the fire retardant sheathing;

FIG. **12** is a perspective similar to FIG. **10**, but showing a floor truss positioned for mounting in the truss hanger;

FIG. **13** is a side elevation of FIG. **12**;

FIG. **13**A is an enlarged fragmentary perspective of FIG. **13** with a portion of the fire retardant sheathing broken away;

FIG. **14** is the perspective of FIG. **10**, but showing floor trusses mounted in the truss hangers;

FIG. **14**A is an enlarged fragmentary perspective of FIG. **14**;

FIG. **15** is a top view of a stamped metal blank for forming a truss hanger according to the present invention;

FIG. **16** is a perspective of a slot template for use in cutting the slot in the sheathing to receive the truss hanger;

FIG. **17** is a rear perspective of the slot template;

FIG. **18** is a front elevation thereof;

FIG. **19** is a right side elevation thereof;

FIG. **20** is a left side elevation thereof;

FIG. **21** is a rear elevation thereof;

FIG. **22** is a top plan thereof;

FIG. **23** is a bottom plan thereof;

FIG. **24** is a front view of a stamped metal blank for forming the slot template;

FIG. **25** is a fragmentary perspective of adjacent floor trusses connected at an angle to a wall having fire retardant sheathing by truss hangers of a second embodiment that extend through the sheathing;

FIG. **26** is a perspective of one of the truss hangers of FIG. **25**;

FIG. **27** is a rear perspective thereof;

FIG. **28** is a front elevation thereof;

FIG. **29** is a right side elevation thereof;

FIG. **30** is a left side elevation thereof;

FIG. **31** is a rear elevation thereof;

FIG. **32** is a top plan thereof;

FIG. **33** is a bottom plan thereof;

FIG. **34** is a perspective of a wall and the two truss hangers mounted thereon with parts broken away;

FIG. **35** is an enlarged fragmentary perspective of FIG. **34**;

FIG. **36** is a top plan of FIG. **34**, illustrating the truss hangers extending through the fire retardant sheathing;

FIG. **37** is a side elevation of FIG. **34**;

FIG. **38** is an enlarged fragment of FIG. **37**;

FIG. **39** is a top plan similar to FIG. **36**, but showing a floor truss mounted in each truss hanger; and

FIG. **40** is a front view of a stamped metal blank for forming a truss hanger according to the present invention.

Corresponding reference characters indicate corresponding parts throughout the drawings.

DETAILED DESCRIPTION

Referring to FIG. **1**, a first embodiment of a connection system for a fire separation wall is shown generally at **10**. Floor trusses generally indicated at **12** each include truss members (broadly, "wooden structural members") including a top chord **14**, a bottom chord **16**, and web members **18** joining the top and bottom chords. Each floor truss also includes end members **20** at each end joining the top and bottom chords **14**, **16** (only one end of each truss is shown). The truss members can be joined by nail plates **22** or by any other suitable fastening structure. The number and orientations of the web members **18** and chords **14**, **16** may vary from the illustrated embodiment without departing from the scope of the invention, as a truss hanger **26** according to the present invention is readily applicable to other truss configurations (e.g. a roof truss). Moreover, the hanger **26** may be used to connect structural components other than trusses to a wall or other part of a structure. The hanger can be used to support other wood framing members such as solid sawn or structural composite lumber.

As seen in FIG. **1**, a wall **28** includes a top member or plate **30** and support members or studs **32** (only one stud may be seen in FIG. **1**). As illustrated, the top plate **30** is formed by two 2×4's in stacked relation. Fire retardant sheathing **34** is mounted on both sides of the wall **28**, as illustrated. In one embodiment, the fire retardant sheathing is gypsum board, such as two layers of ⅝" gypsum board mounted on each side of the wall **28** as illustrated, although other configurations of fire retardant sheathing are within the scope of the present invention. Other wall configurations, including different wall constructions and materials, are within the scope of the present invention. For example, the truss hangers **26** can be used with any wall assembly or fire-rated wall assembly, such as a 2-hour fire-resistive wall assembly. The floor trusses **12** are mounted on the wall **28** adjacent the fire retardant sheathing **34** by the truss hangers **26**. The truss hangers **26** extend through a narrow slot in the fire retardant sheathing **34** to maintain the integrity and fire retardant characteristics of the fire separation wall.

Referring to FIGS. **2-8**, the truss hanger **26** includes a channel-shaped portion **38**, an extension portion **40**, and a connection portion **42**. The channel-shaped portion **38** is configured to receive the floor truss **12**. The channel-shaped portion **38** includes a seat or base **44** and a pair of side panels **46** extending upward from the base. When installed, the base **44** is generally horizontal, and the side panels **46** extend generally vertical from the base. A back panel **48** extends from each of the side panels **46**. Each back panel **48** is generally perpendicular to both the side panels **46** and the base **44**. When installed, each back panel **48** extends generally parallel to an interior face **50** of the fire retardant sheathing **34**. The base **44**, side panels **46**, and back panels **48** form a channel **52** configured to receive the floor truss **12**.

As seen in FIGS. **1** and **12-14**A, the floor truss **12** is received in the channel **52** to attach the floor truss to the wall **28**. The bottom chord **16** of the floor truss **12** engages and rests upon (i.e., is supported by) the base **44**. The end member **20** of the floor truss **12** is positioned against the back panels **48** between the side panels **46**. The truss hanger **26** includes fastening structure for attaching the floor truss **12** to the truss hanger. Fastening structure can be of any type known in the art for attaching a connector to a wooden structural member, such as nailing teeth (not shown) struck from the material of the hanger. In the illustrated embodiment, the fastening structure comprises a hole to allow for insertion of a fastening member. More specifically, in one embodiment the fastening structure comprises nail holes **54** in the side panels **46** of the truss hanger **26**, and the fastening member comprises a nail **56** (see FIG. **12**). In the illustrated embodiment, nail holes **54** are positioned on each of the side panels **46** so that nails **56** can be inserted into both the bottom chord **16** and the end member **20** of the floor truss **12** to attach the hanger **26** to the floor truss **12**.

Referring again to FIGS. **2-8**, the extension portion **40** includes two extension flanges **60** configured to extend through the fire retardant sheathing **34**. Each flange **60** extends from one of the back panels **48**. The flanges **60** are positioned in opposed, face-to-face relation, and preferably engage each other along a juncture. Each flange **60** extends generally perpendicular from the corresponding back panel **48** and generally parallel to the side panels **46**. At a bottom edge, each flange **60** includes a driving point **62**. Each of the driving points **62** is generally triangular and includes a pointed tip **64**. As seen in FIGS. **3** and **6**, the tips **64** of the driving points **62** are vertically offset from each other. As illustrated, the tip **64***a* of one flange **60***a* extends vertically below the tip **64***b* of the other flange **60***b*. In one embodiment, the tips **64** are vertically offset from each other about ⅛", although other configurations are within the scope of the present invention, such as tips that are aligned or tips that are offset a smaller or larger amount.

A back flange **66** extends from each of the extension flanges **60**. Each back flange **66** extends generally perpendicular from the extension flange **60** and is oriented generally parallel to the back panels **48**. Referring to FIG. **13**A, the back flanges **66** engage the wall **28** at a first location L_1, which in the illustrated embodiment is a vertical face of the top plate **30** of the wall. The back panels **48**, extension flanges **60**, and back flanges **66** form a pair of sheathing channels **68**. Each sheathing channel **68** is configured to receive a portion of the fire retardant sheathing **34** to secure the sheathing between the hanger **26** and the wall **28**. As seen in FIG. **7**, the sheathing channels **68** extend generally perpendicular to the truss-receiving channel **52**.

As seen in FIGS. **10**A and **11**, the extension flanges **60** extend through a slot **72** in the fire retardant sheathing **34**. Preferably, the slot has an area less than or equal to 6 square inches, and the gap between the extension flanges **60** and the edge of the slot **72** is less than or equal to ⅛". The driving points **62** extend down into the sheathing **34** to further secure the sheathing between the hanger **26** and the wall **28**. A portion of the fire retardant sheathing **34** extends into each sheathing channel **68** and is secured between the back panels **48** and the back flanges **66**.

In one embodiment, the slot **72** in the fire retardant sheathing **34** can be made using a slot template **82** (FIGS. **16-24**). The slot template **82** includes a vertical panel **84** having a rear face **86** configured to engage the interior face **50** of the fire retardant sheathing **34** and a horizontal panel **88** having a bottom face **90** configured to engage a top face of the sheathing. The horizontal panel **88** extends generally perpendicular from the vertical panel **84**. The slot template **82** is configured to be quickly fixed in position on the sheathing **34** for use in cutting the slot **72** to receive the truss hanger **26**. Portions of the slot template **82** are configured to be pressed into the sheathing **34** to locate the template on the sheathing and retain the template in position for cutting the slot **72**. In the illustrated embodiment, the horizontal panel includes prongs **92** that are bent downward for insertion into the top face of the sheathing **34**. Bottom corners **94** of the vertical panel **84** are bent rearward for insertion into the interior face **50** of the sheathing **34**. The prongs **92** and the corners **94** are inserted into the sheathing **34** to retain the template **82** in position for cutting the slot **72**. In addition, the vertical panel **84** optionally includes dimples **96** extending toward the rear face **86** of the vertical panel **84**. The dimples **96** ensure the vertical panel **84** remains slightly spaced from the interior face **50** of the sheathing **34** so the template **82** can be easily removed from the sheathing after the slot **72** is cut.

The template **82** includes a guide slot **98** to guide a cutting tool in cutting the slot **72** in the sheathing **34**. The guide slot **98** extends from a top edge of the vertical panel **84** to a location spaced from a bottom edge of the vertical panel. As illustrated, the guide slot **98** includes a wide, rectangular portion **98***a* in the horizontal panel **88** to ease insertion of a cutting tool into the guide slot. A converging portion **98***b* of the slot **98** in the vertical panel **84** transitions from the wide portion **98***a* to a narrow lower portion **98***c* of the slot. This facilitates entry of the cutting tool into the narrow portion **98***c*. The narrow portion **98***c* of the guide slot **98** is dimensioned to facilitate cutting the slot **72** in the sheathing **34** to a size configured to receive the extension flanges **60** of the truss hanger **26**.

As seen in FIG. **24**, the template **82** described above can be formed as one piece from a metal blank **100** that is stamped from a sheet metal roll and bent into shape. In one embodiment, the template **82** is stamped from 16 gauge steel, although other thicknesses (e.g., 12-18 gauge) and other suitable materials are within the scope of the present invention.

In use, the template **82** is placed on the sheathing **34** in a selected location for a slot **72**. The template can be used to cut the slot **72** in the sheathing **34** either before or after the sheathing is mounted on the wall **28**. The prongs **92** and corners **94** are inserted into the sheathing **34** by tapping with a hand or striking with a hammer or other blunt instrument. Once the template **82** is secured in position on the sheathing **34**, a cutting tool (e.g., a drywall cutout tool) is inserted into the guide slot **98** to cut a slot **72** in the sheathing at the location of the guide slot. In one embodiment, a drywall cutout tool with a ⅛" or ¼" spiral bit is used to cut the slot **72**, although other cutting tools are within the scope of the present invention. After the slot **72** is cut in the sheathing **34**, the template **82** is removed from the sheathing. The sheathing **34** is then configured to receive the truss hanger **26**.

Referring again to FIGS. **2-8**, the connection portion of the hanger includes a pair of connector tabs **74** extending from the back flanges **66**. Each connector tab **74** extends generally perpendicular from one of the back flanges **66**. The connector tabs **74** are generally horizontal when the hanger **26** is installed. The connector tabs **74** are configured to engage an upper surface of the top plate **30** of the wall **28** at a second location L_2 spaced from the first location L_1. The connector tabs **74** can be used to attach the truss hanger **26** to the wall, thereby hanging the floor trusses **12** from the wall. As seen in FIG. **1**, the connector tabs **74** extend over a portion of the top plate **30** of the wall **28**. Each connector tab **74** includes fastening structure, such as nail holes **76**, for insertion of a fastening member, such as nails **78** (see FIGS. **10** and **10**A), to attach the hanger **26** to the wall **28**. In the illustrated embodiment, each connector tab **74** includes three nail holes **76**. Other configurations are within the scope of the present invention, such as a different number of nail holes, or alternate fastening structure such as nailing teeth or other appropriate structure for fastening the hanger to the wall.

The base **44** and back flanges **66** of the truss hanger **26** cooperate to stabilize the truss hanger **26** and protect the fire retardant sheathing **34** under the loads transferred from the truss **12** to the wall **28** by way of the hanger. The channel **52** that receives an end portion of the truss **12** is spaced to the interior of the wall **28** and more particularly to the interior of the second location L_2 where the connector tabs **74** are attached to an upper surface of the top plate **30**. The vertically downward load of the truss **12** applied to the base **44** of the truss hanger **26** urges the truss hanger **26** to pivot

so that the base would move toward the wall **28**, which could damage the fire retardant sheathing **34** and pry out the nails **78** connecting the connector tabs **74** to the upper surface of the top plate **30**. However, this motion is resisted by the engagement of the back flanges **66** with the interior vertical face of the top plate **30** at the first location L_1. Thus, there is a force couple between the base **44** of the hanger **26** carrying the vertical load of the truss **12** and the back panels **48** of the hanger (via engagement of the back flanges **66** with the top plate **30**) engaging the end face of the truss. Accordingly, the truss hanger **26** and truss **12** are stable with minimal disruption of the fire retardant sheathing **34**, even though the truss is held at a distance from the wall **28** by the truss hanger.

As seen in FIG. **15**, a truss hanger **26** as described above can be formed as one piece from a metal blank **80** that is stamped from a sheet metal roll and bent into shape. In one embodiment, the truss hanger **26** is stamped from 12-14 gauge steel, although other suitable materials are within the scope of the present invention. The configuration of the truss hanger **26** of the present invention allows a lighter gauge metal to be used.

In use, the truss hanger **26** is positioned in the slot **72** of the fire retardant sheathing **34** mounted on the wall **28**. As seen in FIGS. **9-14**A, one method of using the truss hanger **26** includes cutting the slot **72** in the fire retardant sheathing **34** (either before or after the sheathing is mounted on the wall). In one embodiment, the slot **72** can be cut using the slot template **82** (either before or after the sheathing **34** is mounted to the wall **28**). The slot can be any suitable length, and in one embodiment is about 10 inches long. The truss hanger **26** is then positioned against the fire retardant sheathing **34** so that the extension flanges **60** extend through the slot **72**. In one embodiment, the hanger **26** is slid downward into place so that the extension flanges **60** extend through the slot **72**, the back flanges **66** are positioned adjacent the wall **28**, and the fire retardant sheathing **34** is positioned in the sheathing channels **68** between the back flanges and the back panels **48**. The hanger connector tabs **74** are fastened to the top plate **30** of the wall **28** by any suitable means, such as by inserting nail **78** through the nail holes **76**. Then, a truss member, e.g. truss bottom chord **16**, is positioned in the truss channel **52** of the hanger **26** (see FIG. **1**), thereby securing the floor truss **12** to the wall **28**. The truss hanger **26** is then fastened to the truss **12** by any suitable means, such as by inserting nails **56** through the nail holes **54** in each side panel **46** of the hanger. The hanger **26** is thus secured to both the truss **12** and the wall **28**, with the fire retardant sheathing **34** secured between the hanger and the wall.

In another embodiment, the truss hangers **26** can be installed without pre-forming the slot **72** in the fire retardant sheathing **34**. More particularly, each hanger **26** can be driven into the sheathing **34**. The driving point **62** of the hanger **26** is positioned against a top edge of the fire retardant sheathing. The hanger **26** is then driven downward into the sheathing **34**, led by the pointed tip **64**. The hanger **26** continues to be driven into the gypsum boards until the connector tabs **74** engage the upper surface of the top plate **30**. In this way, the hanger **26** forms the slot in the sheathing **34**.

In still another embodiment, the truss hangers **26** can be installed on the wall **28** before the sheathing **34** is mounted on the wall. This simplifies construction by allowing the building to be completely framed and roofed before requiring the sheathing **34** to be installed. Trade workers (e.g., mechanical, electrical) therefore have complete access to the wall cavity to install components without interference from the sheathing **34**. The truss hanger **26** is positioned against the wall **28** such that the back flanges **66** engage the wall and the connector tabs **74** engage the top plate **30**. The connector tabs **74** are fastened to the top plate **30** of the wall by any suitable means, such as by inserting nails **78** through nail holes **76**. Then, a truss **12** is positioned in the truss channel **52** of the hanger **26**. The truss hanger is fastened to the truss **12** by any suitable means, such as by inserting nails **56** through the nail holes **54** in each side panel **46** of the hanger **26**. The floor truss **12** is thereby secured to the hanger **26** and the wall **28**, and access to the wall cavity remains unhindered by sheathing. Subsequently, the sheathing **34** can be mounted on the wall **28** by moving the sheathing upward into place so that the extension flanges **60** of the hanger **26** extend through the slot **72** of the sheathing and the sheathing is positioned in the sheathing channels **68** between the back flanges **66** and the back panels **48**.

Referring to FIGS. **25-40**, a second embodiment of a truss hanger **126** for use in mounting the floor truss **12** to the wall **28** is illustrated. The truss hanger **126** is similar to the truss hanger **26** described above, with differences as pointed out herein. Where the truss hanger **26** is configured for mounting the floor truss **12** generally orthogonal to the wall **28**, the truss hanger **126** is configured for mounting the floor truss **12** in a skewed position relative to the wall.

Referring to FIGS. **26-33**, the truss hanger **126** includes a channel-shaped portion **138**, an extension portion **140**, and a connection portion **142**. The channel-shaped portion **138** is configured to receive the floor truss **12**. The channel-shaped portion **138** is configured to support the floor truss **12** at a non-orthogonal angle relative to the wall **28**. In this skewed embodiment, the channel-shaped portion **138** is offset from the extension portion **140**. The channel-shaped portion **138** includes a seat or base **144** and a pair of side panels **146** extending upward from the base. When installed, the base **144** is generally horizontal, and the side panels **146** extend generally vertical from the base. A back panel **148** extends from one of the side panels **146***a* toward the opposing side panel **146***b*. The back panel **148** is generally perpendicular to both the side panels **146** and the base **144**. When installed, the back panel **148** extends at a non-orthogonal angle (e.g., about 45°) to the interior face **50** of the fire retardant sheathing **34**. The base **144**, side panels **146**, and back panel **148** form a channel **152** configured to receive the floor truss **12**. Other configurations are within the scope of the present invention. For example, the truss hanger **126** can be configured to support the floor truss **12** at a range of different angles with respect to the wall **28**.

As seen in FIGS. **25** and **39**, the floor truss **12** is received in the channel **152** to attach the floor truss to the wall **28** at a skewed angle. The bottom chord **16** of the floor truss **12** engages and rests upon (i.e., is supported by) the base **144**. The end member **20** of the floor truss **12** is positioned against the back panel **148** between the side panels **146**. The truss hanger **126** includes fastening structure for attaching the floor truss **12** to the truss hanger. Fastening structure can be of any type known in the art for attaching a connector to a wooden structural member, such as nailing teeth (not shown) struck from the material of the hanger. In the illustrated embodiment, the fastening structure comprises a hole to allow for insertion of a fastening member. More specifically, in one embodiment the fastening structure comprises nail holes **154** in the side panels **146** of the truss hanger **126** (see, FIG. **26**), and the fastening member comprises a nail **156** (see, FIG. **25**). In the illustrated embodiment, nail holes **154** are positioned on each of the side panels **146** so that nails

156 can be inserted into both the bottom chord 16 and the end member 20 of the floor truss 12 to attach the hanger 126 to the floor truss.

Referring again to FIGS. 26-33, the extension portion 140 includes two extension flanges 160 configured to extend through the fire retardant sheathing 34. One of the flanges 160*a* extends from the back panel 148. The other flange 160*b* extends from the side panel 146*b*. The flanges 160 are positioned in opposed, face-to-face relation, and preferably engage each other along a juncture. At a bottom edge, each flange 160 includes a driving point 162. Each of the driving points 162 is generally triangular and includes a pointed tip 164. As seen in FIG. 28, the tips 164 of the driving points 162 are vertically offset from each other. As illustrated, the tip 164*a* of one flange 160*a* extends vertically below the tip 164*b* of the other flange 160*b*. In one embodiment, the tips 164 are vertically offset from each other about ⅛", although other configurations are within the scope of the present invention, such as tips that are aligned or tips that are offset a smaller or larger amount.

A back flange 166 extends from the extension flange 160 generally perpendicular from the extension flange. Referring to FIG. 38, the back flange 166 engages the wall 28 at a first location L_{10}, which in the illustrated embodiment is a vertical face of the top plate 30 of the wall behind the fire retardant sheathing 34. The back flange 166 comprises a back flange portion 166*a* bent from the extension flange 160*a* and a back flange portion 166*b* bent from the extension flange 160*b*. The back panel 148, side panel 146*b*, extension flanges 160, and back flange 166 form a pair of sheathing channels 168 (see, FIG. 32). Each sheathing channel 168 is configured to receive a portion of the fire retardant sheathing 34.

As seen in FIGS. 34-36, the extension flanges 160 extend through the slot 72 in the fire retardant sheathing 34. Preferably, the slot has an area less than or equal to 6 square inches, and the gap between the extension flanges 60 and the edge of the slot 72 is less than or equal to ⅛". The driving points 162 extend down into the sheathing 34 to engage the sheathing and further secure the sheathing between the hanger 126 and the wall 28. A portion of the fire retardant sheathing 34 extends into each sheathing channel 168 and is secured against the back flange 166.

Referring again to FIGS. 26-33, the connection portion 142 of the hanger 126 includes a pair of connector tabs 174 extending from the back flange portions 166*a*, 166*b*. Each connector tab 174 extends generally perpendicular from a respective one of the back flanges 166*a*, 166*b*. The connector tabs 174 are generally horizontal when the hanger 126 is installed. The connector tabs 174 are configured to overlie and engage an upper surface of the top plate 30 of the wall 28 at a second location L_{20} spaced from the first location L_{10} (see, FIGS. 37 and 38). The connector tabs 174 can be used to attach the truss hanger 126 to the wall 28, thereby hanging the floor trusses 12 from the wall. As seen in FIG. 25, the connector tabs 174 extend over a portion of the top plate 30 of the wall 28. Each connector tab 174 includes fastening structure, such as nail holes 176, for insertion of a fastening member, such as nails 178 (see FIGS. 34 and 35), to attach the hanger 126 to the wall 28. In the illustrated embodiment, each connector tab 174 includes three nail holes 176. Other configurations are within the scope of the present invention, such as a different number of nail holes, or alternate fastening structure such as nailing teeth or other appropriate structure for fastening the hanger to the wall.

The base 144 and back flanges 166 cooperate to stabilize the truss hanger 126 and protect the fire retardant sheathing 34 from exposure to the loads transferred from the truss 12 to the wall 28 by way of the truss hanger 126. The channel 152 that receives an end portion of the truss 12 is spaced to the interior of the wall 28 and more particularly to the interior of the second location L_{20} where the connector tabs 174 are attached to an upper surface of the top plate 30 (see FIG. 38). The vertically downward load of the truss 126 applied to the base 144 of the truss hanger 126 urges the truss hanger to pivot so that the base would move toward the wall 28, which could damage the fire retardant sheathing 34 and pry out the nails 178 connecting the connector tabs 174 to the upper surface of the top plate 30. However, this motion is resisted by the engagement of the back flanges 166 with the interior vertical face of the top plate 30 at the first location L_{10}. Thus, there is a force couple between the base 144 and back panel 148 of the hanger 126 (via engagement of the back flanges 166 with the top plate 30) engaging the end fact of the truss. Accordingly, the truss hanger 126 and truss 12 are stable with minimal disruption of the fire retardant sheathing 34, even though the truss is held at a distance from the wall 28.

As seen in FIG. 40, a truss hanger 126 as described above can be formed as one piece from a metal blank 180 that is stamped from a sheet metal roll and bent into shape. Parts of the blank 180 are labelled with reference numerals corresponding to the various parts of the formed truss hanger 126. In one embodiment, the truss hanger 126 is stamped from 12-14 gauge steel, although other suitable materials are within the scope of the present invention. The configuration of the truss hanger 126 of the present invention allows a lighter gauge metal to be used.

The truss hanger 126 is used as described above with reference to the truss hanger 26. In use, the truss hanger 126 is positioned in the slot 72 of the fire retardant sheathing 34 mounted to the wall 28. One method of using the truss hanger 126 includes cutting the slot 72 in the fire retardant sheathing 34 (either before or after the sheathing is mounted on the wall). In one embodiment, the slot 72 can be cut using the slot template 82 (either before or after the sheathing 34 is mounted to the wall 28). The slot 72 can be any suitable length, and in one embodiment is about 10 inches long. The truss hanger 126 is then positioned against the fire retardant sheathing 34 so that the extension flanges 160 extend through the slot 72. In one embodiment, the hanger 126 is slid downward into place so that the extension flanges 160 extend through the slot 72, the driving point 162 engages the fire retardant sheathing 34, the back flange 166 is positioned adjacent the wall 28, and the fire retardant sheathing is positioned in the sheathing channels 168 of the hanger. The hanger connector tabs 174 are fastened to the top plate 30 of the wall 28 by driving nails 178 through the nail holes 176 into the top plate 30. Then, a truss member, e.g. truss bottom chord 16 is positioned in the truss channel 152 of the hanger 126. Nails 156 are driven through holes 154 in the side panels 146 to secure the floor truss 12 to the wall 28. The hanger 126 is thus secured to both the truss 12 and the wall 28, with the fire retardant sheathing 34 between the hanger and the wall.

In another embodiment, the truss hangers 126 can be installed without pre-forming the slot 72 in the fire retardant sheathing 34. More particularly, each hanger 126 can be driven into the sheathing 34. The pointed tip 164 of the driving point 162 of the hanger 126 is positioned against a top edge of the fire retardant sheathing 34. The hanger 126 is then driven downward into the sheathing 34, led by the pointed tip 164. The hanger 126 continues to be driven into the gypsum boards until the connector tabs 174 engage the

upper surface of the top plate **30**. In this way, the hanger **126** forms the slot in the sheathing **34**.

In another embodiment, the truss hangers **126** can be installed on the wall **28** before the sheathing **34** is mounted on the wall. This simplifies construction by allowing the building to be completely framed and roofed before requiring the sheathing **34** to be installed. Trade workers (e.g., mechanical, electrical) therefore have complete access to the wall cavity to install components without interference from the sheathing **34**. The truss hanger **126** is positioned against the wall **28** such that the back flange **166** engages the wall and the connector tabs **174** engage the top plate **30**. The connector tabs **174** are fastened to the top plate **30** of the wall by any suitable means, such as by inserting nails **178** through nail holes **176**. Then, a truss **12** is positioned in the truss channel **152** of the hanger **126**. The truss hanger **126** is fastened to the truss **12** by any suitable means, such as by inserting nails **156** through the nail holes **154** in each side panel **146** of the hanger. The floor truss **12** is thereby secured to the hanger **126** and the wall **28**, and access to the wall cavity remains unhindered by sheathing. Subsequently, the sheathing **34** can be mounted on the wall **28** by moving the sheathing upward into place so that the extension flanges **160** of the hanger **126** extend through the slot **72** of the sheathing and the sheathing is positioned in the sheathing channels **168** of the hanger.

The truss hanger **26**, **126** permits a floor truss **12** to be secured to a wall **28** through fire retardant sheathing **34** with minimal interruption to the sheathing. Installation of the truss hanger minimally disrupts the continuity of the sheathing and therefore does not reduce the fire resistive rating of a fire rated assembly. The extension flanges **60**, **160** extend through the fire retardant sheathing **34** so that the sheathing is interrupted only by the slot **72** required to receive the flanges. The back flanges **66**, **166** engage the wall **28** behind the sheathing **34** to stabilize the hanger **26**, **126** and protect the sheathing. The truss hanger **26**, **126** can be mounted on a wall already having sheathing mounted thereon, or can be mounted on a wall before the sheathing (i.e., the sheathing does not have to be mounted on the wall before the truss hanger), thereby simplifying construction. The truss hanger **26**, **126** can be formed from a metal blank **80**, **180**, which reduces the number of parts required to hang the floor truss **12** and simplifies the manufacturing process.

In an independent test performed by an outside firm, the truss hanger was installed as part of a wall assembly including 2×6 wood studs, 24" on center, with two layers of ⅝" Type X gypsum attached to each side. The gypsum board included a slot to accommodate the hanger. The hanger was fixed to the top plate of the wall with six 10d common nails in the connector tabs. The cavities in the wall were filled with mineral wool insulation. The testing was performed per ASTM E814 which subjected the specimen to the time/temperature curve prescribed in ASTM E119 for a period of two hours, followed by a hose stream test. As a result of this testing, the outside firm reported that when installed on one side of a maximum 2 hour fire-rated wall assembly, the penetration of the truss hanger through the gypsum board will not reduce the fire resistive rating of the 2 hour fire resistive assembly.

Having described the invention in detail, it will be apparent that modifications and variations are possible without departing from the scope of the invention defined in the appended claims.

When introducing elements of the present invention or the preferred embodiments(s) thereof, the articles "a", "an", "the" and "said" are intended to mean that there are one or more of the elements. The terms "comprising", "including" and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above products without departing from the scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A fire wall hanger for connecting a structural component to a frame wall adapted to have two layers of ⅝-inch-thick drywall mounted thereon to form a fire separation wall, the fire wall hanger comprising:

a channel-shaped portion configured to receive the structural component;

a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and a back flange extending from an edge of the top flange, the back flange arranged to engage a vertical face of the top plate of the frame wall, the back flange having a front surface lying in a back flange plane; and

an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion, the extension portion spacing the channel-shaped portion from the back flange plane by a distance sized large enough to permit the two layers of ⅝-inch-thick drywall of the fire separation wall to be received between the channel-shaped portion and the back flange plane;

wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another.

2. The fire wall hanger of claim **1**, further comprising a stop arranged to engage and space an end of the structural component from the back flange plane by a distance sized large enough to permit the two layers of ⅝-inch-thick drywall to be received between the end of the structural component and the back flange plane.

3. The fire wall hanger of claim **2**, wherein the stop comprises first and second back panels extending toward each other.

4. The fire wall hanger of claim **3**, wherein the extension portion includes a second extension flange extending from the connection portion to the channel-shaped portion, the first back panel being directly attached to the first extension flange, and the second back panel being directly attached to the second extension flange.

5. The fire wall hanger of claim **4**, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the channel-shaped portion including first and second side panels extending upward from the base, the first back panel being directly attached to the first side panel, and the second back panel being directly attached to the second side panel.

6. The fire wall hanger of claim **2**, wherein the stop is part of the channel-shaped portion.

7. The fire wall hanger of claim **6**, wherein the channel-shaped portion bounds a channel sized and shaped to receive the structural component, the stop comprising a first back panel bounding the channel.

8. The fire wall hanger of claim **7**, wherein the stop comprises a second back panel bounding the channel.

9. The fire wall hanger of claim 1, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, and wherein the first extension flange lies in a first extension flange plane, the first extension flange plane being generally perpendicular to the base plane.

10. The fire wall hanger of claim 9, wherein the first extension flange is generally planar.

11. The fire wall hanger of claim 10, wherein the first extension flange is arranged to extend edgewise through the two layers of ⅝-inch-thick drywall.

12. The fire wall hanger of claim 9, wherein the first extension flange includes an upper free edge.

13. The fire wall hanger of claim 9, wherein the extension portion includes a second extension flange extending from the connection portion to the channel-shaped portion, the second extension flange lying in a second extension flange plane, the second extension flange plane being generally perpendicular to the base plane and parallel to the first extension flange plane.

14. The fire wall hanger of claim 13, wherein the channel-shaped portion includes first and second side panels extending upward from the base, the first and second side panels each having a rear edge, the rear edges of the first and second side panels lying in a rear edge plane, the rear edge plane being perpendicular to the first and second extension flange planes.

15. The fire wall hanger of claim 13, wherein the channel-shaped portion includes first and second side panels extending upward from the base, the first and second side panels each having a rear edge, the rear edges of the first and second side panels lying in a rear edge plane, the rear edge plane being oriented at a skewed angle to the first and second extension flange planes.

16. The fire wall hanger of claim 1, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, and wherein the first extension flange is directly attached to the channel-shaped portion by a first connection, the first connection having an upper end and a lower end, the first connection extending from the upper end to the lower end in a first direction, the first direction being perpendicular to the base plane.

17. The fire wall hanger of claim 16, wherein the first extension flange is directly attached to the connection portion by a second connection, the second connection having an upper end and a lower end, the second connection extending from the upper end of the second connection to the lower end of the second connection in a second direction, the second direction being parallel to the first direction and perpendicular to the base plane.

18. The fire wall hanger of claim 17, wherein the first extension flange is directly attached to the back flange of the connection portion by the second connection.

19. The fire wall hanger of claim 17, wherein the extension portion includes a second extension flange extending from the connection portion to the channel-shaped portion, the second extension flange being directly attached to the channel-shaped portion by a third connection, the third connection having an upper end and a lower end, the third connection extending from the upper end of the third connection to the lower end of the third connection in a third direction, and the second extension flange being directly attached to the connection portion by a fourth connection, the fourth connection having an upper end and a lower end, the fourth connection extending from the upper end of the fourth connection to the lower end of the fourth connection in a fourth direction, the third and fourth directions being parallel to the first and second directions and being perpendicular to the base plane.

20. The fire wall hanger of claim 16, wherein the channel-shaped portion includes a side panel having an upper edge, the lower end of the first connection being disposed at an elevation located in an inclusive range between the base plane and the upper edge of the side panel.

21. The fire wall hanger of claim 1, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, and wherein the first extension flange includes an edge, 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.

22. The fire wall hanger of claim 1, wherein the first extension flange and the channel-shaped portion are formed as one-piece of sheet metal.

23. The fire wall hanger of claim 1, wherein the first extension flange and the connection portion are formed as one-piece of sheet metal.

24. The fire wall hanger of claim 1, wherein the channel-shaped portion, the connection portion, and the extension portion are formed as one-piece of sheet metal.

25. The fire wall hanger of claim 1, wherein the channel-shaped portion is made of sheet metal, the first extension flange being an extension of the sheet metal forming the channel-shaped portion.

26. The fire wall hanger of claim 1, wherein the first extension flange and the channel-shaped portion are formed as one-piece.

27. The fire wall hanger of claim 1, wherein the channel-shaped portion, the connection portion, and the extension portion are formed as one-piece.

28. The fire wall hanger of claim 1, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, the channel-shaped portion including a first side panel extending upward from the base, and wherein the first side panel is spaced apart from the front surface of the back flange along a first axis that is normal to the front surface of the back flange, the first axis intersecting the first side panel and the front surface of the back flange.

29. The fire wall hanger of claim 1, wherein the extension portion includes a second extension flange extending from the connection portion to the channel-shaped portion, the first and second extension flanges being parallel to one another.

30. The fire wall hanger of claim 1, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component and a first side panel extending upward from the base, and wherein a front edge of the first extension flange abuts a rear edge of the first side panel.

31. The fire wall hanger of claim 30, wherein the first extension flange is directly attached to the first side panel by way of a bend such that the front edge of the first extension flange abuts the rear edge of the first side panel.

32. The fire wall hanger of claim 1, wherein the top flange includes a rear edge located rearwardly of the edge of the top flange from which the back flange extends, the rear edge located rearwardly of the back flange.

33. The fire wall hanger of claim 1, further comprising a drywall space sized and shaped to receive the two layers of ⅝-inch-thick drywall therein, the channel-shaped portion and the back flange plane bounding the drywall space.

34. The fire wall hanger of claim 33, wherein the first extension flange bounds the drywall space.

35. The fire wall hanger of claim 34, wherein the extension portion includes a second extension flange extending from the connection portion to the channel-shaped portion, the second extension flange bounding the drywall space.

36. The fire wall hanger of claim 1, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component and first and second side panels extending upward from the base, wherein the extension portion includes a second extension flange extending from the connection portion to the channel-shaped portion, and wherein the first and second extension flanges and the first and second side panels are all parallel to each other.

37. The fire wall hanger of claim 1, wherein the channel-shaped portion is arranged with respect to the connection portion to mount the structural component at a non-orthogonal angle relative to the frame wall.

38. The fire wall hanger of claim 1, wherein the extension portion includes a second extension flange extending from the connection portion to the channel-shaped portion, the first and second extension flanges engaging each other along a juncture, the juncture arranged to be positioned within the two layers of ⅝-inch-thick drywall.

39. The fire wall hanger of claim 1, wherein the back flange is a first back flange and the top flange is a first top flange, and wherein the connection portion includes a second top flange arranged to engage the top surface of the top plate of the frame wall and a second back flange extending from an edge of the second top flange, the second back flange arranged to engage the vertical face of the top plate of the frame wall, the second back flange having a front surface lying in the back flange plane.

40. The fire wall hanger of claim 39, wherein the first top flange includes a first rear edge located rearwardly of the edge of the first top flange from which the first back flange extends, and wherein the second top flange includes a second rear edge located rearwardly of the edge of the second top flange from which the second back flange extends, the first rear edge being located rearwardly of the first back flange and the second rear edge being located rearwardly of the second back flange.

41. The fire wall hanger of claim 40, wherein the extension portion includes a second extension flange extending from the second back flange to the channel-shaped portion.

42. The fire wall hanger of claim 41, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component and first and second side panels extending upward from the base, and wherein the first and second extension flanges and the first and second side panels are all parallel to each other.

43. The fire wall hanger of claim 42, wherein a front edge of the first extension flange abuts a rear edge of the first side panel.

44. The fire wall hanger of claim 43, wherein the first extension flange and the first back flange are directly attached to each other by a first bend, the first back flange and the first top flange are directly attached to each other by a second bend, the second extension flange and the second back flange are directly attached to each other by a third bend, and the second back flange and the second top flange are directly attached to each other by a fourth bend.

45. The fire wall hanger of claim 44, wherein the channel-shaped portion, the connection portion, and the extension portion are formed as one-piece of sheet metal.

46. The fire wall hanger of claim 1, wherein the channel-shaped portion and the connection portion are spaced apart from one another.

47. The fire wall hanger of claim 1, wherein the extension portion includes a second extension flange extending from the connection portion to the channel-shaped portion, and wherein the first and second extension flanges each include an inner face and an outer face, the inner faces of the first and second extension flanges facing one another, the inner face of the first extension flange facing in a first direction toward the inner face of the second extension flange and the outer face of the first extension flange facing in a second direction that is opposite the first direction, the back flange having a side edge disposed outward, in the second direction, of the outer face of the first extension flange.

48. The fire wall hanger of claim 47, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component and first and second side panels extending upward from the base, each of the first and second side panels having an inner face and an outer face, the inner faces of the first and second side panels facing one another, wherein the outer face of the first side panel is disposed outward, in the second direction, of the inner face of the first extension flange and the outer face of the second side panel is disposed outward, in the first direction, of the inner face of the second extension flange.

49. The fire wall hanger of claim 47, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, and wherein the outer faces of the first and second extension flanges each have a height extending in a direction that is perpendicular to the base plane and a length extending in a direction that is parallel to the base plane and perpendicular to the first direction, the height of the outer face of the first extension flange being greater than the length of the outer face of the first extension flange, and the height of the outer face of the second extension flange being greater than the length of the outer face of the second extension flange.

50. The fire wall hanger of claim 1, further comprising a stop arranged to engage an end of the structural component to space the end of the structural component from the back flange plane by a distance sized large enough to permit the two layers of ⅝-inch-thick drywall to be received between the end of the structural component and the back flange plane;

wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane;

wherein the first extension flange is directly attached to the channel-shaped portion by a first connection, the first connection having an upper end and a lower end, the first connection extending from the upper end to the

lower end in a first direction, the first direction being perpendicular to the base plane;

wherein the first extension flange is directly attached to the connection portion by a second connection, the second connection having an upper end and a lower end, the second connection extending from the upper end of the second connection to the lower end of the second connection in a second direction, the second direction being parallel to the first direction and perpendicular to the base plane;

wherein the first extension flange and the channel-shaped portion are formed as one-piece of sheet metal;

wherein the top flange includes a rear edge located rearwardly of the edge of the top flange from which the back flange extends, the rear edge located rearwardly of the back flange; and

wherein the channel-shaped portion and the connection portion are spaced apart from one another.

51. The fire wall hanger of claim **50**, wherein the stop comprises first and second back panels extending toward each other;

wherein the extension portion includes a second extension flange extending from the connection portion to the channel-shaped portion, the second extension flange being directly attached to the channel-shaped portion by a third connection, the third connection having an upper end and a lower end, the third connection extending from the upper end of the third connection to the lower end of the third connection in a third direction, and the second extension flange being directly attached to the connection portion by a fourth connection, the fourth connection having an upper end and a lower end, the fourth connection extending from the upper end of the fourth connection to the lower end of the fourth connection in a fourth direction, the third and fourth directions being parallel to the first and second directions and being perpendicular to the base plane;

wherein the channel-shaped portion includes a first side panel extending upward from the base, and wherein a front edge of the first extension flange abuts a rear edge of the first side panel; and

wherein the fire wall hanger further comprises a drywall space sized and shaped to receive the two layers of ⅝-inch-thick drywall therein, the channel-shaped portion, the first and second extension flanges and the back flange plane bounding the drywall space.

52. The fire wall hanger of claim **51**, wherein the first back panel is directly attached to the first extension flange and the second back panel is directly attached to the second extension flange;

wherein the channel-shaped portion, the connection portion, and the extension portion are formed as one-piece of sheet metal;

wherein the channel-shaped portion includes a second side panel extending upward from the base, and wherein the first and second extension flanges and the first and second side panels are all parallel to each other;

wherein the back flange is a first back flange and the top flange is a first top flange, and wherein the connection portion includes a second top flange arranged to engage the top surface of the top plate of the frame wall and a second back flange extending from an edge of the second top flange, the second back flange arranged to engage the vertical face of the top plate of the frame wall, the second back flange having a front surface lying in the back flange plane; and

wherein the second extension flange extends from the second back flange to the channel-shaped portion, and wherein the first and second extension flanges each include an inner face and an outer face, the inner faces of the first and second extension flanges facing one another, the inner face of the first extension flange facing in a first direction toward the inner face of the second extension flange and the outer face of the first extension flange facing in a second direction that is opposite the first direction, the first back flange having a side edge disposed outward, in the second direction, of the outer face of the first extension flange, and the second back flange having a side edge disposed outward, in the first direction, of the outer face of the second extension flange.

53. A fire wall hanger for connecting a structural component to a frame wall adapted to have two layers of ⅝-inch-thick drywall mounted thereon to form a fire separation wall, the fire wall hanger comprising:

a channel-shaped portion configured to receive the structural component;

an extension portion extending from the channel-shaped portion and configured to extend through the two layers of ⅝-inch-thick drywall; and

a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and a back flange extending from an edge of the top flange, the back flange arranged to engage a vertical face of the top plate of the frame wall, the back flange having a front surface lying in a back flange plane, the extension portion spacing the channel-shaped portion from the back flange plane by a distance sized large enough to permit the two layers of ⅝-inch-thick drywall of the fire separation wall to be received between the channel-shaped portion and the back flange plane;

wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another.

54. The fire wall hanger of claim **53**, further comprising a stop arranged to engage an space an end of the structural component from the back flange plane by a distance sized large enough to permit the two layers of ⅝-inch-thick drywall to be received between the end of the structural component and the back flange plane.

55. The fire wall hanger of claim **54**, wherein the stop comprises first and second back panels extending toward each other.

56. The fire wall hanger of claim **55**, wherein the extension portion includes first and second extension flanges extending from the channel-shaped portion to the connection portion, the first back panel being directly attached to the first extension flange, and the second back panel being directly attached to the second extension flange.

57. The fire wall hanger of claim **56**, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the channel-shaped portion including first and second side panels extending upward from the base, the first back panel being directly attached to the first side panel, and the second back panel being directly attached to the second side panel.

58. The fire wall hanger of claim **54**, wherein the stop is part of the channel-shaped portion.

59. The fire wall hanger of claim **58**, wherein the channel-shaped portion bounds a channel sized and shaped to receive the structural component, the stop comprising a first back panel bounding the channel.

60. The fire wall hanger of claim 59, wherein the stop comprises a second back panel bounding the channel.

61. The fire wall hanger of claim 53, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, and wherein the extension portion includes a first extension flange extending from the channel-shaped portion to the connection portion, the first extension flange being generally perpendicular to the base plane.

62. The fire wall hanger of claim 61, wherein the extension portion includes a second extension flange extending from the channel-shaped portion to the connection portion, the second extension flange being generally perpendicular to the base plane and parallel to the first extension flange.

63. The fire wall hanger of claim 62, wherein the first and second extension flanges are each generally planar.

64. The fire wall hanger of claim 63, wherein the first and second extension flanges each include an edge, the first and second extension flanges each being arranged to extend edgewise through the two layers of ⅝-inch-thick drywall.

65. The fire wall hanger of claim 64, wherein the first and second extension flanges each include an upper free edge.

66. The fire wall hanger of claim 62, wherein the channel-shaped portion includes first and second side panels extending upward from the base, the first and second side panels each having a rear edge, the rear edges of the first and second side panels lying in a rear edge plane, the rear edge plane being perpendicular to the first and second extension flanges.

67. The fire wall hanger of claim 62, wherein the channel-shaped portion includes first and second side panels extending upward from the base, the first and second side panels each having a rear edge, the rear edges of the first and second side panels lying in a rear edge plane, the rear edge plane being oriented at a skewed angle to the first and second extension flanges.

68. The fire wall hanger of claim 53, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, and wherein the extension portion includes a first extension flange directly attached to the channel-shaped portion by a first connection, the first connection having an upper end and a lower end, the first connection extending from the upper end to the lower end in a first direction, the first direction being perpendicular to the base plane.

69. The fire wall hanger of claim 68, wherein the first extension flange is directly attached to the connection portion by a second connection, the second connection having an upper end and a lower end, the second connection extending from the upper end of the second connection to the lower end of the second connection in a second direction, the second direction being parallel to the first direction and perpendicular to the base plane.

70. The fire wall hanger of claim 69, wherein the first extension flange is directly attached to the back flange of the connection portion by the second connection.

71. The fire wall hanger of claim 69, wherein the extension portion includes a second extension flange directly attached to the channel-shaped portion by a third connection, the third connection having an upper end and a lower end, the third connection extending from the upper end of the third connection to the lower end of the third connection in a third direction, and the second extension flange being directly attached to the connection portion by a fourth connection, the fourth connection having an upper end and a lower end, the fourth connection extending from the upper end of the fourth connection to the lower end of the fourth connection in a fourth direction, the third and fourth directions being parallel to the first and second directions and being perpendicular to the base plane.

72. The fire wall hanger of claim 71, wherein the channel-shaped portion includes a side panel having an upper edge, the lower end of the first connection being disposed at an elevation located between the base plane and the upper edge of the side panel and the lower end of the third connection being disposed at an elevation located between the base plane and the upper edge of the side panel.

73. The fire wall hanger of claim 53, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, and wherein the extension portion includes a first extension flange and a second extension flange, each of the first and second extension flanges having an edge, the first and second extension flanges each extending edgewise from the channel-shaped portion toward the back flange plane in an extension direction, the extension directions being parallel to the base plane.

74. The fire wall hanger of claim 53, wherein the extension portion and the channel-shaped portion are formed as one-piece of sheet metal.

75. The fire wall hanger of claim 53, wherein the extension portion and the connection portion are formed as one-piece of sheet metal.

76. The fire wall hanger of claim 53, wherein the channel-shaped portion, the connection portion, and the extension portion are formed as one-piece of sheet metal.

77. The fire wall hanger of claim 53, wherein the channel-shaped portion is made of sheet metal, the extension portion being an extension of the sheet metal forming the channel-shaped portion.

78. The fire wall hanger of claim 53, wherein the extension portion and the channel-shaped portion are formed as one-piece.

79. The fire wall hanger of claim 53, wherein the channel-shaped portion, the connection portion, and the extension portion are formed as one-piece.

80. The fire wall hanger of claim 53, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, the channel-shaped portion including a first side panel extending upward from the base, and wherein the first side panel is spaced apart from the front surface of the back flange along a first axis that is normal to the front surface of the back flange, the first axis intersecting the first side panel and the front surface of the back flange.

81. The fire wall hanger of claim 55, wherein the extension portion includes first and second extension flanges extending from the channel-shaped portion to the connection portion, the first and second extension flanges being parallel to one another.

82. The fire wall hanger of claim 55, wherein the extension portion includes a first extension flange extending from the channel-shaped portion toward the connection portion, and wherein the channel-shaped portion includes a base

configured to receive an end portion of the structural component thereon to support the structural component and a first side panel extending upward from the base, and wherein a front edge of the first extension flange abuts a rear edge of the first side panel.

83. The fire wall hanger of claim **82**, wherein the first extension flange is directly attached to the first side panel by way of a bend such that the front edge of the first extension flange abuts the rear edge of the first side panel.

84. The fire wall hanger of claim **53**, wherein the top flange includes a rear edge located rearwardly of the edge of the top flange, the rear edge located rearwardly of the back flange.

85. The fire wall hanger of claim **53**, further comprising a drywall space sized and shaped to receive the two layers of ⅝-inch-thick drywall therein, the channel-shaped portion and the back flange plane bounding the drywall space.

86. The fire wall hanger of claim **85**, wherein the extension portion includes first and second extension flanges bounding the drywall space.

87. The fire wall hanger of claim **86**, wherein the first and second extension flanges each include a lower edge bounding the drywall space.

88. The fire wall hanger of claim **87**, wherein the back flange bounds the drywall space.

89. The fire wall hanger of claim **53**, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component and first and second side panels extending upward from the base, wherein the extension portion includes first and second extension flanges extending from the channel-shaped portion to the connection portion, and wherein the first and second extension flanges and the first and second side panels are all parallel to each other.

90. The fire wall hanger of claim **53**, wherein the channel-shaped portion is arranged with respect to the connection portion to mount the structural component at a non-orthogonal angle relative to the frame wall.

91. The fire wall hanger of claim **53**, wherein the extension portion includes first and second extension flanges extending from the channel-shaped portion to the connection portion, the first and second extension flanges engaging each other along a juncture, the juncture arranged to be positioned within the two layers of ⅝-inch-thick drywall.

92. The fire wall hanger of claim **53**, wherein the back flange is a first back flange and the top flange is a first top flange, and wherein the connection portion includes a second top flange arranged to engage the top surface of the top plate of the frame wall and a second back flange extending from an edge of the second top flange, the second back flange arranged to engage the vertical face of the top plate of the frame wall, the second back flange having a front surface lying in the back flange plane.

93. The fire wall hanger of claim **92**, wherein the first top flange includes a first rear edge located rearwardly of the edge of the first top flange from which the first back flange extends, and wherein the second top flange includes a second rear edge located rearwardly of the edge of the second top flange from which the second back flange extends, the first rear edge being located rearwardly of the first back flange and the second rear edge being located rearwardly of the second back flange.

94. The fire wall hanger of claim **92**, wherein the extension portion includes first and second extension flanges, the first extension flange extending from the channel-shaped portion to the first back flange, and the second extension flange extending from the channel-shaped portion to the second back flange.

95. The fire wall hanger of claim **94**, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component and first and second side panels extending upward from the base, and wherein the first and second extension flanges and the first and second side panels are all parallel to each other.

96. The fire wall hanger of claim **95**, wherein a front edge of the first extension flange abuts a rear edge of the first side panel.

97. The fire wall hanger of claim **96**, wherein the first extension flange and the first back flange are directly attached to each other by a first bend, the first back flange and the first top flange are directly attached to each other by a second bend, the second extension flange and the second back flange are directly attached to each other by a third bend, and the second back flange and the second top flange are directly attached to each other by a fourth bend.

98. The fire wall hanger of claim **97**, wherein the channel-shaped portion, the connection portion, and the extension portion are formed as one-piece of sheet metal.

99. The fire wall hanger of claim **55**, wherein the channel-shaped portion and the connection portion are spaced apart from one another.

100. The fire wall hanger of claim **53**, wherein the extension portion includes first and second extension flanges extending from the channel-shaped portion to the connection portion, and wherein the first and second extension flanges each include an inner face and an outer face, the inner faces of the first and second extension flanges facing one another, the inner face of the first extension flange facing in a first direction toward the inner face of the second extension flange and the outer face of the first extension flange facing in a second direction that is opposite the first direction, the back flange having a side edge disposed outward, in the second direction, of the outer face of the first extension flange.

101. The fire wall hanger of claim **100**, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component and first and second side panels extending upward from the base, each of the first and second side panels having an inner face and an outer face, the inner faces of the first and second side panels facing one another, wherein the outer face of the first side panel is disposed outward, in the second direction, of the inner face of the first extension flange and the outer face of the second side panel is disposed outward, in the first direction, of the inner face of the second extension flange.

102. The fire wall hanger of claim **100**, wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane, and wherein the outer faces of the first and second extension flanges each have a height extending in a direction that is perpendicular to the base plane and a length extending in a direction that is parallel to the base plane and perpendicular to the first direction, the height of the outer face of the first extension flange being greater than the length of the outer face of the first extension flange, and the height of the outer face of the second extension flange being greater than the length of the outer face of the second extension flange.

103. The fire wall hanger of claim **53**, further comprising a stop arranged to engage an end of the structural component to space the end of the structural component from the back flange plane by a distance sized large enough to permit the two layers of ⅝-inch-thick drywall to be received between the end of the structural component and the back flange plane;

wherein the channel-shaped portion includes a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface arranged to engage the structural component, the upper surface lying in a base plane;

wherein the extension portion includes a first extension flange directly attached to the channel-shaped portion by a first connection, the first connection having an upper end and a lower end, the first connection extending from the upper end to the lower end in a first direction, the first direction being perpendicular to the base plane;

wherein the first extension flange is directly attached to the connection portion by a second connection, the second connection having an upper end and a lower end, the second connection extending from the upper end of the second connection to the lower end of the second connection in a second direction, the second direction being parallel to the first direction and perpendicular to the base plane;

wherein the first extension flange and the channel-shaped portion are formed as one-piece of sheet metal;

wherein the top flange includes a rear edge located rearwardly of the edge of the top flange from which the back flange extends, the rear edge located rearwardly of the back flange; and

wherein the channel-shaped portion and the connection portion are spaced apart from one another.

104. The fire wall hanger of claim **103**, wherein the stop comprises first and second back panels extending toward each other;

wherein the extension portion includes a second extension flange directly attached to the channel-shaped portion by a third connection, the third connection having an upper end and a lower end, the third connection extending from the upper end of the third connection to the lower end of the third connection in a third direction, and the second extension flange being directly attached to the connection portion by a fourth connection, the fourth connection having an upper end and a lower end, the fourth connection extending from the upper end of the fourth connection to the lower end of the fourth connection in a fourth direction, the third and fourth directions being parallel to the first and second directions and being perpendicular to the base plane;

wherein the channel-shaped portion includes a first side panel extending upward from the base, and wherein a front edge of the first extension flange abuts a rear edge of the first side panel; and

wherein the fire wall hanger further comprises a drywall space sized and shaped to receive the two layers of ⅝-inch-thick drywall therein, the channel-shaped portion, the first and second extension flanges and the back flange plane bounding the drywall space.

105. The fire wall hanger of claim **104**, wherein the first back panel is directly attached to the first extension flange and the second back panel is directly attached to the second extension flange;

wherein the channel-shaped portion, the connection portion, and the extension portion are formed as one-piece of sheet metal;

wherein the channel-shaped portion includes a second side panel extending upward from the base, and wherein the first and second extension flanges and the first and second side panels are all parallel to each other;

wherein the back flange is a first back flange and the top flange is a first top flange, and wherein the connection portion includes a second top flange arranged to engage the top surface of the top plate of the frame wall and a second back flange extending from an edge of the second top flange, the second back flange arranged to engage the vertical face of the top plate of the frame wall, the second back flange having a front surface lying in the back flange plane; and

wherein the second extension flange extends from the second back flange to the channel-shaped portion and the first extension flange extends from the first back flange to the channel-shaped portion, and wherein the first and second extension flanges each include an inner face and an outer face, the inner faces of the first and second extension flanges facing one another, the inner face of the first extension flange facing in a first direction toward the inner face of the second extension flange and the outer face of the first extension flange facing in a second direction that is opposite the first direction, the first back flange having a side edge disposed outward, in the second direction, of the outer face of the first extension flange, and the second back flange having a side edge disposed outward, in the first direction, of the outer face of the second extension flange.

* * * * *

EXHIBIT D

DGF/DGBF/DGHF

Fire Wall Hangers

The DGF fire wall hanger is ideal for multi-family, multi-level building construction and easily installs on a two-hour wood stud fire wall (e.g., Type III construction) during framing. The new series features three models of top-flange hangers that connect floor trusses and joists to wood stud walls. The hangers feature enough space for two layers of ⅝" gypsum board (drywall) to be slipped into place after the framing is complete.

They have been tested according to ASTM E814 and received F (flame) and T (temperature) ratings for use on one or both sides of the wall. These ratings verify that the DGF/DGHF/DGBF hangers do not reduce the two-hour fire wall assembly rating.

Features:

- Fire-resistant F (flame) and T (temperature) rated in Intertek Design No. SST/WPCF 120-01.
- No need for additional restraint against rotation of the wall top plates.
- All models can be used on both sides of a 2x6 wall.

Material: DGBF — 7 gauge; DGF — 12 gauge; DGHF — 10 gauge

Finish: DGF — G90; DGHF and DGBF — gray paint

Installation:

- Use all specified fasteners.
- All models are mounted like a standard top-flange hanger.
- Stud wall-plate splices must occur at a stud location.
- I-joist require web stiffeners for full table loads. I-joist without web stiffeners have reduced loads shown in table.
- DGF welded to steel header with four 2" fillet welds and (6) joist nails achieves a download of 1,650 lb.
- DGHF and DGBF welded to steel header with two 2" fillet weld and (8) 0.148" x 1½" joist nails achieve a download of 3,000 lb.
- Weld size to match hanger thickness.
- Table uplift loads apply to welded applications.
- DGBF only — apply two ¼" beads of fire-resistant mortar caulk directly to top of wall plates for the first 6" on either side of top flange. See Intertek design listing for detail.
- DGBF only — locate double stud below hanger.
- Gap at the face of the hanger allows two layers of ⅝" gypsum board to be installed after the hanger is in place.

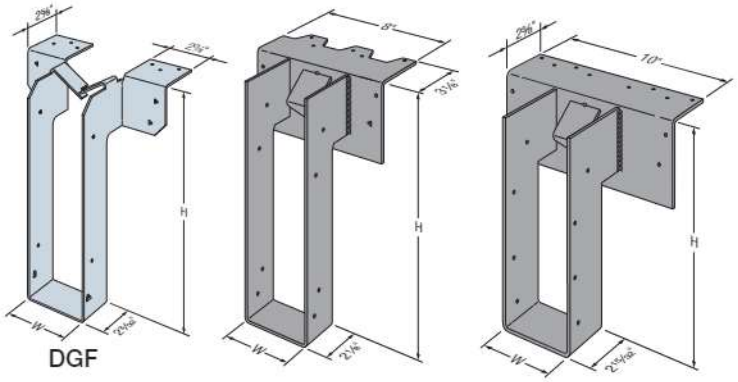
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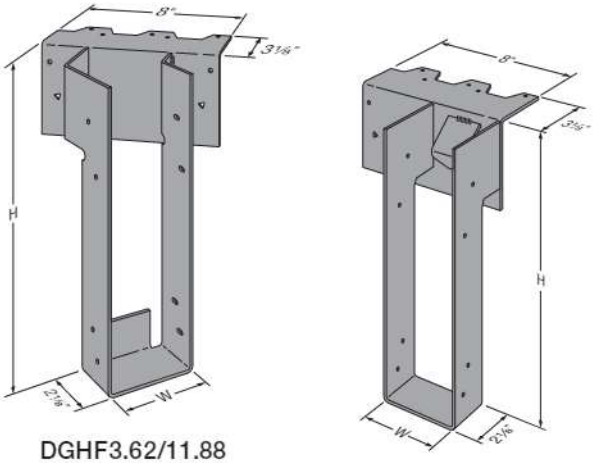
- All models of the DGHF hanger may be ordered with a skew angle of up to 45 degrees or with the top flange offset left or right. To order, add "X" to the model number.

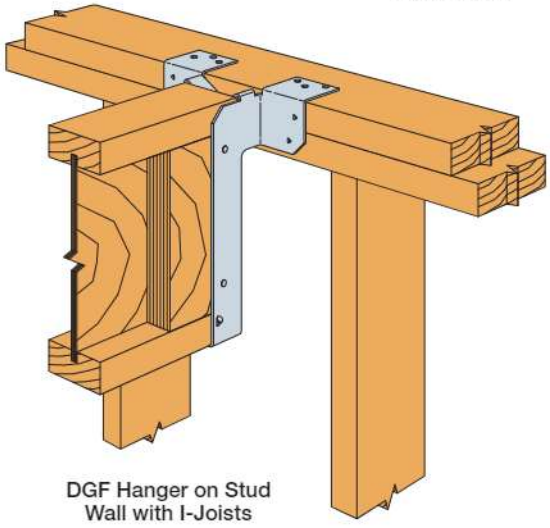
Codes: See p. 11 for Code Reference Key Chart

Two-Hour, Fire-Rated Wall

Simpson Strong-Tie has completed ASTM E814 standard testing at an accredited laboratory. The use of the DGF/DGBF/DGHF hangers does not reduce the two-hour, fire wall assembly rating. The hangers tested provide an F (flame) and T (temperature) rating.







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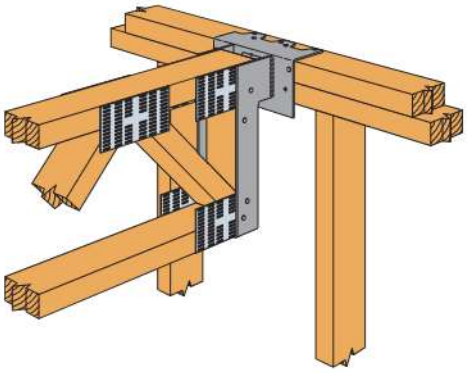
DGF/DGBF/DGHF

Fire Wall Hangers (cont.)

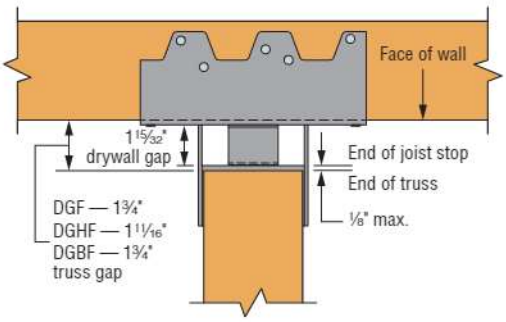
Allowable Loads on 2x4 or 2x6 Wall

Model	Ga.	Joist Depth (in.)	Fasteners (in.)			Web Stiff Req'd	DF/SP				SPF/HF				Code Ref.
							Uplift (160)	Download (100/125)			Uplift (160)	Download (100/125)			
			Top	Face	Joist			Studwall	2x, 3x Nailer	(2) 2x, 4x Nailer		Studwall	2x, 3x Nailer	(2) 2x, 4x Nailer	
DGF	12	7¼ to 11¼	(6) 0.148 x 3	(4) 0.148 x 3	(2) 0.148 x 1½	—	130	1,160	—	1,160	110	1,130	—	1,130	IBC, FL, LA
			(6) 0.148 x 1½	—	(6) 0.148 x 1½	✓	220	1,350	1,350	1,350	190	1,315	1,315	1,315	
			(6) 0.148 x 3	—	(6) 0.148 x 1½	✓	315	1,420	—	1,420	270	1,385	—	1,385	
DGF	12	11⅞ to 24	(6) 0.148 x 3	(4) 0.148 x 3	(2) 0.148 x 1½	—	130	1,160	—	1,160	110	1,130	—	1,130	
			(6) 0.148 x 1½	—	(6) 0.148 x 1½	✓	315	1,620	1,620	1,620	270	1,450	1,450	1,450	
			(6) 0.148 x 3	—	(6) 0.148 x 1½	✓	315	1,705	—	1,705	270	1,525	—	1,525	
DGHF	10	7¼ to 24	(5) 0.148 x 1½	(2) 0.148 x 3	(8) 0.148 x 1½	✓	855	2,030	2,030	2,030	650	1,855	1,855	1,855	
			(5) 0.148 x 3	(2) 0.148 x 3	(8) 0.148 x 1½	✓	900	2,135	—	2,135	770	1,950	—	1,950	
DGBF (over studs)	7	9½ to 24	(8) 0.148 x 3	(4) 0.148 x 3	(8) 0.148 x 3	✓	1,040	3,015	—	3,015	890	2,280	—	2,280	
DGHF (skewed)	10	7¼ to 24	(5) 0.148 x 3	(2) 0.148 x 3	(8) 0.148 x 1½	✓	315	1,620	—	1,620	270	1,350	—	1,350	—
DGHF (offset)	10	7¼ to 24	(5) 0.148 x 3	(2) 0.148 x 3	(8) 0.148 x 1½	✓	870	2,010	—	2,010	755	1,705	1,550	—	

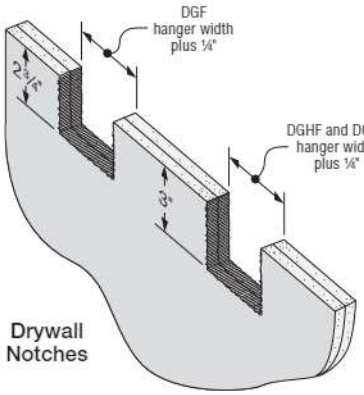
1. Uplift loads have been increased for earthquake or wind loading with no further increase allowed. Reduce where other loads govern.
2. Allowable loads are for 2x4 minimum stud wall or nailer. Back-to-back installations require a minimum 2x6. Wall design by designer.
3. For hangers spaced closer than 16" o.c., the allowable load shall be reduced proportionately.
4. DGBF installation requires a minimum (2) 2x4 stud or post in the wall at hanger location. Post design by designer.
5. DGHF hangers may be skewed up to 45. Skew and offset options cannot be combined.
6. Face nails for DGHF (offset) may be installed in any two holes.
7. DGF and DGHF may be installed over ⅝" maximum wood structural panel sheathing. For DGF, use 0.87 of the table loads for uplift and download. For DGHF, use 0.91 of table loads for uplift and full table downloads. Sheathing shall be installed flush with top of the wall and fastened per code.
8. **Fasteners:** Nail dimensions are listed diameter by length. See pp. 21–22 for fastener information.



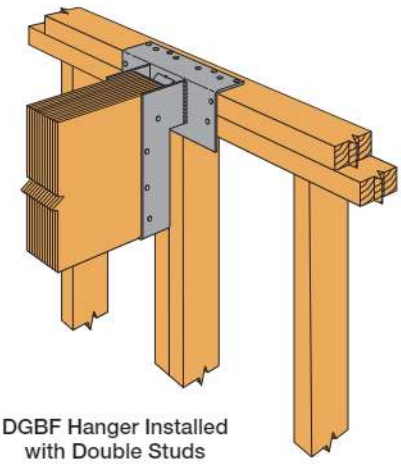
DGF Hanger on Stud Wall with Trusses



DGHF Hanger *(DGF similar)* Top View with Gap



Drywall Notches



DGBF Hanger Installed with Double Studs

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DGF/DGBF/DGHF

Fire Wall Hangers (cont.)

Model Sizes

Joist Size (in.)	DGF Model	DGHF Model	DGBF Model	W (in.)	H (in.)
2x8	DGF28	—	—	1 9/16	7 1/8
2x10	DGF210	—	—	1 9/16	9 1/8
2x12	DGF212	—	—	1 9/16	11 1/8
1 3/4 x 9 1/2	DGF1.81/9.5	DGHF1.81/9.5	—	1 13/16	9 7/16
1 3/4 x 11 7/8	DGF1.81/11.88	DGHF1.81/11.88	—	1 13/16	11 13/16
1 3/4 x 14	DGF1.81/14	DGHF1.81/14	—	1 13/16	13 15/16
1 3/4 x 16	DGF1.81/16	DGHF1.81/16	—	1 13/16	15 15/16
2 x 9 1/2	DGF2.1/9.5	DGHF2.1/9.5	—	2 1/8	9 7/16
2 x 11 7/8	DGF2.1/11.88	DGHF2.1/11.88	—	2 1/8	11 13/16
2 x 14	DGF2.1/14	DGHF2.1/14	—	2 1/8	13 15/16
2 x 16	DGF2.1/16	DGHF2.1/16	—	2 1/8	15 15/16
2 1/16 x 9 1/2	DGF2.1/9.5	DGHF2.1/9.5	—	2 1/8	9 7/16
2 1/16 x 11 7/8	DGF2.1/11.88	DGHF2.1/11.88	—	2 1/8	11 13/16
2 1/16 x 14	DGF2.1/14	DGHF2.1/14	—	2 1/8	13 15/16
2 1/16 x 16	DGF2.1/16	DGHF2.1/16	—	2 1/8	15 15/16
2 5/16 x 9 1/2	DGF2.37/9.5	DGHF2.37/9.5	—	2 3/8	9 7/16
2 5/16 x 11 7/8	DGF2.37/11.88	DGHF2.37/11.88	—	2 3/8	11 13/16
2 5/16 x 14	DGF2.37/14	DGHF2.37/14	—	2 3/8	13 15/16
2 5/16 x 16	DGF2.37/16	DGHF2.37/16	—	2 3/8	15 15/16
2 5/16 x 18	DGF2.37/18	DGHF2.37/18	—	2 3/8	17 15/16
2 5/16 x 20	DGF2.37/20	DGHF2.37/20	—	2 3/8	19 15/16
2 1/2 x 9 1/2	DGF2.56/9.5	DGHF2.56/9.5	—	2 5/8	9 7/16
2 1/2 x 11 7/8	DGF2.56/11.88	DGHF2.56/11.88	—	2 5/8	11 13/16
2 1/2 x 14	DGF2.56/14	DGHF2.56/14	—	2 5/8	13 15/16
2 1/2 x 16	DGF2.56/16	DGHF2.56/16	—	2 5/8	15 15/16
2 1/2 x 18	DGF2.56/18	DGHF2.56/18	—	2 5/8	17 15/16
2 1/2 x 20	DGF2.56/20	DGHF2.56/20	—	2 5/8	19 15/16
2 1/2 x 22	DGF2.56/22	DGHF2.56/22	—	2 9/16	21 15/16
2 1/2 x 24	DGF2.56/24	DGHF2.56/24	—	2 9/16	23 15/16
3 1/2 x 9 1/4	DGF3.62/9.25	DGHF3.62/9.25	DGBF3.62/9.25	3 5/8	9 3/16
3 1/2 x 9 1/2	DGF3.62/9.5	DGHF3.62/9.5	DGBF3.62/9.5	3 5/8	9 7/16
3 1/2 x 11 1/4	DGF3.62/11.25	DGHF3.62/11.25	DGBF3.62/11.25	3 5/8	11 3/16
3 1/2 x 11 7/8	DGF3.62/11.88	DGHF3.62/11.88	DGBF3.62/11.88	3 5/8	11 13/16
3 1/2 x 14	DGF3.62/14	DGHF3.62/14	DGBF3.62/14	3 5/8	13 15/16
3 1/2 x 16	DGF3.62/16	DGHF3.62/16	DGBF3.62/16	3 5/8	15 15/16
3 1/2 x 18	DGF3.62/18	DGHF3.62/18	DGBF3.62/18	3 5/8	17 15/16
3 1/2 x 20	DGF3.62/20	DGHF3.62/20	DGBF3.62/20	3 5/8	19 15/16
3 1/2 x 22	DGF3.62/22	DGHF3.62/22	DGBF3.62/22	3 5/8	21 15/16
3 1/2 x 24	DGF3.62/24	DGHF3.62/24	DGBF3.62/24	3 5/8	23 15/16
5 1/4 x 11 7/8	—	—	DGBF5.37/11.88	5 3/8	11 13/16
5 1/4 x 14	—	—	DGBF5.37/15	5 3/8	11 15/16
5 1/4 x 16	—	—	DGBF5.37/16	5 3/8	15 15/16
5 1/4 x 18	—	—	DGBF5.37/18	5 3/8	17 15/16
5 1/4 x 20	—	—	DGBF5.37/20	5 3/8	19 15/16
5 1/4 x 22	—	—	DGBF5.37/22	5 3/8	21 15/16
5 1/4 x 24	—	—	DGBF5.37/24	5 3/8	23 15/16
5 1/8 glulam	—	—	DGBF5.25	5 1/4	SPEC
5 1/2 glulam and 6x	—	—	DGBF5.56	5 9/16	SPEC
6 3/4 glulam	—	—	DGBF6.88	6 7/8	SPEC
7 x 11 7/8	—	—	DGBF7.12/11.88	7 1/8	11 13/16
7 x 14	—	—	DGBF7.12/14	7 1/8	13 15/16
7 x 16	—	—	DGBF7.12/16	7 1/8	15 15/16
7 x 18	—	—	DGBF7.12/18	7 1/8	17 15/16
7 x 20	—	—	DGBF7.12/20	7 1/8	19 15/16
7 x 22	—	—	DGBF7.12/22	7 1/8	21 15/16
7 x 24	—	—	DGBF7.12/24	7 1/8	23 15/16

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EXHIBIT E

ICC-ES NEWS RELEASE

For Immediate Release
Feb. 10, 2016
www.icc-es.org

For more information, contact:
Joram Suede
Tel: 1-800-423-6587 x3727
jsuede@icc-es.org

ICC-ES Issues ESR-3444 to MiTek for FWH Fire Wall Hangers

Report demonstrates proof of compliance to codes and standards

ICC Evaluation Service (ICC-ES), the experts in building product evaluation and certification, has issued ESR-3444 to MiTek USA for their FWH Fire Wall Hangers, providing evidence they comply with code requirements of the 2012, 2009 and 2006 International Building Codes® (IBC) and International Residential Codes® (IRC).

The FWH Top Mount Firewall Hanger is designed for attaching wood truss, wood I-joist, solid sawn lumber, or engineered wood lumber floor framing members to either minimum double 2-by 6 nominal wall top plates of wood frame walls or double 2-by solid sawn lumber headers, prior to installation of two layers of 5/8-inch-thick (15.9 mm) gypsum wallboard.

"We are pleased to issue another report to MiTek USA, a manufacturer of innovative building products who continue to rely on ICC-ES' technical expertise and high-quality reports, demonstrating proof of code compliance", said ICC-ES President Shahin Moinian, P.E." "ICC-ES reports provide code officials with technical information to instantly approve products for installation."

ICC-ES thoroughly examined MiTek USA's product information, test reports, calculations, quality control methods and other factors to ensure the product is code-compliant.

"MiTek USA is honored to receive this respected third-party validation of its new FWH Fire Wall Hanger," said Maged Diab, President for MiTek Builder Products - MiTek USA. "This ICC-ES evaluation report will provide added confidence for specifiers who are looking for a work-saving fire wall hanger solution."

About ICC-ES
A nonprofit, limited liability company, ICC-ES is the United States' leading evaluation service for innovative building materials, components and systems. ICC-ES Evaluation Reports (ESRs), Building Product Listings and PMG Listings provide evidence that products and systems meet requirements of codes and technical standards. The ICC-ES Environmental Programs issue VAR environmental reports that verify a product meets specific sustainability targets defined by today's codes, standards, green rating systems and ICC-ES environmental criteria. The Environmental Programs now offer Environmental Product Declarations (EPDs), to meet global market demand for science-based, transparent, quality-assured information about a product's environmental performance. ICC-ES is a member of the ICC Family of Companies. For more information, please visit www.icc-es.org.

###

EXHIBIT F

SHARTSIS FRIESE LLP
JOSEPH V. MAUCH (Bar #253693)
jmauch@sflaw.com
DANIEL M. PONIATOWSKI (Bar #306754)
dponiatowski@sflaw.com
One Maritime Plaza, Eighteenth Floor
San Francisco, CA 94111-3598
Telephone: (415) 421-6500
Facsimile: (415) 421-2922

Attorneys for Defendant
SIMPSON STRONG-TIE COMPANY INC.

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

COLUMBIA INSURANCE CO. and MITEK INC.,

Plaintiffs,

v.

SIMPSON STRONG-TIE COMPANY INC.,

Defendant.

Case No. 3:19-CV-04683-TSH

DECLARATION OF SAM HENSEN IN SUPPORT OF OPPOSITION TO MOTION FOR PRELIMINARY INJUNCTION

Date: October 3, 2019
Time: 10:00 a.m.
Ctrm: A, 15th Floor
Judge: Magistrate Thomas S. Hixson

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ONE MARITIME PLAZA
EIGHTEENTH FLOOR
SAN FRANCISCO, CA 94111-3598

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I, SAM HENSEN, declare as follows:

1. I am a Vice President and General Manager of Connectors and Lateral Systems at Simpson Strong-Tie Company Inc., Defendant in the above-captioned case. I provide this Declaration in support of Simpson Strong-Tie Company Inc.'s ("Simpson") Opposition to Plaintiffs Columbia Insurance Co. and MiTek Inc.'s Motion for Preliminary Injunction. I have personal knowledge of the facts set forth herein, except as to matters stated on the basis of information and belief, and I believe such matters to be true. If called as a witness, I would testify as to the matters stated herein.

Factual Background Regarding Simpson

2. For more than 60 years, Simpson has focused on creating structural products that help people build safer and stronger homes and buildings. Simpson invests heavily in research and development, and since its founding has been dedicated to continuously expanding its line of structural connectors with innovative new products that address the changing needs of its customers. Simpson has also invested significant amounts obtaining code approval and code reports for its products.

3. Simpson's structural connectors are identified and described in its 340-page Wood Construction Connectors catalog. *See* <https://embed.widencdn.net/pdf/plus/ssttoolbox/jg8ztjcq8z/C-C-2019.pdf>. The catalog provides detailed information about each product, including load values, specifications, code approvals and other information used by structural engineers, specifiers, code-approval agencies, building departments, architects, designers and other consumers who purchase and use Simpson products.

4. Simpson was one of the first companies to introduce an extensive product line of structural connectors used in wood-to-wood and wood-to-concrete construction. From the beginning, Simpson made a substantial effort to connect with building designers in order to understand their needs and design products to meet their specific requirements for building design. As a result of Simpson's leading role and unparalleled reputation in the industry, building plans for a structure often call out Simpson's products by name and then require "Simpson or

equivalent" in order to comply with building codes. Over time, other companies entered this market to compete with Simpson. Rather than dedicating significant investment to research and development, most of these companies attempted to copy or knock-off the Simpson products.

5. As a company that is built on innovation and intellectual property, Simpson is respectful of and highly values intellectual property rights, both its own rights and the rights of others. Simpson has obtained approximately 900 patents over the past 60 years. Simpson's patent portfolio covers a wide array of inventions related to construction products, including over 100 patents related to joist hangers.

Factual Background on MiTek and USP

6. According to MiTek's website, MiTek is a global supplier of software, engineered products, services, and automated manufacturing equipment. In 2011, Plaintiff MiTek Inc. ("MiTek") acquired USP Structural Connectors ("USP"), one of the companies in the market with Simpson.

Simpson Joist Hangers

7. A "joist hanger" or "hanger" is a type of structural connector, typically made of metal, that is used to secure the ends of joists, trusses, or other structural members to headers, walls, or other support members. Simpson has for many years been selling a diverse line of hangers to handle almost any application, including hangers with top flanges, face mount hangers, and skewed and sloped hangers. The following are just a few examples of the wide array of hangers currently marketed by Simpson:

 HUCQ Heavy-Duty Face-Mount Joist Hanger	 JB Joist, Beam and Purlin Top-Flange Hangers	 LSSR Slopeable/Skewable Rafter Hanger	 THAI Adjustable Hanger

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 WMU GFCMU Top-Flange Hanger	 WP High-Capacity Top-Flange Hangers	 ITS Engineered Wood Product Top-Flange Hangers	 BA Top-Flange Hangers or HUF

As noted above, Simpson obtained patents related to many of these hangers. *See*, *e.g.*, U.S. 3,601,428; 3,752,512; 4,005,942; D248,275; 4,230,416; 4,261,155.

Simpson DHU Hangers

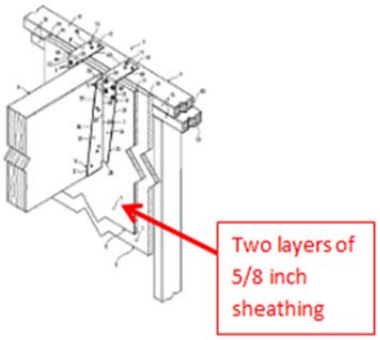
8. Simpson has been working on the development of fire wall hangers or drywall hangers since at least as early as around 2013. Many of the buildings in which Simpson products are installed are subject to fire and safety codes. As merely one example, multi-family structures such as apartment buildings typically require partitions between units to have a fire-resistance rating of not less than two hours. One common way to achieve this rating is to mount fire-resistant sheathing, such as gypsum board (also known as "drywall"), along the walls. Particularly, two layers of 5/8 inch thick drywall are often used to achieve the required two-hour rating.

9. In 2013, building codes changed, allowing for wood structures to be built taller and more dense, leading to increased demand for hangers that would allow larger wood-framed structures to meet the new fire-resistance regulations. Hangers sold at the time could not be installed after drywall (because doing so would crush the drywall), so it was common to install the hangers before the drywall, which required cutting "notches" or "cutouts" around the hangers. However, these large cutouts exposed the wood framing and impaired the fire-resistance rating. To solve this problem, Simpson developed a new hanger that was installed over the typical two layers of 5/8 inch drywall without damaging the drywall.

10. In December 2013, Simpson introduced the DU/DHU/DHUTF Drywall Hangers (the "DHU Hangers"). Prior to Simpson's first public disclosure, Simpson filed a patent

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application covering the DHU Hangers on December 14, 2013. As shown on the cover page of U.S. Patent No. 9,394,680 ("Bundy"), the DHU Hangers are sized to permit two layers of 5/8 inch thick sheathing to be used for a fire-separation wall:



Bundy, Fig. 1

The fire-resistance rating of the DHU Hangers is superior to the rating achieved when drywall is notched around the entire joist and hanger, as described above.

Simpson DG Hangers

11. Although the DHU Hangers were successful in the market, some Simpson customers requested a firewall hanger that could be installed before the drywall, but which would achieve a fire-resistance rating that was closer to the DHU Hanger. Specifically, scheduling conflicts between framing contractors and drywall contractors arose, requiring drywall contractors to come out before the framing was complete so they could put the drywall in place and then come back later to finish the job once framing was complete. As a result, after the DHU Hangers were developed and released, Simpson worked on the design, development, and testing of the products that were released to the market as the DG/DGB/DGH Fire Wall Hangers (collectively, the "DG Hangers").

12. In designing the DG Hangers, Simpson combined the teachings of the Bundy Patent with its decades of experience designing joist hangers. The DG Hangers featured a simple (but, from an engineering perspective, elegant) design that resembles many of Simpson's successful prior art hangers (incorporating the same type of channel-shaped portion and top and back flange as many of its prior art hangers) and is quite different from MiTek's FWH Hanger. The DG Hangers also incorporated the spacing of the DHU Hangers (and the Bundy Patent), which allowed for the inclusion of two layers of 5/8" sheathing to create a fire-resistant barrier.

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13. When Simpson released the DG Hangers to the market in June of 2017, the products were successful. Simpson's design was less costly to make than MiTek's complicated design, allowing Simpson to charge a lower price, which, along with the ease of installation and Simpson's unparalleled reputation, led to increasing demand for the DG Hangers.

Plaintiffs' U.S. 10,024,049 Patent

14. Prior to Simpson's release of the DG Hangers, Simpson was aware of MiTek's FWH Hanger and the fact that Plaintiffs had filed a patent application covering the FWH Hanger. In developing the DG Hangers, Simpson was careful to design around Plaintiffs' then-pending patent application, U.S. Pat. Appl. 14/555,049 ("the '049 Application").

15. Plaintiffs have never asserted that any Simpson products infringe the '049 Patent.

Plaintiffs' U.S. 10,184,242 Patent

16. Simpson was unaware of the new claims added to the '409 Application until Plaintiffs sent Simpson's counsel a letter on December 19, 2018.

Development and Patenting of DGF Product Line

17. When Simpson became aware of the claims of the '409 Application that matured into the '242 Patent, Simpson designed around Plaintiffs' patent claims. On April 1, 2019 Simpson announced the DGF/DGHF/DGBF Fire Wall Hangers (collectively, the "Accused Products").

18. The Accused Products, like the DG Hangers illustrated above, feature a design that is very different than the MiTek FWH Hanger:



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Among other things, the Accused Products feature an innovative stop element that is nothing like the panel stops of the FWH Hanger. Simpson has filed a patent application covering the Accused Products. Plaintiffs have not asserted that the Accused Products infringe any claims of the '049 Patent or the '242 Patent.

Simpson's Opinion of Counsel

19. Within two weeks of first learning that the USPTO had allowed the '510 Patent, Simpson engaged a law firm specializing in patent law, Vierra Magen Marcus LLP (the "Vierra Law Firm"), to investigate the validity of the claims of the then-pending '517 Application. On June 3, 2019 (prior to the issue date of the '510 Patent), the Vierra Law Firm provided a written opinion (the "Vierra Opinion Letter") that all of the Asserted Claims are invalid due to prior art. A true and correct copy of the Vierra Opinion Letter is attached hereto as Exhibit A.

20. The Vierra Opinion Letter is 67-pages long and includes a detailed claim-by-claim explanation that each of the claims of the '517 Application is invalid.

21. After retaining the Vierra Law Firm to investigate the validity of Plaintiffs' patent claims, Simpson engaged another law firm (Sterne, Kessler, Goldstein & Fox P.L.L.C.) for purposes of challenging the validity of the '510 Patent claims through a USPTO Post Grant Review ("PGR") proceeding.

Response to Certain Allegations in Plaintiffs' Moving Papers

22. Many of Simpson's products are sold through distributors. Distributors can carry only Simpson products, only another manufacturer's products, or a combination of various manufacturers' products. Other companies producing products that are sometimes carried by distributors include MiTek, Advanced Connector Systems, and Tamlyn. In fact, some customers carry both Simpson and another manufacturer's products regularly to support home builders with exclusive hardware contracts.

23. Simpson and MiTek both manufacturer fire wall hangers, but they are not the only companies in the United States that do so. Other United States manufacturers of fire wall hangers include Advanced Connector Systems. Although customers purchase fire wall hangers produced by these manufacturers from distributors, they also purchase firewall hangers without going

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through a distributor. Further, I am not aware of any study, analysis, or survey that demonstrates that a customer that purchases any of Simpson's fire wall hanger products is more likely than that customer otherwise would be to purchase other Simpson products. Similarly, I am not aware of any study, analysis, or survey that shows that engineers specified MiTek's fire wall hangers more often in their plans once the MiTek fire wall hangers at issue in this lawsuit were introduced. I have never heard an engineer refer to MiTek as "an innovator" with respect to its fire wall hanger products or any other products.

I declare under penalty of perjury that the foregoing is true and correct and that this declaration was executed this 5th day of September, 2019, at Pleasanton, California.

/s/ Sam Hensen
SAM HENSEN

I hereby attest that I have on file all holographic signatures corresponding to any signatures indicated by a conformed signature (/s/) within this e-filed document.

/s/ Joseph V. Mauch
JOSEPH V. MAUCH

8514055

SHARTSIS FRIESE LLP
ONE MARITIME PLAZA
EIGHTEENTH FLOOR
SAN FRANCISCO, CA 94111-3598

EXHIBIT G

STINSON LEONARD STREET

Kurt James
314.345.7010 **DIRECT**
314.345.7600 **DIRECT FAX**
kurt.james@stinson.com

December 19, 2018

VIA E-MAIL AND CERTIFIED MAIL NO.
Mr. James P. Martin
Shartsis Friese LLP
One Maritime Plaza, 18th Floor
San Francisco, California 94111-3598
jmartin@sflaw.com

RE: U.S. Patent Application No. 15/675,409

Dear Mr. Martin:

Our firm represents Columbia Insurance Company and its related company Mitek Holdings, Inc. in intellectual property matters. Columbia Insurance Company is the owner of recently allowed U.S. Patent Application No. 15/675,409 (the '409 application). A copy of the published application, allowed claims and notice of allowance are enclosed for your reference. This application pertains to a hanger that extends through the fire retardant sheathing of a wall.

We obtained the enclosed copy of an advertisement for the DG/DGH/DGB Fire Wall Hangers sold by Simpson Strong-Tie Company Inc. (Simpson). These fire wall hangers fall within the scope of at least claims 21, 32 and 42 of the recently allowed '409 application.

You will appreciate that this important matter should be addressed as soon as possible. Our position is that Simpson should immediately arrange to stop selling and offering for sale these fire wall hangers and any others that infringe the attached claims. I invite you to call me or Joe Carr at MiTek to discuss the best way to proceed.

Please let us have some meaningful communication from you on this matter not later January 4, 2019.

Sincerely,

Kurt F. James

Kurt F. James

KFJ:SNL/dss
Enclosures

EXHIBIT H

STINSON LEONARD STREET

Kurt James
314.345.7010 **DIRECT**
314.345.7600 **DIRECT FAX**
kurt.james@stinson.com

May 28, 2019

Mr. James P. Martin
Shartsis Friese LLP
One Maritime Plaza, 18th Floor
San Francisco, California 94111-3598
jmartin@sflaw.com

RE: U.S. Patent Application No. 16/225,517 (Fire Wall Hanger)

Dear Mr. Martin:

As you know, our firm represents Columbia Insurance Company and its related company Mitek Holdings, Inc. in intellectual property matters. Columbia Insurance Company (Columbia) is the owner of recently allowed U.S. Patent Application No. 16/225,517, which will issue as U.S. Patent No. 10,316,510 on June 11, 2019. A copy of the published application and allowed claims are enclosed for your reference. This application pertains to a hanger that extends through the fire retardant sheathing of a wall.

We observed that Simpson Strong-Tie Company Inc. (Simpson) changed the design of its fire wall hangers following our recent settlement concerning Columbia's U.S. Patent No. 10,184,242, and now offers for sale the DGF, DBHF and DGBF Fire Wall Hangers on its website. These modified fire wall hangers still incorporate the gist of our client's invention, and fall within the scope of at least claims 1, 13 and 20 of the soon to issue U.S. Patent No. 10,316,510.

You will appreciate that this important matter should be addressed as soon as possible. Our position is that Simpson should immediately arrange to stop selling and offering for sale the DGF, DBHF and DGBF Fire Wall Hangers by June 11, 2019, as well as any others that infringe the attached claims. We can see no reason for any delay beyond the June 11 date. As before, I invite you to call me or Joe Carr at MiTek to discuss how best to settle this matter.

We are also advising you that corresponding Canadian patent 2,875,763 issued on May 14, 2019. A copy of the claims as granted is attached. The claims of this patent read on all of the models of Simpson fire wall hangers that we have brought to your attention in this and our prior communications.

Please let us have a substantive communication from you on this matter not later June 3, 2019.

Sincerely,



Kurt F. James

KFJ/dss
Enclosures

EXHIBIT I

STINSON

Kurt James
PARTNER
DIRECT: 314.345.7010
OFFICE: 314.863.0800
kurt.james@stinson.com

June 25, 2021

Joseph V. Mauch
Shartsis Friese LLP
One Maritime Plaza
Eighteenth Floor
San Francisco, CA 94111-3598

Re: **Subject to FRE 408**: Response to April 16, 2021 Letter Regarding Settlement Discussions

Dear Joe:

Thank you for your April 16, 2021 letter ("Letter") and for initiating the settlement conversation. I know that our clients have had some conversations in the interim and the hope is that this letter will further those discussions.

We understand from your letter that Simpson feels strongly in its positions on appeal of the PTAB's Final Written Decision ("FWD"), and I do not think it will be productive to spend significant energy arguing about who will ultimately win as MiTek feels equally confident in its position. That said, I do want to share our perspective on the issues with the hopes that it advances settlement discussions.

First, your Letter mentions Simpson's Request for Rehearing—which was recently denied in its entirety—and the subsequent appeal. As to the timeline for any appeal, your calculations do not consider that a party has some control over its initial filings. Early filing actions by MiTek would accelerate the suggested timeline in your letter.

Regarding a possible appeal, as we both know, the PTAB is affirmed over 70% of the time at the Federal Circuit. The most likely scenario—for both parties—is that MiTek emerges with its amended claim in the '510 Patent, and the rest of the parties' issues on appeal are denied. Simpson's potential appeal issues are largely premised on: a misreading of the requirements for the PTAB's Motion to Amend Pilot Program; a selective reading of the Board's discussion of *Nautilus* that the Board has twice rejected; and an argument regarding the Board's alleged misinterpretation of Tsukamoto that was squarely addressed in multiple pages of the FWD. These types of issues—including ones fully addressed twice by the PTAB—are rarely disturbed on appeal, particularly given the record established.

We expect that the parties will consider appealing certain claim construction issues, which are reviewed without deference to the Board. In the context of challenger vs. patentee: should Simpson win, the case will likely be remanded for further consideration. Should MiTek win on a claim construction appeal, or other appeal issues related to the obviousness/written description determinations, the Board's decision will likely be reversed. On balance, there is more upside, and less downside, for MiTek at this appellate stage —particularly in light of MiTek's amended claim.

Moreover, Simpson will be unable to further challenge the amended claim in litigation or in a subsequent PGR proceeding. *See,* 35 U.S.C. § 325(e)(1) (noting that the petitioner in a PGR "may not request or maintain a proceeding before the Office with respect to that claim on any ground that petitioner raised, or reasonably could have raised during that post-grant review."); *accord* 35 U.S.C. § 325(e)(2) (noting the same for challenges in civil litigation). *See also Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017) (suggesting that estoppel applies to amended claims). To the extent Simpson claims that estoppel does not apply to the amended claim because it was unable to formally challenge the amended claim, the PTAB Trial Practice Guide—and *Aqua Products*—squarely rejects this position:

> Petitioners may respond to new issues arising from proposed substitute claims and may include evidence responsive to the amendment. 35 U.S.C. §§ 316(a), 326(a). **This includes the submission of new expert declarations or additional prior art that are directed to the proposed substitute claims**. Trial Practice Guide at 72 (emphasis added).
>
> When a petitioner does contest an amended claim, the Board is free to reopen the record to allow admission of any additional relevant prior art proffered by a petitioner or to order additional briefing on any issue involved in the trial. See 37 C.F.R. § 42.20(d); see also id. § 42.123. The Board may then consider all art of record in the IPR, including any newly added art, when rendering its decisions on patentability. *Aqua Prods.*, 872 F.3d at 1314.

In short, the most likely scenario is affirmance of the Board's decision on appeal, and that Simpson is estopped from further challenging the amended claim in any setting.

Even though the appellate issues may take time to sort out, MiTek is in position to pursue an infringement claim against Simpson currently, without regard to the

pendency, or for that matter the outcome of the appeal. The same Simpson fire wall hangers that infringe U.S. Pat. No. 10,316,510 (the "'510 Patent") also infringe MiTek's newly issued U.S. Patent No. 11,021,867 (the "'867 Patent"). Any appeal proceedings would not preclude MiTek from enforcing that newly issued patent. Moreover, MiTek is willing to invest in the appeal to reinstate prior damages for infringement of the '510 Patent. So, even assuming for argument's sake that Simpson prevails on all appellate issues, MiTek's '867 Patent issued on June 1, 2021 and Simpson's hangers infringe one or more claims of this newly issued patent. MiTek also has a continuation application pending (U.S. Pat. App. No. 17/235,349) in the same family. Accordingly, damages for patent infringement are accruing presently, regardless of the outcome of the appeal based at least on the '867 Patent. We understand that Simpson claims to have a noninfringing design, but MiTek is skeptical that any Simpson design—with the same benefits and features as the patented MiTek hanger—will avoid infringement of any issued patent *or patent that will issue in the future*. We do not expect that Simpson has a strong substantive position on these issues. If Simpson would like to share its proposed alternative design, we will, of course, reconsider our thinking. However, given the newly issued patent and continuation application MiTek has covering for this technology, Simpson will not have any product certainty with its proposed design until at least November 26, 2034, given the present circumstances.

Considering these realities, it seems that the best path to avoid the expense and uncertainty of future litigation—for both parties—is to implement a licensing arrangement. A paid-up, lump sum royalty, is not adequate to compensate MiTek for its loss. As we have stated, in addition to the loss of direct sales of fire wall hangers, and erosion of price, it is a commercial reality that the ability to provide the fire wall hanger leads to sales of additional products in many instances. MiTek is not willing to forgo these financial losses to achieve settlement in a situation where the most likely outcome is that MiTek will emerge from appeal with a claim that Simpson's fire wall hangers infringe. To that end, MiTek proposes the following licensing terms, which are subject to formal documentation in a settlement and license agreement:

1. MiTek will provide a non-exclusive license to Simpson, with no right to sublicense, for the technology described and claimed in the '510 Patent and any related continuation, or other application that claims priority to the '510 Patent, for an upfront payment of $750,000 and a royalty at a rate for sales made after the execution of any settlement/license agreement of $6.50/hanger.

2. Simpson agrees not to challenge, or assist others in challenging, the validity of the '510 Patent, any continuation thereof, or any other application from which the '510 patent claims priority or that claims priority to the '510 Patent.

3. Simpson agrees to dismiss, with prejudice, its currently pending lawsuit against MiTek in the Northern District of California captioned *Simpson Strong-Tie Company Inc. v. MiTek Inc.,* Case No. 5:20-CV-06957-VKD.

4. The parties agree to mutual general releases for any claims known, unknown, asserted or unasserted that could have been brought against either party at the time the agreement is executed.

5. Each party bears their own costs and fees.

Finally, thanks again for reaching out to explore settlement. MiTek agrees that now is the time to discuss terms of a settlement—particularly before the expense and distraction of an appeal. Should settlement discussions remain productive during MiTek's briefing period, it will wait to the end of its allotted time to file its opening brief (or a stipulation of dismissal). This should give the parties more than enough time to explore a possible settlement and licensing arrangement, and offers little prejudice to Simpson as the clock will be ticking on MiTek to prepare the necessary briefing during the discussion period. Of course, this letter should not be construed as a waiver of MiTek's rights and is sent in the hopes of furthering settlement pursuant to Federal Rule of Evidence 408. We look forward to hearing from you.

Best regards,

Stinson LLP

Kurt F. James

Kurt James

KFJ:anf

cc: Scott Eidson
Amit Shah, General Counsel, MiTek
Samir Mehta, Assistant General Counsel, MiTek

EXHIBIT J

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

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

PETITION FOR POST-GRANT REVIEW
OF U.S. PATENT NO. 11,021,867

Mail Stop "PATENT BOARD"
Patent Trial and Appeal Board
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

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IV. Claims 1-23 are Indefinite under 35 U.S.C. §112(b). 15

A. "Each extension flange lying in an extension flange plane" of Claims 1-15 is Indefinite. 15

B. "A channel-shaped portion configured to receive the structural component" and "a base configured to receive an end portion of the structural component thereon to support the structural component" of Claims 16-23 are Indefinite.....20

C. "Extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing" of claims 5 and 17 is Indefinite. 22

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[1.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component," 32

[1.1.C] "the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;" 32

[1.2.A] "a connection portion configured for attachment to the wall" 33

[1.2.B] "the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane" 35

[1.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another;" 35

[1.3.A] "an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion," 36

[1.3.B] "each extension flange being configured to extend through the sheathing," 37

[1.3.C] "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane," 39

[1.4] "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall." 40

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D. Claim 3 42
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J. Claim 9 49
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[16.1.A] "a channel-shaped portion configured to receive the structural component," 54
[16.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component and side panels extending upward from the base;" 55
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[16.2.B] "the connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall," 56
[16.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another" 56

[16.3.A] "first and second extension flanges interconnecting the connection portion and the channel-shaped portion and holding the connection portion and channel-shaped portion in spaced apart relation to each other,".....56

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[16.4.A] "the back flange, the first and second extension flanges and the channel-shaped portion defining a sheathing space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing," ..57

[16.4.B] "the back flange being sized and arranged to at least partially block the opening in the sheathing to reduce the exposure of the wooden top plate and wooden studs to an exterior through the opening in the sheathing."....57

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A. Independent Claim 1 59

[1.P] "A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon" 59

[1.1.A] "channel-shaped portion configured to receive the structural component" 60

[1.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component,".....61

[1.1.C] "the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;" 62

[1.2.A] "a connection portion configured for attachment to the wall" 62

[1.2.B] "the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane,".....63

[1.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another;" 64

[1.3.A] "an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion".....66

[1.3.B] "each extension flange being configured to extend through the sheathing".....67

[1.3.C] "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane," 68

[1.4] "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall." 69

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[16.P] "A hanger to connect a joist to a frame wall adapted to have sheathing mounted thereon so that an interior side of the sheathing faces the frame wall and an exterior side of the sheathing faces away from the frame wall, the frame wall including a wooden upper plate and wooden studs extending down from the upper plate, the hanger comprising:" 83

[16.1.A] "a channel-shaped portion configured to receive the structural component," 84

[16.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component and side panels extending upward from the base," 84

[16.2.A] "a connection portion configured for attachment to the frame wall," 85

[16.2.B] "the connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall," 86

[16.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another".....87

[16.3.A] "first and second extension flanges interconnecting the connection portion and the channel-shaped portion and holding the connection portion and channel-shaped portion in spaced apart relation to each other," 87

[16.3.B] "the first and second extension flanges being configured to extend through an opening in the sheathing to the wall frame," 87

[16.4.A] "the back flange, the first and second extension flanges and the channel-shaped portion defining a sheathing space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing," ..88

[16.4.B] "the back flange being sized and arranged to at least partially block the opening in the sheathing to reduce the exposure of the

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[1.1.A] “channel-shaped portion configured to receive the structural component,” 93

[1.1.B] “the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component,” 94

[1.1.C] “the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;” 95

[1.2.A] “a connection portion configured for attachment to the wall,” 96

[1.2.B] “the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane,” 97

[1.2.C] “the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another” 98

[1.3.A] “an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion,” 99

[1.3.B] “each extension flange being configured to extend through the sheathing,” 100

[1.3.C] "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane," 102

[1.4] "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall." 103

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L. Claim 11 113

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O. Independent Claim 16 115

[16.P] "A hanger to connect a joist to a frame wall adapted to have sheathing mounted thereon so that an interior side of the sheathing faces the frame wall and an exterior side of the sheathing faces away from the frame wall, the frame wall including a wooden upper plate and wooden studs extending down from the upper plate, the hanger comprising:" 115

[16.1.A] "a channel-shaped portion configured to receive the structural component," 116

[16.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to

support the structural component and side panels extending upward from the base;” 117

[16.2.A] “a connection portion configured for attachment to the frame wall,” 118

[16.2.B] “the connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall,” 118

[16.2.C] “the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another” 118

[16.3.A] “first and second extension flanges interconnecting the connection portion and the channel-shaped portion and holding the connection portion and channel-shaped portion in spaced apart relation to each other,” 118

[16.3.B] “the first and second extension flanges being configured to extend through an opening in the sheathing to the wall frame,” 119

[16.4.A] “the back flange, the first and second extension flanges and the channel-shaped portion defining a sheathing space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing,” 119

[16.4.B] “the back flange being sized and arranged to at least partially block the opening in the sheathing to reduce the exposure of the wooden top plate and wooden studs to an exterior through the opening in the sheathing.” 119

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EXHIBIT LIST

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")
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

Exhibit No.	Description
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
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).

I. Introduction

Simpson Strong-Tie Company Inc. ("Simpson" or "Petitioner") respectfully requests post-grant review of claims 1-23 of U.S. Patent No. 11,021,867, issued on June 1, 2021, to Steven Brekke et al. ("the '867 Patent") (EX1001) in accordance with 35 U.S.C. §§321-329 and 37 C.F.R. §42.200 et seq.

The '867 Patent is a continuation of U.S. Patent No. 10,316,510 ("the '510 Patent"), which was held unpatentable by the Board under case heading PGR2019-00063, Paper 52 (P.T.A.B. Mar. 11, 2021). Similar to the defects found in the '510 Patent, the claims of the '867 Patent fail to meet the statutory patentability requirements of 35 U.S.C. §§112(b) and 103(a), as demonstrated below and supported by the declaration of Mr. Fennell, who has over 25 years of experience in structural design and construction. Therefore, Petitioner respectfully requests that the Board institute review and ultimately find all claims unpatentable.

II. Identification of Challenge (37 C.F.R. §42.204(b))

A. Citation of Prior Art

The '867 patent issued June 1, 2021, from U.S. Application No. 16/433,799 (the '799 application), filed June 6, 2019. EX1001, (21), (22). The '867 Patent claims the benefit of and priority to Provisional Application No. 61/922,531, filed December 31, 2013; U.S. Patent Application No. 14/555,049, filed November 26, 2014, now U.S. Patent No. 10,024,049; U.S. Patent Application No. 15/675,409, filed August 11, 2017, now U.S. Patent No. 10,184,242; and U.S. Patent Application

No. 16/225,517, later issued as the '510 Patent. The following prior art documents applied in the grounds of unpatentability were published or filed prior to the earliest possible priority date, December 31, 2013, and constitute prior art under the noted statutes:

- U.S. Patent No. 4,422,792 to Gilb, §102(a)(1) (issued December 27, 1983);
- U.S. Publication No. 2005/0155307 to Timony et al., §102(a)(1) (published July 21, 2005);
- U.S. Patent No. 9,394,680 to Bundy et al., §102(a)(2) (effectively filed December 14, 2013); and
- Japanese Application No. 19991014482 to Tsukamoto, §102(a)(1) (published October 16, 1987).

B. Statutory Grounds for Challenge

Petitioner advances the following grounds of unpatentability. Claims 1 and 16 are the independent claims.

Ground	References	Basis	Claims Challenged
1	N/A	35 U.S.C. §112(b)	1-23
2	N/A	35 U.S.C. §112(a)	5, 17
3	Gilb'792 in view of Bundy	35 U.S.C. §103	1-12, 15-17, 21-23

4	Timony	35 U.S.C. §102	1-4, 6, 10, 11
5	Timony in view of Bundy	35 U.S.C. §103	5, 7-9, 12, 15-17, 21-23
6	Tsukamoto in view of Bundy	35 U.S.C. §103	1-12, 15-17, 21-23

III. Background of the '867 Patent

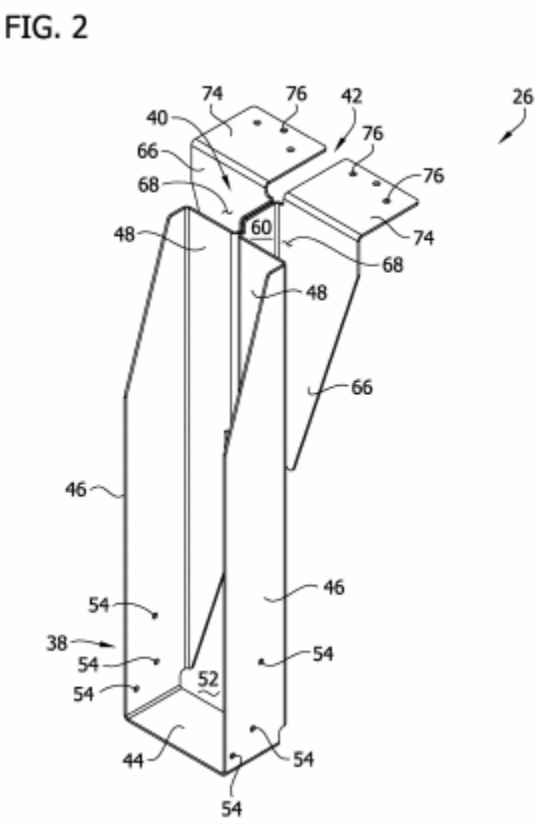
A. Overview of the Claimed Invention

Despite the well-known characteristics of joist hangers common prior to December 31, 2013, Patent Owner claims to have invented a joist hanger used to define "sheath space" sized and shaped to receive sheathing therein. The '867 Patent discloses a hanger for connecting a structural component to a wall that can have sheathing mounted thereon. EX1001, Abstract; EX1003, ¶44.

The hanger includes three primary components: (1) a channel-shaped portion 38 configured to receive the structural component, (2) a connection portion 42 configured to attach against a wall frame, and (3) an extension portion 40 configured to extend through sheathing from the channel-shaped portion 38 to the connection portion 42. EX1001, 4:34-47, 5:1-41, FIGS. 1-2. The channel-shaped portion 38 includes a base 44, a pair of side panels 46 extending upward from the base 44, and a pair of back panels 48 each extending from a respective side panel 46. EX1001, 4:36-47. The connection portion 42 includes a back flange 66 for engaging a vertical face of a top plate. EX1001, 5:19-25. The extension portion 40

includes two extension flanges 60 extending from the back panels 48 to the back flange 66. EX1001, 5:1-25; EX1003, ¶45.

FIG. 2



EX1001, FIG. 2.

While the claimed hanger is intended to be used for connecting a structural element to a frame wall adapted to have sheathing mounted thereon, a POSITA would have understood, in view of the specification and prosecution history, that the claims do not restrict the use of the hanger to a wood-frame construction only. EX1001, 4:18-29; EX1002, 347, 353; EX1003, ¶[]. Indeed, the ’867 Patent specification explicitly states that “[o]ther wall configurations, including different wall constructions and materials, are within the scope of the present invention.”

EX1001, 4:24-26. Thus, the claimed hanger of the ’867 Patent is not limited to a specific wall configuration. EX1003, ¶46.

B. The ’867 Patent Prosecution History

Before examination of the ’867 Patent, Applicant filed a preliminary amendment canceling originally-filed claims 1-20 and adding new claims 21-45, which included two independent claims—claims 21 and 37. EX1002, 125-132. During prosecution, the Office issued one Office Action before ultimately allowing the application. *See generally* EX1002.

The Office Action rejected claims 21-45 on double patenting, indefiniteness, and obviousness. EX1002, 232-254. Notably, the Office rejected independent claim 21 for indefiniteness because the recited phrase “each extension flange having a major surface” introduced a relative term—major surface—that rendered the claim scope unclear. EX1002, 239. The Office rejected independent claim 37 for indefiniteness because the preamble failed to specify whether the claim is “solely drawn to the hanger, or a combination of a hanger and a structure.” EX1002, 239. The Office based its obviousness rejections on prior art—Gilb’155 and Bundy—raised in the post-grant review proceeding of the ’510 patent. EX1002, 241-253.

In response, Applicant amended both independent claims. EX1002, 345-349. In claim 21, Applicant simply removed rather than replaced the relative

term—major surface—from the claim language. EX1002, 345. In claim 37, Applicant amended the preamble "to clarify [that] the *claim is drawn solely to the hanger … and not the combination of the hanger and frame wall*."[1] EX1002, 347, 353. Applicant traversed both the double-patenting and the obviousness rejections, arguing that neither the related patents nor the prior art rendered obvious a connection portion and channel-shaped portion being in a *fixed, spaced apart relation*. EX1002, 350-358.

The Office then issued a Notice of Allowance, identifying "the connection portion and channel-shaped portion being in a fixed, spaced apart relation" as the patentable feature. EX1002, 395. In support of its position, the Office adopted the Board's construction of the term "rigidly fixed" set forth in the post-grant review proceeding of the '510 patent. EX1002, 396 (construing "rigidly fixed" to mean "components are connected such that they do not move freely with respect to one another.") (citing PRG2019-00063, Paper 52, 103 (P.T.A.B. Mar. 11, 2021).

Before the Office issued the '867 Patent, Applicant filed an amendment adding editorial changes to some of the dependent claims. EX1002, 426-432.

[1] Emphasis added, unless otherwise noted.

C. Background of the Art

The ’867 Patent includes two independent claims—claims 1 and 16—each directed to a hanger for connecting a structural component or a joist to a wall adapted to have sheathing mounted thereon. EX1001, 12:15-44, 13:34-14:17. The claims of the ’867 Patent recite basic, well known elements for a joist hanger, such as a channel-shaped portion, a connection portion, and an extension portion interconnecting the channel-shaped portion and the connection portion. EX1003, ¶¶32-43. The ’867 Patent broadly claims the concept of disposing the channel-shaped portion and the connection portion in a “fixed, spaced apart relation” to define a sheath space there between. EX1001, 12:15-44, 13:34-14:17. But these recited elements and concepts were well known prior to the earliest claimed filing date, as demonstrated below by the prior art. EX1003, ¶¶32-43.

1) Joist Hangers

Hangers for supporting structural components in construction and engineering have been commonly used for a long time. EX1003, ¶32. Traditionally, joist and truss hangers are have been used in building construction to secure the ends of joists, trusses, or other structural members to headers, walls, or other support members. *Id*. For example, hangers have long included a portion in the shape of a channel (such as a U-shaped portion) for supporting and seating a structural component. EX1003, ¶33. Conventional hangers also include

mechanisms for connecting the hanger to a wall, and stabilizing the hanger thereon, such as a back flange. *Id*.

2) Hangers Having an Extension Portion Interconnecting a Channel-Shaped Portion and a Connection Portion in a Fixed, Spaced Apart Relation

Long before the ’867 Patent, joist hangers commonly included an extension portion that interconnected a channel-shaped portion and a back flange in a fixed, spaced apart relation, as evidenced by Gilb’792, Timony, and Tsukamoto. EX1003, ¶36.

Gilb’792 discloses a hanger for holding a structural beam member on a wall (e.g., ledger disposed on the inside perimeter of a wall). EX1035, Abstract, 1:5-11, 3:22-28. Gilb’792’s hanger 7’ includes “[f]irst and second stirrup members 11’ and 12’ … adapted for holding a structural beam member.” EX1035, 3:29-31. Gilb’792’s hanger 7’ includes a base 36 for engaging a vertical surface, such as a vertical surface on a ledger or a wall frame. EX1035, 3:39-50; EX1003, ¶37. Gilb’792’s hanger 7’ also includes “first and second gusset members 15’ and 22” that extend from the stirrup members 11’/12’ to base 36. EX1035, 3:31-44. Gilb’792’s stirrup members 11’/12’ and base 36 are disposed in a fixed, spaced apart relation, thereby allowing stirrup members 11’/12’ to receive a structural beam away from the wall. EX1035, 3:23-55; EX1003, ¶37.

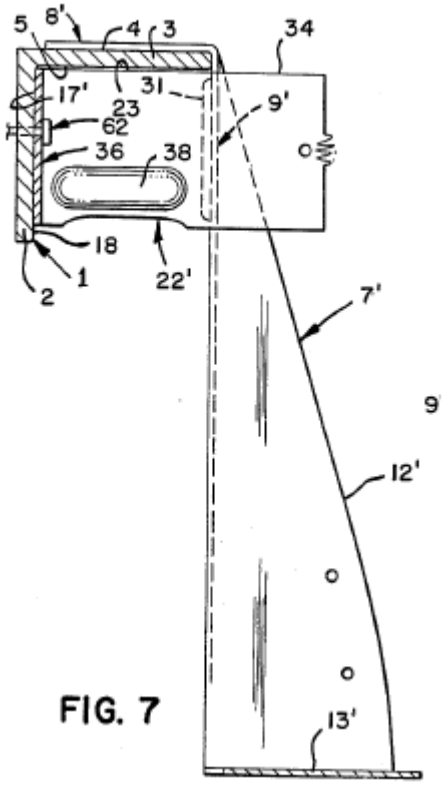
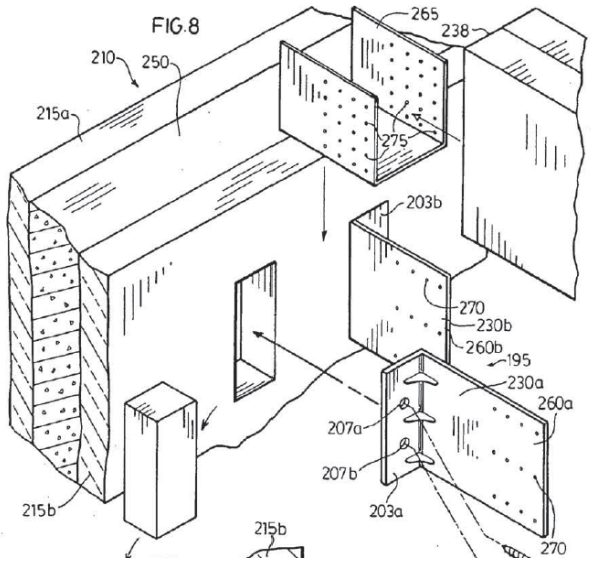


FIG. 7

EX1035, FIG. 7.

Timony discloses a hanger (e.g., bracket 195) for hanging an object, such as a joist, from a wall. EX1008, Abstract, ¶[0046]. Specifically, Timony's hanger includes two retrofit plates 230a/230b that include a retaining portion 203 for engaging a wall core 250 and a hanging portion 260 for extending through a foam wall 215b. EX1008, ¶¶[0048]-[0050]. Timony's hanger further includes a support 265 formed as "U-shaped bracket … to accommodate an object 238" and "securable to hanging portion 260 of retrofit plate 260." EX1008, ¶[0048]. When secured to hanging portion 260 of retrofit plate 230, Timony's support 265 is in a fixed, spaced apart relation with retaining portion 203, thereby allowing support

265 to be disposed outside of the wall 210 to receive object 238. EX1008, ¶¶[0048]-[0050]; EX1003, ¶38.

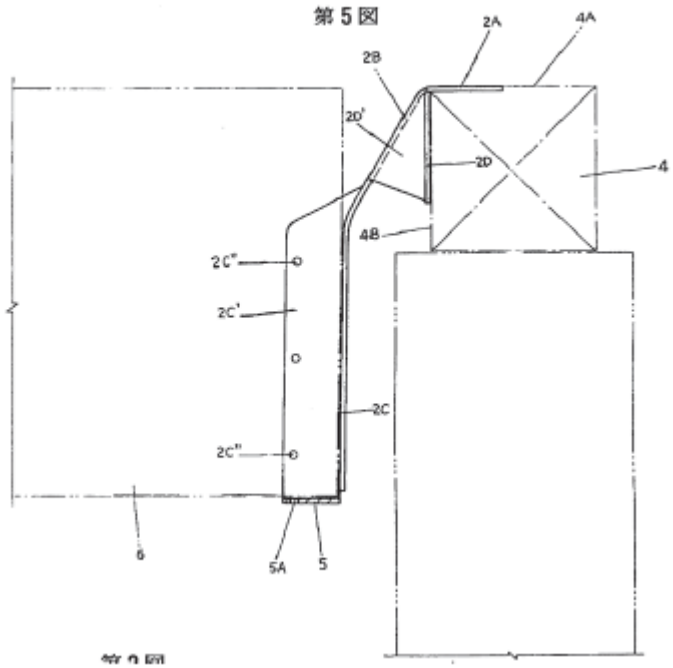


EX1008, FIG. 8.

Tsukamoto discloses a beam hanger having "horizontal portions 2A/3A for abutting a base, inclined portions 2B/3B that extend from front ends of the horizontal portions 2A/3A and are inclined forwardly downward, and vertical portions 2C/3C that extend downward from lower ends of the inclined portions." EX1009, 2. Tsukamoto's vertical portions 2C/3C include holding plates 2C'/3C' for holding a beam." EX1009, 2. Tsukamoto's inclined portions 2B/3B include connection plates 2D'/3D' having "triangular side surfaces." EX1009, 2. Tsukamoto's hanger further includes vertical plates 2D/3D "for abutting the base." EX1009, 2. As shown below in FIG. 5, Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D are disposed in a fixed, spaced apart relation, thereby

allowing holding plates 2C'/3C' to receive a structural beam away from the wall. EX1009, 2-3; EX1003, ¶39.

FIG. 5

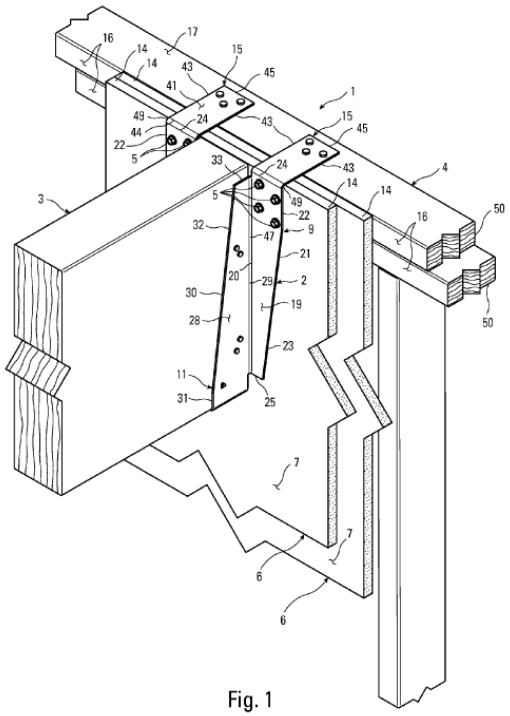


EX1009, FIG. 5.

3) Hangers Defining a Sheath Space between its Channel-Shaped Portion and a Vertical Face of a Wall Member.

Defining a sheath space between a hanger's channel-shaped portion and a vertical face of a wall member was not inventive. EX1003, ¶¶36-43. For example, as mentioned above, in §III.C.2, each of Gilb'792, Timony, and Tsukamoto disclose hangers defining a space between a vertical face of a wall member and a channel-shaped portion. Additionally, Bundy is directed to a hanger for supporting a joist or beam away from a wall. EX1007, Abstract. Bundy's drywall joist hanger

expressly describes an extension portion that accommodates precisely two layers of 5/8" thick sheathing to be received between the rear edge plane and the back wall plane. EX1007, FIG. 1, 5:16-18. 52. Bundy illustrates that it was well known for a structural hanger's extension distance to be sized to define sheath space between a channel-shaped portion of a structural hanger and the vertical face of the wall member. EX1007, 5:16-18.



EX1007, FIG. 1.

Thus, the claim elements directed to the '867 Patent's alleged inventive concept recite nothing more than what was already in the prior art and would have been well known to a POSITA. EX1003, ¶¶52-65.

D. Level of Ordinary Skill in the Art

A POSITA at the time of the earliest claimed filing date of the '867 Patent would have had an education background of, or practical experience providing an equivalent to, a Bachelor of Science in Mechanical Engineering, Structural Engineering or a related/equivalent field and at least four years of work experience in construction connector design/development. EX1003, ¶15.

E. Claim Construction

Generally, the claim construction standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005), applies to this proceeding. 83 Fed. Reg. 51,341 (Oct. 11, 2018); 37 C.F.R. §42.200. Under this standard, words in a claim are given their plain meaning, which is the meaning understood by a person of ordinary skill in the art at the time of the alleged invention after reading the entire patent. *Phillips*, 415 F.3d at 1312-13.

1. Constructions from Prior Proceeding

In PGR2019-00063, the PTAB construed the following terms as noted:

- "extend through": "in the context of element A 'extend[ing] through' element B, [] 'element A extends into one side and out the other of element B'" (FWD, 45);
- "configured to extend through" the sheathing: "extending into one side and out of the other side of the sheathing" (FWD, 51);

- "extending from": "in the context of element B extending from element A, the beginning of element B's extension is on element A" (FWD, 110);
- "rigidly fixed": "components are connected such that they do not move freely with respect to each other" (FWD, 98).

Given that the Specification is identical between the present patent and the '510 Patent (the subject of the Board's prior decision), Petitioner applies the same construction to the same terms in the present claims. While the term "rigidly fixed" does not appear in the '867 Patent claims, the term "fixed" does. Given that the Board's prior construction of "rigidly fixed" appears to have relied on portions of the shared specification using the word "fixed," Petitioner uses the same construction herein for the term "fixed."

2. "Planar"

Claim 2 recites that "each of the first and second extension flanges are planar." A plane is a two-dimensional construct having no thickness. EX1003, ¶20. According to the '867 Patent specification, the hanger is made of sheet metal, which necessarily has a dimension of thickness. As a piece of sheet metal cannot exist solely within a plane, a POSITA would have interpreted the word "planar" in claim 2 as requiring that a surface of the flange is coincident with a plane, not the

entire flange itself. Accordingly, the proper construction of the term "planar" is "having a surface coincident with a plane". *Id.*

Unless otherwise noted, Petitioner submits that the remaining claim terms should be given their plain and ordinary meaning.

IV. Claims 1-23 are Indefinite under 35 U.S.C. §112(b).

The threshold test for indefiniteness under §112(b) is set forth in *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2130 (2014). Under the *Nautilus* standard, a patent claim is invalid for indefiniteness if the claims, "read in light of the specification delineating the patent, and the prosecution history, fail to inform, *with reasonable certainty*, those skilled in the art about the scope of the invention." *Nautilus*, 134 S. Ct. at 2124.

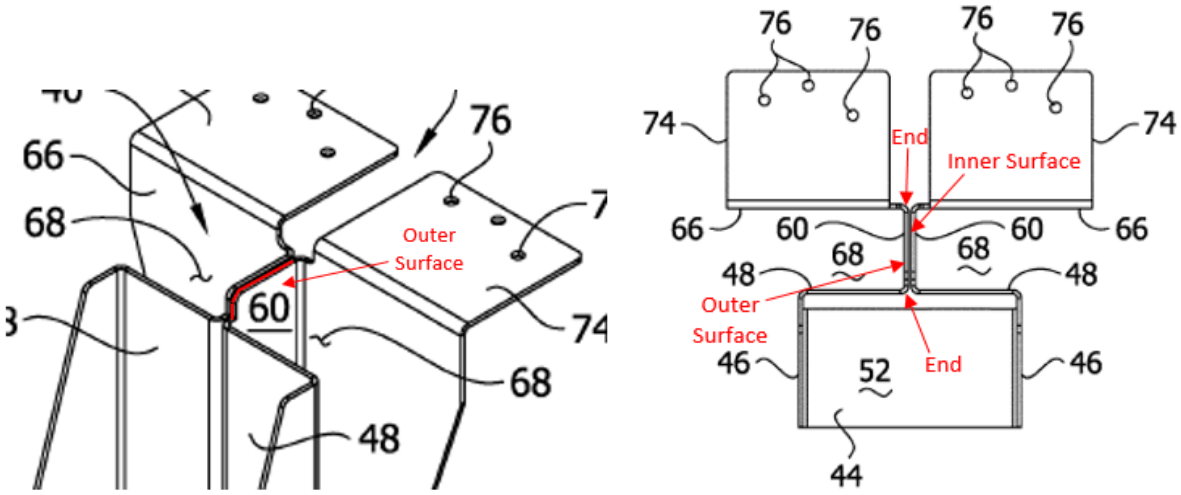
A. "Each extension flange lying in an extension flange plane" of Claims 1-15 is Indefinite.

Claim 1's limitation "each extension flange lying in an extension flange plane" fails to inform with reasonable certainty where the "extension flange" is located relative to the "extension flange plane," specifically which surface of the "extension flange" —and how much of such surface—lies "in" the "extension flange plane." This renders claim 1, and claims 2-15 depending therefrom, indefinite. EX1001, 11:35-36; EX1003, ¶¶67-78.

Claim 1 introduces two imaginary planes—a base plane and an extension flange plane—in an attempt to depict the spatial relationship between the extension

flanges and the base of the channel-shaped portion. EX1001, 11:23-24, 11:35-36; EX1003, ¶68. To define the location of the base plane, claim 1 refers specifically to the base's upper surface. EX1001, 11:21-24 ("the base having an upper surface … the upper surface lying in a base plane"). Because the upper surface of the base constitutes a *two-dimensional object*, a POSITA would have understood precisely, in view of the plain claim language, where the base plane lies relative to the base. EX1003, ¶69; EX1037, 1357 (defining "plane" as "a flat surface on which a straight line joining any two points on it would wholly lie" or "an imaginary flat surface through or joining material objects.")

Claim 1, however, uses a different approach to define the location of the "extension flange plane." EX1001, 11:35-36; EX1003, ¶70. Rather than defining the location of the "extension flange plane" based on any particular surface, claim 1 merely recites "each extension flange lying in an extension flange plane," without any further context. EX1001, 11:35-36. That is, claim 1 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 extension flange. EX1003, ¶70. Each extension flange has multiple surfaces, which surfaces also include curves. This renders the claimed location of the "extension flange plane" ambiguous. *Id.*



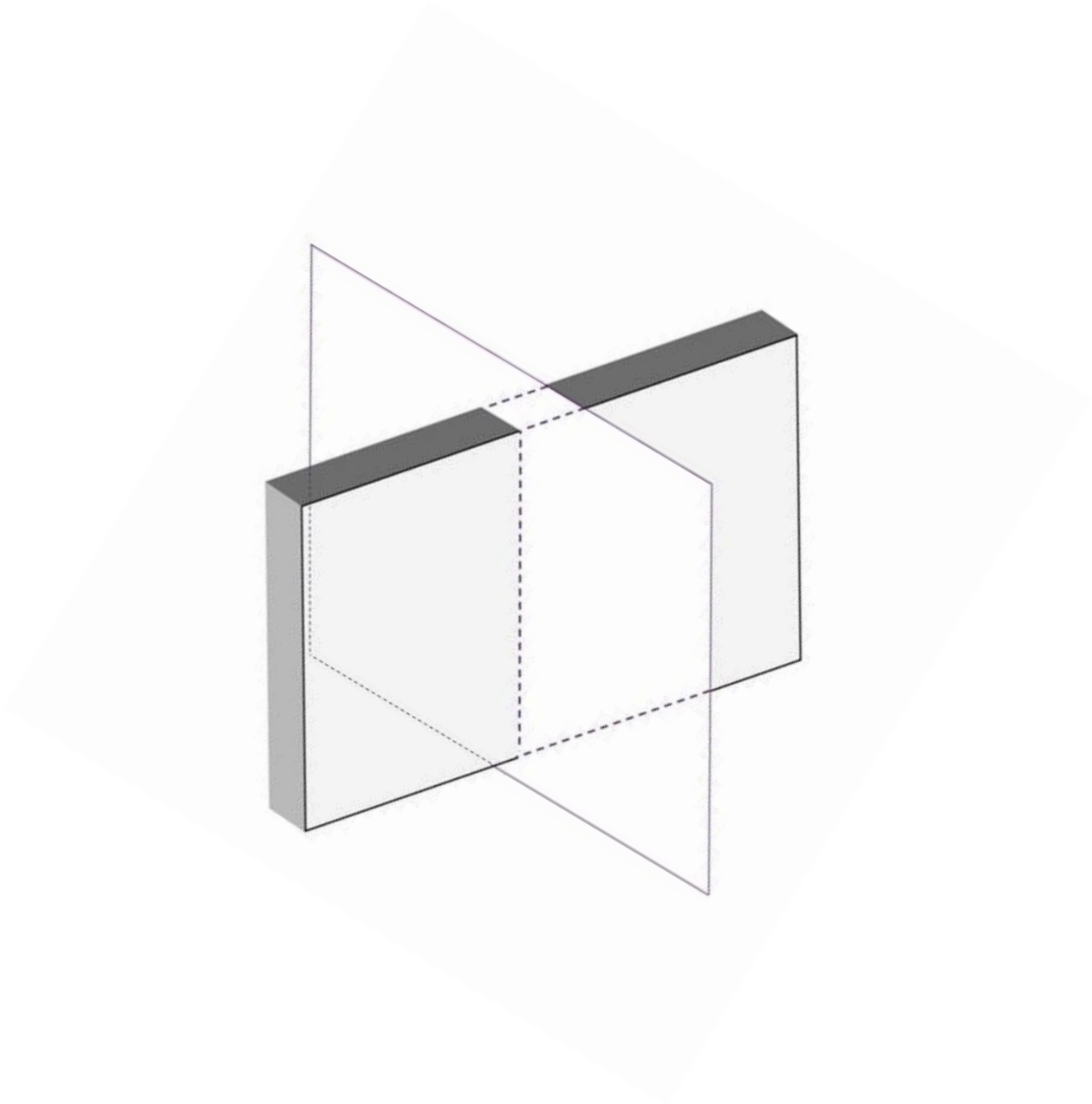
EX1001, FIGS. 2 and 7 (annotated). EX1003, ¶70.

As shown in FIGS. 2 and 7, each extension flange 60 includes an inner surface facing the other extension flange 60, an outer surface facing the sheathing channel 68, and a thickness defined between the inner and outer surfaces. EX1001, FIGS. 2, 7, 7:15-20 (describing that hanger 26 is constructed of a metal blank 80 having 12-14 gauge steel, which corresponds to a thickness between 1.98 mm and 2.78 mm); EX1003, ¶71. Across its thickness, extension flange 60 lies in an infinite number of imaginary two-dimensional planes. EX1003, ¶72. For example, an imaginary plane can extend along the outer surface of extension flange 60, the inner surface of extension flange 60, and a midpoint between the inner and outer surfaces of extension flange 60. EX1003, ¶72. Any one of these imaginary planes can correspond to the recited "extension flange plane." EX1003, ¶74.

Moreover, as shown in FIGS. 2 and 7, the ends of extension flange 60 *bend* before connecting to the back panel 48 and the back flange 66, respectively.

EX1001, FIGS. 2, 7. These bends clearly define extension flange 60 as a three-dimensional object, whose position cannot be defined by a single two-dimensional plane. For example, by bending toward back panel 48 and back flange 66, the ends of extension flange 60 coincide with planes at any number of angles with respect to the imaginary planes described above. EX1003, ¶73. In other words, the extension flange 60 lies in and passes through multiple, intersecting imaginary planes. *Id.* Thus, in order to define the recited "extension flange plane," a specific surface of extension flange 60 must be identified, not the entire extension flange itself. EX1003, ¶74. Accordingly, a POSITA would not have been able to ascertain the location of the "extension flange plane" with reasonable certainty by generally referring to the extension flange, as recited in claim 1. *Id.* And a POSITA would not have been able to determine, in view of the claim language, which surface or cross-section on the extension flange lies in the recited "extension flange plane." *Id.*

Additionally, the claims' use of the word "in" lends further ambiguity to the phrase. EX1003, ¶75. Consider a plane that cuts across a three-dimensional extension flange, perpendicular to its direction of extension:



Because the three-dimensional extension flange passes through such a plane, the extension flange is "in" the plane, via its cross-section. *Id.* This leaves an infinite number of planes that might satisfy the limitation "each extension flange lying *in* an extension flange plane." *Id.*

The specification fails to shed light on this issue, as it neither mentions the term "plane" nor explicitly depicts a required spatial relationship between the extension flanges and the base. *See generally* EX1001. And the prosecution history reflects how the claim language defines the location of the "base plane" and "extension flange plane" inconsistently. EX1002, 344-358. In a preliminary amendment, independent claim 21—corresponding to claim 1 of the '867 Patent—initially recited "the extension flange plane *having a major surface* lying in an extension flange plane." EX1002, 125-131. But during prosecution, the Office identified the term "major" as a relative term of degree that rendered the claim indefinite. EX1002, 239. Rather than replacing the term "major" with another term that precisely located a particular surface on the extension flange, Applicant simply removed the phrase "having a major surface" from the claim language. EX1002, 345. While Applicant's amendment addressed the relative terminology indefiniteness rejection set forth in Office Action, this amendment raises another indefiniteness issue—where the extension flange plane is located relative to the extension flange. EX1003, ¶¶76-77.

Accordingly, claim 1, and claims 2-15 depending therefrom, should be found indefinite. EX1003, ¶78.

B. "A channel-shaped portion configured to receive the structural component" and "a base configured to receive an end portion of

the structural component thereon to support the structural component" of Claims 16-23 are Indefinite.

The recited limitations "a channel-shaped portion configured to receive the structural component" and "a base configured to receive an end portion of the structural component thereon to support the structural component" lack proper antecedent basis for the term "structural component," thereby failing to inform with reasonable certainty what object—a joist or a structural component—is intended to be used with the recited hanger. EX1003, ¶¶79-83.

The preamble of claim 16 introduces the intended use of a joist and a frame wall with the recited hanger. EX1001, 13:35-38 ("A hanger to connect *a joist* to a frame wall adapted to have sheathing mounted thereon ….") The remaining limitations of claim 16, however, never refer to the recited "joist" of the preamble. Instead, claim 16 recites that the channel-shaped portion of the hanger is configured to receive "the structural component." EX1001, 13:42-45. Dependent claims 21 and 22 also reference use of "the structural component," not a joist. EX1001, 13:33-47. Thus, claim 16 fails to provide proper antecedent basis for the term "the structural component." EX1003, ¶¶81-82.

Because claim 16 introduces "a joist" in the preamble and then later introduces "the structural component" without proper antecedent basis, a POSITA would not have been able to determine with reasonable certainty whether the recited hanger is intended to be used with a joist (a specific type of structural

member having standard, uniform sizes) or a structural component (a generic term covering various structural members (e.g. a truss) having different shapes and sizes). EX1003, ¶¶81-82; s*ee Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1249 (Fed. Cir. 2008) ("We have also stated that a claim could be indefinite if a term does not have proper antecedent basis where such basis is not otherwise present by implication or the meaning is not reasonably ascertainable."); *Interval Licensing LLC v. AOL Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014) ("If the claim language might mean several different things and no informed and confident choice is available among the contending definitions, the claim is indefinite."). Thus, a POSITA would not have been able to determine with reasonable certainty what the claimed hanger is intended to support.

Accordingly, claim 16, and claims 17-23 depending therefrom, should be found indefinite. EX1003, ¶83.

C. "Extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing" of claims 5 and 17 is Indefinite.

The limitation "extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing" in claims 5 and 17 fails to inform with reasonable certainty how the recited function of maintaining a 2 hour fire resistance rating further limits the claimed hanger. EX1003, ¶¶84-87.

Functional claim language failing "to provide a clear-cut indication of the scope of the subject matter embraced by the claim," renders the claim indefinite. *In re Swinehart*, 439 F.2d 210, 213 (CCPA 1971). For example, when claims merely recite a description of a problem to be solved or a function or result achieved by the invention, the boundaries of the claim scope may be unclear. *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1255, (Fed. Cir. 2008).

Here, the recited function of maintaining a 2 hour fire resistance rating of sheathing does not clarify what is required by the hanger, because the fire resistance rating is based on the entire wall assembly, not just the conformance between the sheathing and the hanger. EX1003, ¶86. Indeed, the specification describes determining a fire resistance rating based on "*a wall assembly* including … two layers of 5/8" type X gypsum … [and] cavities in the wall [that] were *filled with mineral wool insulation*." EX1001, 11:45-53. That is, other materials, such as wool, are needed to achieve the desirable fire resistance rating even using the '867 Patent's own hanger. EX1003, ¶86. And a POSITA would have understood that two layers of 5/8" sheathing, alone, do not provide a 2 hour fire rating. EX1003, ¶86. Thus, a POSITA would not have understood with reasonable certainty what is required by the claimed hanger to maintain a 2 hour fire resistance rating of the "*sheathing*." *Id.*

Accordingly, claims 5 and 17 should be found indefinite.

V. Claims 5 and 17 Lack Written Description under 35 U.S.C. §112(a).

Under the written description requirement of 35 U.S.C. §112(a), the specification must reasonably convey to a person of ordinary skill in the art that the inventor had possession of the claimed subject matter as of the filing date. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

Here, the subject matter of dependent claims 5 and 17 is not disclosed expressly or inherently in the ’867 Patent specification, and thus lack written description support. EX1003, ¶¶88-90. Specifically, nowhere does the ’867 patent disclose that the sheathing alone has a 2 hour fire resistance rating, such that there is no support for the claimed term “maintaining a 2 hour fire resistance rating of the sheathing.” *Id.* The specification only ever refers to a 2 hour fire resistance rating of the “wall assembly,” not the sheathing itself. See, e.g., EX1001, 4:26-29, 11:29-32, 11:49-60. As discussed above, for example, the specification of the ’867 Patent describes determining a fire resistance rating based on “a wall assembly including … two layers of 5/8” Type X gypsum … [and] cavities in the wall [that] were filled with mineral wool insulation.” EX1001, 11:45-53. That is, other materials and wall components were needed to achieve the desirable fire resistance rating of the entire assembly, even using the ’867 Patent’s own hanger. EX1003, ¶89.

Accordingly, there is no support in the written description for sheathing that itself has a 2 hour fire resistance rating, or for maintaining such a non-existent rating. EX1003, ¶90.

VI. The Board should not deny institution under Section 325(d).

The Board has discretion to deny institution when "the same or substantially the same prior art or arguments previously were presented to the Office," but should not do so here. 35 U.S.C. §325(d). The Board has articulated six non-exclusive factors for considering whether to exercise its discretion to deny institution under §325(d). *Becton, Dickinson & Co. v. B. Braun Melsungen AG,* IPR2017-01586, Paper 8, 17-18 (P.T.A.B. Dec. 15, 2017) (informative; precedential as to §III.C.5, first para.). Here, although some of the applied art—Gilb'792, Timony, and Bundy—was either cited by the Examiner or applied during prosecution, the *Becton* factors firmly establish that the Board should not exercise its discretion to deny institution..

Regarding Becton factors (a)-(b)—the similarities, material differences, and cumulative nature of the asserted prior art—Tsukamoto was not considered by the Examiner during prosecution. Tsukamoto is not cumulative over the references applied by the Examiner during prosecution because Tsukamoto discloses a feature—a connection portion and channel-shaped portion being in a fixed, spaced apart relation—that was deemed by the Examiner to be missing in the cited art. *See*

infra §X.B.[1.2.C]. This scenario presented is much like that in *Oticon M. AB et al. v. Cochlear Ltd.*, IPR2019-00975, Paper 15, 18-20 (P.T.A.B. Oct. 16, 2019) (precedential) (declining to deny institution under §325(d) where previously applied reference was combined with reference not previously considered). Accordingly, the Tsukamoto-Bundy combination is materially different from the prior art considered by the Office during prosecution.

Further, the primary reference applied by the Examiner during prosecution was Gilb'155, whose rotatable channel-shaped portion was found to be different from the claimed "fixed, spaced-apart relationship" from the connection portion. But both Gilb'792 and Timony are materially different from Gilb'155, as they do not feature rotatable portions and do disclose a connection portion and a channel-shaped portion in a "fixed, spaced-apart relationship." Thus, challenges based on Gilb'792 or Timony are materially different from and not cumulative with the rejections applied during prosecution.

Regarding *Becton* factor (c), *none* of the primary references—Gilb'792, Timony, and Tsukamoto—in the asserted combinations served as the basis for rejection. *See Intel Corp. v. Qualcomm Inc.*, IPR2019-00128, Paper 9, 16 (P.T.A.B. May 29, 2019) ("The fact that [a reference] was not the basis of rejection weighs strongly against exercising our discretion to deny institution under 35 U.S.C. §325(d)."). Thus, the applicant did not "overcome" Gilb'792, Timony, and

Tsukamoto as prior art. This also directly relates to *Becton* factor (d)—the applicant made no arguments whatsoever during examination against the prior art combinations applied here. Thus, there is no overlap between arguments made during examination and the manner in which this Petition uses the asserted art.

Regarding *Becton* factor (e), the Examiner erred during examination by not substantially considering Gilb'792 and Timony. At no point during prosecution were Gilb'792 and Timony discussed by either the Examiner or the applicant. Yet as the Petition demonstrates, both Gilb'792 and Timony provide key teachings, namely a hanger having a connection portion and a channel-shaped portion being in a fixed, spaced apart relation to define a sheath space therein, as demonstrated below. The failure to recognize the substantial relevance of Gilb'792 and Timony constituted an error in evaluating the asserted prior art. Indeed the Board has instituted review when the prosecution record provides no indication that the asserted references were substantively considered by the Examiner. *See e.g.*, *Pure Storage, Inc. v. Realtime Data LLC*, IPR2018-00549, Paper 7, 11 (P.T.A.B. July 23, 2018) (noting "there is no evidence of record that [the prior art references] were substantively considered by the Examiner."); *Synaptic Medical Inc. v. Karl Storz Endoscopy-America, Inc*., Case No. IPR2018-00462, Paper 6, 10 (P.T.A.B. July 16, 2018) (stating "the references here were not applied to reject the claims of the '360 Patent and there is no evidence that the Examiner considered the

particular disclosures cited in the Petition or addressed arguments similar to those Petitioner now presents").

Furthermore, under *Becton* factor (f), additional facts and evidence here—including Mr. Fennell's declaration—warrant institution and ultimately a finding of unpatentability based on the newly assert prior art combinations.

VII. Claims 1-12, 15-17, and 21-23 Would Have Been Obvious over Gilb'792 in view of Bundy.

Gilb'792 discloses each and every structural element listed in claim 1 of the '867 Patent, but does not explicitly disclose that the space between its hanger's channel-shaped portion and back flange is sized and shaped to receive sheathing therein. However, Bundy discloses an analogous hanger that receives sheathing between the channel-shaped portion and the wall. EX1003, ¶¶91-96.

For the reasons discussed below, Gilb'792 as modified in view of Bundy renders obvious claims 1-12, 15-17, and 21-23.

A. Motivation to Modify Gilb'792 Based on the Teachings of Bundy.

Gilb'792 and Bundy are both from the same field of endeavor, namely construction support hangers. EX1003, ¶92. Bundy discloses spacing an extension portion of an analogous hanger to receive two layers of 5/8" thick sheathing. *Id*., ¶93; EX1007, 5:16-18.

Gilb'792 already discloses a space between its back flange (base 36 having side face 17') and its channel-shaped portion (stirrup members 11'/12'), the width

of the space defined by gusset members 15'/22'. EX1003, ¶92. A POSITA would have found it obvious to receive sheathing between Gilb'792's stirrup members 11'/12' and base 36, as Bundy teaches receiving sheathing between a channel-shaped portion of a hanger and the wall. EX1003, ¶¶93-94. Moreover, it would have been obvious to optimize the size of the spacing between Gilb'792's stirrup members 11'/12' and base 36 to accommodate two layers of 5/8" thick sheathing according to the size preference described by Bundy. *Id.* Bundy teaches this preferred construction for optimal wall integrity. EX1003, ¶94; EX1007, 5:10-22. This modification would have been nothing more than applying a known technique (Bundy's spacing to accommodate two sheets of 5/8" sheathing) to a similar device (Gilb'792's space defined by gusset members 15'/22') to obtain the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby "protect[ing] the structural members of a building." EX1007, 5:18-20; EX1003, ¶94.

A POSITA would have had an expectation of success in defining a sheath space between Gilb'792's stirrup members 11'/12' and base 36 because Gilb'792's and Bundy's hangers are constructed of similar materials (e.g., metal) and used for similar purposes (e.g., hanging a structural object to a wall). EX1003, ¶95; EX1007, 4:47-51; EX1035, 2:33-58.

B. Independent Claim 1

[1.P] "A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon"

Initially, the limitation "for connecting a structural component to a wall adapted to have sheathing mounted thereon" recites an intended use of the claimed invention, satisfied by any prior art structure capable of performing the intended use. EX1002, 0167; EX1003, ¶¶46, 98-99; *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997); *see also Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997).

To the extent that the preamble is limiting, Gilb'792-Bundy combination renders obvious a hanger for connecting a structural component to a wall. EX1035, 3:22-31; EX1003, ¶¶97-100. A POSITA would have understood that Gilb'792's hanger 7' could be used for a variety of different wall types, including the claimed intended use. EX1003, ¶99. While Gilb'792 explicitly discloses using hanger 7' for connecting a beam to a metal ledger at a roof line around the inside perimeter of buildings, EX1035, 1:5-11, a POSITA would have understood that wall assemblies having both ledgers and sheathing were known, and Gilb'792's hanger would be applicable to any kind of wall, such as a wall having sheathing mounted thereon. EX1003, ¶99. Indeed, drywall is a common sheathing used in wall construction, and Bundy discloses using an analogous hanger for a wall covered with drywall. *Id.*; EX1007, 2:37-41. Accordingly, it would have been obvious to a POSITA to use a hanger such as Gilb'792's to connect a structural component to a wall

adapted to have sheathing mounted thereon. EX1003, ¶99. Such a modification would have been simply applying a known technique (Bundy's use with drywall) to a known device (Gilb'792's hanger 7') to obtain the predictable result of optimizing the size of the hanger's spacing to receive sheathing. *Id*., ¶99; *see, e.g.*, EX1007, 5:18-19; EX1018, Table 721.1(2).

Thus, Gilb'792-Bundy combination renders obvious element [1.P].

[1.1.A] "channel-shaped portion configured to receive the structural component,"

Gilb'792 discloses a channel shaped portion (e.g., stirrup members 11'/12' and depending flanges 9') configured to receive the structural component (e.g., structural beam). EX1003, ¶¶101-102; EX1035, 3:29-31 ("First and second stirrup members 11' and 12' are attached to the depending flanges 9' and are adapted for holding a structural beam member ….").

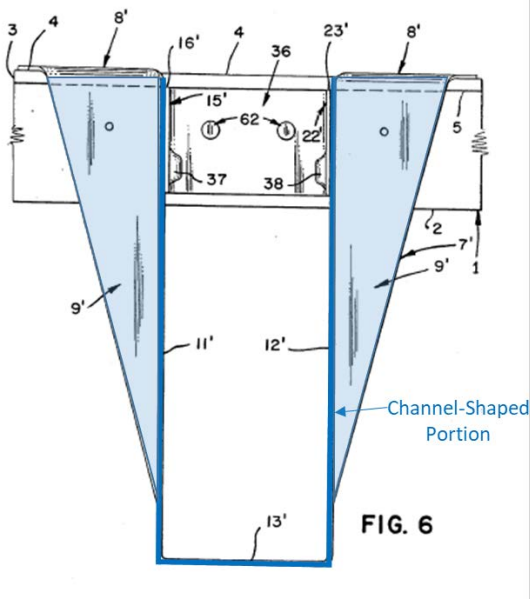


FIG. 6

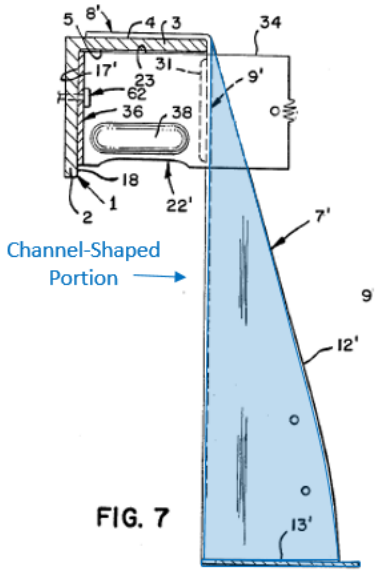
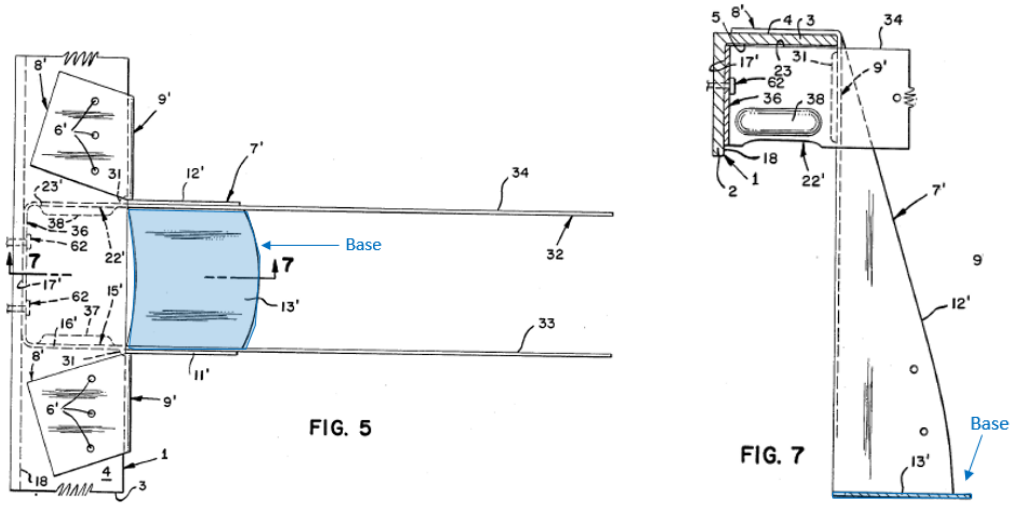


FIG. 7

EX1035, FIGS. 6, 7 (annotated). EX1003, ¶101.

[1.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component,"

Gilb'792 discloses that the channel-shaped portion (stirrup members 11'/12' and depending flanges 9') includes a base (seat member 13') configured to receive an end portion of the structural component (beam) thereon to support the structural component. EX1003, ¶¶103-104; EX1035, 3:51-52 ("Preferably hanger 7' is formed with a seat member 13' integrally connected to stirrup members 11' and 12'.")

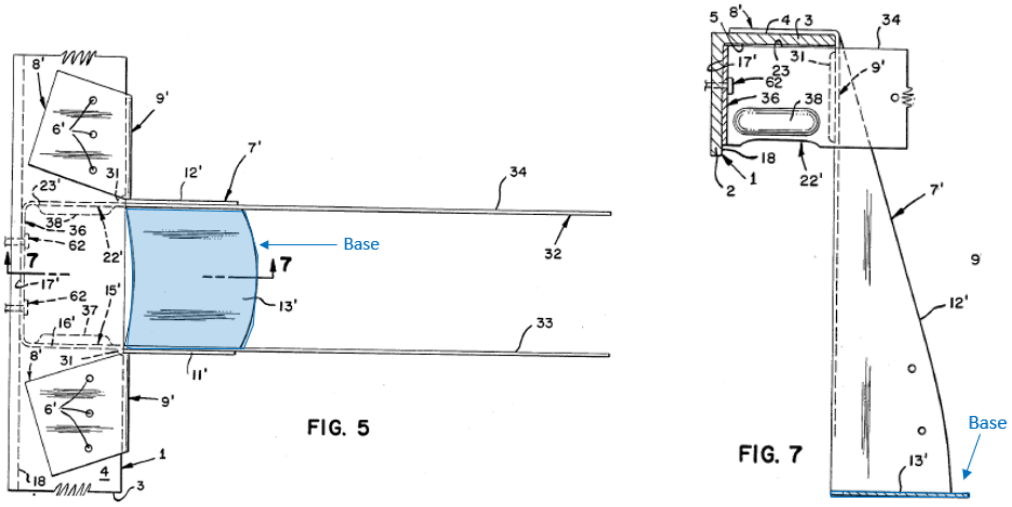


EX1035, FIGS. 5, 7 (annotated). EX1003, ¶103.

[1.1.C] "the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;"

As shown below in Figure 7, Gilb'792 discloses that the base (seat member 13') has an upper surface (its top) configured to engage the structural component,

and that the upper surface of the base lies in a base plane. EX1003, ¶¶105-106; EX1035, 3:51-52. As illustrated, the two-dimensional top surface of seat member 13' is flat, and thus defines a base plane in which it lies.



EX1035, FIGS. 5, 7 (annotated). EX1003, ¶105.

[1.2.A] "a connection portion configured for attachment to the wall"

Gilb'792 discloses a connection portion (base 36) configured for attachment to the wall. EX1003, ¶¶107-110; EX1035, 3:43-44; 3:47-50 ("First and second gusset members 15' and 22' are held in position by shooting nail means 62 through base 36 of the U-shaped member into lower leg 2 of the metal ledger."). A POSITA would have understood that Gilb'792's base 36 corresponds to the recited "connection portion," and that nail means 62 extend past the ledger into the wall. EX1003, ¶¶107-108; EX1035, Figures 5 and 6.

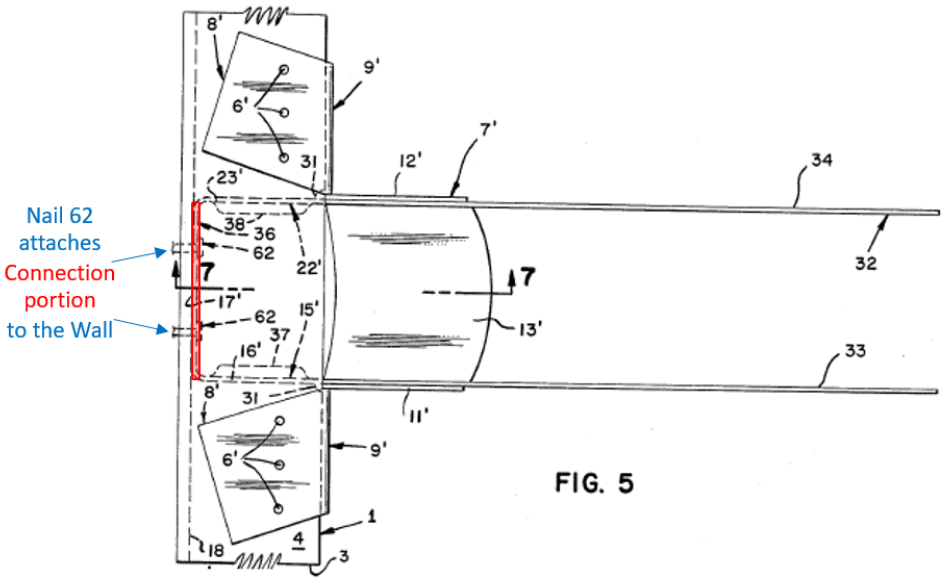


FIG. 5

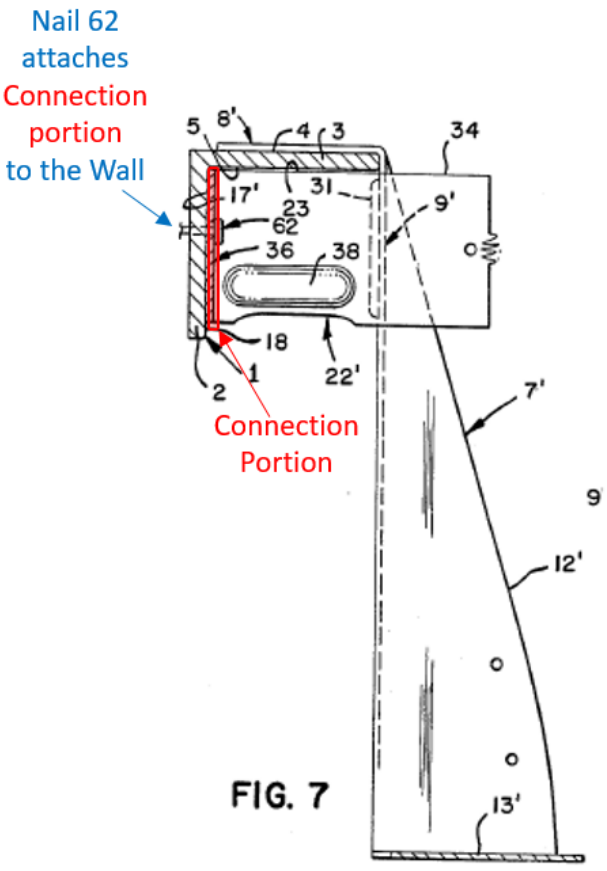
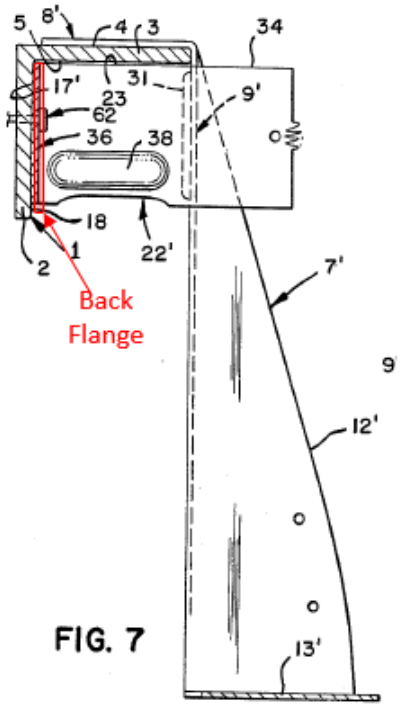


FIG. 7

EX1035, FIGS. 5, 7 (annotated). EX1003, ¶108.

[1.2.B] "the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane"

As shown below in FIG. 7, Gilb'792 discloses that the connection portion (base 36) includes a back flange having an upper edge (i.e., the very top of the back flange) and that the back flange extends downward from the upper edge in a direction generally toward the base plane. EX1003, ¶¶111-112; EX1035, 3:39-49

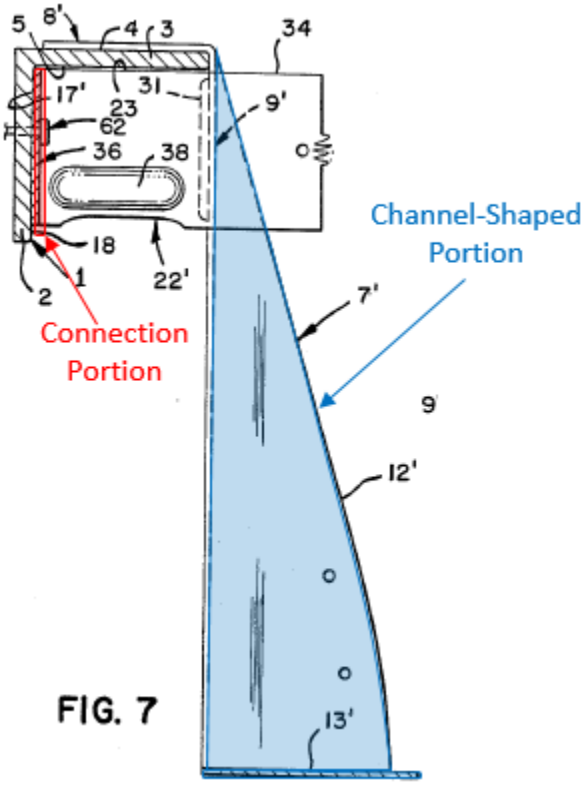


EX1035, FIG. 7. EX1003, ¶111.

[1.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another;"

As shown below in Figure 7, Gilb'792 discloses that the connection portion (base 36) and channel-shaped portion (stirrup members 11'/12' with flanges 9') are

in a fixed, spaced apart relation relative to one another. EX1003, ¶113-114, EX1035, 3:39-44.



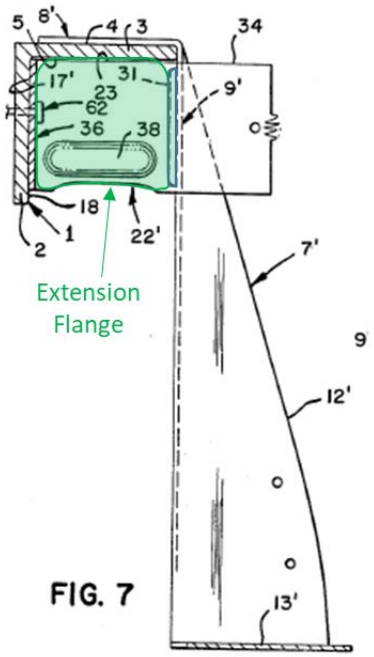
EX1008, FIG. 7 (annotated). EX1003, ¶113.

The elements are welded sheet metal and thus are fixed. EX1003, ¶113.

[1.3.A] "an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion,"

Gilb'792 discloses an extension portion (gusset members 15'/22') including first and second extension flanges (gusset members 15'/22') extending from the channel-shaped portion (stirrup members 11'/12') to the connection portion (base

36). EX1003, ¶¶115-117; EX1035, 3:34-42, FIGS. 5-7 ("A first gusset member 15' is… directly connected to stirrup member 11' by weld 31.").



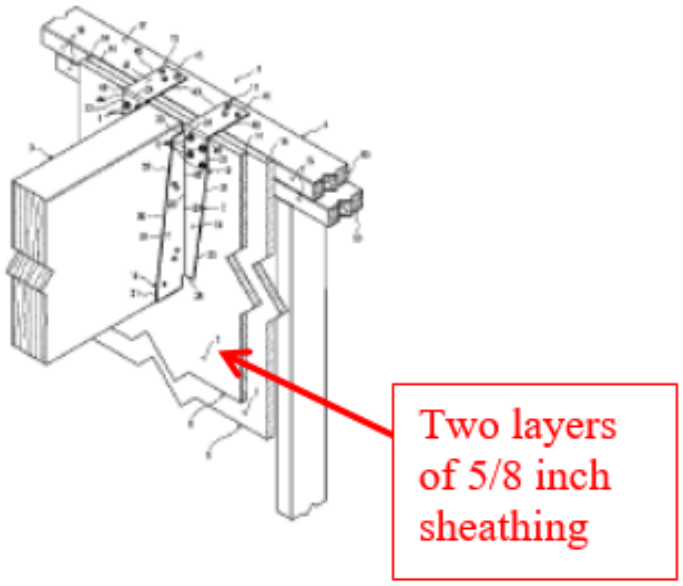
EX1035, FIG. 7. EX1003, ¶115.

A POSITA would have understood that the Gilb'792's gusset members 15'/22' (along with weld 31), correspond to the recited first and second extension flanges. EX1003, ¶¶115-116.

[1.3.B] "each extension flange being configured to extend through the sheathing,"

Gilb'792-Bundy combination renders obvious each extension flange (gusset members 15'/22') being configured to extend through sheathing. EX1003, ¶¶118-120.

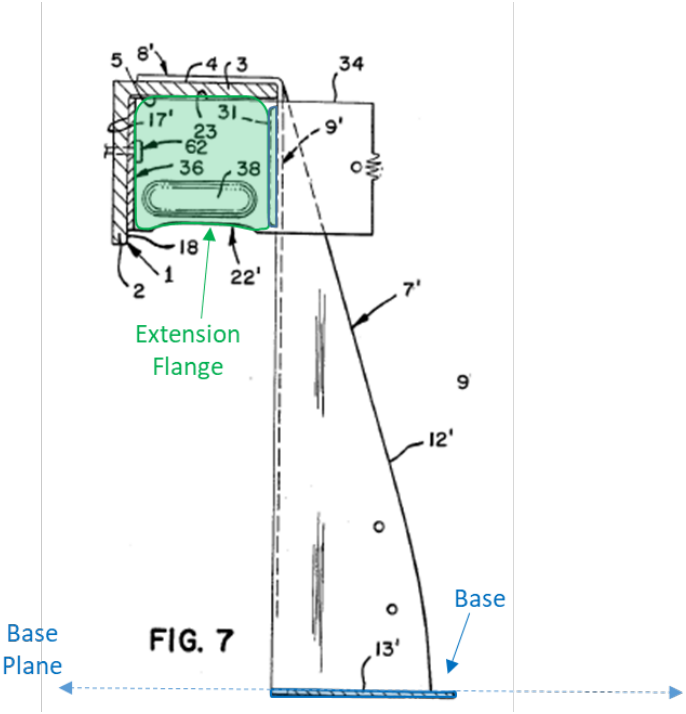
While Gilb'792 does not explicitly disclose extending gusset members 15'/22' through sheathing, a POSITA would have found it obvious to use Gilb'792's hanger 7' with sheathing. EX1003, ¶119. This would simply have been applying a known technique (Bundy's use with sheathing) to a known device (Gilb'792's hanger), yielding the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby "cover[ing] and protect[ing] the structural members of a building." EX1007, 5:18-20; EX1003, ¶119. Because Gilb'792's gusset members 15'/22' are flat and constructed from sheet metal, 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 of sheathing, when sheathing is installed between base 36 and stirrup members 11'/12'. EX1003, ¶119. And a POSITA would have had an expectation of success extending Gilb'792's gusset members through the sheathing. *Id*., ¶119.



EX1007, FIG. 1 (annotated). EX1003, ¶119.

[1.3.C] "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane,"

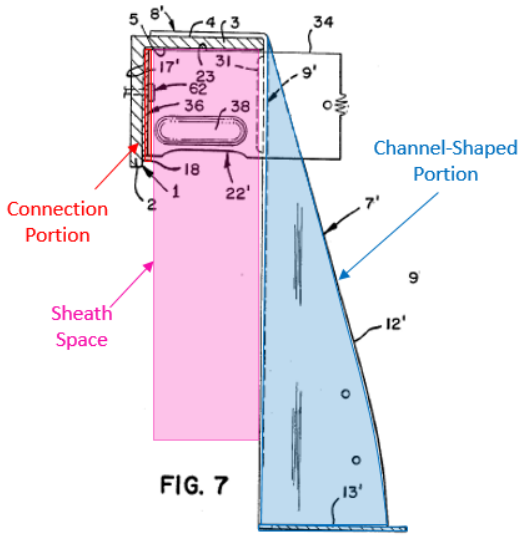
While claim 1 does not explicitly identify a surface defining the extension flange plane, Gilb'792's extension flanges (gusset members 15'/22') maintain the same generally perpendicular relationship with the base plane as is illustrated in the '867 Patent. EX1003, ¶121-122; EX1035, FIG. 7 (annotated below). Thus, if the '867 Patent's claims are deemed sufficiently definite, then this element would be disclosed by the similar arrangement described by Gilb'792.



EX1035, FIG. 7 (annotated). EX1003, ¶121.

[1.4] "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall."

Gilb'792 discloses positioning base 36 (the back flange) at one end of gusset members 15'/22' and welding stirrup members 11'/12' (the channel-shaped portion) at opposite ends of gusset members 15'/22'. EX1035, 3:31-44; EX1003, p.59. Thus, Gilb'792's gusset members 15'/22' define a space that would permit sheathing to be inserted so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall. EX1003, p. 59; EX1035, 3:23-55.



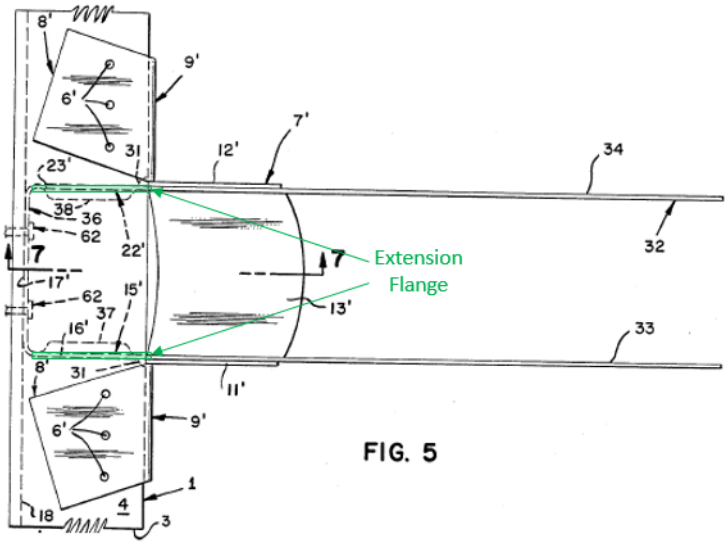
EX1035, FIG. 7 (annotated). EX1003, p.59.

While Gilb'792 does not explicitly disclose installing sheathing between Gilb'792's stirrup members 11'/12' and base 36, a POSITA would have found it obvious to size the length of Gilb'792's gusset members 15'/22' to define a sheathing space therein for receiving sheathing based on Bundy. EX1003, ¶123. Bundy teaches installing two layers of 5/8" sheathing between a hanger's channel shaped portion (Bundy's side members 11) and wall frame. EX1007, 5:18-20; EX1003, ¶123. A POSITA would have had an expectation of success in defining a sheath space between Gilb'792's stirrup members 11'/12' and base 36, because Gilb'792's and Bundy's hangers are used for similar purposes (e.g., hanging a structural object to a wall) and Gilb'792's stirrup members 11'/12', flanges 9', and base 36 already define a space therebetween. EX1003, ¶123; EX1007, 4:46-51; EX1035, 1:5-11, 3:23-55.

Thus, Gilb'792-Bundy combination renders obvious element [1.4]. EX1003, ¶124.

C. Claim 2

The term "planar" in claim 2 is construed as "having a surface coincident with a plane," such that claim 2 requires that each of the first and second extension flanges has a surface coincident with a plane. *See supra*, §III.E.2. Gilb'792 discloses that each of the first and second extension flanges (e.g., gusset members 15'/22') has a surface coincident with a plane. EX1035, FIGS. 5-7. EX1003, ¶¶125-126.



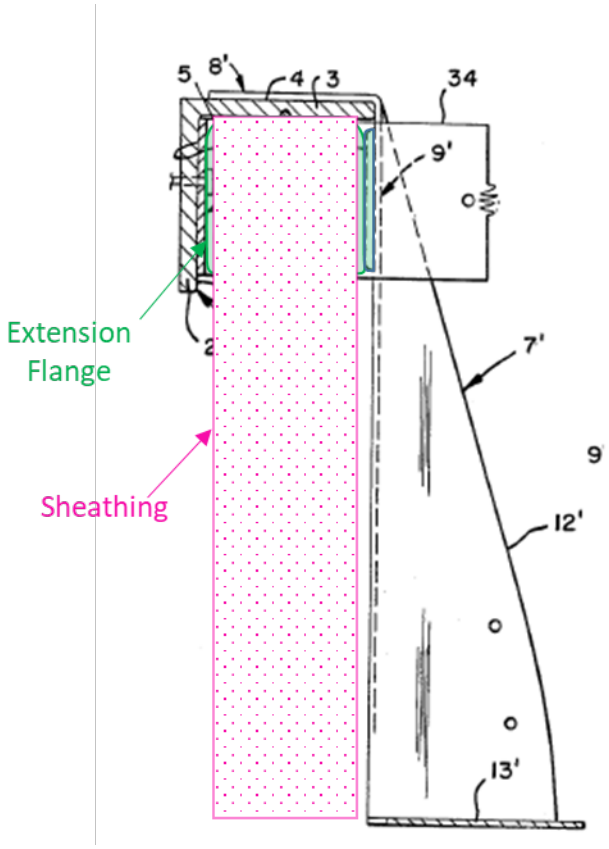
EX1035, FIG. 5 (annotated). EX1003, ¶125.

Thus, Gilb'792 discloses claim 2. EX1003, ¶126.

D. Claim 3

Gilb'792 discloses that the first and second extension flanges (gusset members 15'/22') each include an edge. EX1003, ¶¶127-128. When combined

with Bundy, the combination renders obvious that the first and second extension flanges are arranged to extend edgewise through the sheathing. EX1035, FIG. 5.



EX1035, FIG. 7 (annotated). EX1003, ¶127.

E. Claim 4

Gilb'792 discloses that the first and second extension flanges (gusset members 15'/22') include an upper free edge (e.g., 16'/23'). EX1035, 3:34-38, FIG. 7; EX1003, ¶¶129-130.

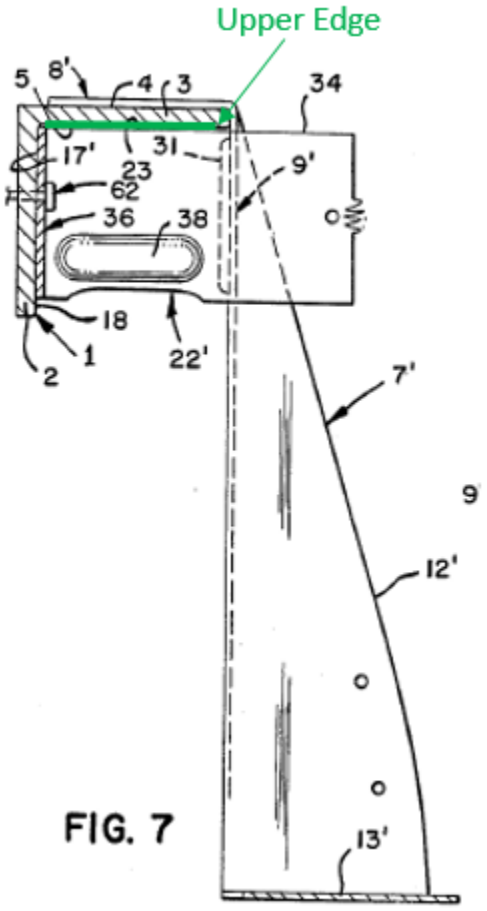


FIG. 7

EX1035, FIG. 7 (annotated). EX1003, ¶129.

F. Claim 5

Gilb'792-Bundy combination renders this limitation obvious. EX1003, ¶¶131-134.

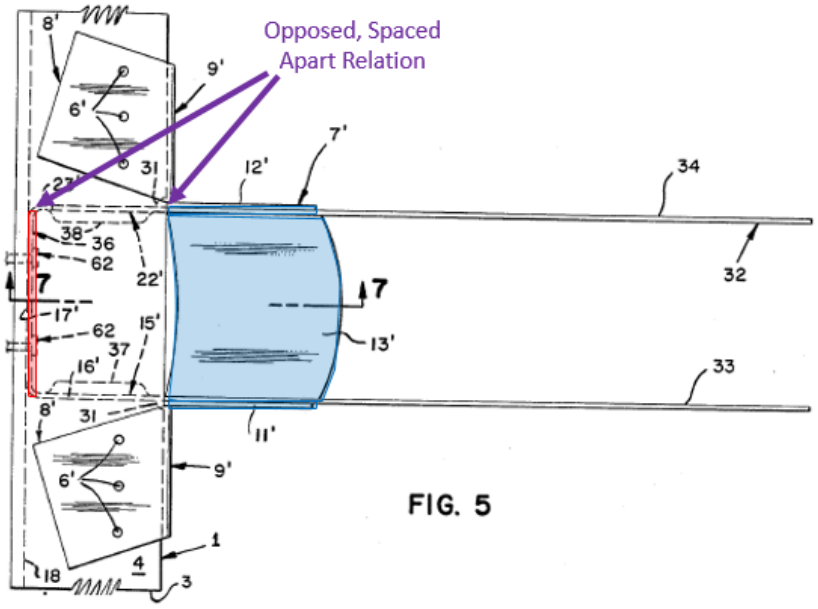
As discussed above, installation of sheathing is an intended use, not a required element of the claim. Additionally, a 2-hour fire resistance rating of sheathing is an intended use that does not affect the structure of the hanger itself. *See supra* §§IV.C, VII.B.[1.P]. Whether the sheathing is installed in a way that

maintains a 2-hour fire rating depends on the human installer, not the hanger structure. EX1003, ¶132.

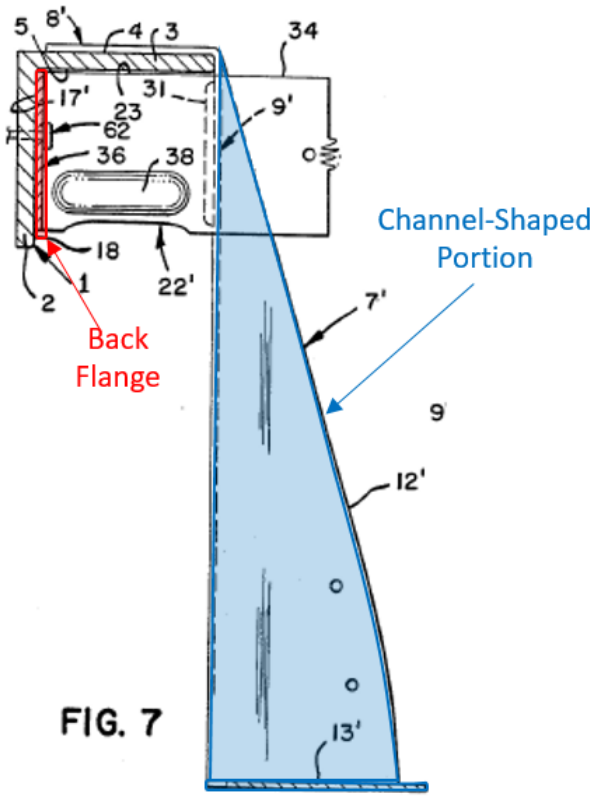
If installing the hanger on a fire rated wall, a POSITA would have understood, as with any fire rated wall assembly, the need to limit interruptions in the sheathing that exposes Gilb'792's gusset members 15'/22' by conforming the sheathing openings to the contour of Gilb'792's gusset members and filling the openings with fire retardant materials. EX1003, ¶133. Thus, a POSITA would have found it obvious, in light of the Gilb'792-Bundy combination, to extend Gilb'792's gusset members 15'/22' through any sheathing installed therein, in a way that maintains a 2-hour fire resistance rating as described in Bundy. EX1003, ¶133; EX1035, 3:39-42.

G. Claim 6

Gilb'792 discloses that a portion of channel-shaped portion (stirrup members 11'/12') is in an opposed, spaced apart relation with the back flange (base 36). EX1003, ¶¶135-136; EX1035, FIG. 5, 3:39-44.



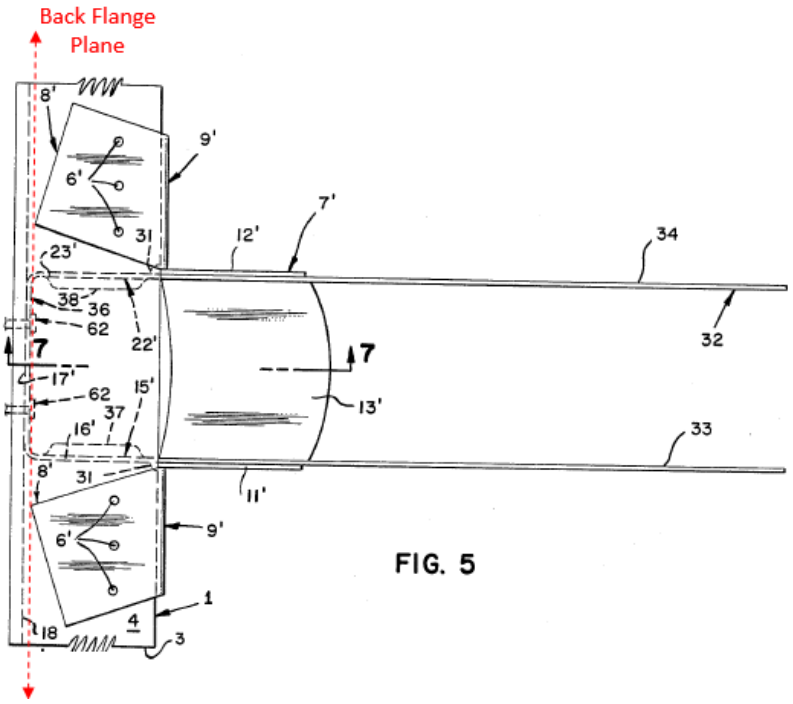
EX1035, FIG. 5 (annotated). EX1003, ¶135.



EX1035, FIG. 7 (annotated). EX1003, ¶135.

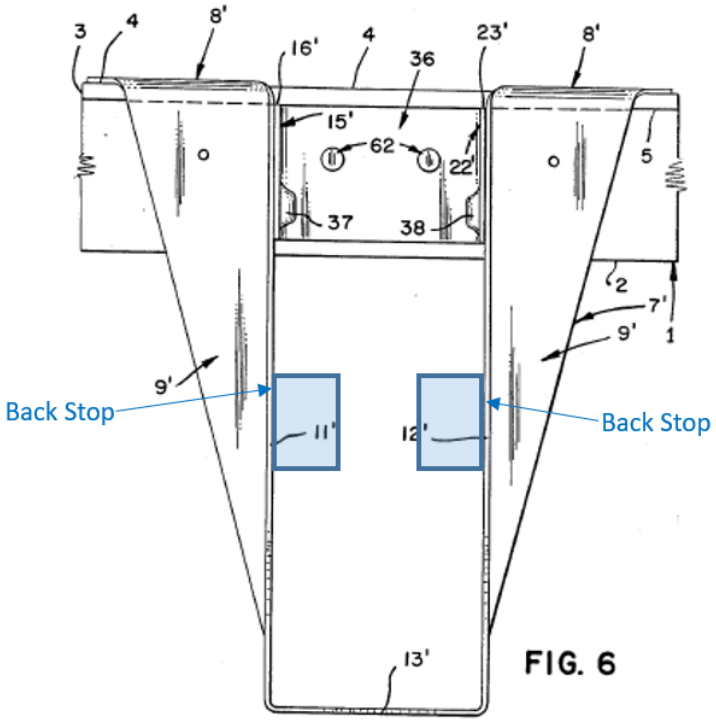
H. Claim 7

Gilb'792 discloses that the back flange (base 36) has a front surface lying in a back flange plane. EX1003, ¶137. EX1035, FIG. 5.



EX1035, FIG. 5 (annotated).

Gilb'792 does not explicitly disclose a stop configured to engage the end of the structural component. Bundy teaches an analogous hanger that includes a stop (e.g., back plate members 9) engaging the end of the structural component and spacing the end of the structural component from the back flange plane. EX1003, ¶138. Bundy discloses that first and second back plate members 9 "could both be bent inward to face each other between the first and second side members 11." EX1007, 4:39-46; EX1003, ¶138.



EX1035, FIG. 6 (annotated). EX1003, ¶138.

Thus, it would have been obvious for a POSITA to modify Gilb'792 by providing a stop to engage an end of the structural element, as taught by Bundy, to ensure that the end of the structural component 17 is spaced from the back flange. EX1003, ¶¶139-140. Such a modification would have been applying a known technique (Bundy's channel-shaped portion having stops bent inwards to face each other) to a known device (Gilb'792's channel-shaped portion without stops) to obtain predictable result of providing support at the end of a structural element. *Id*.

Thus, Gilb'792-Bundy combination renders obvious claim 7.

I. Claim 8

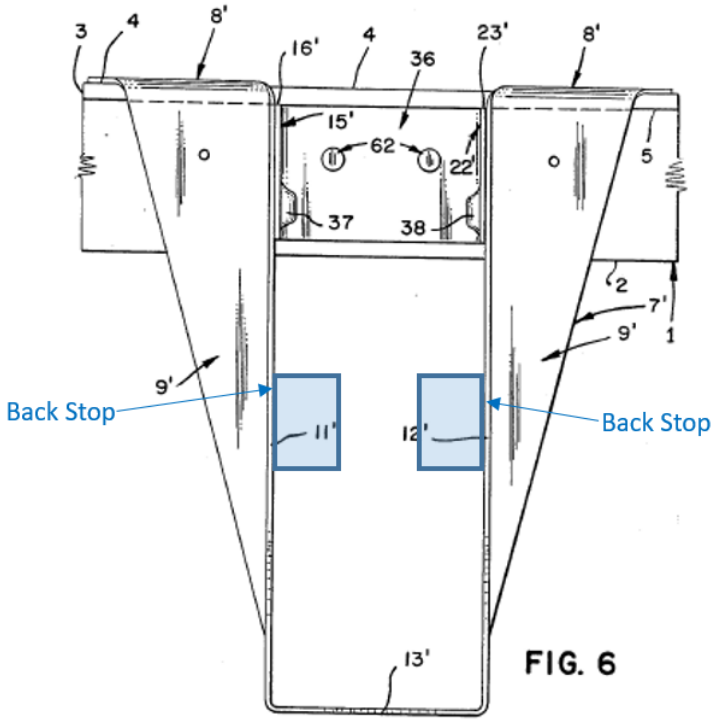
Gilb'792-Bundy combination renders obvious a stop configured to engage a structural element. *See supra* §VII.H; EX1003, ¶141.

Furthermore, Bundy discloses an extension portion sized to accommodate two layers of 5/8" thick sheathing between a channel-shaped portion (e.g., Bundy's side members 11) and a support member. *Id*., ¶[]; EX1007, 5:16-18. Bundy further discloses disposing the back face 10 of back plate members 9 "in parallel registration with the front face 7 of a first [drywall] panel 6." EX1007, 4:8-13. It would have been obvious to a POSITA to adjust the sizing of Gilb'792's gusset members to allow two 5/8" thick sheathing to be received between Gilb'792's stirrup members 11'/12' and base 36 and to dispose Gilb'792-Bundy's back plate member, as modified in claim 7, flush with the front face of sheathing, as taught by Bundy, thereby preventing the end of Gilb'792's structural beam from extending into the sheath space. EX1003, ¶¶141-142; EX1007, 5:16-22.

Thus, Gilb'792-Bundy combination renders obvious claim 8.

J. Claim 9

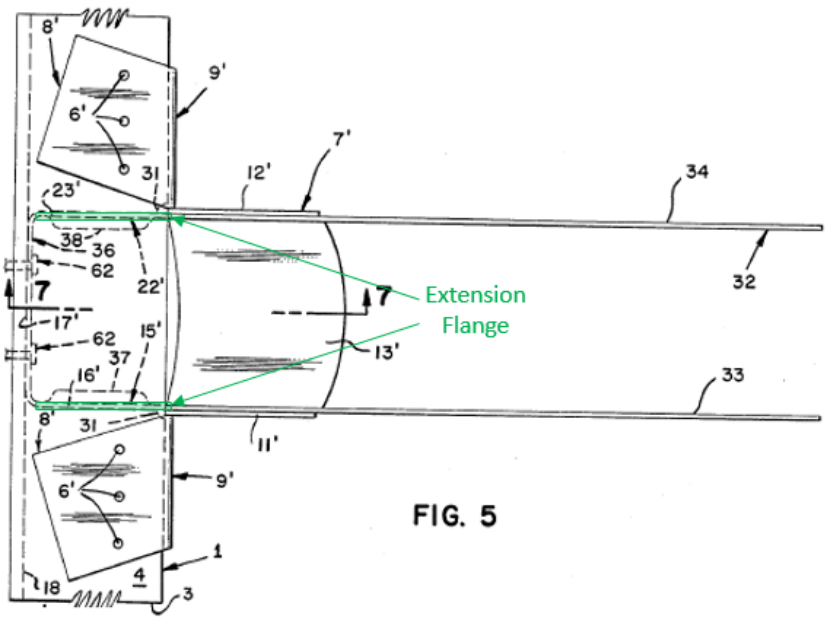
Gilb'792-Bundy combination renders obvious a stop comprising back panels (e.g., Bundy's back plate members 9) that extend toward each other. *See supra* §VII.H; EX1003, ¶¶144-145; EX1007, 4:39-44.



EX1035, FIG. 6 (annotated). EX1003, ¶144.

K. Claim 10

Gilb'792 discloses first and second extension flanges (e.g., gusset members 15'/22') parallel to one another. EX1003, ¶¶146-147; EX1035, FIG. 5.



EX1035, FIG. 5 (annotated). EX1003, ¶146.

L. Claim 11

Gilb'792 discloses connections (weld 31) between the first and second extension flanges (gusset members 15'/22') and the channel-shaped portion (stirrup members 11'/12'). EX1035, 3:31-34, FIG. 7; EX1003, ¶¶148-149. Gilb'792 further discloses that the locations of the connections (weld 31) are spaced apart from a lower end of the channel-shaped portion (stirrup members 11'/12') where the base (seat member 13') of the channel-shaped member is located. EX1035, FIG. 7; EX1003, ¶¶148-149.

M. Claim 12

Gilb'792 discloses that the back flange (base 36) has a front surface lying in a back flange plane. *See supra* §VII.H; EX1035, FIG. 8; EX1003, ¶150. The

Gilb'792-Bundy combination renders obvious spacing the channel-shaped portion (front surface of e.g., Gilb'792's stirrup members 11'/12') from the back flange plane (top of Gilb'792's base 36) enough to permit two layers of 5/8" thick sheathing to be received between the channel-shaped portion (Gilb'792's stirrup members 11'/12') and the back flange (Gilb'792's base 36). *See supra* §VII.I; EX1035, FIG. 7; EX1003, ¶150. Specifically, a POSITA would have found it obvious to adjust the sizing of Gilb'792's gusset members to allow two 5/8" thick sheathing to be received between Gilb'792's stirrup members 11'/12' and base 36, as taught by Bundy, yielding the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby protecting the wall's structural members. EX1003, ¶¶150-151; EX1007, 5:16-22.

N. Claim 15

Gilb'792 discloses that the back flange (base 36) has a vertical dimension greater than the vertical dimension of a top plate of a frame wall. EX1003, ¶152. Specifically, Gilb'792 discloses that the height of the gusset members, which corresponds to the height of base 36, is approximately 3", which is greater than the 1.5" height of a typical top plate. EX1035, 2:53-54, 3:22-25; EX1003, ¶152.

Moreover, a recitation of relative dimensions does not render a claimed apparatus patentably distinct from a prior art apparatus if an apparatus having the claimed relative dimensions would not perform differently than the prior art

apparatus. *Gardner v. TEC Syst., Inc.*, 725 F.2d 1338, (Fed. Cir. 1984). The '867 Patent does not describe any benefit of sizing the vertical dimension of the back flange larger than a top plate. *See generally* EX1001; EX1003, ¶152.

O. Independent Claim 16

[16.P] "A hanger to connect a joist to a frame wall adapted to have sheathing mounted thereon so that an interior side of the sheathing faces the frame wall and an exterior side of the sheathing faces away from the frame wall, the frame wall including a wooden upper plate and wooden studs extending down from the upper plate,"

Similar to the wall and structural component of claim 1, the joist, the frame wall, the upper plate, the studs, and the sheathing of claim 16 are not positively recited and not required elements of the claim. EX1002, 0353. To the extent that the preamble is limiting, Gilb'792-Bundy combination renders obvious a hanger to connect a joist to a frame wall adapted to have sheathing mounted thereon. EX1003, ¶¶154-157; EX1035, 3:22-55, FIGS. 5-7 (e.g., Gilb'792's hanger 7'). Bundy, in the same field of endeavor, discloses using an analogous hanger for a wood-framed wall covered with drywall. EX1003, ¶155; EX1007, 2:37-41. While Gilb'792 explicitly discloses using hanger 7' for connecting a beam to a metal ledger at a roof line around the inside perimeter of buildings, EX1035, 1:5-11, a POSITA would have understood that wall assemblies having both ledgers and sheathing were known, and Gilb'792's hanger would be applicable to any kind of wall, such as a wall covered with drywall. EX1003, ¶156. Indeed, drywall is a

common sheathing used in wall construction, and Bundy discloses using an analogous hanger for a wall covered with drywall. *Id.*; EX1007, 2:37-41. A POSITA would have also understood that Gilb'792's hanger is configured to secure to a top plate of a frame wall by either connecting a metal ledger to the top plate or connecting Gilb'792's hanger directly to the top plate. EX1003, ¶156. Accordingly, it would have been obvious to a POSITA to use Gilb'792's hanger to connect a structural component to a top plate of a frame wall adapted to have drywall mounted thereon. EX1003, ¶156. Such a modification would have been simply applying a known technique (Bundy's use of a hanger on a frame wall with drywall) to a known device (Gilb'792's hanger 7') to obtain the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby shielding wall structures with sheathing. *Id.*; s*ee, e.g.*, EX1007, 5:18-19. A POSITA would have had an expectation of success in using Gilb'792's hanger with a top plate because Bundy's and Gilb'792's hangers serve similar purposes—supporting a floor joist/structural beam at a top end of a wall. EX1003, ¶156.

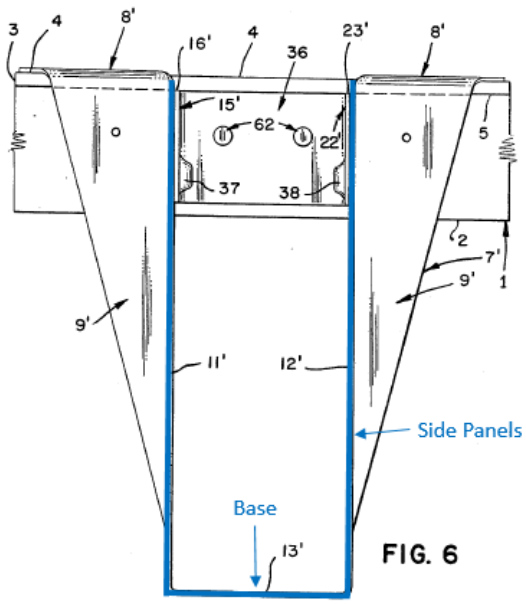
Thus, Gilb'792-Bundy combination renders obvious element [16.P]. EX1003, ¶157.

[16.1.A] "a channel-shaped portion configured to receive the structural component,"

As discussed with respect to claim 1, element [1.1.A], Gilb'792 discloses this limitation. EX1003, ¶158; EX1035, 3:23-55, FIGS. 5-7.

[16.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component and side panels extending upward from the base;"

As discussed with respect to claim 1, element [1.1.B], Gilb'792 discloses that the channel-shaped portion (stirrup members 11'/12') includes a base (seat member 13') configured to receive an end portion of the structural component (or a joist) thereon. EX1003, ¶¶159-160; EX1035, 3:22-55, FIGS. 5-7. As shown below in Figure 7, Gilb'792 further discloses that the channel-shaped portion includes side panels (stirrup members 11'/12') extending upward from the base (seat member 13'). EX1003, ¶159.



EX1035, FIG. 6 (annotated).

[16.2.A] "a connection portion configured for attachment to the frame wall,"

As discussed above with respect to claim 1, element [1.2.A], Gilb'792 discloses this limitation. EX1003, ¶161; EX1035, 3:23-55, FIGS. 5-7.

[16.2.B] "the connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall,"

As discussed above with respect to claim 1, element [1.2.B], Gilb'792 discloses a back flange (base 36). EX1003, ¶162; EX1035, 3:23-55, FIGS. 5-7. Gilb'792's base 36 is configured to engage a vertical surface to secure hanger 7' to a wall via nails. EX1035, 3:42-50. When installed to an upper plate of a frame wall, Gilb'792's base 36 would be configured to engage the vertical face of the upper plate by securing the hanger to the wall via nails. EX1003, ¶162. Thus, Gilb'792 discloses this limitation.

[16.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another"

As discussed above with respect to claim 1, element [1.2.C], Gilb'792 discloses this limitation. EX1003, ¶163; EX1035, 3:23-55, FIGS. 5-7.

[16.3.A] "first and second extension flanges interconnecting the connection portion and the channel-shaped portion and holding the connection portion and channel-shaped portion in spaced apart relation to each other,"

As discussed above with respect to claim 1, element [1.3.A], Gilb'792 discloses first and second extension flanges (gusset members 15'/22') holding the

channel-shaped portion (stirrup members 11'/12') and the connection portion (base 36) in a spaced apart relation. EX1003, p. 76; EX1035, 3:23-55, FIGS. 5-7. Gilb'792 further discloses that gusset members 15'/22' are interconnected to stirrup members 11'/12' by a weld 31 and integrally interconnected to base 36. EX1003, p. 76; EX1035, 3:23-55, FIGS. 5-7.

[16.3.B] "the first and second extension flanges being configured to extend through an opening in the sheathing to the wall frame,"

As discussed above with respect to claim 1, element [1.3.B], Gilb'792 discloses this limitation. EX1003, ¶164; EX1035, 3:23-55, FIGS. 5-7.

[16.4.A] "the back flange, the first and second extension flanges and the channel-shaped portion defining a sheathing space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing,"

As discussed above with respect to claim 1, element [1.4], Gilb'792-Bundy combination renders obvious this limitation. EX1003, ¶165; EX1035, 3:23-55, FIGS. 5-7; EX1007, 5:9-21.

[16.4.B] "the back flange being sized and arranged to at least partially block the opening in the sheathing to reduce the exposure of the wooden top plate and wooden studs to an exterior through the opening in the sheathing."

First, the limitation "to reduce the exposure…sheathing" is an intended purpose of the back flange that does not affect the flange's structure, and should

not be given patentable weight. *Hewlett-Packard Co.v.Bausch & Lomb Inc.*, 909 F.2d 1464, 1469 (Fed. Cir. 1990).

Second, Gilb'792-Bundy combination renders obvious the back flange (base 36) being sized and arranged to partially block any opening in the sheathing. EX1003, ¶¶166-167. Gilb'792's base 36 extends between gusset members 15'/22' to form a "U-shaped member." *Id*.; EX1035, 3:39-49. A POSITA would have understood that Gilb'792's base 36 would cover any exposure otherwise resulting from a cutout in sheathing, and thus would reduce the exposure of a wooden top plate when Gilb'792's hanger 7' is used with a wooden wall frame, such as the wooden frame in Bundy. EX1003, ¶166.

P. Claim 17

As discussed above with respect to claim 5, Gilb'792-Bundy combination renders this limitation obvious. EX1003, ¶168; EX1007, 5:9-22.

Q. Claim 21

As discussed above with respect to claim 7, Gilb'792-Bundy combination renders these limitations obvious. EX1003, ¶169; EX1035, FIG. 5; EX1007, 4:41-45.

R. Claim 22

As discussed above with respect to claim 8, Gilb'792-Bundy combination renders these limitations obvious. EX1003, ¶170; EX1007, 5:9-22.

S. Claim 23

As discussed above with respect to claim 9, Gilb'792-Bundy combination renders this limitation obvious. EX1003, ¶171; EX1007, 4:41-45.

VIII. Claims 1-4, 6, 10, and 11 are anticipated by Timony.

For the reasons discussed below, Timony discloses each element of and thus anticipates claims 1-4, 6, 10, and 11.

A. Independent Claim 1

[1.P] "A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon"

As discussed above, the limitation "for connecting a structural component to a wall adapted to have sheathing mounted thereon" is an intended use of the claimed invention, not a required element. *See supra* VII.B.[1.P].

To the extent that the preamble is limiting, Timony discloses a hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon. EX1008, Abstract; EX1003, ¶¶172-175. Timony's hanger 100 connects a structural component (object 238) to a wall 110, with adequate spacing for a foam panel (i.e., sheathing). EX1003, ¶¶`173-174; EX1008, Abstract, FIGS. 1-8, ¶¶34, 48.

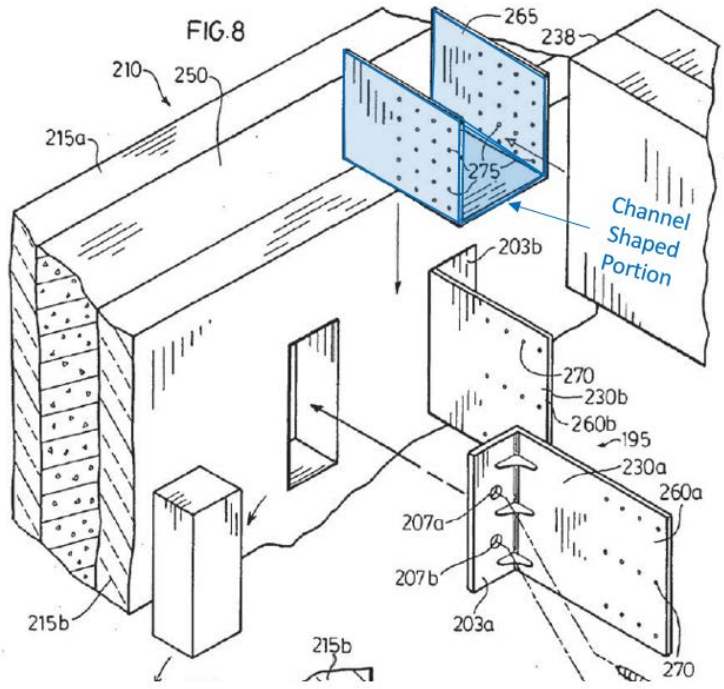
Timony's discloses a retrofit hanger. *Id*., ¶12, Figures 8-9. Timony discloses that to "install retrofit bracket 195, a portion of foam wall 215b sized and shaped to accommodate retaining portion 203 is cut away at a desired hanging position.

Retaining portion 203 is then fastened to concrete core 250." *Id*., ¶49; EX1003, ¶173.

Accordingly, Timony's hanger is configured to connect a structural component to a wall adapted to have sheathing mounted thereon. EX1003, ¶¶173-175.

[1.1.A] "channel-shaped portion configured to receive the structural component"

Timony discloses a channel shaped portion (support 265) configured to receive the structural component (object 238). EX1003, ¶¶176-177; EX1008, ¶¶38, 48, 50, FIGS. 8-9.

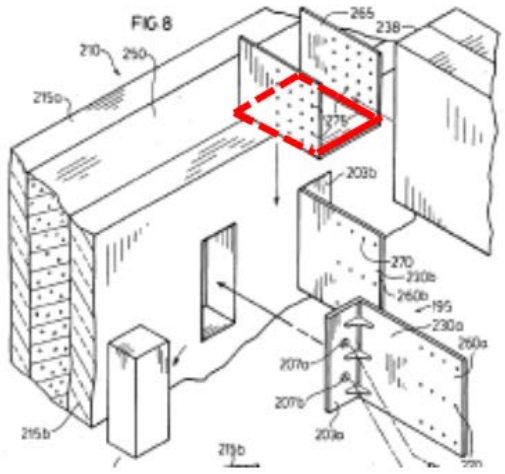


EX1008, FIG. 8 (annotated). EX1003, ¶176.

Timony discloses that support 265 is inserted between and secured to both hanging portions 260a and 260b via apertures 270 and 275. EX1003, ¶177; EX1008, ¶48.

[1.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component,"

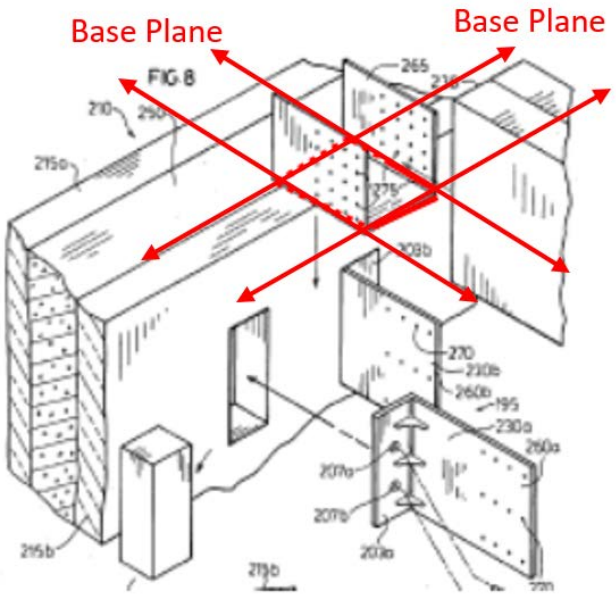
Timony discloses that the channel-shaped portion (265) includes a base configured to receive an end portion of the structural component thereon to support the structural component. EX1003, ¶¶178-179. Specifically, Timony's channel-shaped portion is a U-shaped bracket which is secured to hanging portion 260 of retrofit plate 230, and sized to accommodate an object 238:



EX1003, ¶178; EX1008, FIG. 8 (annotated), ¶48. The base is the horizontal flat portion of support 265. *Id.*

[1.1.C] "the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;"

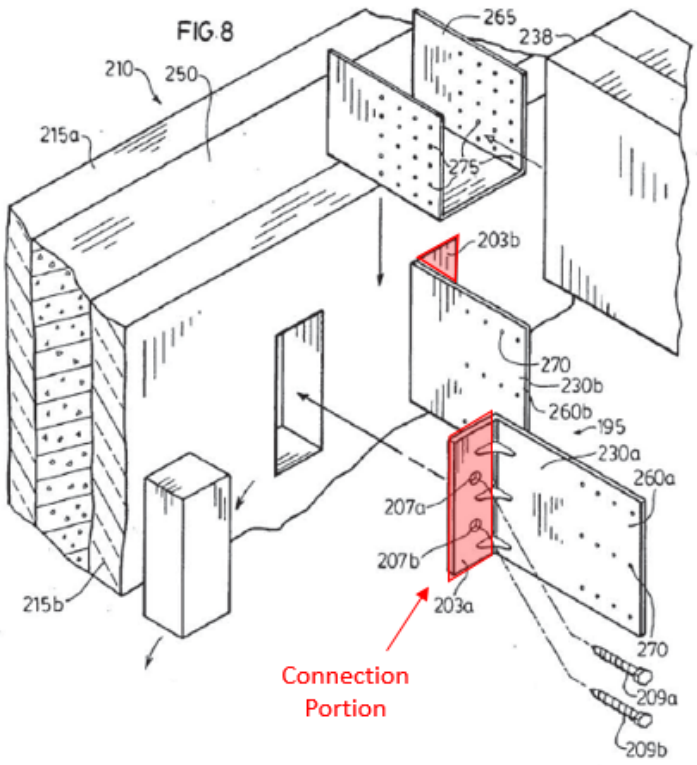
As shown below in Figure 8, Timony's base has an upper surface configured to engage the structural component and lying in a base plane. EX1003, ¶¶180-181; EX1008, FIG. 8, ¶48.



EX1008, FIG. 8 (annotated). EX1003, ¶180.

[1.2.A] "a connection portion configured for attachment to the wall"

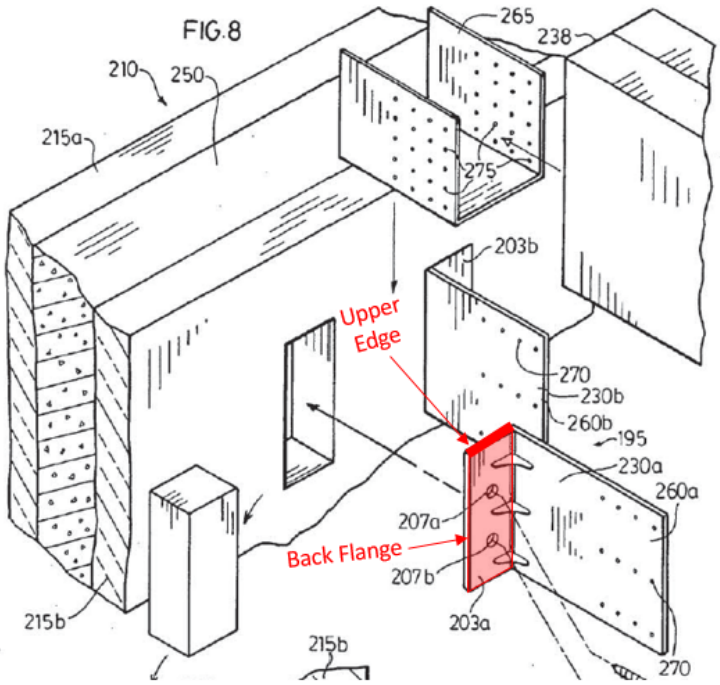
Timony discloses a connection portion (retaining portion 203) configured for attachment to the wall. EX1003, ¶¶182-183; EX1008, ¶47 ("Retrofit plate 230 has a retaining portion 203, which comprises one or more retaining apertures … to accommodate … securing means …."), 49 ("Retaining portion 203 is then fastened to concrete core 250."), FIG. 8 (annotated).



EX1008, FIG. 8 (annotated). EX1003, ¶182.

[1.2.B] "the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane,"

As shown below in Figure 8, Timony discloses that the connection portion (retaining portion 203) includes a back flange having an upper edge and that the back flange extends from the upper edge in a direction generally toward the base plane. EX1003, ¶¶184-185; EX1008, ¶49, FIGS. 8, 9. While Figure 8 illustrates the hanger in an exploded configuration, when assembled the upper surface of support 265's base is below the extension flange. *Id.*



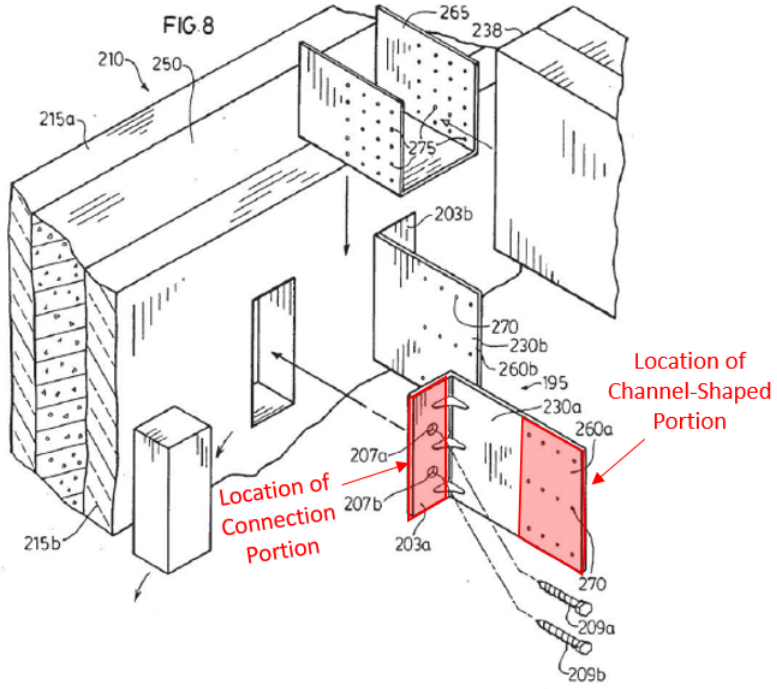
EX1008, FIG. 8 (annotated). EX1003, ¶184.

[1.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another;"

Timony discloses that the connection portion (retaining portion 203) and channel-shaped portion (support 265) are in a fixed, spaced apart relation relative to one another. EX1003, ¶¶186-187. Specifically, support 265 is "secured" to hanging portions 260a/260b. EX1008, ¶48. Timony discloses locating support 265 and retaining portion 203 at opposite ends of hanging portion 260, such that support 265 is disposed outside of outer wall 215b and retaining portion 203 is disposed against core 250 to avoid making unnecessary and limiting cuts in the

foam panel. EX1008, ¶¶7, 48-49, FIGS. 8-9.[2] Timony also discloses securing support 265 to hanging portion 260 of retrofit plate 230 by inserting screws or nails through aligned apertures 270, 275 so that support 265 does not move freely with respect to hanging portion 260. EX1008, ¶[0050]; EX1003, ¶186. A POSITA would have understood that the arrangement between Timony's retaining portion 203 and support 265 is in a fixed, spaced apart relation relative to one another. EX1003, ¶186.

[2] To the extent that Patent Owner argues a discrepancy in the drawing of Figure 9, Timony's description clarifies that support 265 is disposed at *the hanging ends* of retrofit plate 230 such that support 265 is located entirely outside foam wall 215b to receive the structural component, just as the arrangement is shown between support 165 and embedded portion 140 shown in Figures 1-5. EX1008, ¶50 ("Support 265 is positioned between *hanging ends 260a and 260b* of retrofit plates 230a and 230b."). A PHOSITA would thus have recognized and understood the specification to describe that the support is located entirely outside the foam wall, particularly as there is no hole in the foam panel shown in Figure 8 where a support beam resting in the support could fit. EX1003, ¶186, fn. 2.

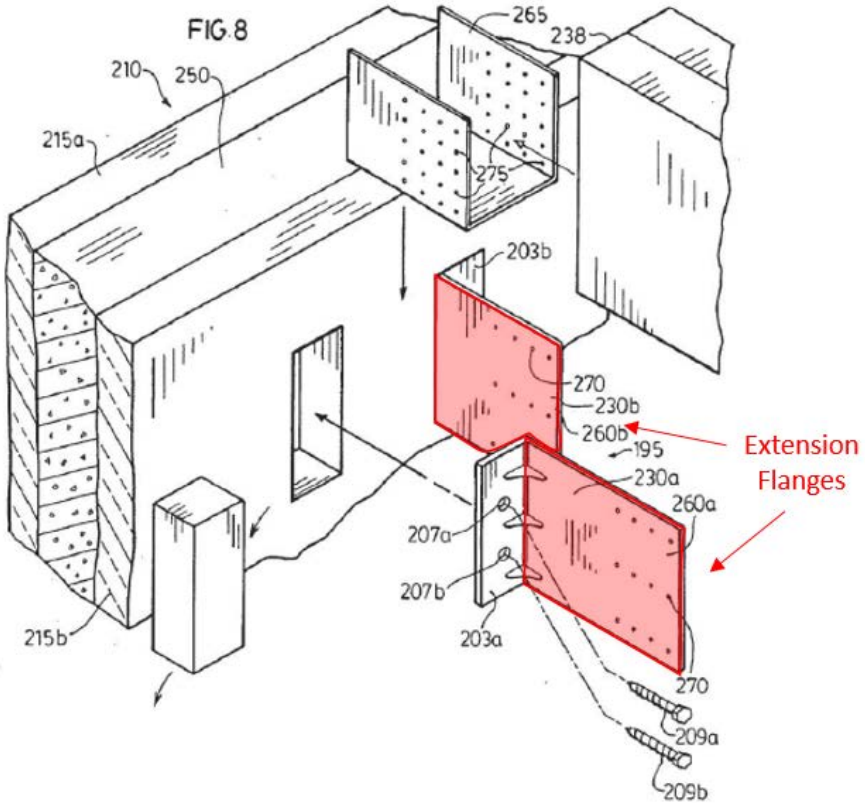


EX1008, FIG. 8 (annotated). EX1003, ¶186.

[1.3.A] "an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion"

Timony discloses an extension portion (retrofit plates 230a/230b and hanging portions 260a/260b) including first and second extension flanges extending from the channel-shaped portion to the connection portion. EX1003, ¶¶188-189. As shown below in FIG. 8, Timony's retrofit plates 230a/230b include a hanging portion 260 that directly contacts and is secured to support 265 and extends from support 265 to retaining portion 203. EX1008, ¶¶47-48. A POSITA would have understood that Timony's retrofit plates 230a/230b having hanging

portions 260a/260b correspond to the recited first and second extension flanges. EX1003, ¶188.



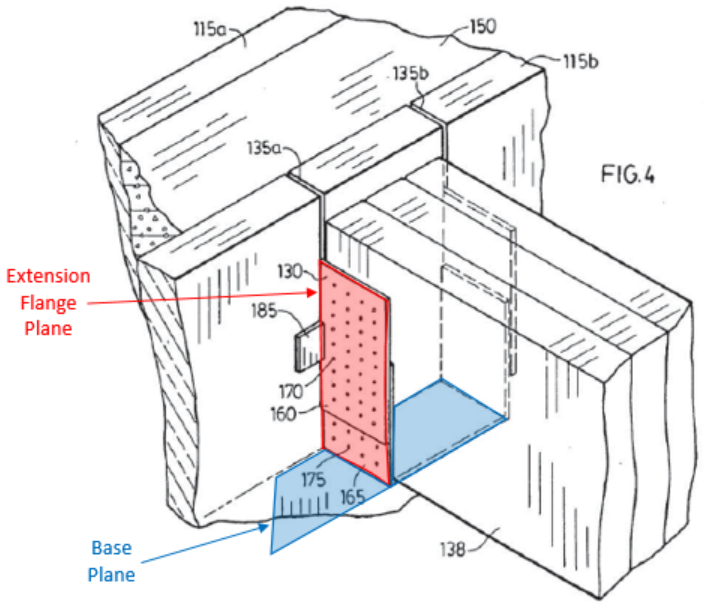
EX1008, FIG. 8 (annotated). EX1003, ¶188.

[1.3.B] "each extension flange being configured to extend through the sheathing"

Each of Timony's extension flanges (retrofit plates 230a/230b having hanging portions 260a/260b) is configured to extend through sheathing. EX1003, ¶¶190-191. Timony's retrofit plate 230 extends through outer foam wall 215b—a form of sheathing that includes foam "panels." *Id.*; EX1008, ¶49, Figures 8-9.

[1.3.C] "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane,"

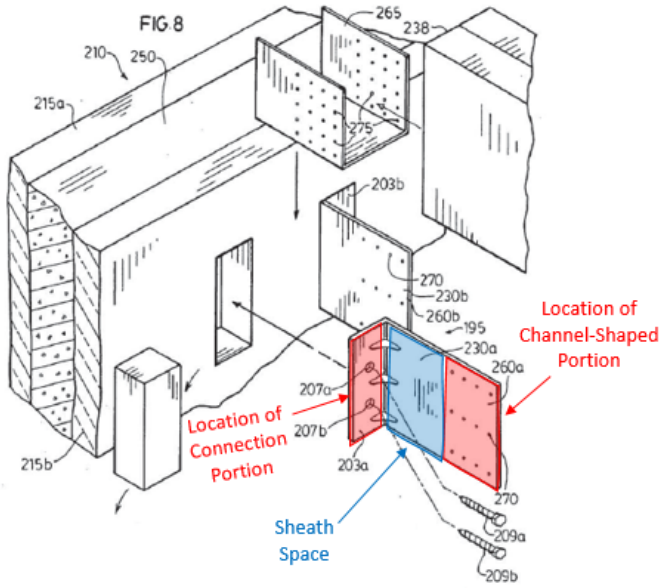
Timony discloses that each extension flange (retrofit plates 230a/230b having hanging portions 260a/260b) is generally perpendicular to the base plane. EX1003, ¶¶192-193; EX1008, ¶49, FIGS. 4, 8 (The spatial relationship between support 165 and plate 130 shown in Figure 4 is equivalent to the spatial relationship between support 265 and plate 230 in Figure 8). While claim 1 does not explicitly identify a surface defining the extension flange plane, Timony's retrofit plates 230a/230b maintain the same relationship with the base plane as is illustrated in the '867 Patent. EX1003, ¶192. Thus, if the '867 Patent's claims are deemed sufficiently definite, then this limitation would be satisfied by the similar arrangement described by Timony.



EX1008, FIG. 4 (annotated). EX1003, ¶192.

[1.4] "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall."

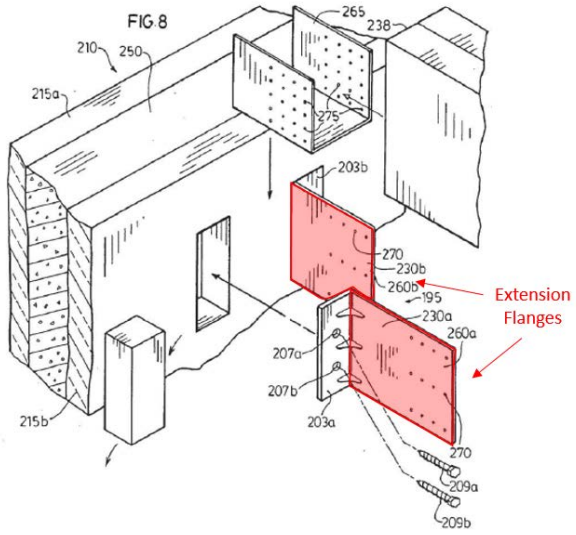
Timony's back flange (retaining portion 203) and channel-shaped portion (support 265) define a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall. EX1003, ¶¶194-195; EX1008, ¶¶48-50. Specifically, Timony discloses positioning support 265 "between hanging ends 260a and 260b of retrofit plates 230a and 230b," and locating retaining portions 203 next to the wall at opposite ends of retrofit plates 230a,b. EX1008, ¶¶48-50. And Timony discloses locating retaining portion 203 on an interior side of foam wall 215b and support 265 on an opposite exterior side of foam wall 215b such that foam wall 215b is between support 265 and retaining portion 203, to avoid making U-shaped slots in the foam wall. *Id*., ¶¶7, 47-50. Thus, Timony's retrofit plates 230a/230b having hanging portions 260a/260b permit sheathing (foam wall 215b) to be inserted therebetween. EX1003, ¶¶194-195.



EX1008, FIG. 8 (annotated).

B. Claim 2

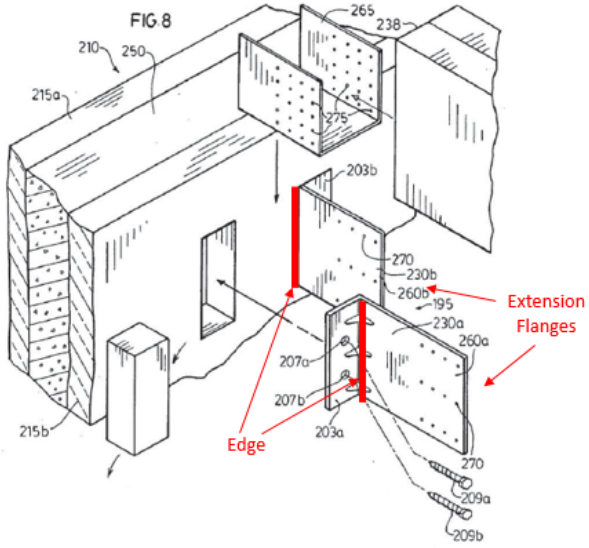
The term "planar" in claim 2 is construed as "having a surface coincident with a plane." *See supra*, §III.E.2. Timony discloses each of the first and second extension flanges (retrofit plates 230 having hanging portions 260) having a surface coincident with a plane. EX1003, ¶196; EX1008, FIG. 8.



EX1008, FIG. 8 (annotated). EX1003, ¶196.

C. Claim 3

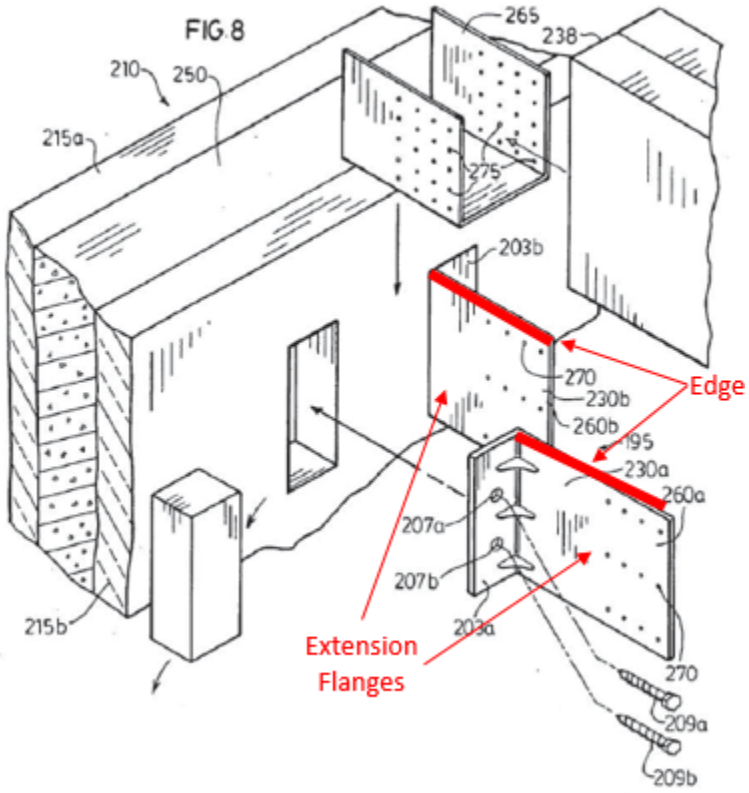
Timony discloses that the first and second extension flanges (retrofit plate 230 having hanging portions 260) each include an edge and are arranged to extend edgewise through the sheathing. EX1003, ¶¶197-198; EX1008, ¶49, FIG. 8.



EX1008, FIG. 8 (annotated). EX1003, ¶197.

D. Claim 4

Timony discloses that the first and second extension flanges (retrofit plates 230 having hanging portions 260) include an upper free edge. EX1003, ¶¶199-200; EX1008, FIG. 8.



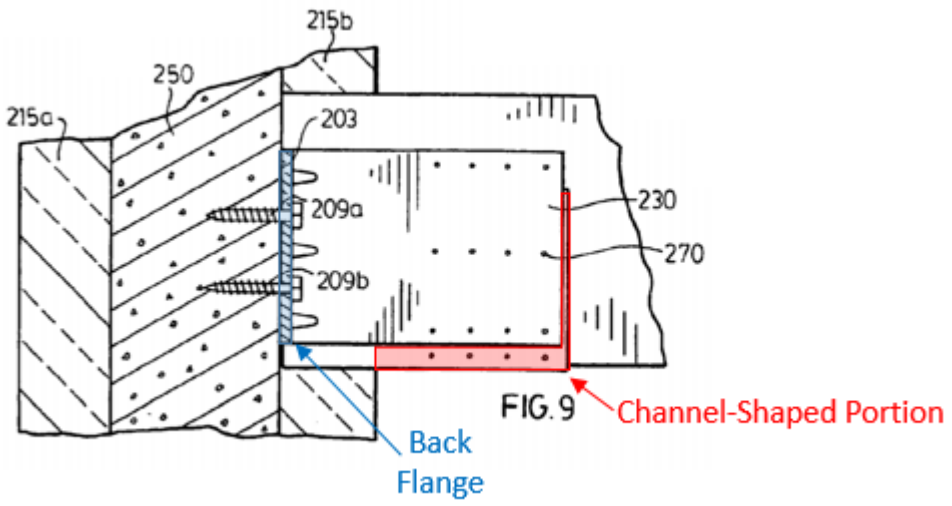
EX1008, FIG. 8 (annotated). EX1003, ¶199.

E. Claim 6

Timony discloses a portion of the channel-shaped portion (a portion of support 265) is in opposed, spaced apart relation with the back flange (retaining portion 203). EX1003, ¶¶201-202; EX1008, FIG. 9.[3] The edge of retaining portion

[3] See fn. 2.

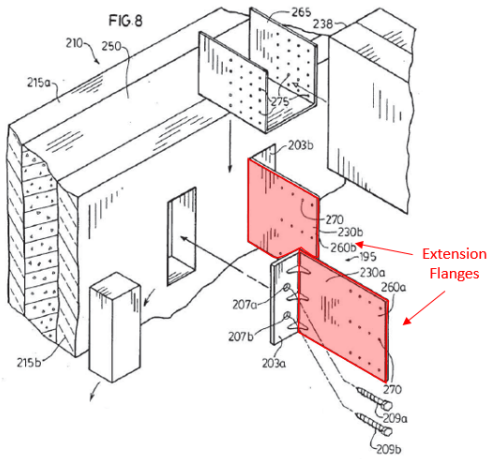
203 extends to the inner surface of plate 230, thereby being in opposed, spaced apart relation to the edge of support 265 disposed flush against the inner surface of retrofit plate 230. EX1003, ¶201.



EX1008, FIG. 9 (annotated). EX1003, ¶201.

F. Claim 10

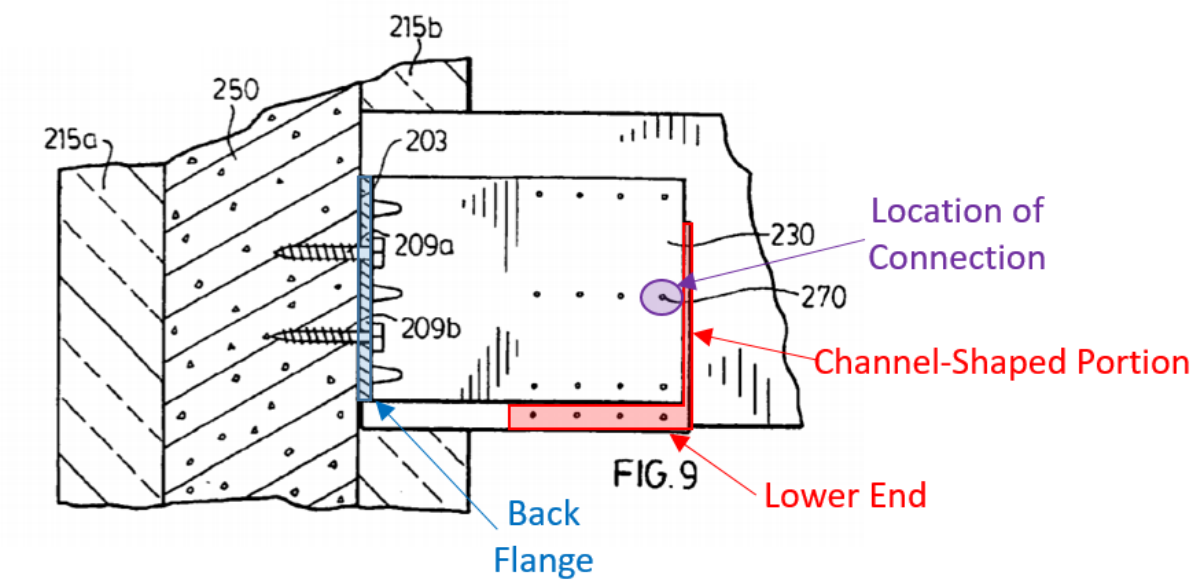
Timony discloses that the first and second extension flanges (retrofit plates 230) are parallel to one another. EX1003, ¶¶203-204; EX1008, FIG. 8.



EX1008, FIG. 8 (annotated). EX1003, ¶203.

G. Claim 11

Timony discloses connections (securing means 280) between the first and second extension flanges (retrofit plates 230 having hanging portions 260) and the channel-shaped portion (support 265). EX1008, ¶50; EX1003, ¶¶205-206. Timony further discloses that the locations of the connections (securing means 280) are spaced apart from a lower end of the channel-shaped portion (support 265) where the base of the channel-shaped portion is located. EX1008, ¶¶48, 50, FIGS. 8-9; EX1003, ¶¶205-206.



EX1008, FIG. 9 (annotated). EX1003, ¶205.

IX. Claims 5, 7-9, 12, 15-17, and 21-23 Would Have Been Obvious over Timony in view of Bundy.

Timony discloses each and every structural element of claim 1 of the '867 Patent, but does not explicitly disclose using the hanger on wood frame walls, defining the sheath space between Timony's support 265 and retaining portion 203 based on the size of fire-resistant sheathing, or including a stop in its retrofit embodiment, as recited in one or more of claims 5, 7-9, 12, 15-17, and 21-23. However, Bundy discloses an analogous hanger that receives fire-resistant sheathing in a space between the channel-shaped portion and a wood-frame wall, the hanger including a stop. EX1003, ¶¶207-212, 217-220. For the reasons discussed below, these claims would have been obvious based on Timony in view of Bundy.

A. Motivation to Modify Timony Based on the Teachings of Bundy.

Timony and Bundy are both from the same field of endeavor, namely construction support hangers. EX1003, ¶208. Bundy discloses spacing an extension portion of an analogous hanger to receive two layers of 5/8" thick fire-resistant sheathing. *Id*., ¶209; EX1007, 5:16-18.

Timony discloses receiving sheathing, namely foam panels, in a space between its retaining portion 203, which is coupled to a wall, and its support 265, which is coupled to a support element such as a joist. EX1003, ¶210. A POSITA would have found it obvious to receive fire retardant sheathing, rather than a foam

panel, between Timony's support 265 and retaining portion 203, based on Bundy's teaching to receive sheathing between a channel-shaped portion of a hanger and the wall. *Id*. Moreover, it would have been obvious to optimize the size of the spacing between Timony's support 265 and retaining portion 203 to accommodate two layers of 5/8" thick sheathing based on the size preference described by Bundy. *Id*. Bundy teaches this preferred construction for optimal wall integrity. *Id.*; EX1008, 5:10-22. This modification would have been nothing more than simple substitution of one known element (Bundy's spacing to accommodate two sheets of 5/8" sheathing) for another (Timony's sheath spacing of indeterminate size) to obtain the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby "protect[ing] the structural members of a building." EX1008, 5:18-20; EX1003, ¶210.

A POSITA would have had an expectation of success in receiving two layers of 5/8" thick sheathing between Timony's support 265 and retaining portion 203 because Timony's and Bundy's hangers are constructed of similar materials (e.g., steel) and used for similar purposes (e.g., hanging a structural object to a wall with a panel between). EX1003, ¶¶210-211; EX1007, 4:46-53; EX1008, ¶¶34, 55-56. Accordingly, a POSITA would have been motivated to modify the sizing of Timony's hanging portions 260a/260b to define a sheath space for receiving two layers of 5/8" thick sheathing between support 265 and retaining portion 203 so

that the wall frame is adequately covered and protected by sheathing. EX1003, ¶¶210-212; EX1007, 5:10-21.

Moreover, Timony explicitly states that "[h]anger 100 is also suitable for other purposes including…fastening an exterior or interior applied framed partition wall to a composite wall, hanging an exterior or interior applied roof truss to a composite wall." EX1008, ¶34. A POSITA would have further understood that such a composite wall would include the wooden frame/drywall setting in Bundy. *Id*., ¶211. Thus, a POSITA would have appreciated that Timony's bracket 195 can be used in a wood frame wall construction, such as Bundy's wood frame wall. *Id*., ¶211. And when using Timony's bracket in a wood frame construction, a POSITA would have been motivated to modify the sizing of Timony's retrofit plates 230 to define a sheath space between support 265 and retaining portion 203 so that wall frame is adequately covered and protected by fire retardant sheathing. *Id*.

B. Claim 5

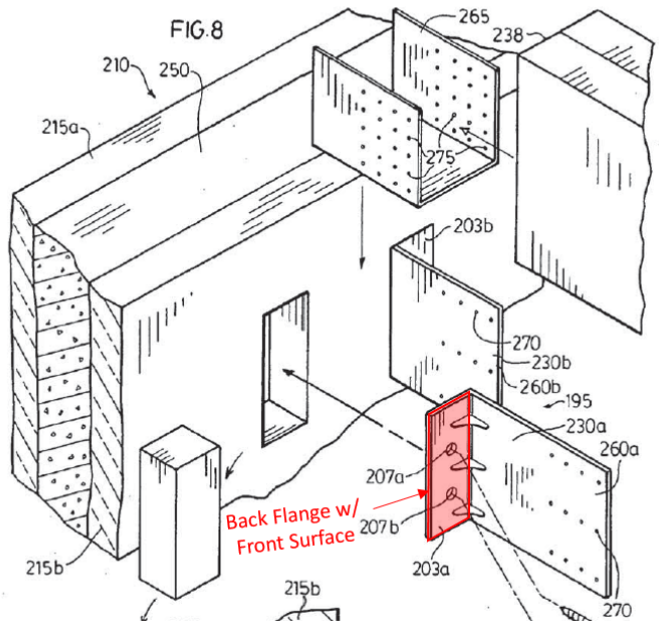
To the extent claim 5 is deemed sufficiently definite, the Timony-Bundy combination renders this limitation obvious. EX1003, ¶¶213-215.

First, sheathing and a 2-hour fire resistance rating are intended uses, not positively recited elements of the claim. *See supra* §IV.C. Second, a POSITA would have understood, as with any fire-rated wall assembly, the need to limit openings in the sheathing by conforming the openings to the contour of Timony's

retrofit plate 230 and filling the openings with fire retardant materials. EX1003, ¶214. Thus, it would have been obvious for a POSITA to extend Timony's retrofit plate 230 having hanging portions 260 through any sheathing mounted thereon, in a way that maintains a 2-hour fire resistance rating for the assembly as described in Bundy. EX1003, ¶214.

C. Claim 7

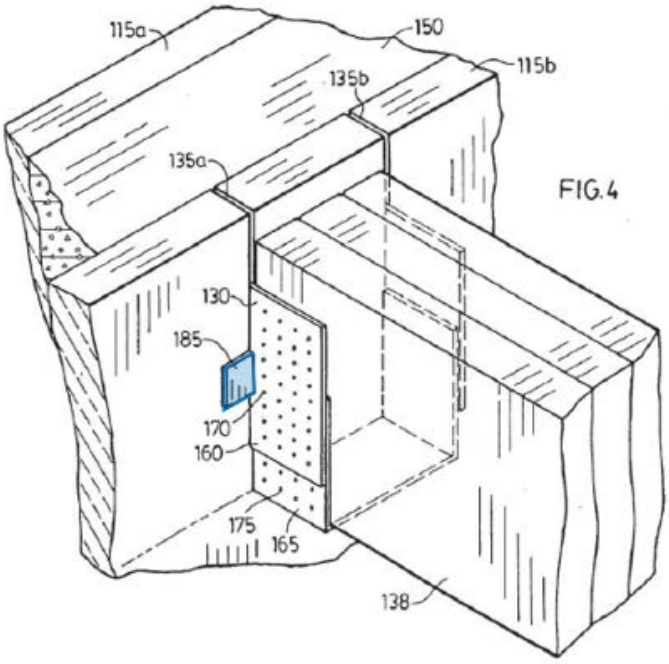
Timony discloses that the back flange (retaining portion 203) has a front surface (surface facing away from core 250) lying in a back flange plane. EX1003, ¶216; EX1008, FIG. 8.



EX1008, FIG. 8. EX1003, ¶216.

While Timony does not explicitly disclose that bracket 195 shown in FIGS. 8 and 9 also includes a stop configured to engage the end of the structural

component, Timony discloses in another embodiment a plate 130 "further compris[ing] an outer projection 185 … extend[ing] at substantially a 90 degree angle from plate 130 and when plate 130 is in a hanging position, abuts an exterior surface of outer wall 115a." EX1003, ¶217; EX1008, ¶40. Timony further discloses that "[o]uter projection 185 may project from ***either face*** of plate 130" (i.e., outer or inner face) by "punching out portions of plate 130." *Id*.



EX1008, FIG. 4 (annotated). EX1003, ¶217.

Bundy teaches an analogous hanger that includes a stop (e.g., back plate members 9) engaging the end of the structural component and spacing the end of the structural component from the back flange plane. EX1003, ¶218.

A POSITA would have found it obvious to bend Timony's projections 185 inwards from the inner face of plate 130 to engage the end of object 238, to space the end of object 238 from retaining portion 203 by a distance sized large enough to permit the sheathing to be received between the end of the structural component and the back flange plane, using the projections as a stop as taught by Bundy. EX1003, ¶¶219-220. This would have been nothing more than use of a known technique (Timony's disclosure of bending flanges inward to face each other) to improve similar devices (Timony's plates 230) in the same way (Bundy's use of such flanges as stops). *Id.*

D. Claim 8

Timony renders obvious a stop configured to engage a structural element. *See supra* §IX.C. Furthermore, Timony-Bundy combination renders obvious spacing the end of the structural component (Timony's object 238) enough to permit two layers of 5/8" thick sheathing to be received between the end of structural component and the back flange (Timony's retaining portion 203). EX1003, ¶¶221-223.

Bundy discloses an extension portion sized to accommodate two layers of 5/8" thick sheathing between a channel-shaped portion (Bundy's side members 11) and a support member. *Id*., ¶222; EX1007, 5:16-18. It would have been obvious to a POSITA to size Timony's retrofit plates 230 to allow two 5/8" thick sheathing

layers to be received between Timony's outer projection 185 and retaining portion 203, as taught by Bundy, yielding the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby protecting the wall's structural members. EX1003, ¶222; EX1007, 5:16-22.

Thus, Timony-Bundy combination renders obvious claim 8. EX1003, ¶223.

E. Claim 9

Timony-Bundy combination renders obvious that the stop comprises back panels (Timony's outer projections 185) extending toward each other. *See supra* §IX.C; EX1003, ¶¶224-225; EX1008, ¶40 ("Outer projection 185 may project from ***either face*** of plate 130."); EX1007, 4:41-45 ("back plate members 9 … could both be bent inward to face each other between the first and second side members 11 ….").

F. Claim 12

Timony discloses that the back flange (retaining portion 203) has a front surface lying in a back flange plane. *See supra* §IX.C; EX1008, FIG. 8; EX1003, ¶[]. Timony-Bundy combination also renders obvious spacing Timony's channel-shaped portion (support 265) from its back flange (retaining portion 203) enough to permit two layers of 5/8" thick sheathing to be received between Timony's channel-shaped portion (support 256) and its back flange (retaining portion 203). *See supra* §IX.D; EX1008, FIG. 8; EX1003, ¶¶226-227. Specifically, a POSITA

would have found it obvious to size Timony's retrofit plates 230 to allow two 5/8" thick sheathing to be received between Timony's support 265 and retaining portion 203, as taught by Bundy, yielding the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby protecting the wall's structural members. EX1003, ¶¶226-227; EX1007, 5:16-22.

Thus, Timony-Bundy combination renders obvious claim 12.

G. Claim 15

Timony renders obvious that the back flange (e.g., retaining portion 203) has a vertical dimension greater than the vertical dimension of a top plate of a frame wall. EX1003, ¶¶228-231.

First, this recitation of relative dimension carries no patentable weight. *See supra* §VII.N.

Furthermore, the sizing is a simple design choice. A POSITA would have found it obvious to make the vertical dimension of Timony's retaining portion 203 larger than a top plate to ensure there is sufficient contact surface between Timony's retaining portion 203 and the top plate, when the retaining portion is installed at the top of a wall. EX1003, ¶¶229-230. Increasing the contact surface between Timony's retaining portion 203 and the wall frame's top plate allows more fasteners to be embedded into the top plate, thereby ensuring a secure connection between retaining portion 203 and top plate. *Id*.

H. Independent Claim 16

[16.P] "A hanger to connect a joist to a frame wall adapted to have sheathing mounted thereon so that an interior side of the sheathing faces the frame wall and an exterior side of the sheathing faces away from the frame wall, the frame wall including a wooden upper plate and wooden studs extending down from the upper plate, the hanger comprising:"

Similar to the wall and structural component of claim 1, the joist, the frame wall, the upper plate, the studs, and the sheathing of claim 16 are not positively recited and not required elements of the claim. EX1002, 347, 353; *Hewlett-Packard Co.*, 909 F.2d at 1469. To the extent that the preamble is limiting, Timony discloses a hanger (bracket 195) to connect a joist to a wall adapted to have sheathing mounted thereon. *See supra* §VIII.A.[1.P]; EX1003, ¶¶232-233; EX1008, ¶¶34, 46, FIGS. 8, 9. Nowhere is Timony limited to any particular type of wall installation. EX1003, ¶233; EX1008, ¶34. A POSITA would have understood that the top plate of a frame wall would have been accessible to Timony's retaining portion 203 when replacing a truss or joist at the top of a wall as taught by Bundy, and that Timony's retaining portion 203—a simple bracket portion with retaining holes for fastening to any surface—is configured to engage the vertical surface of the top plate. EX1003, ¶233. Accordingly, Timony in view of Bundy renders obvious connecting a joist to a frame wall adapted to have sheathing mounted thereon so that an interior side of the sheathing faces the frame wall and an exterior

side of the sheathing faces away from the frame wall. *Id*. A POSITA would have had an expectation of success in using Timony's bracket with a top plate because Bundy's and Timony's hangers serve similar purposes—supporting a floor joist/structural beam at a wall. *Id.*

Thus, Timony-Bundy combination renders obvious element [16.P].

[16.1.A] "a channel-shaped portion configured to receive the structural component,"[4]

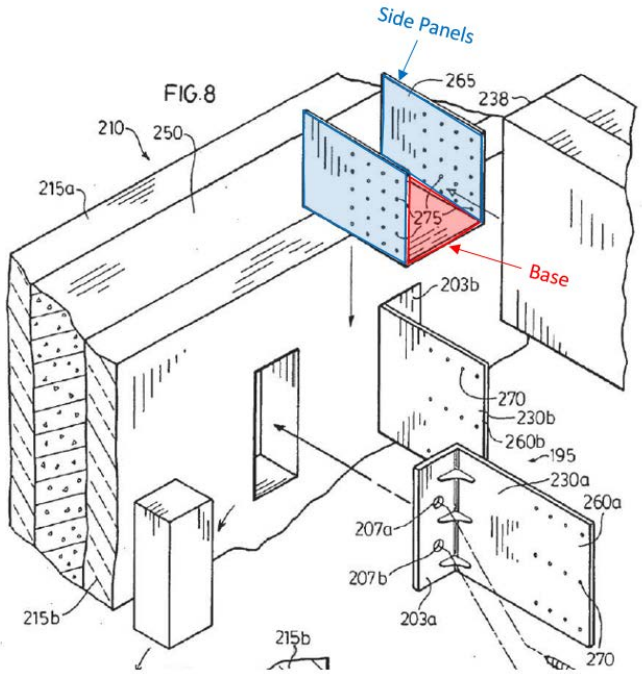
As discussed with respect to claim 1, element [1.1.A], Timony discloses this limitation. EX1003, ¶234; EX1008, ¶¶48-50.

[16.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component and side panels extending upward from the base,"

As discussed with respect to claim 1, element [1.1.B], Timony discloses that the channel-shaped portion (support 265) includes a base configured to receive an end portion of the structural component (or a joist) thereon. EX1003, ¶¶235-236. As shown below in Figure 8, Timony further discloses that the channel-shaped

[4] As discussed above in §IV.B, the term "the structural component" lacks antecedent basis. For purposes of this Petition, Petitioner treats this term as the "joist" recited in the preamble.

portion (support 265) includes side panels extending upward from the base. EX1008, ¶¶48- 50.



EX1008, FIG. 8 (annotated). EX1003, ¶235.

[16.2.A] "a connection portion configured for attachment to the frame wall,"

Timony-Bundy combination renders obvious this limitation. EX1003, ¶237. As discussed with respect to claim 1, element [1.2.A], Timony discloses a connection portion configured for attachment to a wall. EX1008, ¶¶48-50. While Timony describes using bracket 195 with a concrete wall, it would have been obvious to use bracket 195 on a frame wall as taught by Bundy and discussed above in §IX.A. EX1003, ¶237. As such, it would have been obvious to a POSITA that Timony's retaining portion 203—a simple bracket with apertures through

which fastening means are inserted to secure the bracket to any surface behind it—is configured to attach to a wood frame wall, such as that taught by Bundy. EX1003, ¶237. There are a finite number of wall types where sheathing would be installed, and a POSITA would have had a reasonable likelihood of success in using Timony's hanger on a wood frame wall. *Id*.

[16.2.B] "the connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall,"

As discussed above with respect to claim 1, element [1.2.B], Timony discloses a back flange (retaining portion 203). EX1003, ¶238; EX1008, ¶¶48-50. Just as Timony's retaining portion 203 is configured to engage a vertical face of a wall core 250, a POSITA would have understood that Timony's retaining portion 203 in view of Bundy is further configured to engage a vertical face of the upper plate. EX1003, ¶238. Indeed, a POSITA would have understood that the top plate of a frame wall would have been accessible to Timony's retaining portion 203 when installing at the top of a wall as described in Bundy, and that Timony's retaining portion 203 would engage the vertical surface of the top plate when securing Timony's bracket 195 to the top plate of the wall frame. *Id*., ¶238. Thus, Timony-Bundy combination renders obvious element [16.2.B].

[16.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another"

As discussed above with respect to claim 1, element [1.2.C], Timony discloses this limitation. EX1003, ¶239; EX1008, ¶¶48-50.

[16.3.A] "first and second extension flanges interconnecting the connection portion and the channel-shaped portion and holding the connection portion and channel-shaped portion in spaced apart relation to each other,"

As discussed above with respect to claim 1, element [1.3.A], Timony discloses first and second extension flanges (retrofit plates 230a/230b having hanging portions 260a/260b) holding the channel-shaped portion (support 265) and the connection portion (retaining portion 203) in a spaced apart relation. EX1003, ¶240; EX1008, ¶¶48-50. Timony further discloses that hanging portions 260a/260b of retrofit plates 230a/230b are interconnected to support 265 by a securing means 280 and integrally interconnected to retaining portion 203. EX1008, ¶50; EX1003, ¶240.

[16.3.B] "the first and second extension flanges being configured to extend through an opening in the sheathing to the wall frame,"

As discussed above with respect to claim 1, element [1.3.B], Timony discloses first and second extension flanges being configured to extend through an opening in the sheathing. EX1003, ¶241. In view of Bundy, it would have been obvious to a POSITA that when used with a wood frame wall, the flanges would extend to the wall frame. EX1003, ¶238.

[16.4.A] "the back flange, the first and second extension flanges and the channel-shaped portion defining a sheathing space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing,"

As discussed above with respect to claim 1, element [1.4], Timony discloses this limitation. EX1003, ¶242; EX1008, ¶¶48-50.

[16.4.B] "the back flange being sized and arranged to at least partially block the opening in the sheathing to reduce the exposure of the wooden top plate and wooden studs to an exterior through the opening in the sheathing."

First, the limitation "to reduce the exposure…sheathing" is an intended purpose of the back flange that does not affect the flange's structure, and should not be given patentable weight. *Hewlett-Packard Co.*, 909 F.2d at 1469.

Second, Timony discloses that the back flange (retaining portion 203) is sized and arranged to partially block the opening in the sheathing. EX1003, ¶243. Specifically, Timony discloses cutting away a portion of outer wall 215b that is sized and shaped to accommodate retaining portion 203, which is held flush against the surface of wall core 250, thereby reducing exposure of wall core 250. EX1003, ¶243; EX1008, ¶49. A POSITA would have understood that, when Timony's bracket 195 is used at the top of a wooden wall frame as taught by Bundy, Timony's retaining portion 203 is similarly configured to reduce the exposure of the wooden top plate. EX1003, ¶243.

Thus, Timony-Bundy combination renders obvious element [16.4.B].

I. Claim 17

As discussed above with respect to claim 5, Timony-Bundy combination renders this limitation obvious. EX1003, ¶244; EX1007, 5:10-22.

J. Claim 21

As discussed above with respect to claim 7, Timony-Bundy combination renders these limitations obvious. EX1003, ¶245; EX1008, FIG. 8. EX1007, 4:41-45.

K. Claim 22

As discussed above with respect to claim 8, Timony-Bundy combination renders these limitations obvious. EX1003, ¶246; EX1007, 5:10-22.

L. Claim 23

As discussed above with respect to claim 9, Timony-Bundy combination renders this limitation obvious. EX1003, ¶247; EX1008, ¶40.

X. Claims 1-12, 15-17, and 21-23 Would Have Been Obvious over Tsukamoto in view of Bundy.

Tsukamoto discloses every structural component listed in claim 1 of the ’867 Patent, but does not explicitly disclose that its spacing is “sized and shaped to receive the sheathing therein.” However, Bundy discloses an analogous hanger that receives two layers of 5/8” thick sheathing between the channel-shaped portion and

the wall. EX1003, ¶¶248-250. For the reasons discussed below, Tsukamoto in view of Bundy renders obvious claims 1-12, 15-17, and 21-23 of the '867 patent.

A. Motivation to Modify Tsukamoto Based on the Teachings of Bundy.

Tsukamoto and Bundy are both from the same field of endeavor, namely construction support hangers. EX1003, ¶249.

Tsukamoto already discloses a space defined between a channel-shaped portion (e.g., Tsukamoto's holding plates 2C'/3C') and a back flange (e.g., Tsukamoto's vertical plates 2D/3D) of a connection portion. EX1003, ¶251; EX1009, FIG. 3. While Tsukamoto's hanger is capable of receiving sheathing between holding plates 2C'/3C' and vertical plates 2D/3D, Tsukamoto does not appear to explicitly disclose receiving sheathing between holding plates 2C'/3C' and vertical plates 2D/3D. A POSITA would have found it obvious to receive sheathing between Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D, as Bundy teaches receiving sheathing between a channel-shaped portion of a hanger and the wall. EX1003, ¶¶250-251. Moreover, it would have been obvious to optimize the size of the spacing between Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D to accommodate two layers of 5/8" thick sheathing according to the size preference described by Bundy. *Id.*; EX1007, 5:16-18. Bundy teaches this preferred construction for optimal wall integrity. EX1003, ¶251; EX1007, 5:10-22. This modification would have been nothing more than applying a known

technique (Bundy's spacing to accommodate two sheets of 5/8" sheathing) to a similar device (Tsukamoto's connection plates 3D' and inclined portion 3B) to obtain the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby "protect[ing] the structural members of a building." EX1007, 5:18-20; EX1003, ¶251.

A POSITA would have had an expectation of success in defining a sheath space between Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D, because Tsukamoto's and Bundy's hangers are used for similar purposes (e.g., hanging a structural object to a wall). EX1003, ¶252; EX1007, 4:46-53; EX1009, 2-3.

While Tsukamoto describes securing a hanger to a base 4 on a foundation 8, a POSITA would have understood that Tsukamoto is not limited to the construction shown in Figures 5 and 6. EX1003, ¶252. Drywall is a common sheathing used in wall construction, and Bundy discloses using an analogous hanger for a wall covered with drywall. EX1007, 2:37-41. A POSITA would have recognized that Tsukamoto's hanger can be used in the wood frame/drywall setting of Bundy because Tsukamoto's horizontal portions 2A and vertical plates 2D/3D are shaped to receive side and upper surfaces of a wood frame wall's top plate and receive a fastener embedded into the top plate. EX1003, ¶252.

Furthermore, a POSITA would have understood that sheathing can be attached to the construction shown in Figures 5 and 6 of Tsukamoto because drywall is commonly attached to foundation walls, even in basements, where moisture resistant materials mitigate any seepage that might otherwise occur. *Id*. Indeed, it was well known to provide sheathing with moisture-retarding paint/claddings to preserve the integrity of the sheathing, even when exposed to moisture. *Id*. Accordingly, a POSITA would have been motivated to modify the sizing of Tsukamoto's connection plates 2D'/3D' and inclined portions 2B/3B to define a sheath space for receiving two layers of 5/8" thick sheathing between holding plates and vertical plates so that wall frame is adequately covered and protected by sheathing. *Id*., ¶¶252-253; EX1007, 5:10-22.

B. Independent Claim 1

[1.P] "A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon"

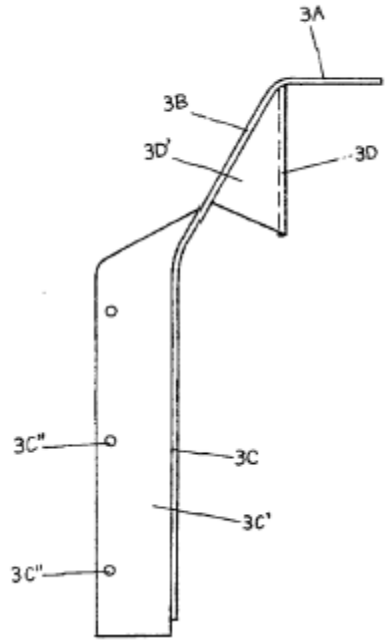
As discussed above, the limitation "for connecting a structural component to a wall adapted to have sheathing mounted thereon" is an intended use of the claimed invention, not a required element. *See supra* §VII.B.[1.P].

To the extent that the preamble is limiting, Tsukamoto-Bundy combination renders obvious a hanger for connecting a structural component to a wall. EX1003, ¶¶254-257; EX1009, 2, FIGS. 1-6. As discussed above, it would have been

obvious for Tsukamoto's wall to have sheathing mounted thereon. *See supra* §X.A; EX1003, ¶256.

FIG. 3

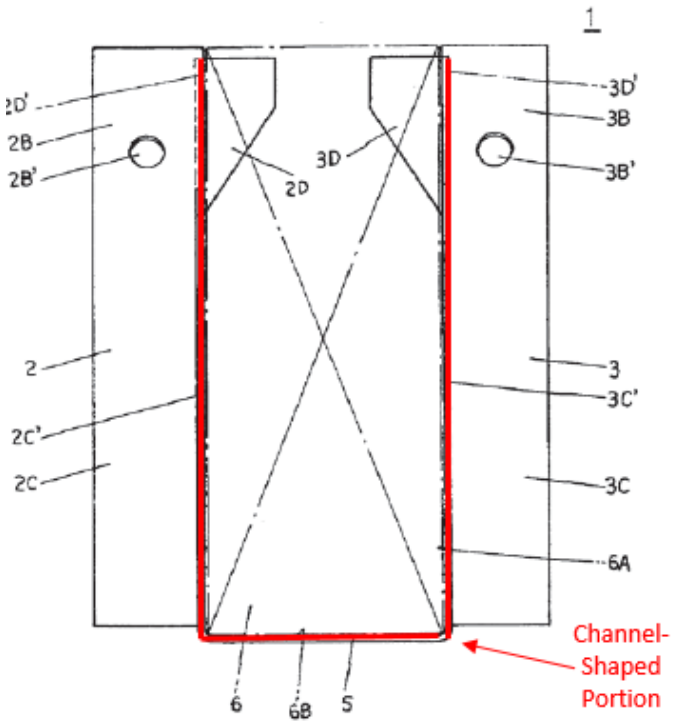
第３図



EX1009, FIG. 3. EX1003, ¶257.

[1.1.A] "channel-shaped portion configured to receive the structural component,"

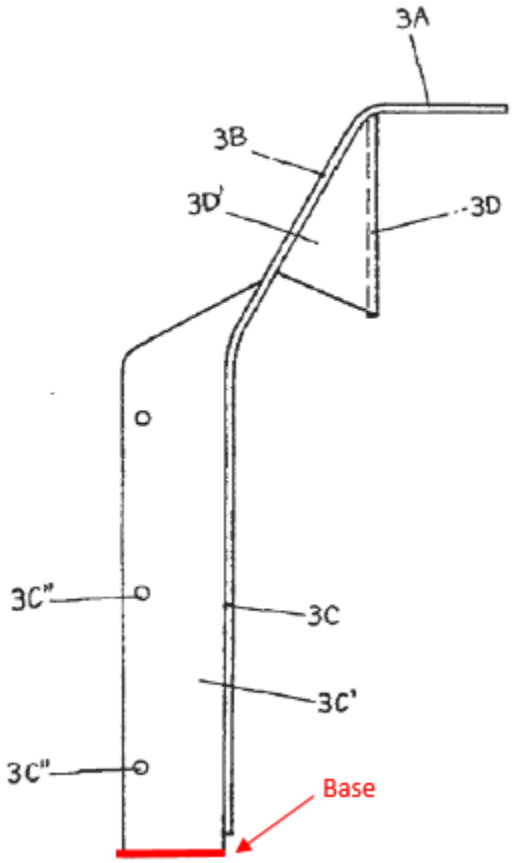
Tsukamoto discloses a channel-shaped portion (beam receiving plate 5 and beam holding side plates 2C'/3C') configured to receive the structural component (beam). EX1003, ¶¶258-259; EX1009, 3, FIGS. 1-6.



EX1009, FIG. 1. EX1003, ¶258.

[1.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component,"

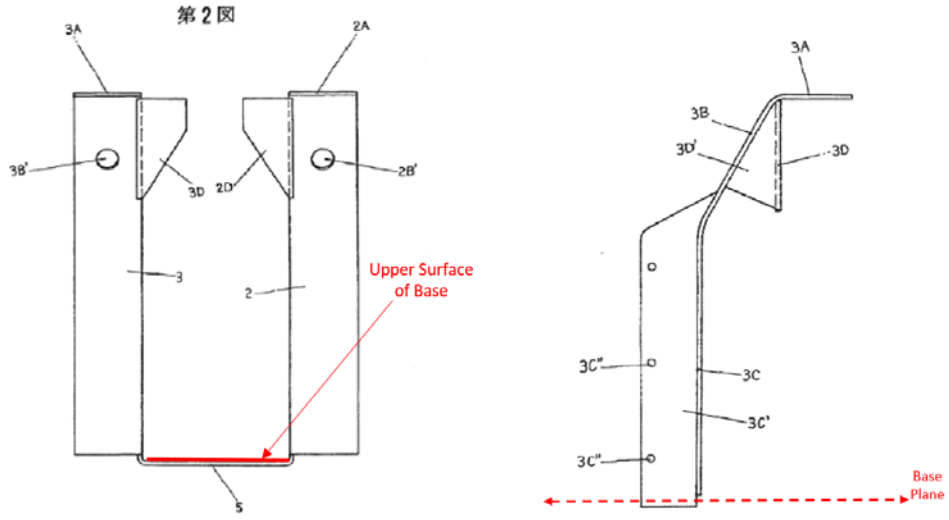
Tsukamoto discloses that the channel-shaped portion includes a base (beam receiving plate 5) configured to receive an end portion of the structural component thereon to support the structural component. EX1003, ¶¶260-261; EX1009, 3 ("Reference numeral 5 is a plate for receiving the beam which bridges horizontally between lower ends of holding plates 2C'/3C' ….")



EX1009, FIG. 3 (annotated). EX1003, ¶260.

[1.1.C] "the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;"

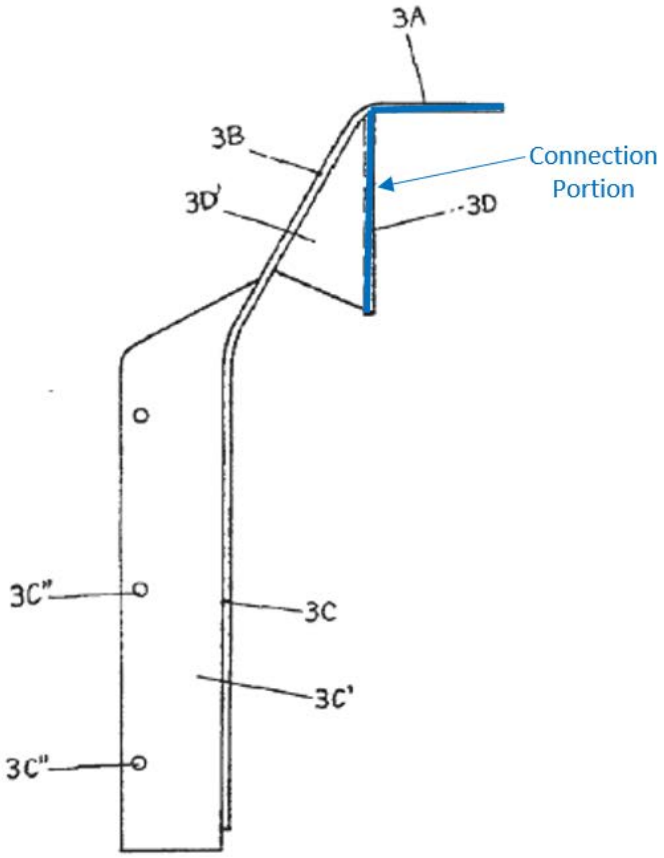
As shown below in Figure 3, Tsukamoto discloses that the base (receiving plate 5) has an upper surface configured to engage the structural component. EX1009, 2-3, FIG. 3; EX1003, ¶¶262-263. Because the two-dimensional upper surface of receiving plate 5 is flat, the surface defines a plane in which it lies. EX1003, ¶262.



EX1009, FIGS. 1, 3 (annotated). EX1003, ¶262.

[1.2.A] "a connection portion configured for attachment to the wall,"

Tsukamoto discloses a connection portion (horizontal portions 2A/3A and vertical plates 2D/3D) configured for attachment to the wall. EX1003, ¶¶264-266; EX1009, 2 ("The horizontal portions 2A,3A abut a top surface 4A of base 4, and the vertical plates 2D/3D abut a side surface 4B of the base 4."), FIG. 5.

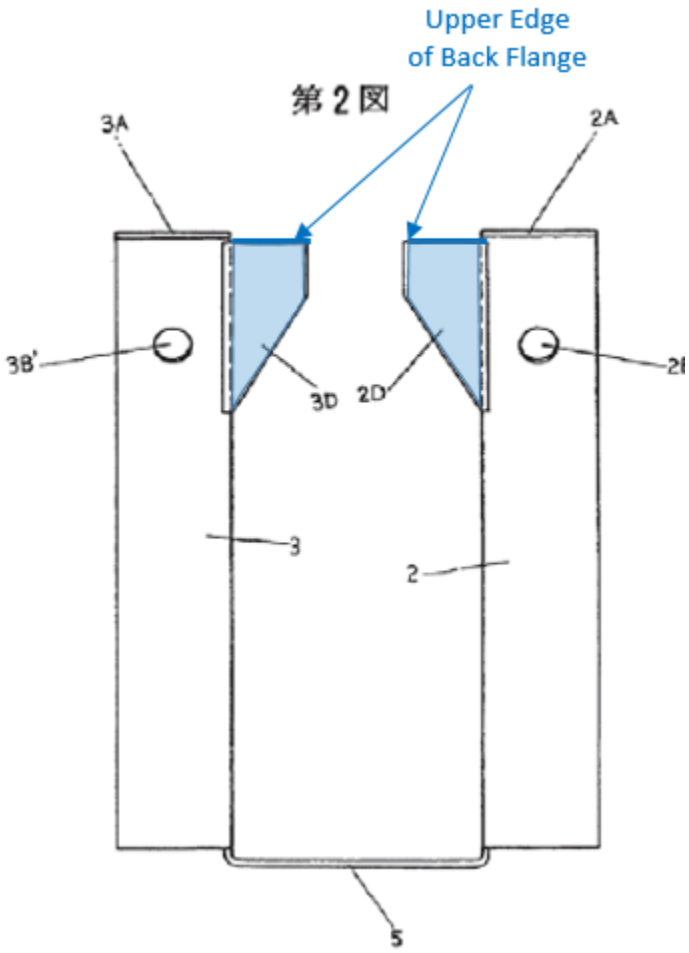


EX1009, FIG. 3 (annotated). EX1003, ¶264.

A POSITA would have understood that Tsukamoto's vertical plates 2D/3D correspond to the recited "connection portion." EX1003, ¶265.

[1.2.B] "the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane,"

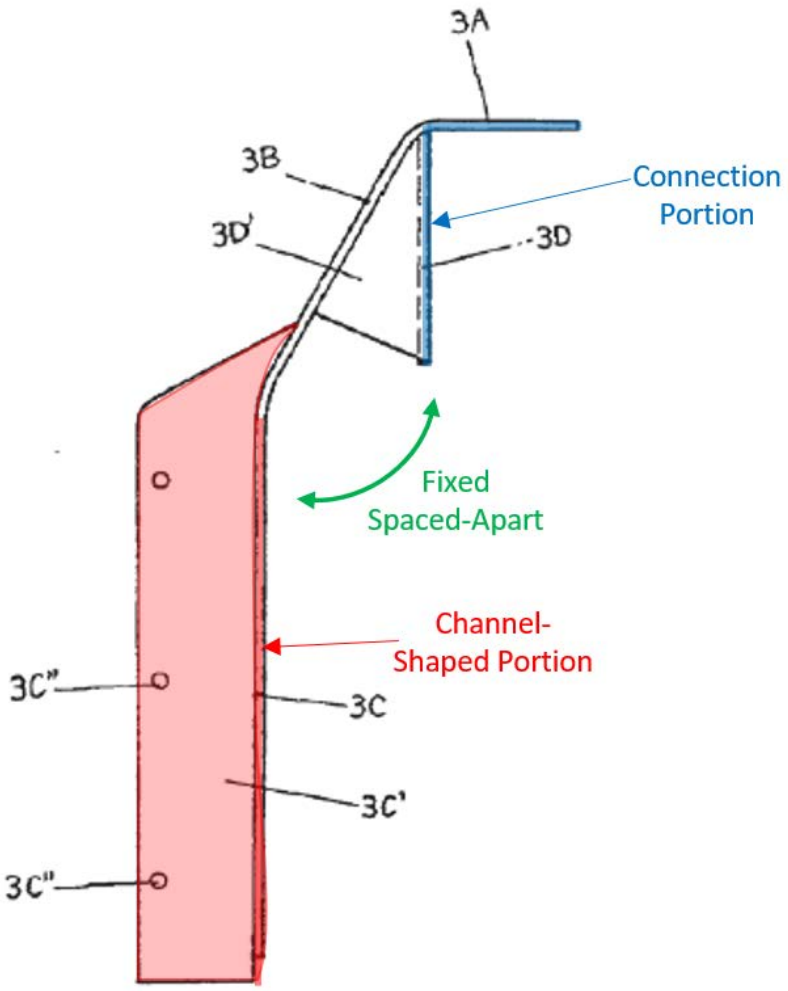
As shown below in Figure 1, Tsukamoto discloses that the connection portion includes a back flange (vertical plates 2D/3D) having an upper edge and that the back flange extends from the upper edge in a direction generally toward the base plane. EX1003, ¶¶267-268; EX1009, FIG. 1.



EX1009, FIG. 2 (annotated). EX1003, ¶267.

[1.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another"

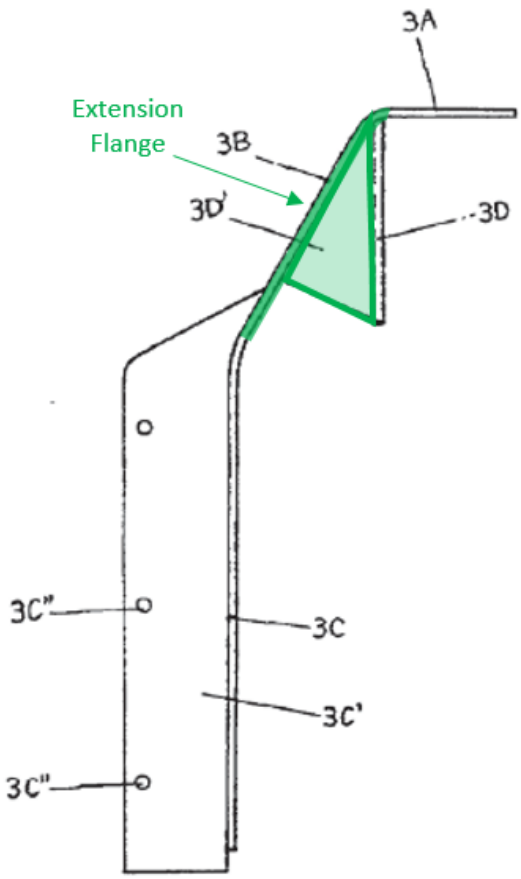
As shown below in FIG. 3, Tsukamoto discloses that the connection portion (vertical plates 2D/3D and horizontal portions 2A/3A) and channel-shaped portion (e.g., holding plates 2C'/3C') are in a fixed, spaced apart relation relative to one another. EX1003, ¶¶269-270; EX1009, 2-3, FIG. 3.



Tsukamoto, FIG. 3 (annotated). EX1003, ¶269.

[1.3.A] "an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion,"

Tsukamoto discloses an extension portion (inclined portion 2B/3B with connection plate 2D'/3D') including first and second extension flanges (inclined portion 2B/3B with connection plate 2D'/3D') extending from the channel-shaped portion (holding plates 2C'/3C') to the connection portion (vertical plate 2D/3D). EX1003, ¶¶271-273; EX1009, FIG. 3.

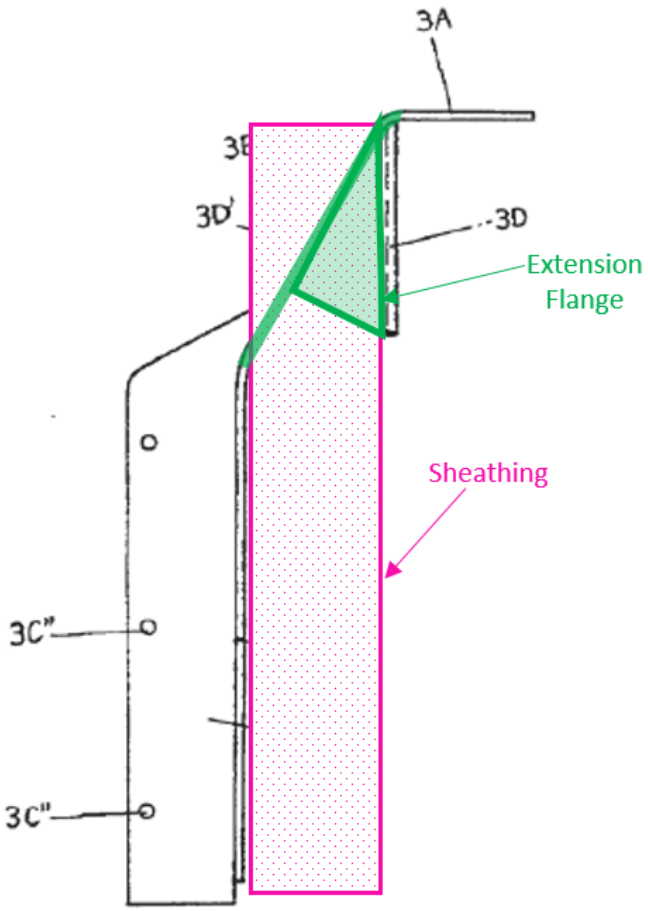


EX1009, FIG. 3 (annotated). EX1003, ¶271.

A POSITA would have understood that Tsukamoto's connection plates 2D'/3D' and inclined portions 2B/3B collectively correspond to the recited first and second extension flanges. EX1003, ¶272.

[1.3.B] "each extension flange being configured to extend through the sheathing,"

Tsukamoto-Bundy combination renders obvious each extension flange (connection plates 2D'/3D' with inclined portions 2B/3B) being configured to extend through sheathing. EX1003, ¶¶274-276.



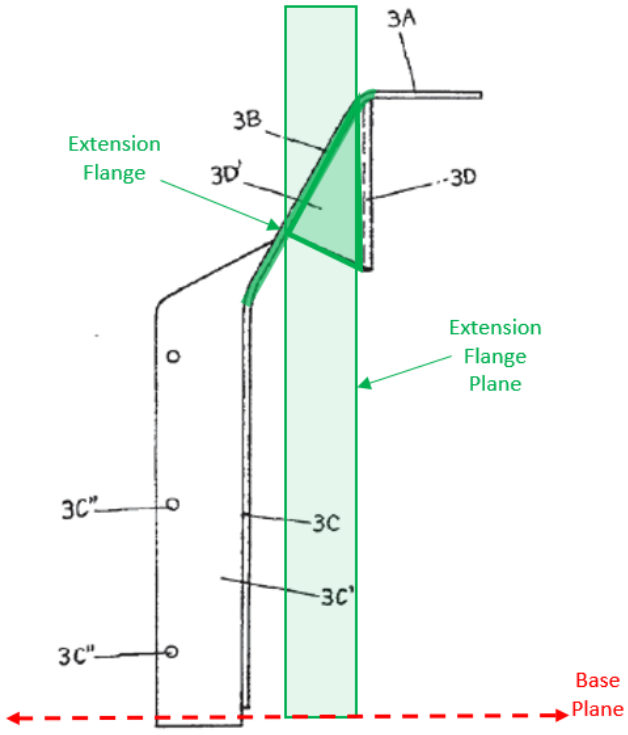
EX1009, FIG. 3 (annotated).

While Tsukamoto does not explicitly disclose extending connection plates 2D'/3D' and inclined portions 2B/3B through sheathing, a POSITA would have found it obvious to use Tsukamoto's hanger with sheathing, as applying a known technique (Bundy's use with drywall) for a known device (Tsukamoto's hanger), yielding the predictable result of "cover[ing] and protect[ing] the structural members of a building." EX1007, 5:18-20; EX1009, 2-3; EX1003, ¶275. Because Tsukamoto's connection plates 2D'/3D' and inclined portions 2B/3B are constructed as a continuous metal sheet, a POSITA would have understood that

Tsukamoto's extension flange is configured to extend into one side of sheathing and out of the other side of sheathing. EX1003, ¶275. And a POSITA would have had an expectation of success extending Tsukamoto's connection plates 2D'/3D' and inclined portions 2B/3B through the sheathing. *Id*.

[1.3.C] "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane,"

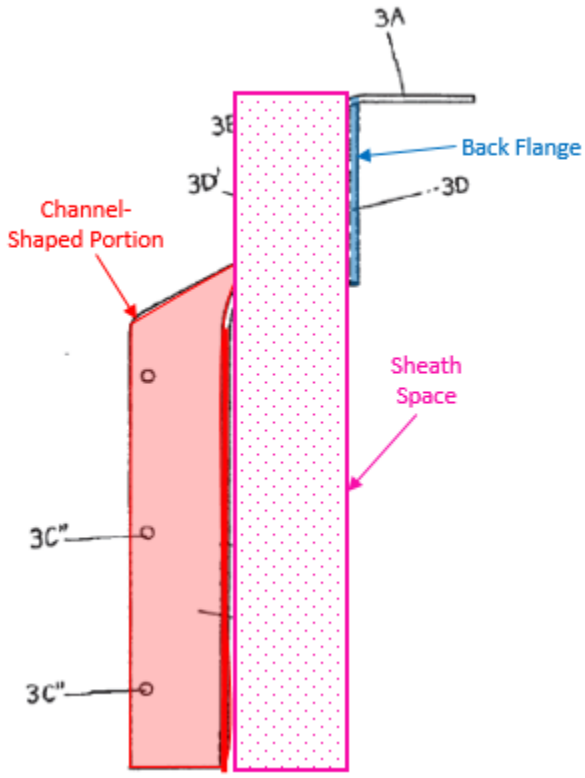
As shown below in Figure 3, Tsukamoto discloses that each extension flange has a surface (connection plates 2D'/3D') that lies in a plane, the planes being generally perpendicular to the base plane. EX1003, ¶¶277-278; EX1009, 2-3, FIGS. 1-6.



EX1009, FIG. 3 (annotated). EX1003, ¶277.

[1.4] "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall."

Tsukamoto-Bundy combination renders obvious the back flange (vertical plates 2D/3D) and the channel-shaped portion (holding plates 2C'/3C') defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion (holding plates 2C'/3C') is located on one side of the sheathing and the back flange (vertical plates 2D/3D) is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall. EX1003, ¶¶279-281; EX1009, FIG. 3. Specifically, Tsukamoto discloses that "inclined portions 2B, 3B … extend from front ends of the horizontal portions 2A, 3A and are inclined forwardly downward, and vertical portions 2C, 3C … extend downward from lower ends of the inclined portions." EX1009, 2. Thus, Tsukamoto's inclined portions 2B/3B define a space therebetween. EX1003, ¶¶279-280.



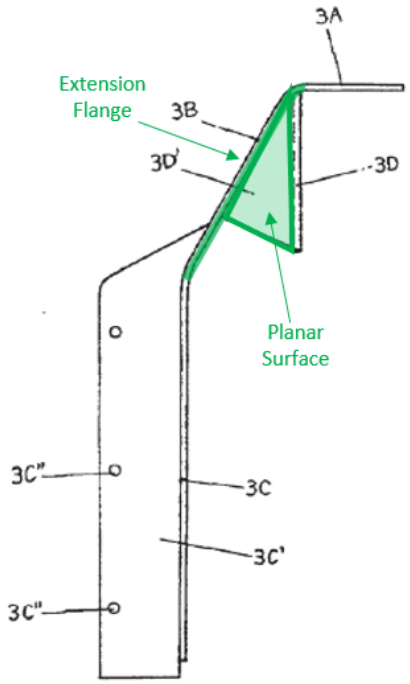
EX1003, FIG. 3 (annotated). EX1003, ¶280.

While Tsukamoto does not explicitly disclose installing sheathing in the space between Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D, a POSITA would have found it obvious to size such a space to receive sheathing based on Bundy. EX1003, ¶280. Bundy teaches installing two layers of 5/8" sheathing between a hanger's channel shaped portion (Bundy's side members 11) and wall frame "to cover and protect the structural members of a building." EX1007, 5:18-20; EX1003, ¶280. A POSITA would have had an expectation of success in defining a sheath-sized space as taught by Bundy between Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D, because Tsukamoto's and Bundy's hangers are

used for similar purposes (e.g., hanging a structural object to a wall) and Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D already define a space therebetween. EX1003, ¶280;EX1007, 4:46-53; EX1009, 1-3.

C. Claim 2

The term "planar" in claim 2 is construed as "having a surface coincident with a plane." *See supra*, §III.E.2. Tsukamoto discloses that each of the first and second extension flanges has a surface (connection plates 2D'/3D') coincident with a plane. EX1003, ¶¶282-283; EX1009, FIG. 3.

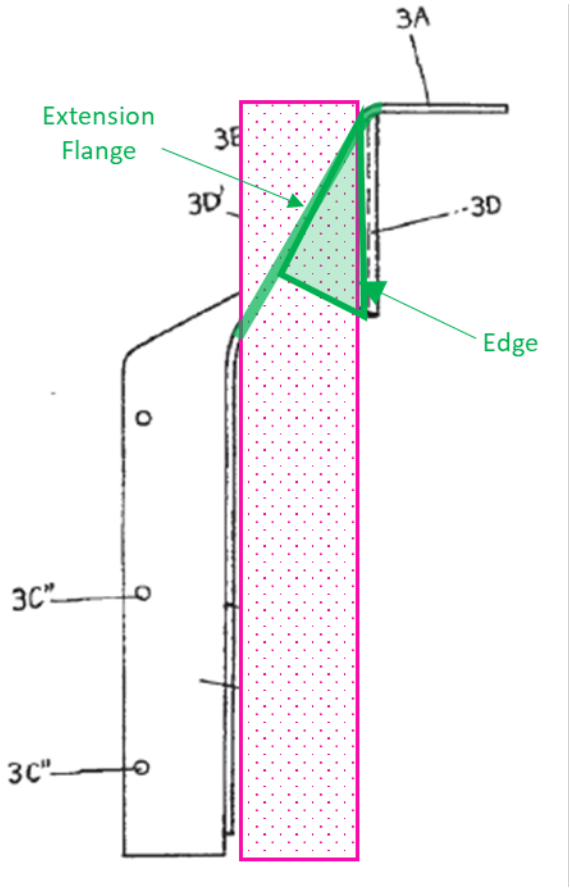


EX1009, FIG. 3 (annotated). EX1003, ¶282.

D. Claim 3

Tsukamoto discloses that the first and second extension flanges (connection plates 2D'/3D') each include an edge (at 2D/3D), and that the first and second

extension flanges are arranged to extend edgewise across the sheath space. EX1009, FIG. 3; EX1003, ¶¶284-286.

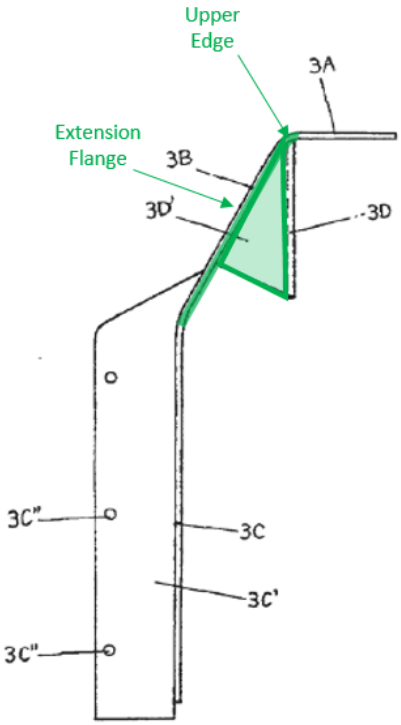


EX1009, FIG. 3 (annotated). EX1003, ¶285.

As would be evident to a POSITA, when combined with the teachings of Bundy, the flanges would extend edgewise through sheathing when sheathing is installed in the sheath space. EX1003, ¶285. Thus, Tsukamoto-Bundy combination renders obvious claim 3.

E. Claim 4

Tsukamoto discloses that the first and second extension flanges (connection plates 2D'/3D') include an upper free edge. EX1009, FIG. 2; EX1003, ¶¶287-288. Particularly, each upper end of Tsukamoto's inclined portions 2B/3B is exposed, and therefore, equates to an upper free edge. EX1003, ¶¶287-288.



EX1009, FIG. 3 (annotated). EX1003, ¶287.

F. Claim 5

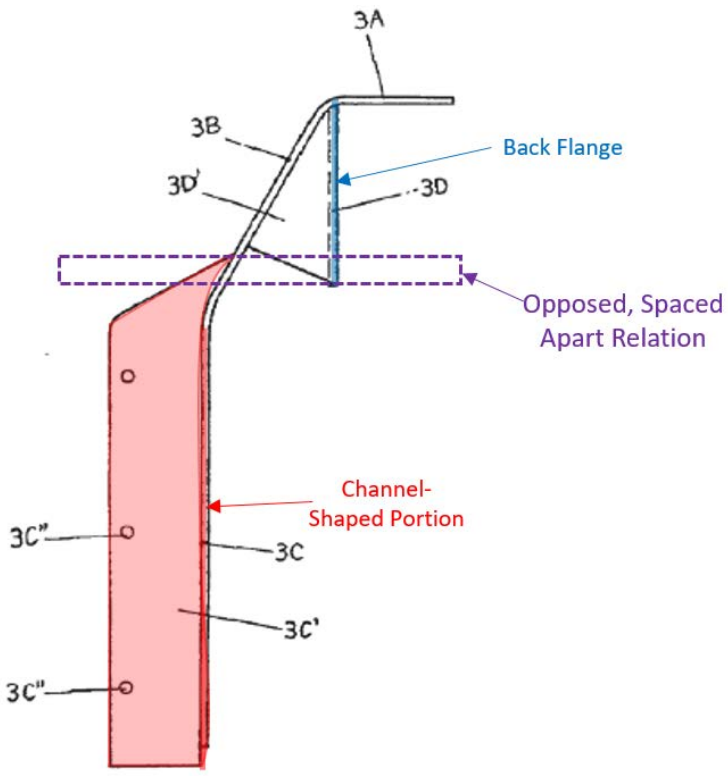
To the extent claim 5 is deemed sufficiently definite, Tsukamoto-Bundy combination renders this limitation obvious. EX1003, ¶¶289-291.

First, sheathing and a 2-hour fire resistance rating are intended uses, not positively recited elements of the claim. *See supra* §IV.C. Second, a POSITA

would have understood, as with any fire-rated wall assembly, to limit openings in the sheathing by conforming the openings to the contour of Tsukamoto's extension flanges and filling the openings with fire retardant materials. EX1003, ¶290. Thus, a POSITA would have found it obvious, in light of the Tsukamoto-Bundy combination, to extend Tsukamoto's extension flanges (connection plates 2D'/3D' and inclined portions 2B/3B) through any sheathing installed therein, in a way that maintains a 2-hour fire resistance rating for the assembly as described in Bundy. *Id.*; EX1009, 2-3.

G. Claim 6

Tsukamoto discloses that Tsukamoto's channel-shaped portion (holding plates 2C'/3C') is in opposed, spaced apart relation with the back flange (vertical plates 2D/3D). EX1003, ¶¶292-293; EX1009, FIG. 3.



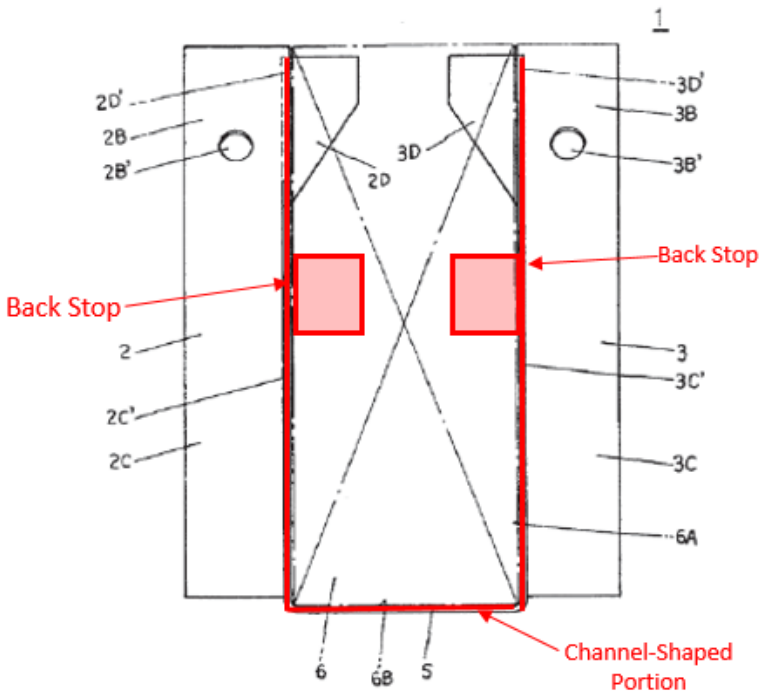
EX1009, FIG. 3 (annotated). EX1003, ¶292.

H. Claim 7

Tsukamoto discloses that the back flange (vertical plates 2D/3D) has a front surface. EX1009, FIG. 4. This front surface is flat, thus defining a back flange plane in which it lies. EX1003, ¶294.

Tsukamoto does not explicitly disclose a stop configured to engage the end of the structural component. Bundy teaches an analogous hanger that includes a stop (back plate members 9 bent inward to face each other) engaging the end of the structural component and spacing the end of the structural component from the back flange plane. EX1003, ¶295; EX1007, 4:39-46.

Thus, it would have been obvious for a POSITA to modify Tsukamoto by providing a stop to engage an end of the structural element, as taught by Bundy, to ensure that the end of the structural component (e.g., beam) is spaced from the back flange. EX1003, ¶¶296-297. Such a modification would have been applying a known technique (Bundy's channel-shaped portion having stops bent inwards to face each other) to a known device (Tsukamoto's channel-shaped portion without stops) to obtain the predictable result of supporting the end of a structural element. *Id.*



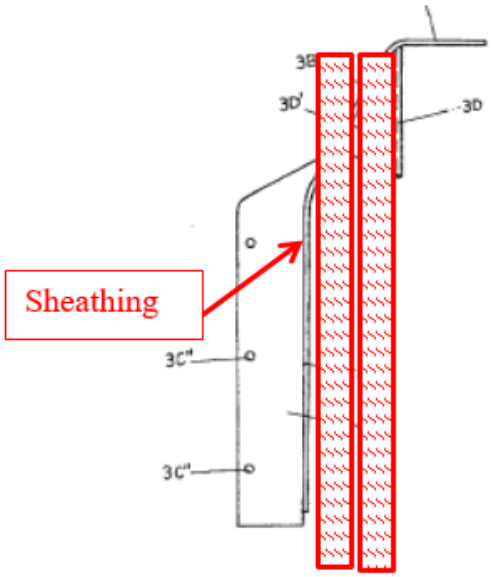
EX1009, FIG. 1 (annotated).

Thus, Tsukamoto-Bundy combination renders obvious claim 7.

I. Claim 8

Tsukamoto-Bundy combination renders obvious a stop configured to engage a structural element. *See supra* §X.H. Furthermore, Tsukamoto-Bundy combination renders obvious spacing the end of the structural component (Tsukamoto's beam) enough to permit two layers of 5/8" thick sheathing to be received between the end of structural component and the back flange (Tsukamoto's vertical plates 2D/3D). EX1003, ¶¶298-300.

Bundy discloses an extension portion sized to accommodate two layers of 5/8" thick sheathing between a channel-shaped portion (side members 11) and a support member. EX1003, ¶299; EX1007, 5:16-18. Bundy further discloses disposing the back face 10 of back plate members 9 "in parallel registration with the front face 7 of a first [drywall] panel 6." EX1007, 4:8-13. It would have been obvious to a POSITA to size Tsukamoto's inclined portions and connection plates to allow two 5/8" thick sheathing to be received between Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D and dispose Tsukamoto-Bundy's back plate member, as modified in claim 7, in parallel registration with the front face of sheathing, as taught by Bundy, preventing the end of the structural component from extending into the sheath space. EX1003, ¶299; EX1007, 5:16-22.



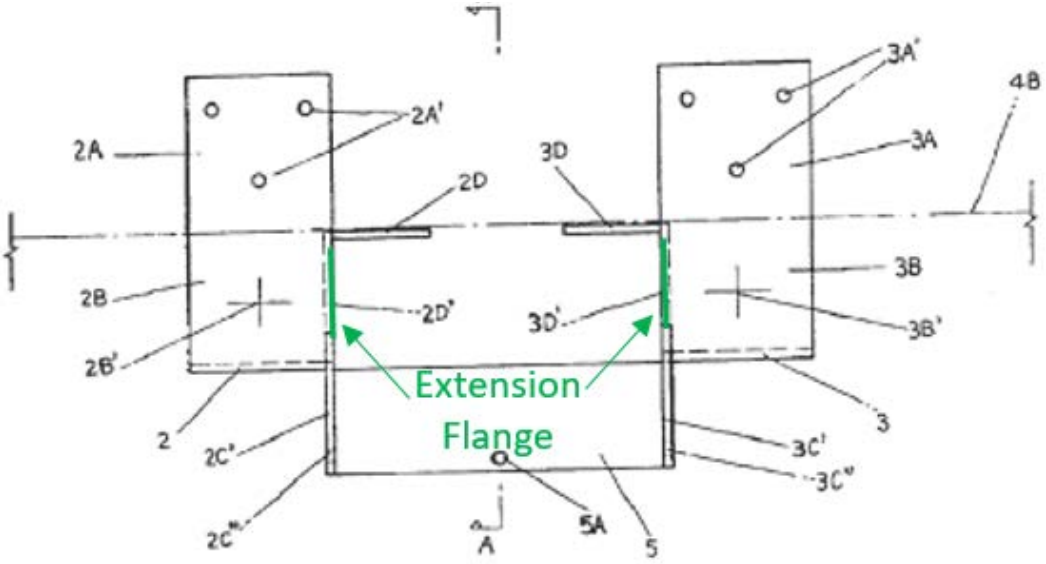
EX1009, FIG. 3 (annotated). EX1003, ¶299.

J. Claim 9

Tsukamoto-Bundy combination renders obvious the stop comprising back panels (Bundy's back plate members 9) extending toward each other. *See supra* §X.H; EX1003, ¶¶301-302; EX1007, 4:39-45.

K. Claim 10

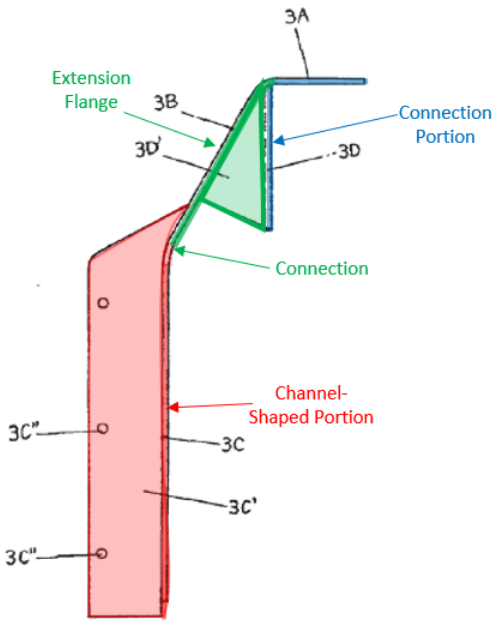
Tsukamoto discloses that first and second extension flanges have parallel surfaces (connection plates 2D'/3D') that extend in the same direction. EX1003, ¶¶303-304; EX1009, FIG. 4.



EX1009, FIG. 4 (annotated). EX1003, ¶303.

L. Claim 11

Tsukamoto discloses connections between the first and second extension flanges (connection plates 2D'/3D' and inclined portions 2B/3B) and the channel-shaped portion (holding plates 2C'/3C'). EX1009, 2 ("[V]ertical portions 2C, 3C … extend downward from lower ends of the inclined portions."); EX1003, ¶¶305-306. Tsukamoto further discloses that such connections are spaced apart from a lower end of the channel-shaped portion where the base (receiving plate 5) is located. EX1009, FIG. 3; EX1003, ¶¶305-306.



EX1003, FIG. 3 (annotated). EX1003, ¶305.

M. Claim 12

Tsukamoto discloses that the back flange (vertical plates 2D/3D) has a front surface lying in a back flange plane. *See supra* §X.H; EX1009, FIGS. 3, 4; EX1003, ¶307. Tsukamoto-Bundy combination renders obvious spacing the channel-shaped portion (Tsukamoto's holding plates 2C'/3C' which hold the end of the structural component) from the back flange (Tsukamoto's vertical plates 2D/3D) enough to permit two layers of 5/8" thick sheathing to be received therebetween. *See supra* §X.I; EX1009, FIG. 3; EX1003, ¶¶307-308.

N. Claim 15

Tsukamoto in view of Bundy renders obvious that the back flange (e.g., vertical plates 2D, 3D) has a vertical dimension greater than the vertical dimension of a top plate of a frame wall. EX1003, ¶¶309-311.

First, this recitation of relative dimension carries no patentable weight. *See supra* §VII.N.

Furthermore, the sizing is a simple design choice. While Tsukamoto does not identify the dimension of its vertical plates 2D/3D, a POSITA would have found it obvious to vertically size the plates, when used at the top of a wood frame wall as taught by Bundy, larger than a top plate to ensure there is sufficient contact surface between Tsukamoto's vertical plates and the top plate. EX1003, ¶¶310-311. Increasing the contact surface between Tsukamoto's vertical plates and the wall frame's top plate allows more fasteners to be embedded into the top plate, thereby ensuring a secure connection. *Id*.

O. Independent Claim 16

[16.P] "A hanger to connect a joist to a frame wall adapted to have sheathing mounted thereon so that an interior side of the sheathing faces the frame wall and an exterior side of the sheathing faces away from the frame wall, the frame wall including a wooden upper plate and wooden studs extending down from the upper plate, the hanger comprising:"

Similar to the wall and structural component of claim 1, the joist, the frame wall, the upper plate, the studs, and the sheathing of claim 16 are not positively

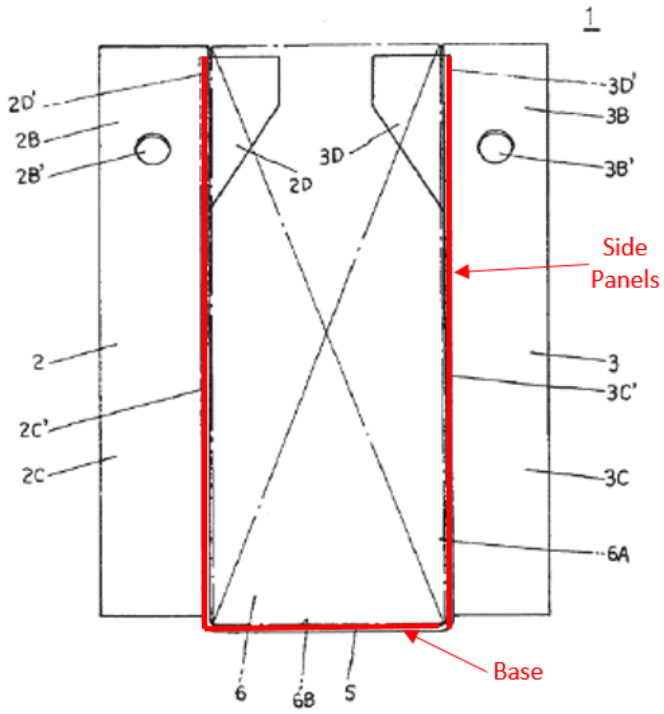
recited, required elements of the claim. EX1002, 347, 353. To the extent that the preamble is limiting, Tsukamoto-Bundy combination renders obvious a hanger to connect a joist to a frame wall adapted to have sheathing mounted thereon. EX1003, ¶¶312-313; EX1009, 3, FIGS. 1-6. And Bundy, in the same field of endeavor, discloses using an analogous hanger for a wood-framed wall covered with drywall. EX1007, 2:37-41. It would have been obvious to a POSITA to use Tsukamoto's hanger to connect a structural component to a top plate of a frame wall adapted to have drywall mounted thereon, as taught by Bundy. *Id*., ¶312. Such a modification would have been simply applying a known technique (Bundy's use of a hanger on a wood frame wall with drywall) to a known device (Tsukamoto's hanger) to obtain the predictable result of supporting a beam on a wood frame wall. *Id*., ¶312; *see, e.g.*, EX1007, 5:18-20. And a POSITA would have had an expectation of success because the hangers serve similar purposes—supporting a floor joist/structural beam at a wall. EX1003, ¶312.

[16.1.A] "a channel-shaped portion configured to receive the structural component,"

As discussed with respect to claim 1, element [1.1.A], Tsukamoto discloses this limitation. EX1003, ¶314; EX1009, 2-3, FIGS. 1-6.

[16.1.B] "the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component and side panels extending upward from the base;"

As discussed with respect to claim 1, element [1.1.B], Tsukamoto discloses that the channel-shaped portion (vertical portions 2C/3C) includes a base (receiving plate 5) configured to receive an end portion of the structural component (or a joist) thereon. EX1003, ¶¶315-316; EX1009, 2-3, FIGS. 1-6. As shown below in Figure 7, Tsukamoto further discloses that the channel-shaped portion includes side panels (holding plates 2C'/3C') extending upward from the base (beam plate 5). EX1009, 2-3, FIGS. 1-6.



EX1009, FIG. 1 (annotated). EX1003, ¶315.

[16.2.A] "a connection portion configured for attachment to the frame wall,"

As discussed above with respect to claim 1, element [1.2.A], Tsukamoto discloses this limitation. EX1003, ¶317; EX1009, 2-3, FIGS. 1-6.

[16.2.B] "the connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall,"

As discussed above with respect to claim 1, element [1.2.B], Tsukamoto discloses a back flange (vertical plates 2D/3D). EX1003, ¶318; EX1009, 2-3, FIGS. 1-6. Just as Tsukamoto's vertical plates 2D/3D are configured to engage a vertical face of a base, a POSITA would have understood that Tsukamoto's vertical plates 2D/3D are similarly configured to engage a vertical face of an upper plate when used at the top of a wood frame wall as taught by Bundy. EX1003, ¶318.

[16.2.C] "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another"

As discussed above with respect to claim 1, element [1.2.C], Tsukamoto discloses this limitation. EX1003, ¶320; EX1009, 2-3, FIGS. 1-6.

[16.3.A] "first and second extension flanges interconnecting the connection portion and the channel-shaped portion and holding the connection portion and channel-shaped portion in spaced apart relation to each other,"

As discussed above with respect to claim 1, element [1.3.A], Tsukamoto discloses first and second extension flanges (connection plates 2D'/3D' and

inclined portions 2B/3B) holding the channel-shaped portion (holding plates 2C'/3C') and the connection portion (vertical plates 2D/3D) in a spaced apart relation. EX1003, ¶321; EX1009, 2-3, FIGS. 1-6. Tsukamoto further discloses that inclined portions 2B/3B are interconnected to holding plates 2C'/3C' and vertical plates 2D/3D. EX1003, ¶321; EX1009, 2-3, FIGS. 1-6.

[16.3.B] "the first and second extension flanges being configured to extend through an opening in the sheathing to the wall frame,"

As discussed above with respect to claim 1, element [1.3.B], Tsukamoto discloses this limitation. EX1003, ¶322; EX1009, 2-3, FIGS. 1-6.

[16.4.A] "the back flange, the first and second extension flanges and the channel-shaped portion defining a sheathing space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing,"

As discussed above with respect to claim 1, element [1.4], Tsukamoto discloses this limitation. EX1003, ¶323; EX1009, 2-3, FIGS. 1-6.

[16.4.B] "the back flange being sized and arranged to at least partially block the opening in the sheathing to reduce the exposure of the wooden top plate and wooden studs to an exterior through the opening in the sheathing."

First, the limitation "to reduce the exposure…sheathing" is an intended purpose of the back flange that does not affect the flange's structure, and should not be given patentable weight. *Hewlett-Packard*, 909 F.2d at 1469.

Second, Tsukamoto discloses that the back flange (vertical plates 2D/3D) is sized and arranged to partially block the opening in the sheathing. EX1003, ¶¶324-325; EX1009, 2-3, FIGS. 1-6. Specifically, Tsukamoto's vertical plates 2D/3D extend inward from connection plates 2C'/3C' EX1003, ¶324; EX1009, FIG. 1. A POSITA would have understood that vertical plates 2D/3D would reduce the exposure of a wooden top plate when used with a wooden wall frame, as taught by Bundy. EX1003, ¶324.

P. Claim 17

As discussed above with respect to claim 5, Tsukamoto-Bundy combination renders this limitation obvious. EX1003, ¶326; EX1007, 5:10-22.

Q. Claim 21

As discussed above with respect to claim 7, Tsukamoto-Bundy combination renders obvious these limitations. EX1003, ¶327; EX1009, FIG. 3; EX1007, 4:41-45.

R. Claim 22

As discussed above with respect to claim 8, Tsukamoto-Bundy combination renders obvious these limitations. EX1003, ¶328; EX1009, FIG. 3; EX1007, 5:10-22.

S. Claim 23

As discussed above with respect to claim 9, Tsukamoto-Bundy combination renders obvious this limitation. EX1003, ¶329; EX1007, 4:41-46.

XI. Mandatory Notices (37 C.F.R. §42.8(a)(1))

REAL PARTY IN INTEREST: The real parties-in-interest are Petitioner Simpson Strong-Tie Company Inc. and its parent company, Simpson Manufacturing Co., Inc.

RELATED MATTERS: The '867 Patent is a continuation of the '510 Patent, which was held unpatentable in post-grant proceeding *Simpson Strong-Tie Company Inc. v. Columbia Insurance Company*, PGR2019-00063, Paper 52 (P.T.A.B. Mar. 11, 2021). Petitioner has been served a Complaint by Patent Owner in the related litigation, *Columbia Insurance Company et al v. Simpson Strong-Tie Company Inc.*, 3-19-cv-04683 (N.D. Cal.), which asserted infringement of the '510 Patent.

LEAD AND BACKUP COUNSEL: Under 37 C.F.R. §§42.8(b)(3) and 42.10(a), Petitioner appoints **Michelle K. Holoubek** (Reg. No. 54,179) as lead counsel and **John Higgins** (Reg. No. 74,992) as back-up counsel, both at the address: STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C., 1100 New York Avenue, N.W., Washington, D.C., 20005, phone (202) 371-2600, and facsimile (202) 371-2540.

SERVICE INFORMATION: Petitioner consents to electronic service by email at: **holoubek-PTAB@sternekessler.com**, **jhiggins-PTAB@sternekessler.com**, and **PTAB@sternekessler.com**.

XII. Grounds for Standing (37 C.F.R. §42.204(a))

Pursuant to 37 C.F.R. §42.204(a), Petitioner hereby certifies that the '867 Patent is available for post-grant review in accordance with 37 C.F.R. §42.202(a), and that Petitioner is not barred or estopped from requesting post-grant review challenging the claims of the '867 Patent on the grounds identified in this Petition.

This Petition is filed within nine months from the date of the grant of the '867 Patent.

XIII. Conclusion

For the reasons above, post-grant review of claims 1-23 of U.S. Patent No. 11,021,867 is requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

/Michelle K. Holoubek, Reg. # 54,179/

Michelle K. Holoubek (Reg. No. 54,179)
Attorney for Petitioner
Simpson Strong-Tie Company Inc.

Date: August 13, 2021

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION, TYPEFACE REQUIREMENTS, AND TYPE STYLE REQUIREMENTS

1. This Petition complies with the type-volume limitation of 18,700 words, comprising 18,516 words, excluding the parts exempted by 37 C.F.R. § 42.24(a).

2. This Petition complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14 point Times New Roman.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

/Michelle K. Holoubek, Reg. # 54,179/

Michelle K. Holoubek (Reg. No. 54,179)
Attorney for Petitioner
Simpson Strong-Tie Company Inc.

Date: August 13, 2021

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

CERTIFICATION OF SERVICE (37 C.F.R. §§42.6(e), 42.105(a))

The undersigned hereby certifies that on August 13, 2021, true and correct copies of the foregoing **PETITION FOR POST-GRANT REVIEW OF U.S. PATENT NO. 11,021,867** and all associated exhibits were served in their entireties on the following parties via FedEx® Express:

STINSON LLP
7700 Forsyth Blvd.
Suite 1100
St. Louis, MO 63105
PAIR Correspondence Address for U.S.P.N. 11,021,867

Duane H. Mathiowetz
MORGAN FRANICH FREDKIN SIAMAS & KAYS LLP
333 W. San Carlos St., Suite 1050
San Jose, CA 95110
Other address known to the petitioner as likely to effect service

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

/Michelle K. Holoubek, Reg. # 54,179/

Michelle K. Holoubek (Reg. No. 54,179)
Attorney for Petitioner
Simpson Strong-Tie Company Inc.

Date: August 13, 2021

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

EXHIBIT K

Trials@uspto.gov
571-272-7822

Paper 42
Entered: March 17, 2022

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.

PGR2021-00109
Patent 11,021,867 B2

Before SCOTT A. DANIELS, NEIL T. POWELL, and STEPHEN E. BELISLE, *Administrative Patent Judges*.

BELISLE, *Administrative Patent Judge*.

DECISION
Granting Institution of Post-Grant Review
35 U.S.C. § 324

I. INTRODUCTION

A. Case Posture

Simpson Strong-Tie Company Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting a post-grant review of claims 1–23 of U.S. Patent No. 11,021,867 B2 (Ex. 1001, "the '867 patent"). Petitioner identifies itself and its parent company, Simpson Manufacturing Co., Inc., as real parties in interest. Pet. 121. Columbia Insurance Company ("Patent Owner") identifies itself as a real party in interest (Paper 4, 2), and timely filed a Preliminary Response to the Petition (Paper 7, "Prelim. Resp."). In addition, with prior authorization from the Board (Paper 6), Patent Owner requested a Certificate of Correction pursuant to 35 U.S.C. § 255 to correct certain mistakes in the '867 patent (Ex. 2003). A Certificate of Correction subsequently issued concerning claims 5, 11, 16, and 17 of the '867 patent. Ex. 2032.

We have authority to determine whether to institute a post-grant review. 35 U.S.C. § 324(c) (2018); 37 C.F.R. § 42.4(a) (2021). We may not institute a post-grant review "unless . . . it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable." 35 U.S.C. § 324(a). When instituting post-grant review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim. 37 C.F.R. § 42.208(a).

Applying those standards, and upon consideration of the information presented in the Petition and Preliminary Response, we determine that Petitioner has established that it is more likely than not that at least one claim of the '867 patent is unpatentable. Accordingly, we institute a post-

grant review as to all challenged claims of the '867 patent on all grounds raised in the Petition. We base our factual findings and conclusions at this stage of the proceeding on the evidentiary record developed so far. This is not a final decision as to the construction of any claim term or the patentability of any claim. Any final decision shall be based on the full trial record, including any response timely filed by Patent Owner. Any arguments not raised by Patent Owner in a timely filed response may be deemed waived, even if they were presented in the Preliminary Response.

B. Related Proceedings

The parties identify the '867 patent as a continuation of U.S. Patent No. 10,316,510 ("the '510 patent"). Pet. 121; Paper 4, 2. The '510 patent was involved in post-grant proceeding *Simpson Strong-Tie Company Inc. v. Columbia Insurance Company*, PGR2019-00063, Paper 52 (PTAB Mar. 11, 2021), which is on appeal and cross-appeal in *Columbia Insurance Company v. Simpson Strong-Tie Company Inc.*, Appeal Nos. 2021-2145, 2021-2157, in the U.S. Court of Appeals for the Federal Circuit. Pet. 121; Paper 4, 2. The '510 patent also is involved in a civil action in *Columbia Insurance Company et al. v. Simpson Strong-Tie Company Inc.*, No. 3-19-cv-04683 (N.D. Cal.) ("Related Litigation"). Pet. 121; Paper 4, 2.

Patent Owner also identifies pending U.S. Patent Application No. 17/235,349, filed April 20, 2021, as claiming benefit of the '867 patent. Paper 4, 2.

C. The '867 Patent

The '867 patent is titled "Hanger For Fire Separation Wall," and issued on June 1, 2021, from U.S. Application No. 16/433,799, filed June 6,

2019. Ex. 1001, codes (10), (21), (22), (45), (54). The '867 patent claims priority through a series of continuing applications to U.S. Provisional Application No. 61/922,531, filed December 31, 2013. Ex. 1001, codes (60), (63).

The '867 patent generally relates to "a truss hanger for connecting a truss to a wall including fire retardant sheathing." Ex. 1001, 1:19–21. Figure 2 of the '867 patent is reproduced below.

FIG. 2

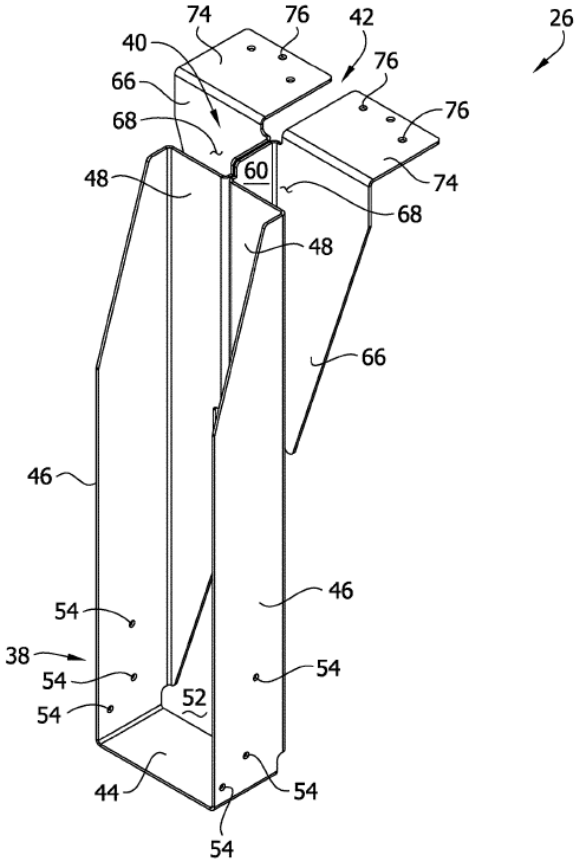


Figure 2 is a perspective view of a truss hanger. *Id.* at 2:59–60.

Figure 2 shows truss hanger 26 having three main portions: channel-shaped portion 38, extension portion 40, and connection portion 42. Ex. 1001, 4:34–36. Channel-shaped portion 38 is configured to receive floor truss 12 (not shown), and includes seat or base 44 and a pair of side panels 46 extending upward from base 44. *Id.* at 4:36–39. When installed, base 44 is generally horizontal, and side panels 46 extend generally vertical from base 44. *Id.* at 4:39–41. Back panel 48 extends from each of side panels 46, and each back panel 48 is generally perpendicular to both side panels 46 and base 44. *Id.* at 4:41–44. When installed, each back panel 48 extends generally parallel to interior face 50 of fire retardant sheathing 34 (not shown). *Id.* at 4:44–47.

Extension portion 40 includes two extension flanges 60 configured to extend through fire retardant sheathing 34 (not shown). Ex. 1001, 5:1–3. Each flange 60 extends from one of back panels 48, and is "positioned in opposed, face-to-face relation," "preferably engag[ing] each other along a juncture." *Id.* at 5:3–6. Back flange 66 extends generally perpendicular from each of extension flanges 60, and is oriented generally parallel to back panels 48. *Id.* at 5:19–22.

Connection portion 42 includes a pair of connector tabs 74 extending from back flanges 66. Ex. 1001, 6:37–39. Each connector tab 74 extends generally perpendicular from one of back flanges 66, and is generally horizontal when hanger 26 is installed. *Id.* at 6:39–42.

Truss hanger 26 mounts to framing of a wall during construction as shown in Figure 10 of the '867 patent, reproduced below. Ex. 1001, 5:32–41.

FIG. 10

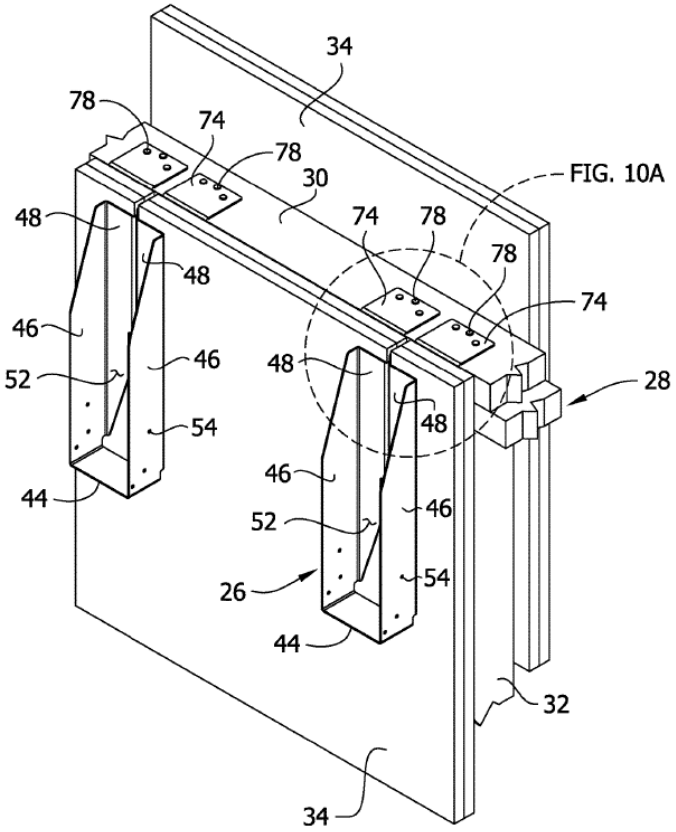


Figure 10 is a perspective view of wall 28 having fire retardant sheathing 34 with a slot cut in the sheathing to receive truss hanger 26.

Id. at 3:4–5. Once installed, a portion of fire retardant sheathing 34 extends into each sheathing channel 68 and is secured between back panels 48 and back flanges 66. *Id.* at 5:38–41. According to the '867 patent, an exemplary embodiment of fire retardant sheathing 34, as shown in Figure 10 for example, is gypsum board, such as two layers of 5/8" gypsum board. *Id.* at 4:18–24.

According to the ’867 patent, the use of truss hanger 26 allows for the mounting of joists or beams to fire separation walls with less interruption to the wall’s fire retardant sheathing, thus minimizing any reduction in the wall’s fire resistant rating. *See* Ex. 1001, 1:25–41.

D. Illustrative Claim

The ’867 patent includes twenty three claims, all of which are challenged. Claims 1 and 16 are independent claims. Claim 1 is illustrative and reproduced below.

> 1. A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:
> a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;
> a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane, the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and
> an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion, each extension flange being configured to extend through the sheathing, each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped

> portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall.

Ex. 1001, 12:15–44.

E. Applied References

Petitioner relies upon the following references:

Gilb, U.S. Patent No. 4,422,792 (Ex. 1035, "Gilb '792"), issued December 27, 1983.

Timony, U.S. Patent Publication No. 2005/0155307 A1 (Ex. 1008, "Timony"), published July 21, 2005.

Tsukamoto, Japanese Patent Publication No. JPH0314482Y2 (Ex. 1009, "Tsukamoto"), published October 16, 1987 (citations herein to Tsukamoto are to the certified translation thereof included in Ex. 1009).

Bundy et al., U.S. Patent No. 9,394,680 B2 (Ex. 1007, "Bundy"), filed December 14, 2013 and issued July 19, 2016.

Pet. 1–3. Petitioner also relies upon the Declaration of W. Andrew Fennell (Ex. 1003). Patent Owner supports its Preliminary Response with the Declaration of Reynaud Serrette, Ph.D. (Ex. 2001).

F. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–23 of the '867 patent based on the following grounds. Pet. 2–3.

Claims Challenged	35 U.S.C. §	References
1–23	112(b)	N/A
5, 17	112(a)	N/A
1–12, 15–17, 21–23	103	Gilb '792, Bundy

1–4, 6, 10, 11	102	Timony
5, 7–9, 12, 15–17, 21–23	103	Timony, Bundy
1–12, 15–17, 21–23	103	Tsukamoto, Bundy

II. DISCRETIONARY DENIAL – 35 U.S.C. § 325(d)

Patent Owner argues the Board should exercise its discretion to deny institution of post-grant review under 35 U.S.C. § 325(d) because each of Petitioner's four asserted prior art references, namely Gilb '792, Timony, Tsukamoto, and Bundy, previously was presented to the Office during prosecution of the '867 patent, and allegedly Petitioner has not demonstrated that the Office erred in allowing the '867 patent over that prior art. Prelim. Resp. 71–88. Based on the record before us, we decline to deny institution of post-grant review under § 325(d), for the reasons discussed below.

Section 325(d) provides that, in determining whether to institute a post-grant review, "the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office." 35 U.S.C. § 325(d). The Board uses a two-part framework in determining whether to exercise its discretion under § 325(d), specifically:

> (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and
>
> (2) if either condition of [the] first part of the framework is satisfied, whether the petitioner has demonstrated that the Office

> erred in a manner material to the patentability of challenged claims.

Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential) ("*Advanced Bionics*").

In applying the two-part framework, we consider the non-exclusive factors set forth in *Becton, Dickinson and Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017) (precedential in relevant part), which "provide useful insight into how to apply the framework" under § 325(d). *Advanced Bionics*, Paper 6 at 9. Those non-exclusive factors include:

> (a) the similarities and material differences between the asserted art and the prior art involved during examination;
>
> (b) the cumulative nature of the asserted art and the prior art evaluated during examination;
>
> (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
>
> (d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art;
>
> (e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and
>
> (f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson, Paper 8 at 17–18. "If, after review of factors (a), (b), and (d), it is determined that the same or substantially the same art or arguments previously were presented to the Office, then factors (c), (e), and (f) relate to

whether the petitioner has demonstrated a material error by the Office." *Advanced Bionics*, Paper 6 at 10.

Under the first part of the § 325(d) framework, the evidence demonstrates that the same four references relied upon in the Petition, namely Gilb '792, Timony, Tsukamoto, and Bundy, previously were presented to the Office during prosecution of the '867 patent. Ex. 1001, code (56); *see generally* Ex. 1002. Petitioner concedes that "some of the applied art—Gilb'792, Timony, and Bundy—was either cited by the Examiner or applied during prosecution." Pet. 25. As for the remaining reference, Tsukamoto, Petitioner argues "Tsukamoto was not considered by the Examiner during prosecution" (Pet. 25), but provides no basis for making such an allegation, particularly given that Tsukamoto is the first foreign patent listed on the face of the '867 patent (Ex. 1001, code (56)). To the extent Petitioner's argument here concerning Tsukamoto is based on the '867 patent's file history lacking a certified translation of Tsukamoto (*see* Ex. 3004), we are not persuaded the lack thereof has a meaningful impact on this analysis in this case, because the parties primarily rely on Tsukamoto's hanger drawings in arguing their cases, and various documents filed in the Related Litigation or in PGR2019-00063 discussing Tsukamoto were presented to the Office during prosecution of the '867 patent. *See, e.g.*, Ex. 1001, code (56) (citing our Final Written Decision in PGR2019-00063, which discusses Tsukamoto); Prelim. Resp. 78–80; *see also* Prelim. Resp. 71–83. Because we determine that the same art was before the Examiner during examination, we need not consider *Becton, Dickinson* factors (b) and (d), and instead turn to the second prong of the *Advanced*

Bionics framework (i.e., *Becton, Dickinson* factors (c), (e), and (f)). *See Ocado Group, PLC v. AutoStore Technology AS*, IPR2021-00398, Paper 10 at 20 (PTAB July 21, 2021).

Becton Dickinson factor (c) considers "the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection." *Becton Dickinson*, Paper 8 at 17. Petitioner argues "*none* of the primary references—Gilb'792, Timony, and Tsukamoto—in the asserted combinations served as the basis for rejection," and "the applicant made no arguments whatsoever during examination against the prior art combinations applied [in the Petition]." Pet. 26–27. Patent Owner does not dispute this. *See* Prelim. Resp. 83–88. The fact that none of these primary references were the basis of rejection weighs against exercising discretion to deny institution under § 325(d). *See Intel Corp. v. Qualcomm Inc.*, IPR2019-00128, Paper 9, 16 (PTAB May 29, 2019).

Becton Dickinson factor (e) considers "whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art." *Becton Dickinson*, Paper 8 at 18. Petitioner argues:

> [T]he Examiner erred during examination by not substantially considering Gilb'792 and Timony. At no point during prosecution were Gilb'792 and Timony discussed by either the Examiner or the applicant. Yet as the Petition demonstrates, both Gilb'792 and Timony provide key teachings, namely a hanger having a connection portion and a channel-shaped portion being in a fixed, spaced apart relation to define a sheath space therein.

Pet. 27. Patent Owner argues "claim charts and fully briefed arguments applying the exact[] same combinations of references *to a related patent* sharing an essentially identical specification and *similar claims* were

presented to the Examiner" (Prelim. Resp. 84 (emphases added)), and concludes that "[r]ather than failing to recognize the relevance of Tsukamoto, Gilb'792, or Timony, the Examiner simply found the Gilb '155/Bundy combination more pertinent than the Tsukamoto/Bundy, Gilb '792/Bundy, and Timony/Bundy prior art combinations" (*id.* at 87). But notably, although the claims at issue in the '510 patent in PGR2019-00063 and in the '867 patent in this case may be "similar" in the sense they share many of the same limitations, the claims in both cases also contain substantively different (and dispositive) limitations.

We agree with Petitioner that the Examiner did not identify the pertinence of Timony's disclosure or of the combined teachings of Gilb '792/Bundy and Timony/Bundy (and Tsukamoto/Bundy), and did not issue a rejection based on such disclosure or combined teachings, and that this constitutes Examiner error. As discussed below in Section III, we determine that Petitioner has established that it is more likely than not that at least claims 1–12, 15–17, and 21–23 of the '867 patent are unpatentable. Accordingly, *Becton Dickinson* factor (e) weighs against exercising discretion to deny institution under § 325(d).

Becton Dickinson factor (f) considers "the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments." *Becton Dickinson*, Paper 8 at 18. Petitioner identifies the declaration of Mr. Fennell as new evidence that was not presented to the Examiner and that warrants consideration. Pet. 28. Patent Owner disagrees, arguing "[P]etitioner fails to identify any meaningful difference between the purported additional facts and evidence presented

with the Petition for this PGR—namely Mr. Fennell's declaration—and Mr. Fennell's prior declarations addressing the very same prior art references with respect to the '510 Patent." Prelim. Resp. 87–88. But as noted above, Mr. Fennell's declaration concerning the '510 patent in PGR2019-00063 was directed to a set of claims with substantively different (and dispositive) limitations as compared to this case.

We agree that the Fennell Declaration in this case, although similar in many respects to declarations filed in PGR2019-00063, contains new, material, non-cumulative evidence. As cited below in our discussion of the prior art, we find the Fennell Declaration probative to issues of patentability and helpful to our consideration of the prior art combinations that were not addressed by the Examiner. Accordingly, *Becton Dickinson* factor (f) weighs against exercising discretion to deny institution under § 325(d).

Upon review of the relevant prosecution history, the art at issue, and the parties' arguments, we find that Petitioner has demonstrated that the Office erred in a manner material to the patentability of the challenged claims in the '867 patent, and that the *Becton Dickinson* factors, when considered as a whole, do not weigh in favor of denying institution of post-grant review under 35 U.S.C. § 325(d). Accordingly, we decline to deny institution under § 325(d).

III. PATENTABILITY

A. Applicable Law

Petitioner challenges the patentability of claims 1–23 of the '867 patent on the grounds that certain claims are indefinite, lack sufficient written description, or are anticipated under 35 U.S.C. § 102 or obvious

under 35 U.S.C. § 103 in light of various references including: Gilb '792, Timony, Tsukamoto, and Bundy. In a post-grant review, the petitioner has the burden from the onset to show *with particularity* why the patent it challenges is unpatentable. *See* 35 U.S.C. § 322(a)(3) (requiring post-grant review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim"); *cf. Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) ("[I]t was [Petitioner's] burden to explain to the Board how [the combination of prior art] rendered the challenged claims unpatentable."). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review).

1. Indefiniteness

Under 35 U.S.C. 112(b), a patent specification "shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor . . . regards as the invention." This is commonly referred to as the definiteness requirement.

The Board applies in post-grant reviews the same indefiniteness standard as used in federal courts and the U.S. International Trade Commission under *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014), and its progeny. USPTO Memorandum, *Approach To Indefiniteness Under 35 U.S.C. § 112 In AIA Post-Grant Proceedings* (Jan. 6, 2021). Under *Nautilus*, "[a] patent is invalid for indefiniteness if its claims, read in light of the patent's specification and prosecution history, fail to inform,

with *reasonable certainty*, those skilled in the art about the scope of the invention." *Nautilus*, 572 U.S. at 898–99 (emphasis added). "[A] patent must be precise enough to afford clear notice of what is claimed, thereby apprising the public of what is still open to them," but the present standard recognizes that "absolute precision is unattainable." *Id.* at 899 (internal quotation marks omitted).

2. Written Description

Under 35 U.S.C. 112(a), a patent specification shall contain a "written description" of the invention. The purpose of the written description requirement is to "'ensure that the scope of the right to exclude, as set forth in the claims, does not overreach the scope of the inventor's contribution to the field of art as described in the patent specification.'" *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 920 (Fed. Cir. 2004) (quoting *Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1345 (Fed. Cir. 2000)). This requirement protects the *quid pro quo* between inventors and the public, whereby the public receives "meaningful disclosure in exchange for being excluded from practicing the invention for a limited period of time." *Enzo Biochem, Inc. v. Gen–Probe Inc.*, 323 F.3d 956, 970 (Fed. Cir. 2002).

To satisfy the written description requirement, the disclosure must reasonably convey to skilled artisans that the inventor possessed the claimed invention as of the filing date. *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). "One does that by such descriptive means as words, structures, *figures*, diagrams, formulas, etc., that fully set forth the claimed invention." *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997) (emphasis added). "The invention is,

for purposes of the 'written description' inquiry, *whatever is now claimed*." *Vas–Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991). Such description need not recite the claimed invention *in haec verba* but must do more than merely disclose that which would render the claimed invention obvious. *Univ. of Rochester*, 358 F.3d at 923; *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566–67 (Fed. Cir. 1997); *see also PowerOasis, Inc. v. T–Mobile USA, Inc.*, 522 F.3d 1299, 1306–07 (Fed. Cir. 2008) (explaining that § 112, ¶ 1 "requires that the written description actually or inherently disclose the claim element").

3. Anticipation

To serve as an anticipatory reference under 35 U.S.C. § 102, "the reference must disclose each and every element of the claimed invention, whether it does so explicitly or inherently." *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009). "The identical invention must be shown in as complete detail *as is contained in the . . . claim*." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989) (emphasis added). The elements must be arranged as required by the claim, "but this is not an '*ipsissimis verbis*' test," i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 832–33 (Fed. Cir. 1990) (citing *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1479 & n.11 (Fed. Cir. 1986)).

4. Obviousness

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

subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when of record, objective evidence of obviousness or non-obviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Secondary considerations may include the following: "commercial success, long felt but unsolved needs, failure of others, etc."[1] *Id.* The totality of the evidence submitted may show that the challenged claims would not have been obvious to one of ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984). When evaluating a combination of teachings, we must also "determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

The Supreme Court has made clear that we apply "an expansive and flexible approach" to the question of obviousness. *Id.* at 415. Whether a patent claiming a combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. To reach this conclusion, however, requires more than a mere

[1] At this stage of the proceeding, Patent Owner has not presented objective evidence of non-obviousness.

showing that the prior art includes separate references covering each separate limitation in a claim under examination. *Unigene Labs., Inc. v. Apotex, Inc*., 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention. *Id.* "To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art, at the time of the effective filing date of the '867 patent, "would have had an education background of, or practical experience providing an equivalent to, a Bachelor of Science in Mechanical Engineering, Structural Engineering or a related/equivalent field and at least four years of work experience in construction connector design/development." Pet. 13 (citing Ex. 1003 ¶ 15). Similarly, Patent Owner contends that the skilled artisan "would have acquired a body of knowledge gained through formal education, or practical experience providing an equivalent to, a Bachelor of Science in Mechanical Engineering, Civil/Structural Engineering, or a related/equivalent field, and

at least four years of work experience in construction connector design/development." Prelim. Resp. 26; *see* Ex. 2001 ¶ 19.

Neither party argues that the outcome of this case would differ based on our adoption of any particular definition of the level of ordinary skill in the art. Although slight differences exist in the formulation of such skill level between the parties, we discern no meaningful differences because none of those differences would affect the outcome of our analysis. Accordingly, we apply the level of skill set forth in the preceding paragraph, which also is consistent with the prior art before us. *See In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (determining that the Board of Patent Appeals and Interferences did not err in concluding that the level of ordinary skill in the art was best determined by the references of record).

C. Claim Construction

We apply the claim construction standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.200(b). Under *Phillips*, claim terms are afforded "their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312. "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* at 1313. "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). Extrinsic evidence is "less significant than the intrinsic record

in determining 'the legally operative meaning of claim language.'" *Phillips*, 415 F.3d at 1317. Only terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999); *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review).

In PGR2019-00063, which involved the '510 patent (an immediate parent of the '867 patent), we construed certain claim limitations also relevant to this case, namely:

(1) "*extend through*": in the context of element A "extend[ing] through" element B, "extend through" means "element A extends into one side and out the other side of element B" (*Simpson Strong-Tie Company Inc. v. Columbia Insurance Company*, PGR2019-00063, Paper 52 (Ex. 2006), 44–45 (PTAB Mar. 11, 2021);

(2) "*configured to extend through*" the sheathing: in the context of "an extension portion extending from the channel-shaped portion and configured to extend through the sheathing," an "extension portion . . . configured to extend through the sheathing" means (or requires structurally) "an extension portion extending from the channel-shaped portion towards the connection portion and defining a space to receive sheathing" (*id.* at 51; *see id.* at 41–52);

(3) "*extending from*": in the context of element B extending from element A, "extending from" means "the beginning of element B's extension is on element A" (*id.* at 110; *see id.* at 106–110); and

(4) "*rigidly fixed*": "rigidly fixed" means "components are connected such that they do not move freely with respect to one another" (*id.* at 98; *see id.* at 96–98). We maintain these same constructions for these terms in this case for the same reasons given in PGR2019-00063. *See* Pet. 14 ("Given that the Specification is identical between the present patent and the '510 Patent (the subject of the Board's prior decision), Petitioner applies the same construction to the same terms in the present claims."); Prelim. Resp. 27 ("For the purposes of this Preliminary Response, [Patent Owner] does not dispute [Petitioner's] constructions of 'extend through,' 'extending from,' and 'rigidly fixed.'"). We note that Petitioner submits "[w]hile the term 'rigidly fixed' does not appear in the '867 Patent claims, the term 'fixed' does," and "[g]iven that the Board's prior construction of 'rigidly fixed' appears to have relied on portions of the shared specification using the word 'fixed,' Petitioner uses the same construction herein for the term 'fixed.'" Pet. 14. To the extent necessary, we further address the meaning of "fixed" (versus "rigidly fixed") in our unpatentability analysis below.

In this case, Petitioner and Patent Owner also collectively advance constructions for four other claim limitations, namely, (1) "planar," as recited in, for example, dependent claim 2 (Pet. 14–15; Prelim. Resp. 52–53); (2) "each extension flange lying in an extension flange plane," as recited in, for example, independent claim 1 (Prelim. Resp. 28–44); (3) "extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing," as recited in, for example, dependent claim 5 (Prelim. Resp. 44–49); and (4) "configured to,"

as recited in, for example, independent claim 1, including as recited in the limitation "configured to extend through" that we already construed in PGR2019-00063 as noted above (Prelim. Resp. 49–52). However, at this stage of the proceeding, the parties have not fully controverted each other's proposed constructions here. Nevertheless, to the extent necessary, we further address claim interpretation in our unpatentability analysis below.

D. Unpatentability of Claims 1–23 Based on Indefiniteness

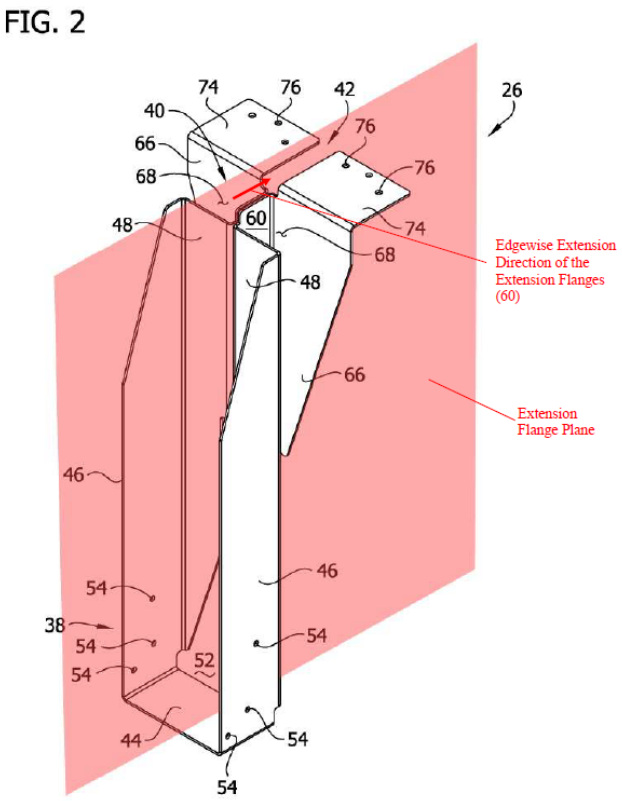
Petitioner contends claims 1–23 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness. Pet. 15–23. Patent Owner opposes Petitioner's contentions. Prelim. Resp. 28–49, 53–66. Based on the record before us, we determine that Petitioner has established that it is more likely than not that claims 5 and 17 (but not claims 1–4, 6–16, and 18–23) are unpatentable under § 112 for indefiniteness, as discussed below.

1. Claims 1–15: "each extension flange lying in an extension flange plane"

Petitioner contends the limitation "each extension flange lying in an extension flange plane" as recited in independent claim 1 is indefinite. Pet. 15–20; Ex. 1001, 12:35–36. In particular, Petitioner argues this limitation "fails to inform with reasonable certainty where the 'extension flange' is located relative to the 'extension flange plane,' specifically which surface of the 'extension flange'—and how much of such surface—lies 'in' the 'extension flange plane.'" Pet. 15. Petitioner further argues "claim 1 defines the location of the 'extension flange plane' based on a *three-dimensional, multiplanar object*—the extension flange—without identifying any particular surface or cross-section on the extension flange," and that

because "[e]ach extension flange has multiple surfaces, which surfaces also include curves," "[t]his renders the claimed location of the 'extension flange plane' ambiguous." Pet. 16; *see* Pet. 17 ("Across its thickness, extension flange 60 lies in an infinite number of imaginary two-dimensional planes.").

Patent Owner argues Petitioner "fails to apply a proper construction of what is means to 'lie in a plane'" in view of claim 1, the Specification, and knowledge of the skilled artisan. Prelim. Resp. 53–54. In particular, Patent Owner argues Petitioner "erroneously asserts, without any claim construction support, that this limitation requires the identification of a specific surface of the extension flange that lies in the extension flange plane, and that the limitation is indefinite because no specific surface of the extension flange is identified by claim 1." *Id.*; *see id.* at 57 ("'[L]ying in a . . . plane' is commonly used in the mechanical arts, including joist hangers, to describe the arrangement of a three dimensional object—particularly an object such as a flange that has a smaller thickness in relation to the dimensions of its major surfaces—relative to a plane." (citing Ex. 2001 ¶ 164)). Patent Owner submits the limitation "each extension flange lying in an extension flange plane" is not indefinite, and 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." *Id.* at 54. Patent Owner argues, based on this proposed construction, "it is readily apparent to [the skilled artisan] where the arrangement of the extension flange plane is relative to the extension flange" (*id.*, citing Ex. 2001 ¶ 158), and to illustrate this provides an annotated version of Figure 2 of the '867 patent, reproduced below.



The above illustration shows Patent Owner's understanding of an extension flange plane applied to Figure 2 of the '867 patent.

Prelim. Resp. 55 (citing Ex. 2001 ¶¶ 159–160); *see* Ex. 1001, Fig. 2.

We agree with Patent Owner's arguments, and turn first to the construction of the limitation at issue.

As noted above, Patent Owner argues *the skilled artisan* would understand the limitation "each extension flange lying in an extension flange plane" to mean "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." Prelim. Resp. 29–30, 54. Patent Owner argues the context of claim 1 itself supports this construction:

> [The skilled artisan] would recognize that when the phrase "lying in a . . . plane" is used in reference to a three dimensional object–in this case the extension flange–the end-to-end extension of the object can be effectively described as being arranged in the plane. Ex. 2001 at ¶ 119. With respect to the extension flange of the claimed hanger, claim 1 identifies this plane in which the end-to-end extension is arranged as an "extension flange plane." *Id.* Claim 1 further provides the starting point ("extending from the channel shaped portion") and ending point ("to the connection portion") of the extent of each of the extension flanges. *Id.* at ¶ 120. Finally, claim 1 provides the orientation of the extension flange plane as being "generally perpendicular to the base plane," thus establishing the orientation of the extension flange relative to the base plane. *Id.* at ¶ 121.

Id. at 29; *see* Ex. 2001 ¶¶ 112–121. Patent Owner argues the Specification supports this construction (Prelim. Resp. 30–32), and submits "it is readily apparent [as shown in annotated Figure 2 reproduced above] that for each extension flange there is an extension flange plane *within the extent of the extension flange* from the channel-shaped portion." *Id.* at 30 (citing Ex. 2001 ¶¶ 122–124) (emphasis added).

In addition, Patent Owner argues "prior art references all show that [Patent Owner's] proposed claim construction for this limitation is consistent with its ordinary usage in the art," and discusses several instances where prior art patents or published patent applications for joist or structural component hangers describe various three-dimensional objects or flanges as lying in planes. Prelim. Resp. 33–43 (citing Ex. 2001 ¶¶ 128–144); *see In re Cortright*, 165 F.3d 1353, 1358 (Fed. Cir. 1999) ("Prior art references may be 'indicative of what all those skilled in the art generally believe a certain term means . . . [and] can often help to demonstrate how a disputed term is

used by those skilled in the art.'") (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1584 (Fed. Cir. 1996)). Notably, for example, a published patent application of Simpson Strong-Tie International, Inc. (Ex. 2015) describes certain three-dimensional aspects of a joist hanger as lying in planes: "The stiffening elements (25) *lie in a plane* substantially parallel with a plane including the side flanges (30, 40)"; and "The return leg(s) *lie in a plane* approximately parallel to a plane including the back flange(s)." Ex. 2015, 10 (emphases added). This Simpson application also claims, for example, "side flanges *in a plane* approximately perpendicular to *planes including* the adjoining side flange and the seat." *Id.* at 15 (emphases added). We find Patent Owner's exposition of various prior art references that describe objects, particularly joist hanger objects, lying in planes supports Patent Owner's proposed claim construction and contradicts Petitioner's indefiniteness argument.

Based on the foregoing and the record before us, we agree with Patent Owner's arguments as supported by the above-cited evidence, and find Patent Owner's proffered construction reasonable. Accordingly, for purposes of institution, we construe the limitation "each extension flange lying in an extension flange plane" to mean "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."

We also note that Petitioner identifies extension flanges lying in extension flange planes in three different asserted prior art references, namely (1) Gilb '792 ("Gilb'792's extension flanges (gusset members 15'/22') maintain the same generally perpendicular relationship with the

base plane as is illustrated in the '867 Patent." (Pet. 39)); (2) Timony ("Timony's retrofit plates 230a/230b maintain the same relationship with the base plane as is illustrated in the '867 Patent." (Pet. 68–69 (annotating Ex. 1008, Fig. 4 to show "Extension Flange Plane")); and (3) Tsukamoto ("Tsukamoto discloses that each extension flange has a surface (connection plates 2D'/3D') that lies in a plane, the planes being generally perpendicular to the base plane." (Pet. 102 (annotating Ex. 1009, Fig. 3 to show "Extension Flange Plane")). Although arguing indefiniteness and obviousness in the alternative, we find in this instance that Petitioner's identification of such planes lends merit to Patent Owner's proposed meaning of an "extension flange lying in an extension flange plane."

Based on the foregoing and the record before us, and given our construction above of the limitation at issue, we are not persuaded that the limitation, namely "each extension flange lying in an extension flange plane," would not inform the skilled artisan, with reasonable certainty, about the scope of the claimed invention. *See Nautilus*, 572 U.S. at 899 ("absolute precision is unattainable"). Accordingly, at this stage of the proceeding, we determine that Petitioner does not demonstrate that it is more likely than not that claims 1–15[2] are unpatentable under 35 U.S.C. § 112(b) for indefiniteness based on this limitation.

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[2] As noted above in Section I, Patent Owner obtained a Certificate of Correction that, in part, added the term "portion" after the last use of the term "channel-shaped" in claim 11. Ex. 2032. We find this change does not affect our indefiniteness analysis here. Thus, we need not and do not decide

2. Claims 16–23: "a channel-shaped portion configured to receive the structural component" and "a base configured to receive an end portion of the structural component thereon to support the structural component"

Petitioner contends the limitations "a channel-shaped portion configured to receive *the structural component*" and "a base configured to receive an end portion of *the structural component* thereon to support *the structural component*" as recited in independent claim 16 are indefinite. Pet. 20–22; Ex. 1001, 13:34–14:18. In particular, Petitioner argues these limitations "lack proper antecedent basis for the term 'structural component,' thereby failing to inform with reasonable certainty what object—a joist or a structural component—is intended to be used with the recited hanger." Pet. 21. According to Petitioner, because claim 16 introduces "a joist" in the preamble and then later introduces "the structural component" without proper antecedent basis, the skilled artisan "would not have been able to determine with reasonable certainty whether the recited hanger is intended to be used with a joist (a specific type of structural member having standard, uniform sizes) or a structural component (a generic term covering various structural members (e.g. a truss) having different shapes and sizes)." Pet. 21–22.

Patent Owner, quoting *Bose Corp. v. JBL, Inc.*, 274 F.3d 1354, 1359 (Fed. Cir. 2001), argues "the failure to provide explicit antecedent basis for

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at this juncture whether the Certificate of Correction, which issued subsequent to the filing of the Petition, has effect in this proceeding.

terms does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite." Prelim. Resp. 59; *see In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971) ("[T]he definiteness of the language employed must be analyzed—not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art."). Patent Owner argues the skilled artisan "would readily ascertain and understand that the term 'a joist' provides antecedent basis for the term 'the structural component' based on the claim language, the specification, and the knowledge possessed by the [skilled artisan]." Prelim. Resp. 60 (citing Ex. 2001 ¶¶ 168–178). Patent Owner argues the skilled artisan "knows a joist is a type of structural component," and highlights that "[Petitioner] even agrees with this point." *Id.* (citing Ex. 2001 ¶ 172; Pet. 21–22 ("a joist (a specific type of structural member[ ])")). Patent Owner argues the skilled artisan would understand "the term 'a joist' provides antecedent basis for the term 'the structural component' as these terms are generally used interchangeably." *Id.* (citing Ex. 2001 ¶ 173); *see id.* at 60–63 (discussing use of "structural component" in the Specification and Petition). We agree with Patent Owner's arguments.

Based on the foregoing and the record before us, we are not persuaded that the limitations "a channel-shaped portion configured to receive the structural component" and "a base configured to receive an end portion of the structural component thereon to support the structural component" would not inform the skilled artisan, with reasonable certainty, about the scope of

the claimed invention. *See Energizer Holdings, Inc. v. Int'l Trade Comm'n*, 435 F.3d 1366, 1370 (Fed. Cir. 2006) ("When the meaning of the claim would reasonably be understood by persons of ordinary skill when read in light of the specification, the claim is not subject to invalidity upon departure from the protocol of 'antecedent basis.'"). Accordingly, at this stage of the proceeding, we determine that Petitioner does not demonstrate that it is more likely than not that claims 16–23 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness based on these limitations.

As noted above in Section I, Patent Owner obtained a Certificate of Correction that, in part, replaces the term "joist" in claim 16 with the term "structural component." Ex. 2032. The Certificate of Correction was filed and issued after Petitioner filed the Petition. Our determination as to Petitioner's indefiniteness challenge is based on the original phrasing of claim 16. As indicated in our analysis, we are currently persuaded that the term "a joist" provides antecedent basis for the term "the structural component." Thus, we would reach the same result regardless of whether the Certificate of Correction has effect in this proceeding. In any event, we need not and do not decide at this juncture whether the Certificate of Correction has effect in this proceeding.

3. Claims 5 and 17: "extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing"

Petitioner contends the limitation "extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing" as recited in dependent claims 5 and 17 is indefinite.

Pet. 22–23; Ex. 1001, 12:53–56, 14:19–22. In particular, Petitioner argues this limitation "fails to inform with reasonable certainty *how* the recited function of maintaining a 2 hour fire resistance rating *further limits the claimed hanger*." Pet. 22 (emphases added). Petitioner argues "the recited function of maintaining a 2 hour fire resistance rating of sheathing *does not clarify what is required by the hanger*, because the fire resistance rating is based on the entire wall assembly, not just the conformance between the sheathing and the hanger." Pet. 23 (citing Ex. 1003 ¶ 86) (emphasis added).

Patent Owner argues the skilled artisan "would recognize that the phrase 'a 2 hour fire resistance rating of the sheathing' as recited in claims 5 and 17 is describing 'a 2 hour fire resistance rating of a wall assembly including the [wall (claim 5)/frame wall (claim 17)] and the sheathing.'" Prelim. Resp. 46 (citing Ex. 2001 ¶ 155); *see id.* at 44–49. Patent Owner argues the skilled artisan "would understand, with reasonable certainty, what the limitation the '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' requires." *Id.* Patent Owner does so without citing any supporting evidence, and without identifying what structural attributes *the claimed hanger* allegedly "requires" to meet this 2-hour fire resistance feature, let alone what the claimed structural difference(s) are between (1) extension flanges configured to extend through sheathing and (2) extension flanges configured to extend through sheathing *while maintaining a 2 hour fire resistance rating of the sheathing*. We find Patent Owner's argument unavailing, and agree with Petitioner (Pet. 22) that the subject limitation, whether interpreted as "while maintaining a 2 hour

fire resistance rating of the sheathing" or "while maintaining a 2 hour fire resistance rating of a wall assembly including the frame wall and the sheathing," fails to inform with reasonable certainty *how* the limitation allegedly *further limits the claimed hanger* (i.e., affects the scope of the claimed *apparatus*).

Accordingly, at this stage of the proceeding, we determine that Petitioner demonstrates that it is more likely than not that claims 5 and 17 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness.

In addition, as noted above in Section I, Patent Owner obtained a Certificate of Correction that, in part, amended the phrase "while maintaining a 2 hour fire resistance rating of the sheathing" in claims 5 and 17 to instead recite "while maintaining a 2 hour fire resistance rating of *a wall assembly including the frame wall and* the sheathing." Ex. 2032 (emphasis added). As discussed above, we find this change does not affect our indefiniteness analysis here. Thus, we need not and do not decide at this juncture whether the Certificate of Correction, which issued subsequent to the filing of the Petition, has effect in this proceeding.

E. Unpatentability of Claims 5 and 17 Based on Lack of Written Description

Petitioner contends claims 5 and 17 also are unpatentable under 35 U.S.C. § 112(a) for lack of written description. Pet. 24–25 ("[T]he subject matter of dependent claims 5 and 17 is not disclosed expressly or inherently in the '867 Patent specification, and thus lack[s] written description support."). Patent Owner opposes Petitioner's contentions. Prelim. Resp. 44–49, 67–70. Based on the record before us, we determine

that Petitioner has established that it is more likely than not that claims 5 and 17 are unpatentable under § 112 for lack of written description.

"Sufficiency of written description is a question of fact." *Gen. Hosp. Corp. v. Sienna Biopharmaceuticals, Inc.*, 888 F.3d 1368, 1371 (Fed. Cir. 2018). Whether a patent claim satisfies the written description requirement depends on whether the description "clearly allow[s] persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Vas–Cath*, 935 F.2d at 1562–63 (internal quotation marks omitted) (quoting *In re Gosteli*, 872 F.2d 1008, 1012 (Fed. Cir. 1989)). But "one cannot disclose a forest in the original application, and then later pick a tree out of the forest and say here is my invention. In order to satisfy the written description requirement, the blaze marks directing the skilled artisan to that tree must be in the originally filed disclosure." *Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1326–27 (Fed. Cir. 2000).

Dependent claims 5 and 17 each recite "the first and second extension flanges are *configured to* extend through the sheathing *while maintaining a 2 hour fire resistance rating of the sheathing*." Ex. 1001, 12:53–56, 14:19–22 (emphases added). Petitioner argues "nowhere does the '867 patent disclose that the sheathing alone has a 2 hour fire resistance rating, such that there is no support for the claimed term 'maintaining a 2 hour fire resistance rating of the sheathing.'" Pet. 24 (citing Ex. 1003 ¶¶ 88–90). Petitioner acknowledges "[t]he specification *only ever* refers to a 2 hour fire resistance rating of the 'wall assembly,' *not the sheathing itself*," and that "other materials and wall components [are] needed to achieve the desirable fire

resistance rating of the entire assembly, *even using the '867 Patent's own hanger*." Pet. 24 (emphases added).

Patent Owner argues Petitioner "fails to consider how the [skilled artisan] would construe this limitation in view of the specification and knowledge possessed by the [skilled artisan]." Prelim. Resp. 70 (citing Ex. 2001 ¶ 186). Specifically, Patent Owner argues the skilled artisan ["would understand 'wherein the first and second extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing' within the context of the '867 Patent to mean 'wherein the first and second extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of a wall assembly including the wall[/frame wall] and the sheathing.'" *Id.* (citing Ex. 2001 ¶ 187); *see id.* at 48 ("[The skilled artisan] would recognize the recitation of a 2 hour fire rating is not referring to a property of the sheathing alone, but rather as a property of the wall assembly that the sheathing is a part of."); *see also id.* at 44–49. Patent Owner argues that under this construction the skilled artisan "would understand that the specification of the '867 Patent reasonably conveys that the inventor was in possession of the claimed subject matter." *Id.* at 70.

We agree with Patent Owner's claim construction argument that, in the context of the '867 patent, *the skilled artisan* would interpret the phrase "while maintaining a 2 hour fire resistance rating of the sheathing" to mean "while maintaining a 2 hour fire resistance rating of a wall assembly including the frame wall and the sheathing," for the reasons given by Patent Owner (*see* Prelim. Resp. 44–49). We also agree with Patent Owner that

Petitioner concedes the '867 patent describes fire ratings *only* in the context of the entire wall assembly (Pet. 24), which includes sheathing ("the only part of the wall assembly affected by the hanger" (Prelim. Resp. 44)), and that this supports Patent Owner's proposed claim construction here.

But this does not end the indefiniteness inquiry before us. Petitioner challenges whether the Specification of the '867 patent discloses the full scope of dependent claims 5 and 17, and in particular, whether the Specification provides written description support for extension flanges "*configured to* extend through the sheathing *while maintaining a 2 hour fire resistance rating of the sheathing*." *See* Pet. 24–25. For the same reasons we determined the subject limitation fails to inform with reasonable certainty *how* the limitation allegedly *further limits the claimed hanger* (i.e., affects the scope of the claimed *apparatus*) (*see* Section III.D.3, *supra*), based on the record before us, we are persuaded that the Specification does not sufficiently describe *how* the claimed extension flange structure is "configured to" extend through sheathing "while maintaining a 2 hour fire resistance rating of the sheathing," particularly where sheathing is not even required by the claims and the claims are not directed to a method of installation. Indeed, claim 1, from which claim 5 depends, is an apparatus claim directed to "[a] hanger"—just the hanger—and there is no evidence of record that the structure of that hanger, as one may find for sale in a local home center, includes a "structural component" (like a joist), a "wall," or "sheathing" (like gypsum board), mounted on a wall. *See* Ex. 1002, 347, 353 ("[T]o clarify the claim is drawn solely to the hanger . . . and not the combination of the hanger and frame wall."). Similarly, in the Related

Litigation, Patent Owner accuses certain of Petitioner's hangers—just the hangers—of infringing the related '510 patent with similar claims to a "hanger." *See* Ex. 1031. Having reviewed the Specification, we find no description in the Specification, and the parties do not direct us to any, disclosing what structural features of the extension flanges (let alone the full scope of such features) are required for such flanges not only to be configured to extend through sheathing, but further configured to extend through sheathing "while maintaining a 2 hour fire resistance rating of the sheathing."

Accordingly, at this stage of the proceeding, we determine that Petitioner demonstrates that it is more likely than not that claims 5 and 17 are unpatentable under 35 U.S.C. § 112(a) for lack of written description.

In addition, as noted above in Sections I and III.D.3, Patent Owner obtained a Certificate of Correction that, in part, amended the phrase "while maintaining a 2 hour fire resistance rating of the sheathing" in claims 5 and 17 to instead recite "while maintaining a 2 hour fire resistance rating of *a wall assembly including the frame wall and* the sheathing." Ex. 2032 (emphasis added). As discussed above, we find this change does not affect our written description analysis here. Thus, we need not and do not decide at this juncture whether the Certificate of Correction, which issued subsequent to the filing of the Petition, has effect in this proceeding.

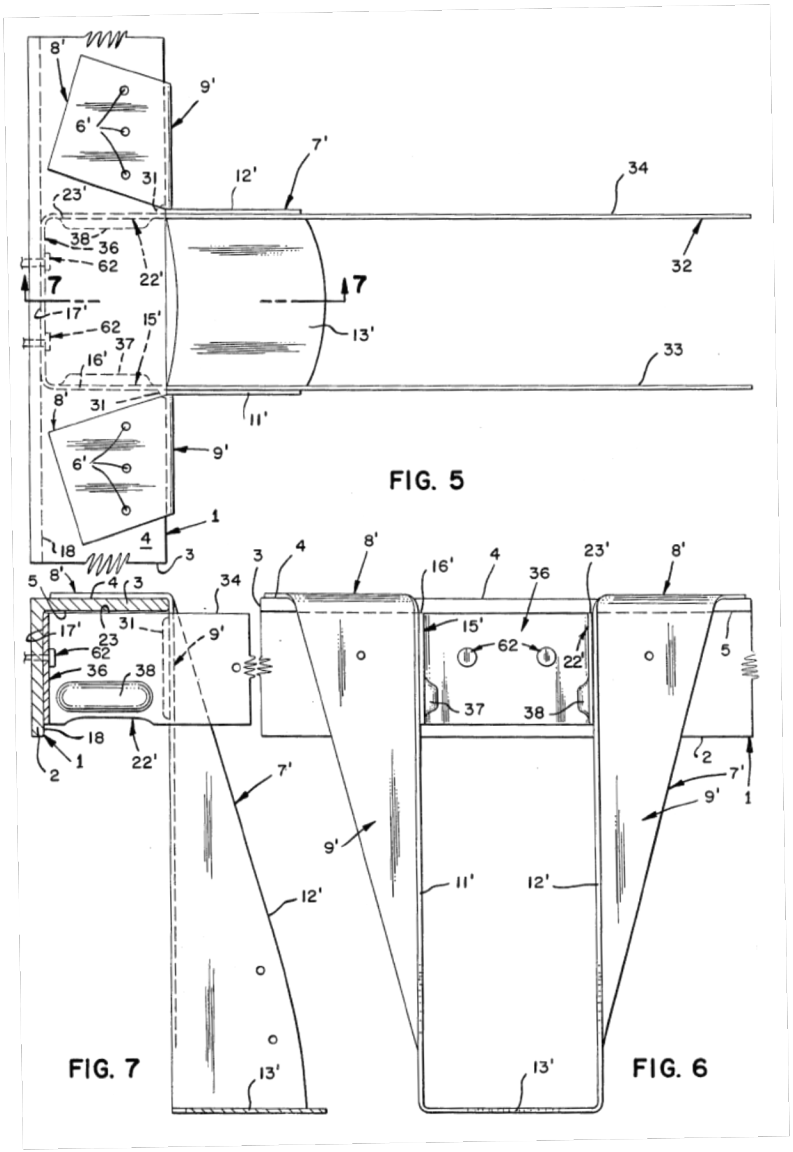
F. Obviousness of Claims 1–12, 15–17, and 21–23 Over Gilb '792 and Bundy[3]

Petitioner contends claims 1–12, 15–17, and 21–23 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Gilb '792 (Ex. 1035) and Bundy (Ex. 1007). Pet. 13–15, 28–59. Patent Owner opposes Petitioner's contentions. Prelim. Resp. 49–52, 88–94. Based on our review of the record before us, we determine that Petitioner has established that it is more likely than not that claims 1–12, 15–17, and 21–23 are unpatentable as obvious over the combination of Gilb '792 and Bundy, as discussed below. We turn first to an overview of Gilb '792 and Bundy.

1. Overview of Gilb '792

Gilb '792 generally is directed to a "gusset metal ledger hanger" that attaches to a metal ledger, as shown, for example, in Figures 5, 6, and 7, reproduced below. Ex. 1035, 2:29–30, 3:22–55.

[3] As noted above in Section I, a Certificate of Correction was filed and issued after Petitioner filed the Petition. The Certificate of Correction concerns claims 5, 11, 16, and 17 of the '867 patent. Our determinations as to Petitioner's prior art grounds of unpatentability are based on the original phrasing of these claims. As discussed in Sections III.D and III.E above, we would reach the same results regardless of whether the Certificate of Correction has effect in this proceeding. In any event, we need not and do not decide at this juncture whether the Certificate of Correction has effect in this proceeding.



Figures 5, 6, and 7 of Gilb '792 are top plan, front elevational, and partial cross sectional (line 7—7) views of the same hanger.

Id. at 2:7–12. Petitioner contends that Gilb '792 discloses "each and every structural element listed in claim 1 of the '867 Patent, but does not explicitly disclose that the space between its hanger's channel-shaped portion and back flange is sized and shaped to receive sheathing therein," for which Petitioner relies on Bundy. Pet. 28.

2. Overview of Bundy

Bundy generally is directed to "a joist hanger adapted to secure a joist to a header or other support member with a first drywall panel between the back of the joist hanger and the front of the header," as shown, for example, in Figure 1, reproduced below. Ex. 1007, 1:5–11.

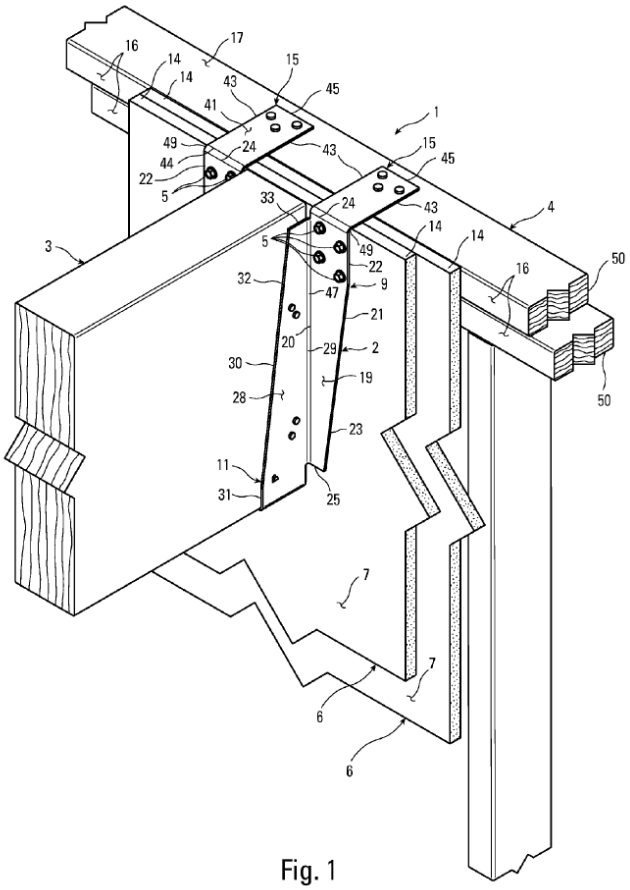


Figure 1 of Bundy is an upper right perspective view of a connection formed in which the joist hanger has a pair of top flanges.

Id. at 3:7–9, 3:55–67. Bundy discloses that "[t]he one or more panels 6 preferably are drywall panels 6," and explains "[c]ommon panel thicknesses

are 1/2-inch and 5/8-inch," and "[i]n the present invention, *two layers of 5/8-inch drywall is preferred*." *Id.* at 5:10–22 (emphasis added).

We further discuss below the disclosures of Gilb '792 and Bundy in connection with the parties' arguments.

3. Independent Claim 1

a) "A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:"

The preamble of claim 1 recites "[a] hanger *for connecting a structural component to a wall adapted to have sheathing mounted thereon*." Ex. 1001, 12:15–17 (emphasis added). Gilb '792 discloses a "gusset metal ledger hanger 7'" "adapted for holding a structural beam member" to a wall. Ex. 1035, 3:22–38, Figs. 5, 6, 7; *see* Pet. 8 (citing Ex. 1003 ¶ 37; Ex. 1035, Abstract, 1:5–11, 3:22–50). Petitioner argues that the phrase "for connecting a structural component to a wall adapted to have sheathing mounted thereon" is not a limitation, but rather "recites an intended use of the claimed invention [i.e., a hanger], satisfied by any prior art structure capable of performing the intended use." Pet. 30 (citing, in part, Ex. 1003 ¶¶ 46, 98, 99).

"Whether to treat a preamble as a limitation is a determination 'resolved only on review of the entire[] . . . patent to gain an understanding of what the inventors actually invented and intended to encompass by the claim.'" *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (quoting *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989)) (alterations in original).

"In general, a preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim." *Id*. (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)). "Conversely, a preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.'" *Id*. (quoting *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997)). "No litmus test defines when a preamble limits claim scope." *Id*. (citing *Corning Glass*, 868 F.2d at 1257).

In this case, we are persuaded that the above preamble phrase is not limiting, because the patentee recites a structurally complete invention in the body of claim 1, and uses the preamble only to state a purpose or intended use for the claimed invention. Claim 1 is an apparatus claim directed to "[a] hanger"—just the hanger—and, as noted above, there is no evidence of record that the structure of that hanger, as one may find for sale in a local home center, includes a "structural component" (like a joist), a "wall," or "sheathing" (like gypsum board), mounted on a wall. *See* Ex. 1002, 347, 353 ("[T]o clarify the claim is drawn solely to the hanger . . . and not the combination of the hanger and frame wall."). Indeed, in the Related Litigation, where claim 1 of the related '510 patent also recites this same hanger preamble, Patent Owner accuses certain of Petitioner's hangers—just the hangers—of infringing the '510 patent. *See* Ex. 1031. If a hanger, standing separate from any joist, wall, or installed sheathing, may fall within the scope of such a claim for infringement purposes, then a prior disclosure of the structure of such a hanger (alone) may anticipate or in combination

with other prior art render obvious that claim. *See Int'l Seaway Trading Corp. v. Walgreens Corp.*, 589 F.3d 1233, 1239 (Fed. Cir. 2009) (citing *Peters v. Active Mfg. Co.*, 129 U.S. 530, 537 (1889)) ("[I]t has been well established for over a century that the same test must be used for both infringement and anticipation," and "[t]his general rule derives from the Supreme Court's proclamation 120 years ago in the context of utility patents: '[t]hat which infringes, if later, would anticipate, if earlier.'").

For the reasons expressed above, and based on the record before us, we determine that the preamble phrase "for connecting a structural component to a wall adapted to have sheathing mounted thereon" in claim 1 is not a limitation, and find Gilb '792 discloses a "hanger," as recited in claim 1.

> b) *"a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;"*

Petitioner contends Gilb '792 discloses a channel shaped portion (e.g., stirrup members 11'/12' and depending flanges 9') configured to receive the structural component (e.g., structural beam), as shown, for example, in Figures 5, 6, and 7, reproduced above. Pet. 31 (citing Ex. 1003 ¶¶ 101–102; Ex. 1035, 3:29–31 ("First and second stirrup members 11' and 12' are attached to the depending flanges 9' and are adapted for holding a structural beam member . . . .")). Petitioner contends Gilb '792 discloses the channel-

shaped portion (stirrup members 11'/12' and depending flanges 9') includes a base (seat member 13') configured to receive an end portion of the structural component (beam) thereon to support the structural component. Pet. 32 (citing Ex. 1003 ¶¶ 103–104; Ex. 1035, 3:51–52). Petitioner contends Gilb '792 discloses the base (seat member 13') has an upper surface (its two-dimensional top surface) configured to engage the structural component, and that the upper surface of the base lies in a base plane. Pet. 32–33 (citing Ex. 1003 ¶¶ 105–106; Ex. 1035, 3:51–52).

For the reasons stated in the Petition at pages 31–33, and based on the record before us, we find Petitioner sufficiently establishes that Gilb '792 teaches this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

> c) *"a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane, the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and"*

Petitioner contends Gilb '792 discloses a connection portion (base 36) configured for attachment to the wall. Pet. 33 (citing Ex. 1003 ¶¶ 107–110; Ex. 1035, 3:43–44; 3:47–50 ("First and second gusset members 15' and 22' are held in position by shooting nail means 62 through base 36 of the U-shaped member into lower leg 2 of the metal ledger.")). Petitioner argues the skilled artisan "would have understood that Gilb'792's base 36 corresponds to the recited 'connection portion,' and that nail means 62 extend past the ledger into the wall." Pet. 33 (citing Ex. 1003 ¶¶ 107–108;

Ex. 1035, Figs. 5, 6); *see* Ex. 1001, Fig. 7. Petitioner contends Gilb '792 discloses that the connection portion (base 36) includes a back flange having an upper edge (i.e., the very top of the back flange) and that the back flange extends downward from the upper edge in a direction generally toward the base plane. Pet. 35 (citing Ex. 1003 ¶¶ 111–112; Ex. 1035, 3:39–49). Petitioner contends Gilb '792 discloses that the connection portion (base 36) and channel-shaped portion (stirrup members 11'/12' with flanges 9') are in a fixed, spaced apart relation relative to one another, noting that the "elements are welded sheet metal and thus are fixed." Pet. 35–36 (citing Ex. 1003 ¶¶ 113–114; Ex. 1035, 3:39–44).

For the reasons stated in the Petition at pages 33–36, and based on the record before us, we find Petitioner sufficiently establishes that Gilb '792 teaches this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

d) "an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion,"

Petitioner contends Gilb '792 discloses an extension portion (gusset members 15'/22') including first and second extension flanges (gusset members 15'/22') extending from the channel-shaped portion (stirrup members 11'/12') to the connection portion (base 36). Pet. 36–37 (citing Ex. 1003 ¶¶ 115–117; Ex. 1035, 3:[31]–42 ("A first gusset member 15' is . . . directly connected to stirrup member 11' by weld 31."), Figs. 5–7). Petitioner argues the skilled artisan "would have understood that the Gilb'792's gusset members 15'/22' (along with weld 31), correspond to the

recited first and second extension flanges." Pet. 37 (citing Ex. 1003 ¶¶ 115–116).

For the reasons stated in the Petition at pages 36–37, and based on the record before us, we find Petitioner sufficiently establishes that Gilb '792 teaches this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

> e) *"each extension flange being configured to extend through the sheathing, each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall"*

This limitation recites, *inter alia*, that the "extension portion," and more specifically "each extension flange" thereof, is "*configured to extend through the sheathing* [mounted on a wall];" and that "the back flange and the channel-shaped portion defin[e] a *sheath space sized and shaped to receive the sheathing therein* so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing *when* the hanger and sheathing *are installed* on the wall." Ex. 1001, 12:32–41 (emphases added). But, as argued by Petitioner, claim 1 is directed to and claims only "[a] hanger." *See* Pet. 30 ("[T]he limitation 'for connecting a structural component to a wall adapted to have sheathing mounted thereon' recites an intended use of the claimed invention."), 4–5

("[T]he claimed hanger of the '867 Patent is not limited to a specific wall configuration."). Based on the current record at this stage of the proceeding, we find the claimed hanger's *structure* does not include a "wall." It does not include "sheathing." And it does not include "sheathing" between certain portions of the hanger. In addition, claim 1 recites no limitation on the size of any sheathing cutout necessary to allow a hanger's extension portion to "extend through the sheathing." In other words, claim 1 recites a hanger having certain structural features, and would cover a hanger having the structural limitations of claim 1 whether that hanger were on a shelf in a hardware store or installed as shown, for example, in Figure 1 of the '867 patent (or even incorrectly installed). Nevertheless, as in PGR2019-00063, the parties continue to dispute whether the prior art discloses extension flanges configured to extend through the sheathing and a sheath space sized and shaped to receive the sheathing therein.

(1) "each extension flange being configured to extend through the sheathing"

Petitioner argues that although Gilb '792 "does not explicitly disclose extending gusset members 15'/22' through sheathing," the skilled artisan "would have found it obvious to use Gilb'792's hanger 7' with sheathing." Pet. 38 (citing Ex. 1003 ¶ 119). Petitioner relies on "Bundy's use with sheathing," and argues this "would simply have been applying a known technique . . . to a known device (Gilb'792's hanger), yielding the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby 'cover[ing] and protect[ing] the structural members of a building.'" Pet. 38 (citing Ex. 1007, 5:18–20; Ex. 1003 ¶ 119); *see* Pet. 28–

29. Patent Owner, on the other hand, argues that extension flanges in the prior art must "be specifically 'meant to' or 'designed to' extend into one side and out of the other side of the sheathing, not simply be[] 'capable of doing so.'" Prelim. Resp. 89. Patent Owner argues "neither Gilb '792, nor Bundy, disclose a hanger with an extension flange that is 'designed to' or 'meant to' extend through sheathing." *Id.* at 90 (citing Ex. 2001 ¶¶ 195–196) ("Gilb '792 is entirely silent as to the use of the disclosed hanger with sheathing."); *see id.* at 49–52, 88–94. We find Patent Owner's argument unavailing.

First, we addressed Patent Owner's proposed construction of "configured to," along with its arguments and cited support, in PGR2019-00063, and found them unpersuasive. *See* Ex. 2006, 39–52. We continue to find them unpersuasive in the context of the same apparatus—a hanger—at issue in this proceeding. In PGR2019-00063, we construed "configured to extend through the sheathing," in the context of "an extension portion extending from the channel-shaped portion and configured to extend through the sheathing," to mean (or require structurally) "an extension portion extending from the channel-shaped portion towards the connection portion and defining a space to receive sheathing." Ex. 2006, 51; *see id.* at 41–52. In this case, we maintain the same construction, and thus construe "each extension flange being configured to extend through the sheathing" to mean (or require structurally) "each extension flange defining a space to receive sheathing."

Second, Patent Owner does not explain why a hanger having the *structural* features recited in claim 1, particularly the recited "extension

portion including first and second extension flanges extending from the channel-shaped portion to the connection portion" such as disclosed in Gilb '792 (*see* Pet. 36–37 (citing Ex. 1003 ¶¶ 115–117; Ex. 1035, 3:[31]–42, Figs. 5–7 (gusset members 15'/22'))), would not necessarily be *configured to* extend through sheathing mounted on a wall (and provide a sheath space sized and shaped to receive the sheathing therein), regardless of whether anyone installs sheathing around the extension portion. Indeed, in the Related Litigation, Patent Owner accuses certain of Petitioner's hangers—just the hangers—of infringing the related '510 patent. *See* Ex. 1031. As noted above, if a hanger, standing separate from any wall or installed sheathing, may fall within the scope of a claim for infringement purposes, then a prior disclosure of such a hanger may anticipate or in combination with other art render obvious that claim. *See Int'l Seaway*, 589 F.3d at 1239 (citing *Peters*, 129 U.S. at 537). In this case, Patent Owner repeatedly argues that the claimed extension flanges are "specifically 'meant to' or 'designed to' extend into one side and out of the other side of the sheathing," but does not explain what that means structurally for the claimed apparatus (hanger), i.e., how the skilled artisan would know *based only on the structure of an alleged extension flange* whether it is "meant to" or "designed to" extend through sheathing. *See* Prelim. Resp. 27, 49–52, 88–94.

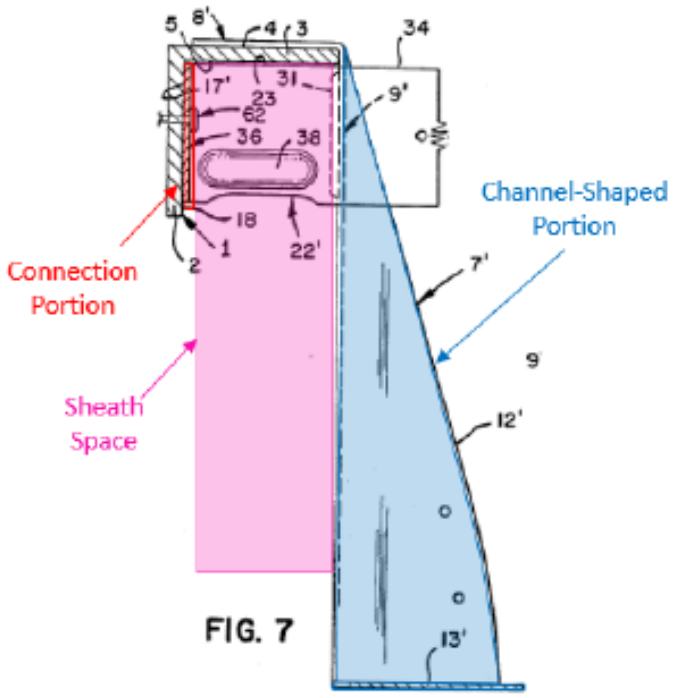
We further address Patent Owner's dispute over the "use" of Gilb '792 with sheathing in connection with our analysis of the "sheath space" limitation below. *See* Section III.F.3.e.3, *infra*.

> *(2) "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane"*

Petitioner contends the extension flanges (gusset members 15'/22') disclosed in Gilb '792 "maintain the same generally perpendicular relationship with the base plane as is illustrated in the '867 Patent." Pet. 39 (citing Ex. 1003 ¶¶ 121–122; Ex. 1035, Fig. 7 (annotated)). Patent Owner does not contend otherwise at this stage of the proceeding.

> *(3) "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall"*

Petitioner contends Gilb '792 discloses positioning base 36 (the back flange) at one end of gusset members 15'/22' and welding stirrup members 11'/12' (the channel-shaped portion) at opposite ends of gusset members 15'/22'. Pet. 40 (citing Ex. 1035, 3:31–44; Ex. 1003, 59). Petitioner argues "gusset members 15'/22' define a space that would permit sheathing to be inserted so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall," as shown, for example, in Petitioner's annotated version of Figure 7, reproduced below. Pet. 40–41 (Ex. 1003, 59; Ex. 1035, 3:23–55).



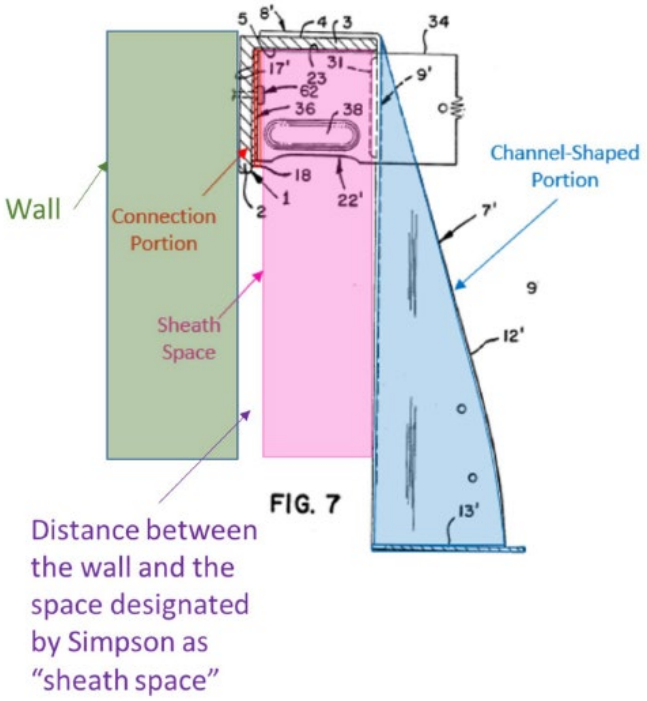
The above illustration shows Figure 7 of Gilb '792 annotated by Petitioner to show a "sheath space."

Ex. 1035, Fig. 7 (annotated); Pet. 41.

Petitioner argues, "[w]hile Gilb'792 does not explicitly disclose installing sheathing between Gilb'792's stirrup members 11'/12' and base 36, [the skilled artisan] would have found it obvious to size the length of Gilb'792's gusset members 15'/22' to define a sheathing space therein for receiving sheathing based on Bundy." Pet. 41 (citing Ex. 1003 ¶ 123). Petitioner argues Bundy discloses "installing two layers of 5/8" sheathing between a hanger's channel shaped portion (Bundy's side members 11) and wall frame." Pet. 41 (citing Ex. 1007, 5:18–20; Ex. 1003 ¶ 123).

Patent Owner argues, not only is Gilb '792 "entirely silent as to the use of the disclosed hanger with sheathing," but "the intended use of the

Gilb '792 hanger would be impractical with extending the gusset members 15'/22' through sheathing," as shown, for example, in Patent Owner's annotated version of Figure 7, reproduced below. Prelim. Resp. 90 (citing Ex. 2001 ¶¶ 196–197).



The above illustration shows Figure 7 of Gilb '792 annotated by Patent Owner to show a gap between a wall and alleged "sheath space."

Ex. 1035, Fig. 7 (annotated); Prelim. Resp. 92; Ex. 2001 ¶ 200.

According to Patent Owner, "the presence of the ¼ inch thick ledger (2) together with the 7-gauge base (36) would separate the sheathing from the wall by nearly half an inch," and the skilled artisan "would readily recognize that sheathing is secured flush to the wall, not floating in space approximately half an inch away from the wall." Prelim. Resp. 92 (citing Ex. 2001 ¶¶ 202–203). Patent Owner argues "[t]here is little doubt that the

gusset members (15'/22') of the Gilb '792 hanger were not designed to or meant to extend through sheathing," because "the installation of sheathing (to the extent that sheathing would be installed at all) would be stopped below the ledger and gusset members (15'/22')." *Id.* at 92–93 (citing Ex. 2001 ¶¶ 204–206). Patent Owner submits that "it would require a significant deviation from the intended application of the Gilb '792 hanger (e.g. omitting the metal ledger) to make the hanger compatible with installing sheathing up to and around the gusset members (15'/22')." *Id.* at 93 (citing Ex. 2001 ¶ 206). Based on the record before us and at this stage of the proceeding, we find Patent Owner's argument unavailing.

Although Patent Owner has selectively drawn a "wall" in the above annotated version of Figure 7 of Gilb '792 (which does not appear in the Gilb '792 figures) and alleged that Petitioner's "sheath space" leaves an unworkable gap between that sheath space and the wall, Patent Owner does not address readily apparent resolutions to its alleged problem. For example, Patent Owner alleges that the unworkable gap is about 1/2", but applying an initial 1/2" sheathing to the wall up to the ledger and then applying sheathing in Petitioner's designated "sheathing space" would appear to moot Patent Owner's alleged problem with using the Gilb '792 hanger with sheathing. We note that claim 1 is a "comprising" claim, and does not preclude elements in addition to those required by the claim. Similarly, claim 1 does not preclude other means for accounting for such an alleged gap, like intermediary furring strips applied to the wall, to which sheathing in the "sheathing space" is applied. Still further, had Patent Owner drawn the "wall" as a concrete wall purposely formed with a 1/2" recess to receive the

ledger, then no such alleged gap would exist, which again would appear to moot Patent Owner's alleged problem with using the Gilb '792 hanger with sheathing. Nevertheless, we encourage the parties to further brief this issue in their respective trial briefs.

(4) Reason to Combine Gilb '792 and Bundy

Petitioner argues Gilb '792 "already discloses a space between its back flange (base 36 having side face 17') and its channel-shaped portion (stirrup members 11'/12'), the width of the space defined by gusset members 15'/22'." Pet. 28–29 (citing Ex. 1003 ¶ 92). Petitioner argues the skilled artisan "would have found it obvious to receive sheathing between Gilb'792's stirrup members 11'/12' and base 36, as Bundy teaches receiving sheathing between a channel-shaped portion of a hanger and the wall." Pet. 29 (Ex. 1003 ¶¶ 93–94). Petitioner argues "it would have been obvious to optimize the size of the spacing between Gilb'792's stirrup members 11'/12' and base 36 to accommodate two layers of 5/8" thick sheathing according to the size preference described by Bundy." *Id.* Petitioner argues "[t]his modification would have been nothing more than applying a known technique (Bundy's spacing to accommodate two sheets of 5/8" sheathing) to a similar device (Gilb'792's space defined by gusset members 15'/22') to obtain the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby 'protect[ing] the structural members of a building.'" Pet. 29 (citing Ex. 1007, 5:18–20; Ex. 1003 ¶ 94).

Petitioner also argues the skilled artisan "would have had an expectation of success in defining a sheath space between Gilb'792's stirrup members 11'/12' and base 36, because Gilb'792's and Bundy's hangers are

used for similar purposes (e.g., hanging a structural object to a wall) and Gilb'792's stirrup members 11'/12', flanges 9', and base 36 already define a space therebetween." Pet. 41 (citing Ex. 1003 ¶ 123; Ex. 1007, 4:46–51; Ex. 1035, 1:5–11, 3:23–55); *see* Pet. 29 (citing Ex. 1003 ¶ 95; Ex. 1007, 4:47–51; Ex. 1035, 2:33–58).

Except as noted above concerning the alleged "unworkable gap" (between the wall and alleged "sheath space") formed by placing Bundy's sheathing in the "sheath space" of the Gilb '792 hanger as identified by Petitioner, Patent Owner does not otherwise challenge Petitioner's reason(s) to combine Gilb '792 and Bundy at this stage of the proceeding. Instead, Patent Owner appears to concede that, but for the alleged "unworkable gap," the combination of Gilb '792 and Bundy would teach extension flanges that extend through sheathing and otherwise satisfy the limitations of claim 1. *See* Prelim. Resp. 91 ("Further annotating Ex. 1035, FIG. 7 . . . *demonstrates the installation* were sheathing installed overlapping the ledger and base 36 . . . of the hanger *such that the gusset members 15'/22' would extend through the sheathing*." (emphases added)).

(5) Summary

For the reasons stated in the Petition at pages 37–42, Petitioner sufficiently establishes that the combination of Gilb '792 and Bundy teaches this limitation. We are persuaded that Petitioner's cited evidence provides sufficient rational reasons for purposes of institution to combine Gilb '792 and Bundy to arrive at this limitation.

f) Conclusion

At this stage of the proceeding and based on the record before us, we are persuaded that Petitioner's cited evidence provides sufficient rational reasons for purposes of institution to combine Gilb '792 and Bundy with a reasonable expectation of success, and sufficiently supports Petitioner's contention that independent claim 1 is unpatentable as obvious over the combination of Gilb '792 and Bundy.

To the extent that Patent Owner attempts to refute Petitioner's obviousness showing based on allegedly different objectives or purposes of the systems of Gilb '792, Bundy, and the '867 patent (*see, e.g.*, Prelim. Resp. 90 ("Gilb '792 is entirely silent as to the use of the disclosed hanger with sheathing."), 93 ("intended application of the Gilb '792 hanger")), we are not persuaded. It is sufficient that the skilled artisan would have had a rational reason to combine Gilb '792 and Bundy to arrive at the invention of claim 1, even if the particular purpose of the invention of claim 1 is different from that of the references. *See In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983) (citing *In re Gershon*, 372 F.2d 535, 538–39 (CCPA 1967)); *In re Graf*, 343 F.2d 774, 777 (CCPA 1965) ("Obviousness is not to be determined on the basis of purpose alone."). The prior art also need not have the same or similar utility as the patented invention. *In re Dillon*, 919 F.2d 688, 692–93 (Fed. Cir. 1990) (en banc) (overruling *In re Wright*, 848 F.2d 1216 (Fed. Cir. 1988).

Accordingly, at this stage of the proceeding, we are persuaded that Petitioner has shown that it is more likely than not that independent claim 1

would have been obvious over the combined teachings of Gilb '792 and Bundy.

4. Independent Claim 16

Petitioner contends independent claim 16 would have been unpatentable as obvious over the combination of Gilb '792 and Bundy. Pet. 53–58. The Petition provides a detailed assessment of claim 16, with references to the Petition's analysis of claim 1, disclosures in Gilb '792 and Bundy, and the declaration testimony of Mr. Fennell. *Id.* At this stage of the proceeding, Patent Owner does not present any separate arguments that are distinct to claim 16. Rather, Patent Owner generally states the view that the alleged deficiencies in the Petition with respect to claim 1 also are applicable to claim 16. *See generally* Prelim. Resp. 49–52, 88–94. As discussed above, we are persuaded that the cited evidence sufficiently supports Petitioner's contention that independent claim 1 is unpatentable as obvious over the combination of Gilb '792 and Bundy. For the reasons set forth in the Petition (Pet. 53–58), we also are persuaded that the current record sufficiently supports Petitioner's challenges to independent claim 16 for purposes of institution.

5. Dependent Claims 2–12, 15, 17, and 21–23

Petitioner contends claims 2–12, 15, 17, and 21–23, which depend directly or indirectly from independent claims 1 or 16, would have been unpatentable as obvious over the combination of Gilb '792 and Bundy. Pet. 42–53, 58–59. The Petition provides a detailed assessment of these claims, with references to the Petition's analysis of claims 1 and 16, disclosures in Gilb '792 and Bundy, and the declaration testimony of

Mr. Fennell. *Id.* At this stage of the proceeding, Patent Owner does not present any separate arguments that are distinct to any of these claims. Rather, Patent Owner generally states the view that the alleged deficiencies in the Petition with respect to claim 1 also are applicable to these challenged claims. *See generally* Prelim. Resp. 49–52, 88–94. As discussed above, we are persuaded that the cited evidence sufficiently supports Petitioner's contention that independent claims 1 and 16 are unpatentable as obvious over the combination of Gilb '792 and Bundy. For the reasons set forth in the Petition (Pet. 42–53, 58–59), we also are persuaded that the current record sufficiently supports Petitioner's challenges to dependent claims 2–12, 15, 17, and 21–23 for purposes of institution.

6. Summary

For the foregoing reasons, and the reasons stated in the Petition (Pet. 13–15, 28–59), we determine that Petitioner demonstrates that it is more likely than not that claims 1–12, 15–17, and 21–23 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Gilb '792 and Bundy.

G. Anticipation of Claims 1–4, 6, 10, and 11 by Timony

Petitioner contends claims 1–4, 6, 10, and 11 are unpatentable under 35 U.S.C. § 102 as anticipated by Timony (Ex. 1008). Pet. 13–15, 59–74. Patent Owner opposes Petitioner's contentions. Prelim. Resp. 49–52, 94–100. Based on our review of the record before us, we determine that Petitioner has established that it is more likely than not that claims 1–4, 6, 10, and 11 are unpatentable as anticipated by Timony, as discussed below. We turn first to an overview of Timony.

1. Structure Disclosed by Timony

Timony generally is directed to "a hanger for an insulated concrete system," and as applied by Petitioner, more particularly to "*a retrofit hanger* [for] an insulated concrete system," as shown, for example, in Figure 8, reproduced below. Ex. 1008 ¶ 2 (emphasis added), Fig. 8.

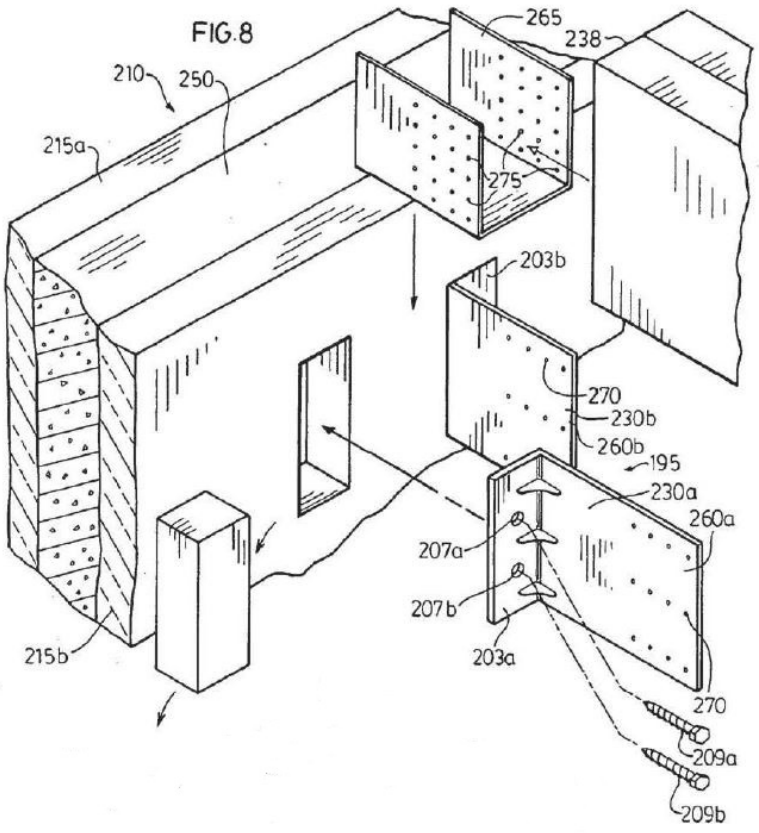


Figure 8 of Timony is a perspective view of a partially assembled retrofit bracket.

Id. ¶ 29. Petitioner contends Timony discloses each limitation of claims 1–4, 6, 10, and 11 of the '867 patent. We further discuss below the disclosure of Timony in connection with the parties' arguments.

2. Independent Claim 1

a) "A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:"

The preamble of claim 1 recites "[a] hanger *for connecting a structural component to a wall adapted to have sheathing mounted thereon*." Ex. 1001, 12:15–17 (emphasis added). Petitioner contends Timony discloses "hanger 100 connects a structural component (object 238) to a wall 110, with adequate spacing for a foam panel (i.e., sheathing)." Pet. 59 (citing Ex. 1003 ¶¶ 173–174; Ex. 1008, Abstract, Figs. 1–8, ¶¶ 34, 48). Regardless, for the reasons expressed in Section III.F.3.a above, and based on the record before us, we determine that the preamble phrase "for connecting a structural component to a wall adapted to have sheathing mounted thereon" in claim 1 is not a limitation, and find Timony discloses a "hanger," as recited in claim 1.

b) "a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;"

Petitioner contends Timony discloses a channel shaped portion (support 265) configured to receive the structural component (object 238), where "support 265 is inserted between and secured to both hanging portions 260a and 260b via apertures 270 and 275." Pet. 60–61 (citing Ex. 1003 ¶¶ 176–177; Ex. 1008, ¶¶ 38, 48, 50, Figs. 8, 9). Petitioner

contends channel-shaped portion (265) includes a base configured to receive an end portion of the structural component thereon to support the structural component, where the base is the horizontal flat portion of support 265 (i.e., the bottom of the U-shaped bracket 265). Pet. 61 (citing Ex. 1003 ¶¶ 178–179; Ex. 1008, Fig. 8, ¶ 48). Petitioner contends "Timony's base has an upper surface configured to engage the structural component and lying in a base plane." Pet. 62 (citing Ex. 1003 ¶¶ 180–181; Ex. 1008, Fig. 8, ¶ 48).

For the reasons stated in the Petition at pages 60–62, and based on the record before us, we find Petitioner sufficiently establishes that Timony discloses this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

> *c) "a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane,"*

Petitioner contends Timony discloses a connection portion (retaining portion 203) configured for attachment to the wall. Pet. 62 (citing Ex. 1003 ¶¶ 182–183; Ex. 1008, ¶ 47 ("Retrofit plate 230 has a retaining portion 203, which comprises one or more retaining apertures . . . to accommodate . . . securing means . . . ."), 49 ("Retaining portion 203 is then fastened to concrete core 250."), Fig. 8). Petitioner contends the connection portion (retaining portion 203) includes a back flange having an upper edge and that the back flange extends from the upper edge in a direction generally toward the base plane, and argues that "[w]hile Figure 8 [of Timony] illustrates the hanger in an exploded configuration, when assembled the upper surface of

support 265's base is below the extension flange." Pet. 63 (citing Ex. 1003 ¶¶ 184–185; Ex. 1008, ¶ 49, Figs. 8, 9).

For the reasons stated in the Petition at pages 62–64, and based on the record before us, we find Petitioner sufficiently establishes that Timony discloses this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

d) "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and"

Petitioner contends Timony discloses the connection portion (retaining portion 203) and channel-shaped portion (support 265) are in a fixed, spaced apart relation relative to one another, because "support 265 is 'secured' to hanging portions 260a/260b." Pet. 64 (citing Ex. 1003 ¶¶ 186–187; Ex. 1008, ¶ 48 ("[S]upport 265 is inserted between and secured to both hanging portions 260*a* and 260*b*."). Petitioner contends Timony discloses "securing support 265 to hanging portion 260 of retrofit plate 230 by inserting screws or nails through aligned apertures 270, 275 so that support 265 does not move freely with respect to hanging portion 260." Pet. 65 (citing Ex. 1008, ¶ 50; Ex. 1003 ¶ 186). Petitioner argues the skilled artisan "would have understood that the arrangement between Timony's retaining portion 203 and support 265 is in a fixed, spaced apart relation relative to one another." Pet. 65 (citing Ex. 1003 ¶ 186).

Patent Owner observes that, "*[a]s delivered to the job site*, the connection portion (retrofit plate 230) and channel-shaped portion (support (265)) of the Timony hanger are *separate parts*, and require securing the support (265) to the retrofit plate (230) 'by inserting screws or nails through

aligned apertures 270, 275 *so that support 265 does not move freely*.'" Prelim. Resp. 95 (emphases added). Patent Owner argues "the components of the Timony retrofit hanger (especially the support (265)) *may be moved freely prior to securing* the hanger components and the object (238) together during installation." *Id.* at 97 (emphasis added). Patent Owner argues "even after the support (265) is secured to the retrofit plate (230), the components still are not *permanently fixed* together as the nails or screws could later be removed allowing further movement of the components with respect to each other." *Id.* at 97–98 (citing Ex. 2001 ¶ 217). We find Patent Owner's argument unavailing.

Patent Owner effectively concedes that, although the relevant hanger components are not placed in "a fixed, spaced apart relation relative to one another" in a manufacturing setting, they are placed in such a relationship in the field, thus producing (so be it not in a factory) a hanger having a connection portion and channel-shaped portion in a fixed, spaced apart relation relative to one another. *See* Prelim. Resp. 95–98. Patent Owner's point of contention here is that such components are not "permanently" fixed in such a relationship. *Id.* at 97–98. But claim 1 recites only "fixed . . . relative to one another," not "permanently" fixed, and Patent Owner does not provide any claim construction analysis supporting the interpretation of "fixed" as used in claim 1 to mean "permanently" fixed.

For the reasons stated in the Petition at pages 64–66, and based on the record before us, we find Petitioner sufficiently establishes that Timony discloses this limitation.

e) "an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion,"

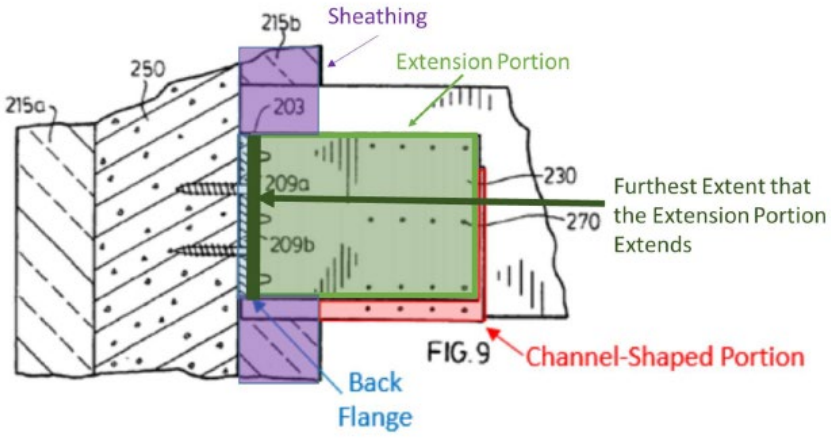
Petitioner contends Timony discloses an extension portion (retrofit plates 230a/230b and hanging portions 260a/260b) including first and second extension flanges extending from the channel-shaped portion to the connection portion. Pet. 66–67 (citing Ex. 1003 ¶¶ 188–189). Petitioner contends retrofit plates 230a/230b include hanging portion 260 that directly contacts and is secured to support 265 and extends from support 265 to retaining portion 203. Pet. 66–67 (citing Ex. 1008 ¶¶ 47–48). Petitioner argues the skilled artisan "would have understood that Timony's retrofit plates 230a/230b having hanging portions 260a/260b correspond to the recited first and second extension flanges." Pet. 66–67 (citing Ex. 1003 ¶ 188).

For the reasons stated in the Petition at pages 66–67, and based on the record before us, we find Petitioner sufficiently establishes that Timony discloses this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

f) "each extension flange being configured to extend through the sheathing,"

Petitioner contends "[e]ach of Timony's extension flanges (retrofit plates 230a/230b having hanging portions 260a/260b) is configured to extend through sheathing." Pet. 67 (citing Ex. 1003 ¶¶ 190–191). Petitioner contends "retrofit plate 230 extends through outer foam wall 215b—a form of sheathing that includes foam 'panels.'" Pet. 67 (citing Ex. 1008 ¶ 49, Figs. 8, 9).

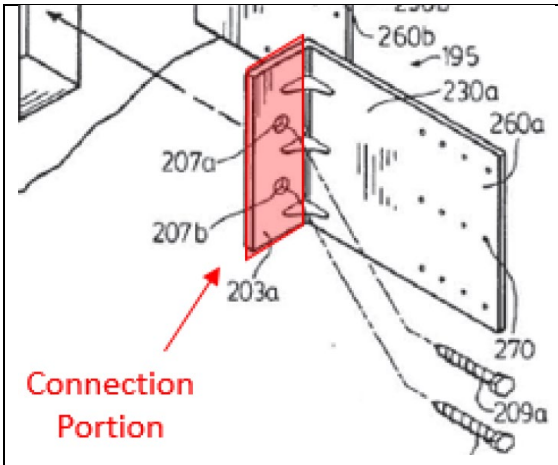
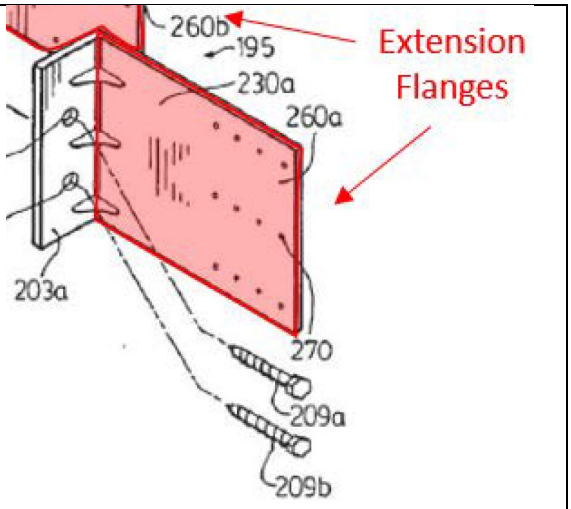
Patent Owner alleges Petitioner "is excluding the retaining portion (203a/203b) of the retrofit plate from its identification of the extension flanges." Prelim. Resp. 98. Patent Owner alleges "[w]hile the portion of the retrofit plates 230a/230b that [Petitioner] identifies as an extension flange would extend into one side of the sheathing, . . . it would not extend out of the other side of the sheathing," as allegedly shown, for example, in Patent Owner's annotated version of Timony's Figure 9, reproduced below. *Id.* at 99–100.



The above illustration shows Figure 9 of Timony
as annotated by Patent Owner.

Ex. 1008, Fig. 9 (annotated); Prelim. Resp. 100. According to Patent Owner, "[Petitioner] agrees that the extension flange *stops at the front face of retaining portion 203* and does not extend all the way to the concrete core, and therefore terminates within the sheathing." Prelim. Resp. 100. We find Patent Owner's argument unavailing, at least at this stage of the proceeding.

We reproduce below enlarged versions of Timony's Figure 8 as annotated by Petitioner to identify a "connection portion" and "extension flanges."

	
The above illustration shows an enlarged portion of Timony's Figure 8 as annotated by Petitioner to identify a "connection portion."	The above illustration shows an enlarged portion of Timony's Figure 8 as annotated by Petitioner to identify "extension flanges."

Pet. 63, 67; Ex. 1008, Fig. 8; *see* Pet. 66 (annotated Fig. 8 showing "connection portion"). Petitioner identifies the connection portion (left figure above) as stopping short of its right edge (the corner of the "L" bracket), and the extension flange (right figure above) as running the full length of the bracket side (i.e., past the thickness of the connection portion), which aligns with Petitioner's argument discussed above that Timony's "extension flange" extends through the sheathing (outer foam wall 215b).

For the reasons stated in the Petition at pages 62–67, and based on the record before us, we find Petitioner sufficiently establishes that Timony discloses this limitation.

We understand Petitioner, in arguing anticipation of claim 6 by Timony, makes a statement that appears to contradict its foregoing identification of the extent of the "connection portion" and "extension flanges," namely: "The edge of retaining portion 203 extends *to the inner*

surface of plate 230, thereby being in opposed, spaced apart relation to the edge of support 265 disposed flush against the inner surface of retrofit plate 230." Pet. 72–73 (emphasis added). We encourage the parties to address this potential discrepancy, as well as to construe the term "opposed" as used in the context of claim 6, in their respective trial briefs.

> g) *"each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall"*

Petitioner contends Timony discloses that each extension flange (retrofit plates 230a/230b having hanging portions 260a/260b) is generally perpendicular to the base plane. Pet. 68 (citing Ex. 1003 ¶¶ 192–193; Ex. 1008 ¶ 49, Figs. 4, 8). Petitioner argues "Timony's retrofit plates 230a/230b maintain the same relationship with the base plane as is illustrated in the '867 Patent." Pet. 68 (citing Ex. 1003 ¶ 192).

Petitioner also contends Timony discloses "positioning support 265 'between hanging ends 260a and 260b of retrofit plates 230a and 230b,' and locating retaining portions 203 next to the wall at opposite ends of retrofit plates 230a,b," and "locating retaining portion 203 on an interior side of foam wall 215b and support 265 on an opposite exterior side of foam wall 215b such that foam wall 215b is between support 265 and retaining portion 203, to avoid making U-shaped slots in the foam wall." Pet. 69–70 (citing Ex. 1008 ¶¶ 7, 47–50; Ex. 1003 ¶¶ 194–195). Petitioner argues "Timony's

retrofit plates 230a/230b having hanging portions 260a/260b permit sheathing (foam wall 215b) to be inserted therebetween." Pet. 69 (citing Ex. 1003 ¶¶ 194–195).

For the reasons stated in the Petition at pages 68–70, and based on the record before us, we find Petitioner sufficiently establishes that Timony discloses this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

h) Conclusion

At this stage of the proceeding and based on the record before us, we are persuaded that Petitioner's cited evidence sufficiently supports Petitioner's contention that independent claim 1 is unpatentable as anticipated by Timony. Accordingly, at this stage of the proceeding, we are persuaded that Petitioner has shown that it is more likely than not that independent claim 1 would have been anticipated by Timony.

3. Dependent Claims 2–4, 6, 10, and 11

Petitioner contends claims 2–4, 6, 10, and 11, which depend directly or indirectly from independent claim 1, would have been unpatentable as anticipated by Timony. Pet. 70–74. The Petition provides a detailed assessment of these claims, with references to the Petition's analysis of claim 1, disclosures in Timony, and the declaration testimony of Mr. Fennell. *Id.* At this stage of the proceeding, Patent Owner does not present any separate arguments that are distinct to any of these claims. Rather, Patent Owner generally states the view that the alleged deficiencies in the Petition with respect to claim 1 also are applicable to these challenged claims. *See generally* Prelim. Resp. 94–100. As discussed above, we are

persuaded that the cited evidence sufficiently supports Petitioner's contention that independent claim 1 is unpatentable as anticipated by Timony. For the reasons set forth in the Petition (Pet. 70–74), we also are persuaded that the current record sufficiently supports Petitioner's challenges to dependent claims 2–4, 6, 10, and 11 for purposes of institution.

4. Summary

For the foregoing reasons, and the reasons stated in the Petition (Pet. 13–15, 59–74), we determine that Petitioner demonstrates that it is more likely than not that claims 1–4, 6, 10, and 11 are unpatentable under 35 U.S.C. § 102 as anticipated by Timony.

H. Obviousness of Claims 5, 7–9, 12, 15–17, and 21–23 Over Timony and Bundy

Petitioner contends claims 5, 7–9, 12, 15–17, and 21–23 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Timony (Ex. 1008) and Bundy (Ex. 1007). Pet. 13–15, 75–89. Claim 16 is an independent claim reciting structure commensurate in scope with structure recited in independent claim 1, and claims 5, 7–9, 12, 15, 17, and 21–23 depend directly or indirectly from independent claims 1 or 16. The Petition provides a detailed assessment of these claims, with references to the Petition's analysis of claim 1, disclosures in Timony and Bundy, and the declaration testimony of Mr. Fennell. Pet. 13–15, 75–89. Similar to its case for combining the teachings of Gilb '792 and Bundy (*see* Section III.F.3.e.4, *supra*), Petitioner also evidences sufficient rational reasons for purposes of institution to combine Timony and Bundy, and to do so with a reasonable expectation of success. Pet. 75–77 (citing, *inter alia*, Ex. 1003 ¶¶ 208–211).

At this stage of the proceeding, Patent Owner does not present any separate arguments that are distinct to any of these claims. Rather, Patent Owner generally states the view that the alleged deficiencies in the Petition with respect to claim 1 also are applicable to these challenged claims. *See generally* Prelim. Resp. 94–100. As discussed above, we are persuaded that the cited evidence sufficiently supports Petitioner's contention that independent claim 1 is unpatentable as anticipated by Timony. For the reasons set forth in the Petition (Pet. 13–15, 75–89), we also are persuaded that the current record sufficiently supports Petitioner's challenges to claims 5, 7–9, 12, 15–17, and 21–23 under 35 U.S.C. § 103 as obvious over the combination of Timony and Bundy for purposes of institution.

Accordingly, for the foregoing reasons and those stated in the Petition (Pet. 13–15, 75–89), we determine that Petitioner demonstrates that it is more likely than not that claims 5, 7–9, 12, 15–17, and 21–23 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Timony and Bundy.

I. Obviousness of Claims 1–12, 15–17, and 21–23 Over Tsukamoto and Bundy

Petitioner contends claims 1–12, 15–17, and 21–23 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Tsukamoto (Ex. 1009) and Bundy (Ex. 1007). Pet. 13–15, 89–120. Patent Owner opposes Petitioner's contentions. Prelim. Resp. 49–52, 100–108. Based on our review of the record before us, we determine that Petitioner has established that it is more likely than not that claims 1–12, 15–17, and 21–23

are unpatentable as obvious over the combination of Tsukamoto and Bundy, as discussed below. We turn first to an overview of Tsukamoto.

1. Structure Disclosed by Tsukamoto (Ex. 1009)

Tsukamoto generally is directed to a "beam hanger" for connecting a beam to a wall, as shown, for example, in Figure 5, reproduced below. Ex. 1009, 1–3, Fig. 5.

FIG. 5

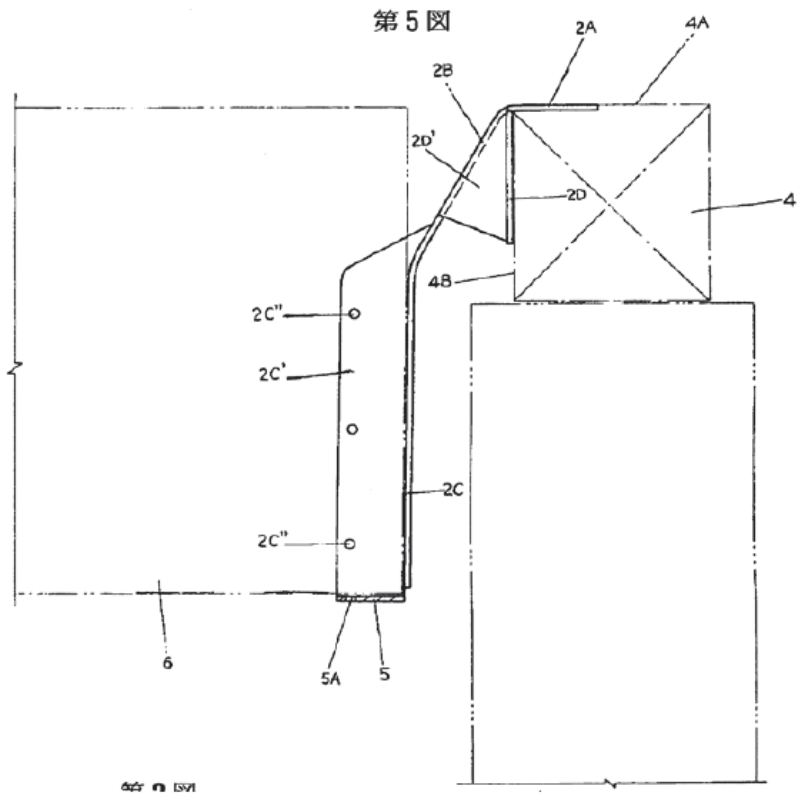


Figure 5 of Tsukamoto is a cross-sectional view of a beam hanger connecting a beam to a wall.

Id. at 3. Petitioner contends "Tsukamoto discloses every structural component listed in claim 1 of the '867 Patent, but does not explicitly disclose that its spacing is 'sized and shaped to receive the sheathing

therein,'" for which Petitioner turns to Bundy. Pet. 89. We turn to the limitations recited in independent claim 1.

2. Independent Claim 1

a) "A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:"

The preamble of claim 1 recites "[a] hanger *for connecting a structural component to a wall adapted to have sheathing mounted thereon*." Ex. 1001, 12:15–17 (emphasis added). Petitioner contends Tsukamoto discloses a hanger for connecting a structural component to a wall. Pet. 92–93 (citing Ex. 1003 ¶¶ 254–257; Ex. 1009, 2, Figs. 1–6). Regardless, for the reasons expressed in Section III.F.3.a above, and based on the record before us, we determine that the preamble phrase "for connecting a structural component to a wall adapted to have sheathing mounted thereon" in claim 1 is not a limitation, and find Tsukamoto discloses a "hanger," as recited in claim 1.

b) "a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;"

Petitioner contends Tsukamoto discloses a channel-shaped portion (beam receiving plate 5 and beam holding side plates 2C'/3C') configured to receive a structural component (beam). Pet. 93 (citing Ex. 1003 ¶¶ 258–259; Ex. 1009, 3, Figs. 1–6). Petitioner contends the channel-shaped portion

includes a base (beam receiving plate 5) configured to receive an end portion of the structural component thereon to support the structural component. Pet. 94 (citing Ex. 1003 ¶¶ 260–261; Ex. 1009, 3 ("Reference numeral 5 is a plate for receiving the beam which bridges horizontally between lower ends of holding plates 2C'/3C'.")). Petitioner contends the base (receiving plate 5) has an upper surface configured to engage the structural component, and argues that "[b]ecause the two-dimensional upper surface of receiving plate 5 is flat, the surface defines a plane in which it lies." Pet. 95 (citing Ex. 1009, 2–3, Fig. 3; Ex. 1003 ¶¶ 262–263).

For the reasons stated in the Petition at pages 93–96, and based on the record before us, we find Petitioner sufficiently establishes that Tsukamoto teaches this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

> *c) "a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane,"*

Petitioner contends Tsukamoto discloses a connection portion (horizontal portions 2A/3A and vertical plates 2D/3D) configured for attachment to a wall. Pet. 96 (citing Ex. 1003 ¶¶ 264–266; Ex. 1009, 2 ("The horizontal portions 2A,3A abut a top surface 4A of base 4, and the vertical plates 2D/3D abut a side surface 4B of the base 4."), Fig. 5). Petitioner argues the skilled artisan "would have understood that Tsukamoto's vertical plates 2D/3D correspond to the recited 'connection portion.'" Pet. 97 (citing Ex. 1003 ¶ 265). Petitioner contends the

connection portion includes a back flange (vertical plates 2D/3D) having an upper edge and that the back flange extends from the upper edge in a direction generally toward the base plane. Pet. 97–98 (citing Ex. 1003 ¶¶ 267–268; Ex. 1009, Fig. 1).

For the reasons stated in the Petition at pages 96–98, and based on the record before us, we find Petitioner sufficiently establishes that Tsukamoto teaches this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

d) "the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and"

Petitioner contends Tsukamoto discloses the connection portion (vertical plates 2D/3D and horizontal portions 2A/3A) and channel-shaped portion (e.g., holding plates 2C'/3C') are in a fixed, spaced apart relation relative to one another. Pet. 98–99 (citing Ex. 1003 ¶¶ 269–270; Ex. 1009, 2–3, Fig. 3).

For the reasons stated in the Petition at pages 98–99, and based on the record before us, we find Petitioner sufficiently establishes that Tsukamoto teaches this limitation. Patent Owner does not contend otherwise at this stage of the proceeding.

e) "an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion,"

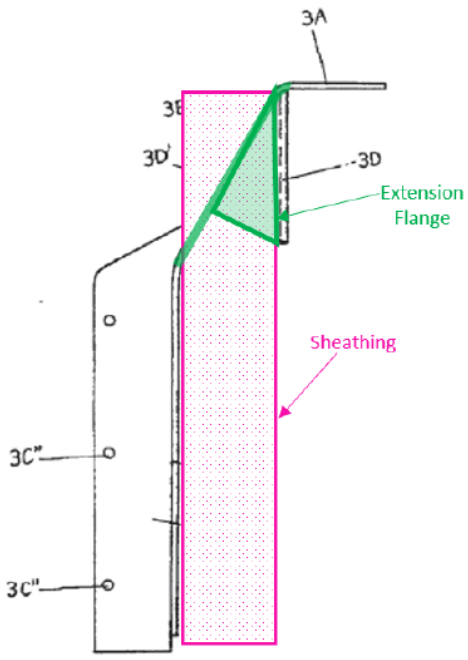
Petitioner contends Tsukamoto discloses an extension portion (inclined portion 2B/3B with connection plate 2D'/3D') including first and second extension flanges (inclined portion 2B/3B with connection plate

2D'/3D') extending from the channel-shaped portion (holding plates 2C'/3C') to the connection portion (vertical plate 2D/3D). Pet. 99–100 (citing Ex. 1003 ¶¶ 271–273; Ex. 1009, Fig. 3). Petitioner argues the skilled artisan "would have understood that Tsukamoto's connection plates 2D'/3D' and inclined portions 2B/3B collectively correspond to the recited first and second extension flanges." Pet. 100 (citing Ex. 1003 ¶ 272).

For the reasons stated in the Petition at pages 99–100, and based on the record before us, we find Petitioner sufficiently establishes that Tsukamoto teaches this limitation. Patent Owner does not contend otherwise at this stage of the proceeding, except as discussed below concerning the limitation "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane."

f) "each extension flange being configured to extend through the sheathing,"

Petitioner contends the combination of Tsukamoto and Bundy teaches each extension flange (connection plates 2D'/3D' with inclined portions 2B/3B) being configured to extend through sheathing, as shown, for example, in Tsukamoto's Figure 3 as annotated by Petitioner, reproduced below. Pet. 100–101 (citing Ex. 1003 ¶¶ 274–276); Ex. 1009, Fig. 3.



The above illustration shows Figure 3 of Tsukamoto as annotated by Petitioner.

Ex. 1009, Fig. 3 (annotated); Pet. 101. Petitioner argues that, although "Tsukamoto does not explicitly disclose extending connection plates 2D'/3D' and inclined portions 2B/3B through sheathing," the skilled artisan "would have found it obvious to use Tsukamoto's hanger with sheathing, as applying a known technique (Bundy's use with drywall) for a known device (Tsukamoto's hanger), yielding the predictable result of 'cover[ing] and protect[ing] the structural members of a building.'" Pet. 101 (citing Ex. 1007, 5:18–20; Ex. 1009, 2–3; Ex. 1003 ¶ 275). Petitioner argues that because Tsukamoto's connection plates 2D'/3D' and inclined portions 2B/3B are constructed as a continuous metal sheet, the skilled artisan "would have understood that Tsukamoto's extension flange is configured to extend into one side of sheathing and out of the other side of sheathing," and

"had an expectation of success extending Tsukamoto's connection plates 2D'/3D' and inclined portions 2B/3B through the sheathing." Pet. 101–102 (citing Ex. 1003 ¶ 275). Petitioner provides additional explanation of reasons for combining the teachings of Tsukamoto and Bundy at pages 90–92 of the Petition. Pet. 90–92.

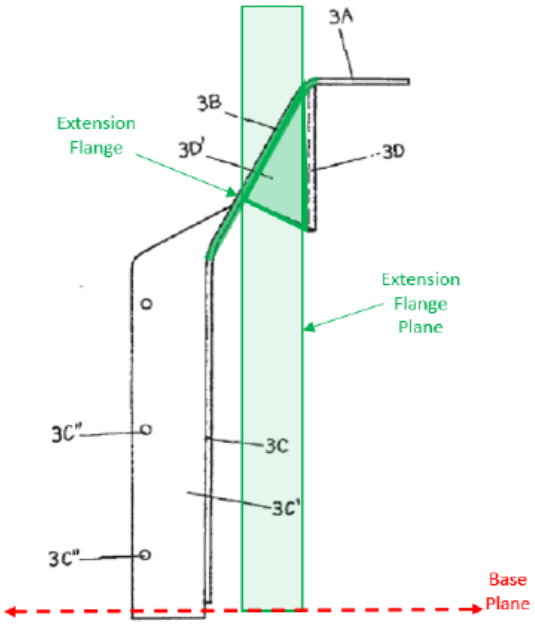
Patent Owner argues that Petitioner's arguments here "merely suggest modifying the Tsukamoto hanger such that it would be *capable of* extending through sheathing," and "there is no evidence that Tsukamoto was ever contemplated for use with sheathing, much less 'designed to' or 'meant to' extend through sheathing." Prelim. Resp. 101–102 (citing Ex. 2001 ¶¶ 233–236). Patent Owner also argues "neither Tsukamoto, nor Bundy, disclose an 'extension flange being configured to extend through the sheathing.'" *Id.* at 102 (citing Ex. 2001 ¶¶ 237–238). As with this same argument applied to Gilb '792 by Patent Owner, we find it unavailing here too. *See* Section III.F.3.e.1, *supra*. Moreover, Patent Owner argues against Tsukamoto and Bundy individually, but does not address their combined teachings as argued and evidenced by Petitioner. The test for obviousness is not whether the claimed invention is expressly suggested in any one or all of the references, as argued by Patent Owner, but whether the claimed subject matter would have been obvious to those of ordinary skill in the art *in light of the combined teachings of those references*. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981); *In re Burckel*, 592 F.2d 1175, 1179 (CCPA 1979) ("[A] reference must be considered not only for what it expressly teaches, but also for what it fairly suggests."). We also again note that, although Patent Owner argues the Tsukamoto hanger needs some "modification" such

that it would be capable of extending through sheathing, Patent Owner does not identify any such "modification" that would be needed for the disclosed structure of the Tsukamoto hanger to do so, where an installer chooses to install such sheathing.

For the reasons stated in the Petition at pages 90–92 and 100–102, and based on the record before us, we find Petitioner sufficiently establishes that the combination of Tsukamoto and Bundy teaches this limitation. We are persuaded that Petitioner's cited evidence provides sufficient rational reasons for purposes of institution to combine Tsukamoto and Bundy to arrive at this limitation.

> *g) "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane,"*

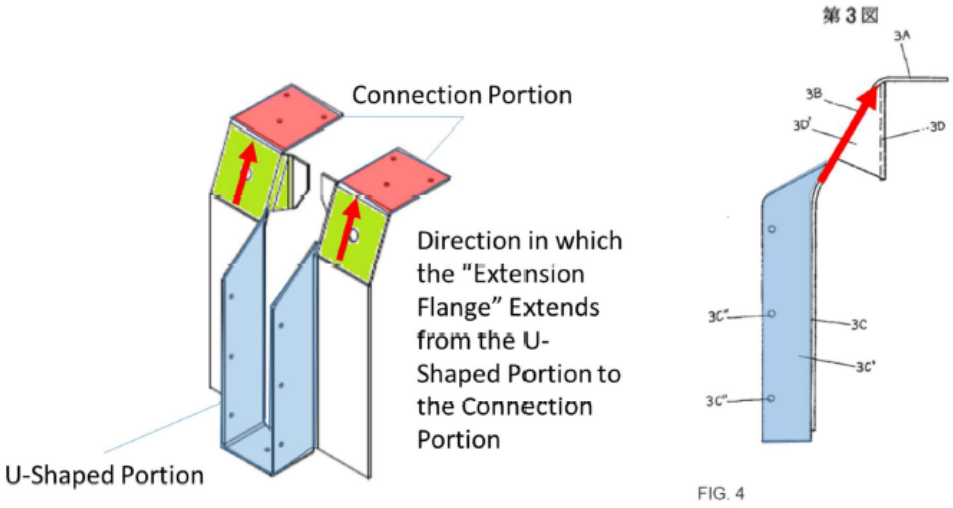
Petitioner contends Tsukamoto discloses that "each extension flange has a surface (connection plates 2D'/3D') that lies in a plane, the planes being generally perpendicular to the base plane," as shown, for example, in Tsukamoto's Figure 3 as annotated by Petitioner, reproduced below.
Pet. 102 (citing Ex. 1003 ¶¶ 277–278; Ex. 1009, 2–3, Figs. 1–6).



The above illustration shows Figure 3 of Tsukamoto as annotated by Petitioner.

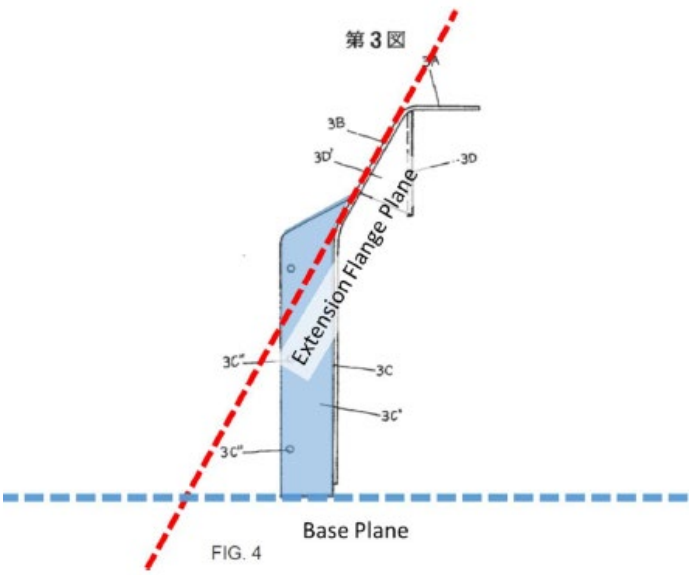
Ex. 1009, Fig. 3 (annotated); Pet. 102.

Patent Owner argues that for each set of Tsukamoto's inclined portions 2B/3B and respective connection plates 2D'/3D', the skilled artisan "would have considered each of the inclined portions (2B/3B) and connection plates (2D'/3D') to be separate flanges"; and regardless, "to the extent each set of the inclined portion (2B/3B) and connection plate (2D'/3D') could be considered as a single flange, the extent of the 'flange' as it extends from the channel-shaped portion to the connection portion would be along the inclined portion (2B/3B)," as shown, for example, in Patent Owner's illustrations of Tsukamoto's hanger, reproduced below. Prelim. Resp. 102–104 (citing Ex. 2001 ¶¶ 241–243).



The above illustrations show Patent Owner's interpretation of Tsukamoto's hanger.

Prelim. Resp. 104; Ex. 1009, Fig. 4 (annotated). Patent Owner argues "[Petitioner's] identification of an extension flange would result [sic] not result in an 'extension flange plane' that is perpendicular to the 'base plane,'" as shown, for example, in Patent Owner's annotated version of Tsukamoto's Figure 4, reproduced below. Prelim. Resp. 104–105 (citing Ex. 2001 ¶ 244; Ex. 1009, Fig. 4).



The above illustration shows Figure 4 of Tsukamoto as annotated by Patent Owner.

Prelim. Resp. 105; Ex. 1009, Fig. 4 (annotated). We find Patent Owner's argument unavailing.

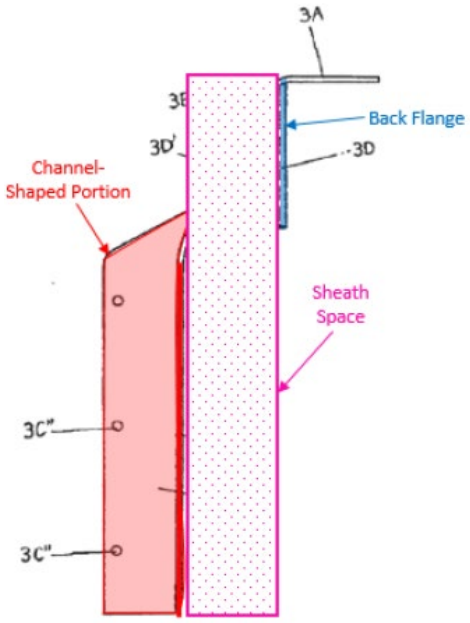
Having argued that the skilled artisan "would have considered each of the inclined portions (2B/3B) and connection plates (2D'/3D') to be separate flanges" (Prelim. Resp. 103), Patent Owner does not meaningfully address Petitioner's argument (Pet. 102) that Tsukamoto's *connection plates 2D'/3D'* each lie in a plane that is generally perpendicular to the base plane. Indeed, in its rendering of Tsukamoto's hanger (reproduced above), Patent Owner identifies the "connection portion" in Tsukamoto as only the top flanges (i.e., horizontal portions 2A/3A) (colored in red) and addresses Tsukamoto's inclined portions 2B/3B as extension flanges, but ignores that Petitioner argues Tsukamoto's vertical plates 2D/3D also are part of the "connection portion." *See* Pet. 97 (citing Ex. 1003 ¶ 265) (arguing the skilled artisan "would have understood that Tsukamoto's vertical plates

2D/3D correspond to the recited 'connection portion'"). Patent Owner does not explain why Petitioner's designated extension flanges in Tsukamoto may not lay in more than one plane (under Patent Owner's construction thereof), and more particularly, why there is no plane within the extent of Tsukamoto's connection plates 2D'/3D' from the channel-shaped portion to the connection portion (i.e., vertical plates 2D/3D).

For the reasons stated in the Petition at page 102, and based on the record before us, we find Petitioner sufficiently establishes that Tsukamoto teaches this limitation.

> *h) "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall"*

Petitioner contends the combination of Tsukamoto and Bundy teaches the back flange (vertical plates 2D/3D) and the channel-shaped portion (holding plates 2C'/3C') defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion (holding plates 2C'/3C') is located on one side of the sheathing, and the back flange (vertical plates 2D/3D) is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall, as shown, for example, in Tsukamoto's Figure 3 as annotated by Petitioner, reproduced below.
Pet. 103 (citing Ex. 1003 ¶¶ 279–281; Ex. 1009, Fig. 3).



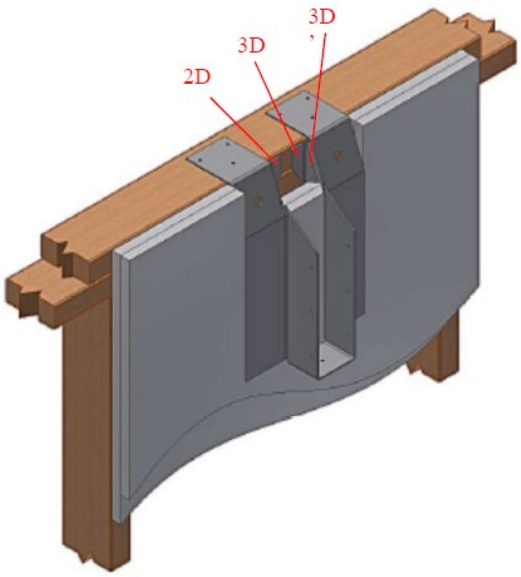
The above illustration shows Figure 3 of Tsukamoto as annotated by Petitioner.

Ex. 1009, Fig. 3 (annotated); Pet. 104.

Petitioner argues that, although "Tsukamoto does not explicitly disclose installing sheathing in the space between Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D," the skilled artisan "would have found it obvious to size such a space to receive sheathing based on Bundy." Pet. 104 (citing Ex. 1003 ¶ 280). Petitioner contends Bundy discloses installing two layers of 5/8" sheathing between a hanger's channel shaped portion (Bundy's side members 11) and wall frame "'to cover and protect the structural members of a building.'" Pet. 104 (citing Ex. 1007, 5:18–20; Ex. 1003 ¶ 280). Petitioner argues the skilled artisan would have had an expectation of success in defining a sheath-sized space as taught by Bundy between Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D, "because Tsukamoto's and Bundy's hangers are used for similar purposes

(e.g., hanging a structural object to a wall) and Tsukamoto's holding plates 2C'/3C' and vertical plates 2D/3D already define a space therebetween." Pet. 104–105 (citing Ex. 1003 ¶ 280; Ex. 1007, 4:46–53; Ex. 1009, 1–3).

Patent Owner argues Tsukamoto's "vertical plates (2D/3D) do not define any part of the sheathing space sized and shaped to receive the sheathing (to the extent Tsukamoto's hanger receives sheathing at all)." Prelim. Resp. 107 (citing Ex. 2001 ¶ 251). According to Patent Owner, this is so because a rendering of Tsukamoto's hanger (modified in view of Bundy), reproduced below, used by Petitioner in PGR2019-00063 does not show sheathing adjacent the vertical plates. *Id.* at 107.



The above illustration is a rendering of the combination of Tsukamoto and Bundy prepared by Petitioner in PGR2019-00063.

Prelim. Resp. 107. We find Patent Owner's argument unavailing.

But for the fortuity of Petitioner's above rendering for purposes of another case, Patent Owner provides no explanation as to why the sheathing

in the above rendering, for purposes of this case, could not pass over Tsukamoto's vertical plates 2D/3D, such as, for example, by cutting two generally rectangular openings or notches in the sheathing as shown below:



See id. at 108 (Patent Owner arguing Petitioner has taken the position that openings in sheathing would be "generally rectangular with straight edges to fit around a hanger."). Given that claim 1 does not require sheathing, let alone sheathing installed in any specific manner around the hanger, we also note that Patent Owner does not explain why sheathing must pass over the back flange in order for the back flange to *define* structurally a sheath space or to be *located* structurally on a side of the sheathing.

For the reasons stated in the Petition at pages 90–92 and 103–105, and based on the record before us, we find Petitioner sufficiently establishes that the combination of Tsukamoto and Bundy teaches this limitation. We are persuaded that Petitioner's cited evidence provides sufficient rational reasons for purposes of institution to combine Tsukamoto and Bundy to arrive at this limitation.

i) Conclusion

At this stage of the proceeding and based on the record before us, we are persuaded that Petitioner's cited evidence provides sufficient rational reasons for purposes of institution to combine Tsukamoto and Bundy with a reasonable expectation of success, and sufficiently supports Petitioner's contention that independent claim 1 is unpatentable as obvious over the combination of Tsukamoto and Bundy. Accordingly, at this stage of the proceeding, we are persuaded that Petitioner has shown that it is more likely

than not that independent claim 1 would have been obvious over the combined teachings of Tsukamoto and Bundy.

3. Independent Claim 16

Petitioner contends independent claim 16 would have been unpatentable as obvious over the combination of Tsukamoto and Bundy. Pet. 115–120. The Petition provides a detailed assessment of claim 16, with references to the Petition's analysis of claim 1, disclosures in Tsukamoto and Bundy, and the declaration testimony of Mr. Fennell. *Id.* At this stage of the proceeding, Patent Owner does not present any separate arguments that are distinct to claim 16. Rather, Patent Owner generally states the view that the alleged deficiencies in the Petition with respect to claim 1 also are applicable to claim 16. *See generally* Prelim. Resp. 49–52, 100–108. As discussed above, we are persuaded that the cited evidence sufficiently supports Petitioner's contention that independent claim 1 is unpatentable as obvious over the combination of Tsukamoto and Bundy. For the reasons set forth in the Petition (Pet. 115–120), we also are persuaded that the current record sufficiently supports Petitioner's challenges to independent claim 16 for purposes of institution.

4. Dependent Claims 2–12, 15, 17, and 21–23

Petitioner contends claims 2–12, 15, 17, and 21–23, which depend directly or indirectly from independent claims 1 or 16, would have been unpatentable as obvious over the combination of Tsukamoto and Bundy. Pet. 105–115, 120. The Petition provides a detailed assessment of these claims, with references to the Petition's analysis of claims 1 and 16, disclosures in Tsukamoto and Bundy, and the declaration testimony of

Mr. Fennell. *Id.* At this stage of the proceeding, Patent Owner does not present any separate arguments that are distinct to any of these claims. Rather, Patent Owner generally states the view that the alleged deficiencies in the Petition with respect to claim 1 also are applicable to these challenged claims. *See generally* Prelim. Resp. 49–52, 100–108. As discussed above, we are persuaded that the cited evidence sufficiently supports Petitioner's contention that independent claims 1 and 16 are unpatentable as obvious over the combination of Tsukamoto and Bundy. For the reasons set forth in the Petition (Pet. 105–115, 120), we also are persuaded that the current record sufficiently supports Petitioner's challenges to dependent claims 2–12, 15, 17, and 21–23 for purposes of institution.

5. Summary

For the foregoing reasons, and the reasons stated in the Petition (Pet. 13–15, 89–120), we determine that Petitioner demonstrates that it is more likely than not that claims 1–12, 15–17, and 21–23 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Tsukamoto and Bundy.

IV. CONCLUSION

Based on the evidence before us, we determine that Petitioner has established that it is more likely than not that at least claims 1–12, 15–17, and 21–23 of the '867 patent are unpatentable. Accordingly, we institute trial on all the challenges in the Petition.

At this stage of the proceeding, the Board has not made a final determination on the construction of any claim term or the patentability of any challenged claim.

V. ORDER

Upon consideration of the record before us, it is:

ORDERED that, pursuant to 35 U.S.C. § 324, a post-grant review of claims 1–23 of the '867 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 324 and 37 C.F.R. § 42.4(b), post-grant review of the '867 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

For PETITIONER:

Michelle K. Holoubek
John Higgins
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
holoubek-ptab@sternekessler.com
jhiggins-PTAB@sternekessler.com

For PATENT OWNER:

Kurt F. James
Steven Levitt
John R. Schroeder
B. Scott Eidson
STINSON LLP
kurt.james@stinson.com
steven.levitt@stinson.com
john.schroeder@stinson.com
scott.eidson@stinson.com

EXHIBIT L

Trials@uspto.gov
571-272-7822

Paper 73
Date: March 15, 2023

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.

PGR2021-00109
Patent 11,021,867 B2

Before SCOTT A. DANIELS, NEIL T. POWELL, and STEPHEN E. BELISLE, *Administrative Patent Judges*.

BELISLE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
Granting-in-Part Patent Owner's Revised Contingent Motion to Amend
35 U.S.C. § 328(a)
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3. Independent Claim 1 47

a) "A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:" 47

b) "a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;" 49

c) "a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane, the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and" 51

d) "an extension portion including first and second extension flanges extending from the

channel-shaped portion to the connection portion," 52

e) "each extension flange being configured to extend through the sheathing, each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall" 56

(1) "each extension flange being configured to extend through the sheathing" 57

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(3) "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall"..... 73

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I. INTRODUCTION

A. Case Posture

Simpson Strong-Tie Company Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting a post-grant review of claims 1–23 ("the challenged claims") of U.S. Patent No. 11,021,867 B2 (Ex. 1001, "the '867 patent"). Columbia Insurance Company ("Patent Owner") filed a Preliminary Response to the Petition (Paper 7, "Prelim. Resp."). In addition, with prior authorization from the Board (Paper 6), Patent Owner requested a Certificate of Correction pursuant to 35 U.S.C. § 255 to correct certain mistakes in the '867 patent (Ex. 2003). A Certificate of Correction subsequently issued concerning claims 5, 11, 16, and 17 of the '867 patent. Ex. 2032. We instituted a post-grant review of claims 1–23 of the '867 patent on all grounds of unpatentability alleged in the Petition. Paper 42 ("Institution Decision" or "Dec.").

After institution: (A) Patent Owner filed a Response. Paper 45 ("PO Resp."). Petitioner filed a Reply. Paper 49 ("Pet. Reply"). Patent Owner filed a Sur-Reply. Paper 54 ("PO Sur-Reply"). (B) Patent Owner filed a Contingent Motion to Amend. Paper 46. Petitioner filed an Opposition to the Contingent Motion to Amend. Paper 50. (C) Patent Owner filed a Revised Contingent Motion to Amend. Paper 53 ("RMTA"). Petitioner filed an Opposition to the RMTA. Paper 56 ("RMTA Opp."). Patent Owner filed a Reply to the RMTA Opposition. Paper 61 ("RMTA Reply"). Petitioner filed a Sur-Reply to the RMTA Reply. Paper 69 ("RMTA Sur-Reply"). (D) Patent Owner filed a Motion to Exclude Evidence, in which Patent Owner moves to exclude page 132, line 10

through page 145, line 5 of Exhibit 1038 (August 22, 2022 Deposition Testimony of Dr. Reynaud Serrette (Patent Owner's expert)). Paper 63 ("Mot. Excl."). Petitioner filed an Opposition to Patent Owner's Motion to Exclude Evidence (Paper 64), and Patent Owner filed a Reply to Petitioner's Opposition to Patent Owner's Motion to Exclude Evidence (Paper 68). We held a hearing on January 17, 2023, and a transcript of the hearing appears in the record. Paper 72 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. Under the applicable evidentiary standard, Petitioner has the burden to prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 326(e) (2018); 37 C.F.R. § 42.1(d) (2022). "Preponderance of the evidence means the greater weight of evidence, evidence which is more convincing than the evidence which is offered in opposition to it." *United States v. C.H. Robinson Co.*, 760 F.3d 1376, 1383 (Fed. Cir. 2014) (internal quotations omitted). This Final Written Decision is issued pursuant to 35 U.S.C. § 328(a) and 37 C.F.R. § 42.73.

For the reasons discussed below, we determine (1) Petitioner has established by a preponderance of the evidence that claims 1–12, 15–17, and 21–23 (but not claims 13, 14, and 18–20) of the '867 patent are unpatentable; (2) Patent Owner has not satisfied the statutory requirements of 35 U.S.C. § 326(d) and the procedural requirements of 37 C.F.R. § 42.221 as to proposed substitute claims 25, 28, and 40, and therefore, we *deny* Patent Owner's RMTA as to proposed substitute claims 25, 28, and 40; (3) Petitioner has demonstrated unpatentability of proposed substitute claims 24–31, 33–35, 38–40, and 44–46 by a preponderance of the evidence,

and therefore, we *deny* Patent Owner's RMTA as to proposed substitute claims 24–31, 33–35, 38–40, and 44–46; (4) Patent Owner has satisfied the statutory requirements of 35 U.S.C. § 326(d) and the procedural requirements of 37 C.F.R. § 42.221 as to proposed substitute claim 32, and Petitioner has not demonstrated unpatentability of this claim by a preponderance of the evidence, and therefore, we *grant* Patent Owner's RMTA as to proposed substitute claim 32; and (5) Petitioner has not established by a preponderance of the evidence that claims 13, 14, and 18–20 are unpatentable, and therefore, we *dismiss* as moot Patent Owner's RMTA as to contingent proposed substitute claims 36, 37, and 41–43, which correspond to original claims 13, 14, and 18–20, respectively.

B. Related Matters

The parties identify the '867 patent as a continuation of U.S. Patent No. 10,316,510 ("the '510 patent"). Pet. 121; Paper 4, 2. The '510 patent was involved in post-grant proceeding *Simpson Strong-Tie Company Inc. v. Columbia Insurance Company*, PGR2019-00063, Paper 52 (PTAB Mar. 11, 2021), which is on appeal and cross-appeal in *Columbia Insurance Company v. Simpson Strong-Tie Company Inc.*, Appeal Nos. 2021-2145, 2021-2157, in the U.S. Court of Appeals for the Federal Circuit. Pet. 121; Paper 4, 2. The '510 patent also is involved in a civil action in *Columbia Insurance Company et al. v. Simpson Strong-Tie Company Inc.*, No. 3-19-cv-04683 (N.D. Cal.) ("Related Litigation"). Pet. 121; Paper 4, 2.

Patent Owner also identifies pending U.S. Patent Application No. 17/235,349, filed April 20, 2021, as claiming benefit of the '867 patent. Paper 4, 2.

C. The '867 Patent

The '867 patent is titled "Hanger For Fire Separation Wall," and issued on June 1, 2021, from U.S. Application No. 16/433,799, filed June 6, 2019. Ex. 1001, codes (10), (21), (22), (45), (54). The '867 patent claims priority through a series of continuing applications to U.S. Provisional Application No. 61/922,531, filed December 31, 2013. *Id.* at codes (60), (63).

The '867 patent generally relates to "a truss hanger for connecting a truss to a wall including fire retardant sheathing." Ex. 1001, 1:19–21. Figure 2 of the '867 patent is reproduced below.

FIG. 2

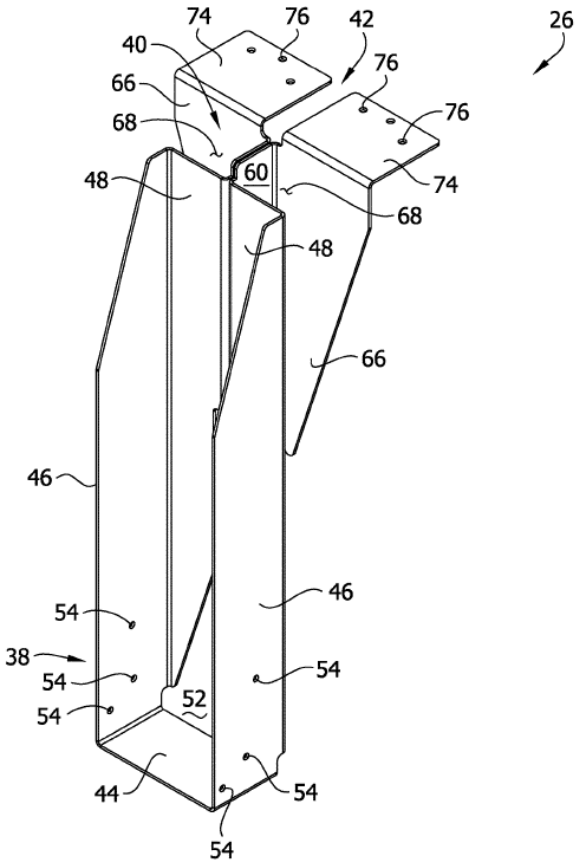


Figure 2 is a perspective view of a truss hanger.

Id. at 2:59–60.

Figure 2 shows truss hanger 26 having three main portions: channel-shaped portion 38, extension portion 40, and connection portion 42. Ex. 1001, 4:34–36. Channel-shaped portion 38 is configured to receive floor truss 12 (not shown), and includes seat or base 44 and a pair of side panels 46 extending upward from base 44. *Id.* at 4:36–39. When installed, base 44 is generally horizontal, and side panels 46 extend generally vertical from base 44. *Id.* at 4:39–41. Back panel 48 extends from each of side panels 46, and each back panel 48 is generally perpendicular to both side

panels 46 and base 44. *Id.* at 4:41–44. When installed, each back panel 48 extends generally parallel to interior face 50 of fire-retardant sheathing 34 (not shown). *Id.* at 4:44–47.

Extension portion 40 includes two extension flanges 60 configured to extend through fire retardant sheathing 34 (not shown). Ex. 1001, 5:1–3. Each flange 60 extends from one of back panels 48, and is "positioned in opposed, face-to-face relation," "preferably engag[ing] each other along a juncture." *Id.* at 5:3–6. Back flange 66 extends generally perpendicular from each of extension flanges 60, and is oriented generally parallel to back panels 48. *Id.* at 5:19–22.

Connection portion 42 includes a pair of connector tabs 74 extending from back flanges 66. Ex. 1001, 6:37–39. Each connector tab 74 extends generally perpendicular from one of back flanges 66, and is generally horizontal when hanger 26 is installed. *Id.* at 6:39–42.

Truss hanger 26 mounts to framing of a wall during construction as shown in Figure 10 of the '867 patent, reproduced below. Ex. 1001, 5:32–41.

FIG. 10

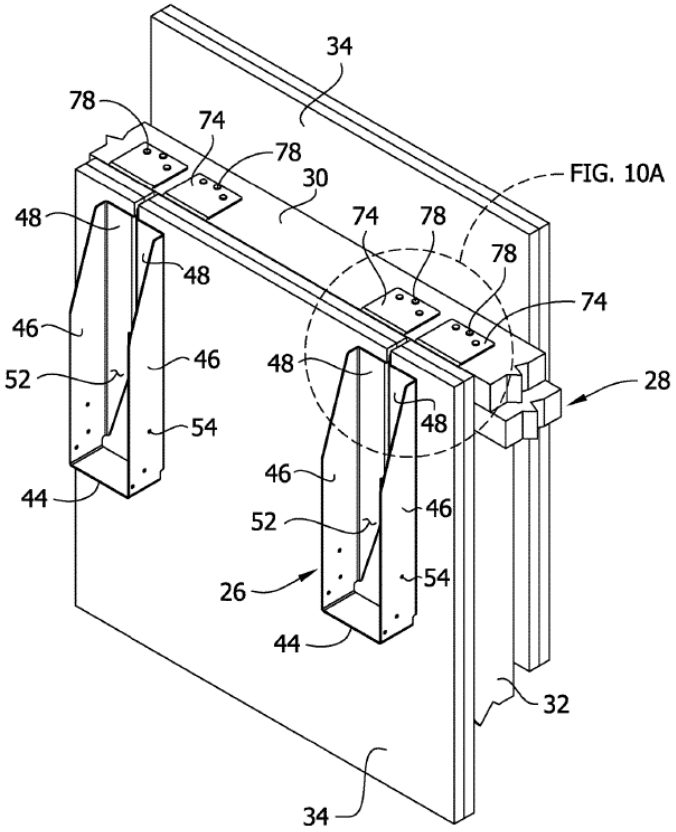


Figure 10 is a perspective view of wall 28 having fire retardant sheathing 34 with a slot cut in the sheathing to receive truss hanger 26.

Id. at 3:4–5. Once installed, a portion of fire-retardant sheathing 34 extends into each sheathing channel 68 and is secured between back panels 48 and back flanges 66. *Id.* at 5:38–41. According to the '867 patent, an exemplary embodiment of fire-retardant sheathing 34, as shown in Figure 10 for example, is gypsum board, such as two layers of 5/8" gypsum board. *Id.* at 4:18–24.

According to the '867 patent, the use of truss hanger 26 allows for the mounting of joists or beams to fire separation walls with less interruption to the wall's fire-retardant sheathing, thus minimizing any reduction in the wall's fire-resistant rating. *See* Ex. 1001, 1:25–41.

D. Illustrative Claim

The '867 patent includes twenty-three claims, all of which are challenged. Claims 1 and 16 are independent claims. Claim 1 is illustrative and reproduced below.

> 1. A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:
>
> a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;
>
> a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane, the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and
>
> an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion, each extension flange being configured to extend through the sheathing, each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped

> portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall.

Ex. 1001, 12:15–44.

E. Evidence of Record

Petitioner relies on the following patent evidence and published patent application evidence.

Name	Document	Exhibit
Bundy	9,394,680 B2	1007
Timony	2005/0155307 A1	1008
Tsukamoto	JPH0314482Y2[1]	1009
Gilb '792	4,422,792	1035
Robinson	GB2433522A	1046
Harrison	2005/0120669 A1	2016

Pet. 1–3, RMTA Opp. 12.

Petitioner relies on the Declarations of W. Andrew Fennell (Exs. 1003, 1039, 1045).

Patent Owner relies on the Declarations of Reynaud Serrette, Ph.D. (Exs. 2001, 2057, 2059, 2069).

We note that Patent Owner does not challenge the prior art status of any of the patents and published patent applications listed above.

[1] Citations herein to Tsukamoto are to the certified translation thereof included in Ex. 1009.

F. Instituted Challenges to Patentability

We instituted post-grant review of claims 1–23 of the '867 patent on the following grounds. Dec. 2–3, 8–9, 87–88.

Claims Challenged	35 U.S.C. §	References/Basis
1–23	112(b)	
5, 17	112(a)	
1–12, 15–17, 21–23	103[2]	Gilb '792, Bundy
1–4, 6, 10, 11	102	Timony
5, 7–9, 12, 15–17, 21–23	103	Timony, Bundy
1–12, 15–17, 21–23	103	Tsukamoto, Bundy

II. ANALYSIS: ORIGINAL CLAIMS 1–23

A. Applicable Law

Petitioner challenges the patentability of original claims 1–23 of the '867 patent on the grounds that various claims are indefinite, lack sufficient written description, or are anticipated under 35 U.S.C. § 102 or obvious under 35 U.S.C. § 103 in light of various references, namely, Gilb '792, Timony, Tsukamoto, and Bundy. To prevail in its challenges to the patentability of the claims, Petitioner must establish unpatentability by a

[2] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103. Because the '867 patent was effectively filed after March 16, 2013, the effective date of the relevant amendment, the AIA versions of §§ 102 and 103 apply.

preponderance of the evidence. 35 U.S.C. § 326(e); 37 C.F.R. § 42.1(d). In a post-grant review, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable. *See* 35 U.S.C. § 322(a)(3) (requiring post-grant review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim"); *cf. Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) ("[I]t was [Petitioner's] burden to explain to the Board how [the combination of prior art] rendered the challenged claims unpatentable."). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review).

1. Written Description

Under 35 U.S.C. § 112(a), a patent specification shall contain a "written description" of the invention. The purpose of the written description requirement is to "ensure that the scope of the right to exclude, as set forth in the claims, does not overreach the scope of the inventor's contribution to the field of art as described in the patent specification." *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 920 (Fed. Cir. 2004) (quoting *Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1345 (Fed. Cir. 2000)). This requirement protects the *quid pro quo* between inventors and the public, whereby the public receives "meaningful disclosure in exchange for being excluded from practicing the invention for a limited period of time." *Enzo Biochem, Inc. v. Gen–Probe Inc.*, 323 F.3d 956, 970 (Fed. Cir. 2002).

To satisfy the written description requirement, the disclosure must reasonably convey to skilled artisans that the inventor possessed the claimed invention as of the claimed priority date. *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). "One does that by such descriptive means as words, structures, *figures*, diagrams, formulas, etc., that fully set forth the claimed invention." *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997) (emphasis added). "The invention is, for purposes of the 'written description' inquiry, whatever is now claimed." *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991). Such description need not recite the claimed invention *in haec verba* but must do more than merely disclose that which would render the claimed invention obvious. *Univ. of Rochester*, 358 F.3d at 923; *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566–67 (Fed. Cir. 1997); *see also PowerOasis, Inc. v. T–Mobile USA, Inc.*, 522 F.3d 1299, 1306–07 (Fed. Cir. 2008) (explaining that § 112, ¶ 1 "requires that the written description actually or inherently disclose the claim element").

2. Indefiniteness

Under 35 U.S.C. § 112(b), a patent specification "shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor . . . regards as the invention." This is commonly referred to as the definiteness requirement.

The Board applies in post-grant reviews the same indefiniteness standard as used in federal courts and the U.S. International Trade Commission under *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014), and its progeny. USPTO Memorandum, *Approach To Indefiniteness*

Under 35 U.S.C. § 112 In AIA Post-Grant Proceedings (Jan. 6, 2021). Under *Nautilus*, "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with *reasonable certainty*, those skilled in the art about the scope of the invention." *Nautilus*, 572 U.S. at 901 (emphasis added). "[A] patent must be precise enough to afford clear notice of what is claimed, thereby apprising the public of what is still open to them," but the present standard recognizes that "absolute precision is unattainable." *Id.* at 909–10 (internal quotation marks and brackets omitted).

3. Anticipation

To serve as an anticipatory reference under 35 U.S.C. § 102, "the reference must disclose each and every element of the claimed invention, whether it does so explicitly or inherently." *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009). "The identical invention must be shown in as complete detail *as is contained in the . . . claim*." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989) (emphasis added). The elements must be arranged as required by the claim, "but this is not an '*ipsissimis verbis*' test," i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 832–33 (Fed. Cir. 1990) (citing *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1479 & n.11 (Fed. Cir. 1986)).

4. Obviousness

A claim is unpatentable under 35 U.S.C. § 103 "if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to

which the claimed invention pertains." 35 U.S.C. § 103; *see KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when of record, objective evidence of obviousness or non-obviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Secondary considerations may include the following: "commercial success, long felt but unsolved needs, failure of others, etc."[3] *Id.* The totality of the evidence submitted may show that the challenged claims would not have been obvious to one of ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984). When evaluating a combination of teachings, we must also "determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

The Supreme Court has made clear that we apply "an expansive and flexible approach" to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming a combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. To reach this conclusion, however, requires more than a mere

[3] Patent Owner has not presented objective evidence of non-obviousness.

showing that the prior art includes separate references covering each separate limitation in a claim under examination. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention. *Id.* "To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

We analyze the challenges presented in the Petition and to the RMTA (*see* section III, *infra*) in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art, at the time of the effective filing date of the '867 patent:

> would have had an education background of, or practical experience providing an equivalent to, a Bachelor of Science in Mechanical Engineering, Structural Engineering or a related/equivalent field and at least four years of work experience in construction connector design/development.

Pet. 13 (citing Ex. 1003 ¶ 15). Similarly, Patent Owner contends that the skilled artisan:

> would have acquired a body of knowledge gained through formal education, or practical experience providing an equivalent to, a Bachelor of Science in Mechanical Engineering, Civil/Structural Engineering, or a related/equivalent field, and at least four years

> of work experience in construction connector design/development.

PO Resp. 23; *see* Ex. 2001 ¶ 19.

In determining the level of ordinary skill in the art, various factors may be considered, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). The level of ordinary skill in the art also is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

Neither party argues that the outcome of this case would differ based on our adoption of any particular definition of the level of ordinary skill in the art. Although slight differences exist in the formulation of such skill level between the parties, we discern no meaningful differences because none of those differences would affect the outcome of our analysis. Considering the subject matter of the '867 patent, the background technical field, the prior art, and parties' proposed definitions of the skilled artisan, we apply the level of skill cumulatively set forth above by the parties, which is consistent with testimony of both parties' experts (Ex. 1003 ¶ 15; Ex. 2001 ¶ 19).

C. Claim Construction

We apply the claim construction standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.200(b). Under *Phillips*, claim terms are afforded "their ordinary and

customary meaning." *Phillips*, 415 F.3d at 1312. "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* at 1313. "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). Extrinsic evidence is "less significant than the intrinsic record in determining 'the legally operative meaning of claim language.'" *Phillips*, 415 F.3d at 1317. Only terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999); *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review).

In PGR2019-00063, which involved the '510 patent (an immediate parent of the '867 patent), we construed certain claim limitations also relevant to this case, namely:

(1) "*extend through*": in the context of element A "extend[ing] through" element B, "extend through" means "element A extends into one side and out the other side of element B" (*Simpson Strong-Tie Company Inc. v. Columbia Insurance Company*, PGR2019-00063, Paper 52 (Ex. 2006) at 44–45 (PTAB Mar. 11, 2021));

(2) "*configured to extend through*" the sheathing: in the context of "an extension portion extending from the channel-shaped portion and configured to extend through the sheathing," an "extension portion . . . configured to extend through the sheathing" means (or requires structurally) "an extension portion extending from the channel-shaped portion towards the connection portion and defining a space to receive sheathing" (*id.* at 51; *see id.* at 41–52);

(3) "*extending from*": in the context of element B extending from element A, "extending from" means "the beginning of element B's extension is on element A" (*id.* at 110; *see id.* at 106–110); and

(4) "*rigidly fixed*": "rigidly fixed" means "components are connected such that they do not move freely with respect to one another" (*id.* at 98; *see id.* at 96–98).

We maintain these same constructions for these terms in this case for the same reasons given in PGR2019-00063. *See* Pet. 14 ("Given that the Specification is identical between the present patent and the '510 Patent (the subject of the Board's prior decision), Petitioner applies the same construction to the same terms in the present claims."); PO Resp. 23–24 ("For the purposes of this Preliminary Response [sic: Response], [Patent Owner] does not dispute [Petitioner's] constructions of 'extend through,' or 'extending from.'"). We note that Petitioner submits "[w]hile the term 'rigidly fixed' does not appear in the '867 Patent claims, the term 'fixed' does," and "[g]iven that the Board's prior construction of 'rigidly fixed' appears to have relied on portions of the shared specification using the word 'fixed,' Petitioner uses the same construction herein for the term 'fixed.'"

Pet. 14. Patent Owner, on the other hand, disputes the meaning of "fixed" in this case. PO Resp. 49–51. Patent Owner also continues its dispute as to the meaning and import of "configured to," as recited in, for example, independent claim 1, including as recited in the limitation "configured to extend through," that we already construed in PGR2019-00063 as noted above. *Id.* at 39–43, 45–49. To the extent necessary, we further address the meaning and import of "fixed" (versus "rigidly fixed") and "configured to" as well as the meaning of these other limitations in our unpatentability analysis below.

In this case, Petitioner and Patent Owner also collectively advance constructions for three other claim limitations:

(1) "*planar*," as recited in, for example, dependent claim 2 (Pet. 14–15; PO Resp. 51–57);

(2) "*each extension flange lying in an extension flange plane*," as recited in, for example, independent claim 1 (PO Resp. 24–39); and

(3) "*extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing*," as recited in, for example, dependent claim 5 (*id.* at 43–45).

To the extent necessary to resolve the controversy before us, we address claim interpretation in our unpatentability analysis below.

D. Alleged Unpatentability of Claims 1–23 Based on Indefiniteness

Petitioner contends claims 1–23 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness. Pet. 15–23; Pet. Reply 2–4, 8–11. Patent Owner opposes Petitioner's contentions. PO Resp. 57–68; PO Sur-Reply 3–9. For the reasons expressed below, and based on the complete record before

us, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 5 and 17 (but not claims 1–4, 6–16, and 18–23) are unpatentable under 35 U.S.C. § 112(b) for indefiniteness.

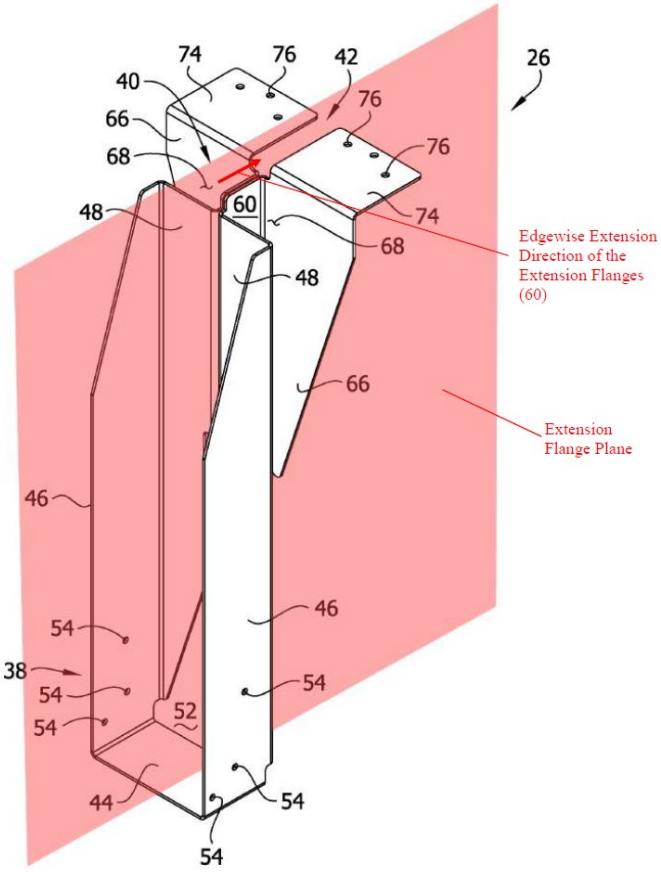
1. Claims 1–15: "each extension flange lying in an extension flange plane"

Petitioner contends the limitation "each extension flange lying in an extension flange plane" as recited in independent claim 1 is indefinite. Pet. 15–20; Pet. Reply 2–4, 8–10; Ex. 1001, 12:35–36. Petitioner's contention also applies to claims 2–15, which depend, directly or indirectly, from claim 1. In particular, Petitioner argues this limitation "fails to inform with reasonable certainty where the 'extension flange' is located relative to the 'extension flange plane,' specifically which surface of the 'extension flange'—and how much of such surface—lies 'in' the 'extension flange plane.'" Pet. 15. Petitioner further argues "claim 1 defines the location of the 'extension flange plane' based on a *three-dimensional, multiplanar object*—the extension flange—without identifying any particular surface or cross-section on the extension flange," and that because "[e]ach extension flange has multiple surfaces, which surfaces also include curves," "[t]his renders the claimed location of the 'extension flange plane' ambiguous." Pet. 16; *see* Pet. 17 ("Across its thickness, extension flange 60 lies in an infinite number of imaginary two-dimensional planes."). Petitioner contends, "[t]o the extent that the phrase 'each extension flange lying in an extension flange plane' can be construed *consistently* with the specification, [the skilled artisan] would have understood this 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 entirely *from* the channel-shaped portion *to* the connection portion." Pet. Reply 4 (citing Ex. 1001, 2:20–23; Ex. 1039 ¶¶ 22–26).

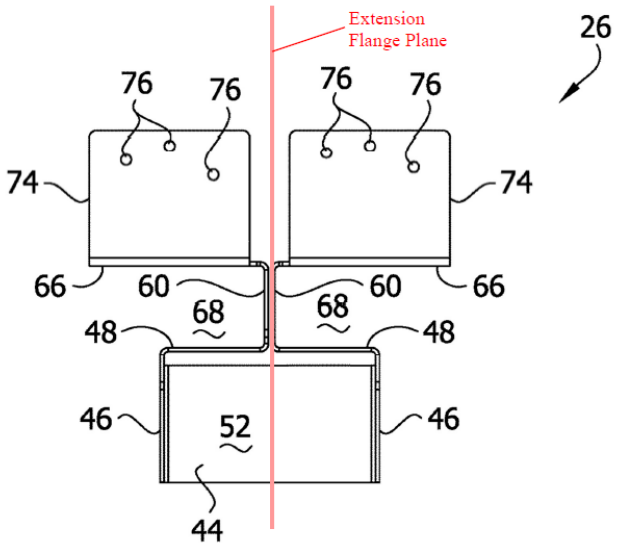
Patent Owner argues Petitioner "fails to apply a proper construction of what [it] means to 'lie in a plane'" in view of claim 1, the Specification, and knowledge of the skilled artisan. PO Resp. 58. In particular, Patent Owner argues Petitioner "erroneously asserts that this limitation requires the identification of a specific surface of the extension flange that lies in the extension flange plane, and that the limitation is indefinite because no specific surface of the extension flange is identified by claim 1." *Id.*; *see id.* at 62 ("'[L]ying in a . . . plane' is commonly used in the mechanical arts, including joist hangers, to describe the arrangement of a three dimensional object—particularly an object such as a flange that has a smaller thickness in relation to the dimensions of its major surfaces—relative to a plane." (citing Ex. 2001 ¶ 164)). Patent Owner contends the limitation "each extension flange lying in an extension flange plane" is not indefinite, and 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." *Id.* at 26. Patent Owner argues, based on this proposed construction, "[the skilled artisan] is readily able to determine, with certainty, the arrangement of the extension flange planes and ultimately the orientation of the extension flanges" (*id.* at 63 (citing Ex. 2001 ¶ 167); *see id.* at 26; Ex. 2001 ¶ 158), and to illustrate this provides annotated versions of Figures 2 and 7 of the '867 patent, reproduced below.

FIG. 2



The above illustration shows Patent Owner's understanding of an extension flange plane applied to Figure 2 of the '867 patent.

FIG. 7



The above illustration shows Patent Owner's understanding of an extension flange plane applied to Figure 7 of the '867 patent.

PO Resp. 58–61 (citing Ex. 2001 ¶¶ 158–160); *see* Ex. 1001, Figs. 2, 7.

We find Petitioner's arguments unpersuasive, and turn first to the construction of the limitation at issue.

a) Claim Construction: "each extension flange lying in an extension flange plane"

Patent Owner argues the skilled artisan would understand the limitation "each extension flange lying in an extension flange plane" to mean "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." PO Resp. 24–39, 58–63; *see* PO Sur-Reply 3–8. Patent Owner argues "[t]his construction represents the plain and ordinary meaning in the art of 'each extension flange lying in an extension flange plane' as would be understood by [the skilled artisan] in view of its context

in claim 1, the specification, and knowledge possessed by the [skilled artisan]." PO Resp. 26 (citing Ex. 2001 ¶¶ 115–121). Patent Owner argues the context of claim 1 itself supports this construction:

> [The skilled artisan] would recognize that the limitation "each extension flange lying in an extension flange plane" is being used to establish the orientation and arrangement of the extension flange. EX2001: ¶¶115–118; EX1001: 12:32–38. Claim 1 defines the plane in which the edgewise end-to-end extension is arranged as an "extension flange plane." EX2001: ¶ 119. Claim 1 further provides the starting point ("extending from the channel shaped portion") and ending point ("to the connection portion") of the extent of each of the extension flanges. *Id.* ¶ 120. Finally, claim 1 provides the orientation of the extension flange plane as being "generally perpendicular to the base plane," thus establishing the orientation of the extension flange relative to the base plane. *Id.* ¶ 121.

Id. at 25; *see* Ex. 2001 ¶¶ 112–121. Patent Owner argues the Specification supports this construction (PO Resp. 26–28), and submits "it is readily apparent [as shown in annotated Figures 2 and 7 reproduced above] that for each extension flange there is an extension flange plane *within the extent of the extension flange* from the channel-shaped portion [to the back flanges of the connection portion]." *Id.* at 26 (citing Ex. 2001 ¶¶ 122–124) (emphasis added).

In addition, Patent Owner argues "prior art references all show that [Patent Owner's] proposed claim construction for this limitation is consistent with its ordinary usage in the art," and discusses several instances where prior art patents or published patent applications for joist or structural component hangers describe various three-dimensional objects or flanges as lying in planes. PO Resp. 29–39 (citing Ex. 2001 ¶¶ 128–144); *see* PO Sur-

Reply 4 ("As was addressed in the [Response] and left unrebutted in [Petitioner's] Reply, the prior art—including [Petitioner's] own art—demonstrates that the term 'plane' is routinely used to describe three-dimensional objects within the art."); *In re Cortright*, 165 F.3d 1353, 1358 (Fed. Cir. 1999) ("Prior art references may be 'indicative of what all those skilled in the art generally believe a certain term means . . . [and] can often help to demonstrate how a disputed term is used by those skilled in the art.'") (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1584 (Fed. Cir. 1996)). Notably, for example, a published patent application of Simpson Strong-Tie International, Inc. (Ex. 2015) describes certain three-dimensional aspects of a joist hanger as lying in planes: "The stiffening elements (25) *lie in a plane* substantially parallel with a plane including the side flanges (30, 40)"; and "The return leg(s) *lie in a plane* approximately parallel to a plane including the back flange(s)." Ex. 2015, 10 (emphases added). This Simpson application also claims, for example, "side flanges *in a plane* approximately perpendicular to *planes including* the adjoining side flange and the seat." *Id.* at 15 (emphases added). We find Patent Owner's exposition of various prior art references that describe objects, particularly joist hanger objects, as lying in planes to support Patent Owner's proposed claim construction above and to contradict Petitioner's indefiniteness argument.

Petitioner urges us to construe the subject limitation not to require an extension flange plane to be *within the extent* of the extension flange *from* the channel-shaped portion *to* the connection portion, but only to require an extension flange plane to be *within a section* of the flange *located between*

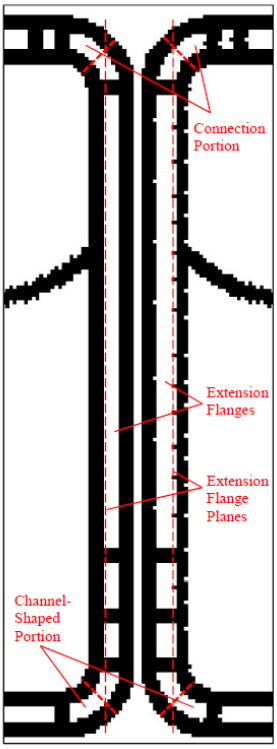
the connection portion *and* the channel-shaped portion. *See* Pet. Reply 4. In other words, according to Petitioner, as long as any section of the flange, however small (even an edge), located anywhere between the connection portion and the channel-shaped portion lies within an extension flange plane, then this would satisfy the subject limitation. We find such a construction unavailing, as it would effectively gut the subject limitation of any limiting value, particularly of providing any meaningful orientation and arrangement of the extension flange relative to other components of the claimed hanger. *See* PO Resp. 25 ("[The skilled artisan] would recognize that the limitation 'each extension flange lying in an extension flange plane' is being used to establish the orientation and arrangement of the extension flange." (citing Ex. 2001 ¶¶ 115–118; Ex. 1001, 12:32–38)); *see also infra* Section II.D.1.b; Ex. 2001 ¶ 127 ("[The skilled artisan] would understand that a flange 'lying in' a plane refers to a plane that is aligned with the end-to-end extension of the flange, and not a plane that crosses or runs perpendicular to the extension." (cited at PO Resp. 28)).

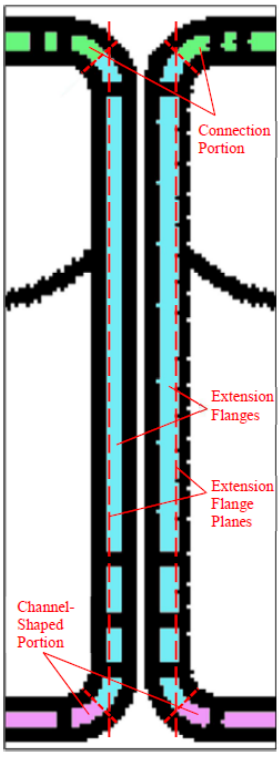
Petitioner argues "[Patent Owner's] construction of 'each extension flange lying in an extension flange plane' is inconsistent with the specification, and therefore, should not be used to add further meaning to the claims," and hence does not provide reasonable certainty as to the scope of this limitation. Pet. Reply 8–9. In particular, Petitioner argues:

> [N]owhere does the specification describe an extension flange coinciding with a plane entirely from the channel-shaped portion to the connection portion. Rather, the extension flange explicitly includes *bends*; only a section (not the ends) of the extension flange coincides with a plane *between* the channel-shaped portion and the connection portion.

Id. at 9 (first emphasis added); *see id.* at 2 ("The specification and drawings make clear that [Patent Owner's] own extension flanges include bends between the channel-shaped portion and connection portion."), 3 ("[E]ither [Patent Owner's] construction cannot be supported or must be broadened to include bends."), 4 ("[Patent Owner's] construction . . . would exclude every disclosed embodiment of the specification."). We find Petitioner's arguments unpersuasive.

As argued by Patent Owner, the "bends" disclosed in the '867 patent and identified by Petitioner "do not preclude[] the extension flange from being coincident with an extension flange plane," as illustrated in Patent Owner's enlarged and annotated versions of Figure 7 of the '867 patent, reproduced below. PO Sur-Reply 5–6; Ex. 2069 ¶ 12.





The above illustrations show Patent Owner's understanding of extension flange planes applied to Figure 7 of the '867 patent.

PO Sur-Reply 5–6; Ex. 2069 ¶ 12; Ex. 1001, Fig. 7. We agree with Patent Owner that in this structural context "the extension flanges are still each coincident with an extension flange plane throughout their extent from the channel-shaped portion to the connection portion even with the bends." PO Sur-Reply 5. This is so because the bends (or bent portions) at the ends of the extension flanges disclosed in Figure 7, for example, have radiuses small enough to allow an extension flange plane to remain *within the extent* of the extension flange *from* the channel-shaped portion *to* the connection portion. During the oral hearing in this proceeding, Petitioner's counsel agreed:

> [Question:] [W]ith Dr. Serrette's fourth declaration drawing [i.e., the enlarged, annotated version of Figure 7 reproduced above], does the location of that dotted line, being the extension flange plane, does that allow the object to satisfy the claim language in your view?
>
> [Petitioner's Counsel:] It doesn't. Well, it's unclear because we don't actually know where the ends of the extension flange are. *If we assume that the ends of the extension flange kind of end where the -- see on the bottom where the blue transitions to pink, that's okay* . . . .

Tr. 11:8–20 (emphasis added).

We note that Patent Owner, in addition to arguing its proposed construction of the subject limitation as discussed above, contends that the subject limitation *also* "should be construed to require that the extension flanges are *thin* and *relatively flat* such that the entire extension flange is *substantially coplanar* with the plane." PO Resp. 39 (emphases added); *see id.* at 25. We find Patent Owner's argument here unavailing, particularly

because Patent Owner's proposed interpretation of the subject limitation (a) introduces three relative terms (i.e., "thin," "relatively flat," and "substantially coplanar"), not present in the subject limitation under construction, without identifying any support from the '867 patent as to the *scope* of such relative terms, and (b) requires us to read-in those limitations which simply are not present in the subject limitation itself (but readily could have been explicitly claimed if intended). More specifically, because the '867 patent discloses certain hanger embodiments stamped from sheet metal (e.g., 16-guage steel sheet) (*see, e.g.*, Ex. 1001, 6:15–21, Fig. 2), and because certain prior art cited by Patent Owner uses variations of the phrase "lying in a plane" in conjunction with features of hangers stamped from sheet metal (*see* PO Resp. 29–39), Patent Owner argues that "lying in [a] . . . plane" in the subject limitation must be read to reflect properties of sheet metal, such as "thin" and "relatively flat" (PO Resp. 39). We disagree, and find doing so to be a clear case of improperly importing limitations (and implicit ones at best) from the Specification into the subject limitation. *See E-Pass Techs., Inc. v. 3Com Corp.*, 343 F.3d 1364, 1369 (Fed. Cir. 2003) (Claims must be interpreted "'in view of the specification' without unnecessarily importing limitations from the specification into the claims." (citing *Texas Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1203–04 (Fed. Cir. 2002))). Indeed, the '867 patent itself describes the construction of its hangers by stamping sheet metal only as "embodiment[s]," and explicitly discloses that "other suitable materials are within the scope of the present invention." Ex. 1001, 6:15–21.

We also note that Patent Owner, again in addition to arguing its proposed construction of the subject limitation as discussed above, contends that "bends" at the ends of extension flanges are "negligible features" and "would not be considered in determining whether a flange lies in a plane." PO Sur-Reply 7. Similarly, Patent Owner contends "the bends would be *ignored* in determin[ing] whether the extension flange lies in a plane." *Id.* at 6 (emphasis added). We find Patent Owner's arguments here unavailing, particularly because they plainly contradict Patent Owner's proffered construction of the subject limitation, which requires an extension flange plane to be *within the extent* of the extension flange *from* the channel-shaped portion *to* the connection portion, and plainly undermine Patent Owner's contention that Petitioner is wrong that the subject limitation requires an extension flange plane to be only within *a section* of the flange *located between* the connection portion *and* the channel-shaped portion. Indeed, disregarding structural features at the ends of extension flanges, such as "bends," leaves only a "section" of the flange to lie in a plane, which we disagree is the proper construction of the subject limitation. *See supra*. As discussed above, the parties agree that construing the subject limitation to mean "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" does accommodate bends of certain radii at the ends of extension flanges, but not any size bend or transition (regardless of location along the extension flange), which we find affords proper boundaries for the subject limitation of "each extension flange lying in an extension flange plane." *See Nautilus*, 572 U.S. at 901.

Accordingly, based on the foregoing and the complete record before us, we construe the limitation "each extension flange lying in an extension flange plane" to mean "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."

b) Alleged Indefiniteness

Based on our reasoning immediately above for our construction of the limitation "each extension flange lying in an extension flange plane," we are not persuaded by Petitioner that this limitation would not have informed *the skilled artisan*, with reasonable certainty, about the scope of the claimed invention. *See Nautilus*, 572 U.S. at 901, 909–10 ("absolute precision is unattainable"); PO Resp. 63 ("[The skilled artisan] is readily able to determine, with certainty, the arrangement of the extension flange planes and ultimately the orientation of the extension flanges."); *see also* PO Resp. 58–63; Ex. 2001 ¶¶ 158–167.

Accordingly, we conclude that Petitioner has not demonstrated by a preponderance of evidence that claims 1–15[4] are unpatentable under 35 U.S.C. § 112(b) for indefiniteness.

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[4] As noted above in Section I, Patent Owner obtained a Certificate of Correction that, in part, added the term "portion" after the last use of the term "channel-shaped" in claim 11. Ex. 2032. We find this change does not affect our indefiniteness analysis here. Thus, we need not and do not decide herein whether the Certificate of Correction, which issued subsequent to the filing of the Petition, has effect in this proceeding.

2. Claims 16–23: "a channel-shaped portion configured to receive the structural component" and "a base configured to receive an end portion of the structural component thereon to support the structural component"

Petitioner contends the limitations "a channel-shaped portion configured to receive *the structural component*" and "a base configured to receive an end portion of *the structural component* thereon to support *the structural component*" as recited in independent claim 16, and thus in claims 17–23 which depend therefrom, are indefinite. Pet. 20–22; Ex. 1001, 13:34–14:18. In particular, Petitioner argues these limitations "lack proper antecedent basis for the term 'structural component,' thereby failing to inform with reasonable certainty what object—a joist or a structural component—is intended to be used with the recited hanger." Pet. 21. According to Petitioner, because claim 16 introduces "a joist" in the preamble and then later introduces "the structural component" without proper antecedent basis, the skilled artisan "would not have been able to determine with reasonable certainty whether the recited hanger is intended to be used with a joist (a specific type of structural member having standard, uniform sizes) or a structural component (a generic term covering various structural members (e.g. a truss) having different shapes and sizes)." Pet. 21–22.

Patent Owner, quoting *Bose Corp. v. JBL, Inc.*, 274 F.3d 1354, 1359 (Fed. Cir. 2001), argues "the failure to provide explicit antecedent basis for terms does not always render a claim indefinite." PO Resp. 63–64; *see In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971) ("[T]he definiteness of the language employed must be analyzed—not in a vacuum, but always in light

of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art."). Patent Owner argues the skilled artisan "would have readily understood that the term 'a joist' provided antecedent basis for the term 'the structural component' based on the claim language, the specification, and the knowledge possessed by the [skilled artisan]." PO Resp. 64 (citing Ex. 2001 ¶¶ 168–178). Patent Owner argues the skilled artisan "knows that joists are a type of structural component," and highlights that Petitioner even agrees with this point. *Id.* (citing Ex. 2001 ¶ 172; Pet. 21–22 ("a joist (a specific type of structural member[])")). Patent Owner argues the skilled artisan "would have understood the term 'a joist' provided antecedent basis for the term 'the structural component.'" *Id.* at 63. We agree with Patent Owner's arguments.

Based on the foregoing and the complete record before us, we are not persuaded by Petitioner that the limitations "a channel-shaped portion configured to receive the structural component" and "a base configured to receive an end portion of the structural component thereon to support the structural component" would not have informed *the skilled artisan*, with reasonable certainty, about the scope of the claimed invention. *See Energizer Holdings, Inc. v. Int'l Trade Comm'n*, 435 F.3d 1366, 1370 (Fed. Cir. 2006) ("When the meaning of the claim would reasonably be understood by persons of ordinary skill when read in light of the specification, the claim is not subject to invalidity upon departure from the protocol of 'antecedent basis.'"). Accordingly, we conclude that Petitioner

has not demonstrated by a preponderance of evidence that claims 16–23 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness.

As noted above in Section I, Patent Owner obtained a Certificate of Correction that, in part, replaces the term "joist" in claim 16 with the term "structural component." Ex. 2032; *see* PO Resp. 63. The Certificate of Correction was filed and issued after Petitioner filed the Petition. Our determination as to Petitioner's indefiniteness challenge is based on the original phrasing of claim 16. As indicated in our analysis, we find that the term "a joist" provides antecedent basis for the term "the structural component." Thus, we would reach the same result regardless of whether the Certificate of Correction has effect in this proceeding. In any event, we need not and do not decide herein whether the Certificate of Correction has effect in this proceeding.

3. Claims 5 and 17: "extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing"

Petitioner contends the limitation "extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing" as recited in dependent claims 5 and 17 is indefinite. Pet. 22–23; Pet. Reply 6–7, 11; Ex. 1001, 12:53–56, 14:19–22. In particular, Petitioner argues this limitation "fails to inform with reasonable certainty *how* the recited function of maintaining a 2 hour fire resistance rating *further limits the claimed hanger*." Pet. 22 (emphases added). Petitioner argues "the recited function of maintaining a 2 hour fire resistance rating of sheathing *does not clarify what is required by the hanger*, because the fire resistance rating is based on the entire wall assembly, not just the

conformance between the sheathing and the hanger." Pet. 23 (citing Ex. 1003 ¶ 86) (emphasis added).

Patent Owner argues the skilled artisan would have recognized that the phrase 'a 2 hour fire resistance rating of the sheathing' as recited in claims 5 and 17 "was describing a 2 hour fire resistance rating of the entire wall assembly including the [wall (claim 5)/frame wall (claim 17)] and the sheathing." PO Resp. 44 (citing Ex. 2001 ¶ 155); *see id.* at 43–45, 64–68. Patent Owner argues, at least implicitly, that the skilled artisan would understand, with reasonable certainty, what the limitation the "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" requires. PO Resp. 43–45, 64–68. Patent Owner does so without citing any supporting evidence, and without identifying what structural attributes *the claimed hanger* allegedly "requires" to meet this 2-hour fire resistance feature, let alone what the claimed structural difference(s) are between (1) extension flanges configured to extend through sheathing and (2) extension flanges configured to extend through sheathing *while maintaining a 2 hour fire resistance rating of the sheathing*.

Patent Owner argues that the limitation "maintaining a 2 hour fire resistance rating of the sheathing" "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 the testing standards prescribed by ASTM E814 and ASTM E119." PO Resp. 45 (emphases added) (citing Ex. 2057 ¶¶ 54, 57).

We disagree. The *claimed hanger* has no structural properties, at least none identified to the Board, that force or enforce the application of sheathing like drywall such that users must apply such sheathing in close conformance with the extension flanges of the claimed hanger. Patent Owner seems to argue this "minimal[] disturb[ance]" feature backwards—it is not the claimed hanger that has structure defined by how each one of countless users applies sheathing around the hanger or that forces or enforces application of sheathing in a particular manner relative to the hanger; instead, it is the *users* of the hanger (e.g., construction workers) that may, at their discretion, apply sheathing or other material around the structure of the claimed hanger so as to achieve a 2-hour fire resistance rating. *See* Pet. Reply 7 ("[The skilled artisan] 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 acknowledged in the '867 patent." (citing Ex. 1038, 121:12–123:22, 148:3–24; Ex. 1001, 11:45–60; Ex. 1039 ¶¶ 32–33)). Indeed, Patent Owner's expert, Dr. Serrette, testifies that "[a]n installer can put *any material they wish to fill that gap* [i.e., any gap between sheathing/drywall and the hanger's structure], provided it's code approved." Ex. 1038, 148:3–24 (cited at Pet. Reply 11) (emphasis added).

We find Patent Owner's arguments here unavailing, and agree with Petitioner (Pet. 22) that the subject limitation, whether interpreted as "while maintaining a 2 hour fire resistance rating of the sheathing" or "while maintaining a 2 hour fire resistance rating of a wall assembly including the

frame wall and the sheathing," fails to inform with reasonable certainty *how* the limitation allegedly *further limits the claimed hanger* (i.e., affects the scope of the claimed *apparatus*). Accordingly, we conclude that Petitioner has demonstrated by a preponderance of evidence that claims 5 and 17 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness.

In addition, as noted above in Section I, Patent Owner obtained a Certificate of Correction that, in part, amended the phrase "while maintaining a 2 hour fire resistance rating of the sheathing" in claims 5 and 17 to instead recite "while maintaining a 2 hour fire resistance rating of *a wall assembly including the frame wall and* the sheathing." Ex. 2032 (emphasis added); *see* PO Resp. 43–44. As discussed above, we find this change does not affect our indefiniteness analysis here. Thus, we need not and do not decide herein whether the Certificate of Correction, which issued subsequent to the filing of the Petition, has effect in this proceeding.

E. Unpatentability of Claims 5 and 17 Based on Lack of Written Description

Petitioner contends claims 5 and 17 also are unpatentable under 35 U.S.C. § 112(a) for lack of written description. Pet. 24–25 ("[T]he subject matter of dependent claims 5 and 17 is not disclosed expressly or inherently in the '867 Patent specification, and thus lack[s] written description support."); Pet. Reply 11–12. Patent Owner opposes Petitioner's contentions. PO Resp. 43–45, 68–70. For the reasons expressed below, and based on the complete record before us, we determine that Petitioner has demonstrated by a preponderance of evidence that claims 5 and 17 are unpatentable under 35 U.S.C. § 112(a) for lack of written description.

"Sufficiency of written description is a question of fact." *Gen. Hosp. Corp. v. Sienna Biopharmaceuticals, Inc.*, 888 F.3d 1368, 1371 (Fed. Cir. 2018). Whether a patent claim satisfies the written description requirement depends on whether the description "clearly allow[s] persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Vas-Cath*, 935 F.2d at 1562–63 (internal quotation marks omitted) (quoting *In re Gosteli*, 872 F.2d 1008, 1012 (Fed. Cir. 1989)). But "one cannot disclose a forest in the original application, and then later pick a tree out of the forest and say here is my invention. In order to satisfy the written description requirement, the blaze marks directing the skilled artisan to that tree must be in the originally filed disclosure." *Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1326–27 (Fed. Cir. 2000).

Dependent claims 5 and 17 each recite "the first and second extension flanges are *configured to* extend through the sheathing *while maintaining a 2 hour fire resistance rating of the sheathing*." Ex. 1001, 12:53–56, 14:19–22 (emphases added). Petitioner argues "nowhere does the '867 patent disclose that the sheathing alone has a 2 hour fire resistance rating, such that there is no support for the claimed term 'maintaining a 2 hour fire resistance rating of the sheathing.'" Pet. 24 (citing Ex. 1003 ¶¶ 88–90). Petitioner acknowledges "[t]he specification *only ever* refers to a 2 hour fire resistance rating of the 'wall assembly,' *not the sheathing itself*," and that "other materials and wall components [are] needed to achieve the desirable fire resistance rating of the entire assembly, *even using the '867 Patent's own hanger*." Pet. 24 (emphases added).

Patent Owner argues Petitioner fails to consider how the skilled artisan would construe this limitation in view of the Specification and knowledge possessed by the skilled artisan. PO Resp. 43–45, 68–70. Specifically, Patent Owner argues the skilled artisan "would have understood 'wherein the first and second extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of the sheathing' within the context of the '867 Patent to mean 'wherein the first and second extension flanges are configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of *a wall assembly including the wall[/frame wall] and the sheathing*.'" *Id.* at 69 (citing Ex. 2001 ¶ 187). Patent Owner argues:

> [T]he [S]pecification identifies that [Patent Owner] had a wall assembly independently tested by an outside firm according to the procedures prescribed by STM E814 and ASTM E119 to confirm that the penetration of the claimed hanger's extension flange through the sheathing did not compromise the 2 hour fire rating of a wall assembly. EX1001: 11:45–60. The inclusion of the independent testing is proof positive that the inventor was in possession of a hanger with extension flanges that were "configured to extend through the sheathing while maintaining a 2 hour fire resistance rating of a wall assembly including the wall[/frame wall] and the sheathing."

Id. at 70. Patent Owner argues that under its construction of the subject limitation the skilled artisan would have understood that the Specification of the '867 patent reasonably conveys that the inventor was in possession of the claimed subject matter. *Id.* at 70.

We agree with Patent Owner's claim construction argument that, in the context of the '867 patent, *the skilled artisan* would interpret the phrase "while maintaining a 2 hour fire resistance rating of the sheathing" to mean

"while maintaining a 2 hour fire resistance rating of a wall assembly including the frame wall and the sheathing," for the reasons given by Patent Owner (*see* PO Resp. 43–45). We also agree with Patent Owner that Petitioner concedes the '867 patent describes fire ratings *only* in the context of the entire wall assembly (Pet. 24), which includes sheathing, and that this supports Patent Owner's proposed claim construction here.

But this does not end the written description inquiry before us. Petitioner challenges whether the Specification of the '867 patent discloses the full scope of dependent claims 5 and 17, and in particular, whether the Specification provides written description support for extension flanges "*configured to* extend through the sheathing *while maintaining a 2 hour fire resistance rating of the sheathing*." *See* Pet. 24–25. Petitioner argues "the [S]pecification does not describe *what structural features of the extension flange* allow the hanger to achieve a 2 hour fire resistance rating," and "[t]here is no support in the '867 patent showing *how the recited extension flanges* maintain a 2 hour fire resistance rating," even as construed by Patent Owner or in view of the Certificate of Correction directed to this limitation. Pet. Reply 11 (emphases added). We agree with Petitioner.

As noted above (*see supra* Section II.D.3), it is not the claimed hanger that has structure *defined by* how each one of countless users applies sheathing around the hanger or that forces or enforces application of sheathing in a particular manner relative to the hanger to achieve a 2-hour fire-resistance rating; instead, it is the *users* of the hanger (e.g., construction workers) that may, at their discretion, apply sheathing or other material around the structure of the claimed hanger however they wish in order to

achieve this fire-resistance rating. *See* Pet. Reply 7 ("[T]he 'fire barrier' includes not just the sheathing and the hanger, but any other fire mitigation materials incorporated into the barrier, as acknowledged in the '867 patent."); Ex. 1038, 148:3–24 (Patent Owner's expert testifying, "An installer can put *any material they wish to fill that gap* [i.e., any gap between sheathing/drywall and the hanger's structure], provided it's code approved."). In other words, a *user* (e.g., construction worker) could install the claimed bracket on a particular wall assembly in a particular way such that the overall assembly provides for a 2-hour fire-resistance rating; but that same *user*, or another *user*, could install that same claimed bracket on the same or a different wall assembly in a different way such that the overall assembly *would not* provide for a 2-hour fire-resistance rating. The claimed hanger itself has no structural properties described in the '867 patent, at least none identified to the Board, *that force or enforce the application of sheathing like drywall such that users must apply such sheathing in close conformance with the extension flanges* of the claimed hanger for purposes of achieving a 2-hour fire-resistance rating—it's simply up to the user. Thus, based on the complete record before us, we are persuaded that the Specification does not sufficiently describe *how* the claimed extension flange structure is "configured to" extend through sheathing "while maintaining a 2 hour fire resistance rating of the sheathing [or "of a wall assembly including the wall[/frame wall] and the sheathing]," particularly where sheathing is not even required by the claims and the claims are not directed to a method of *use* (e.g., *installation*).

Indeed, claim 1, from which claim 5 depends, is an apparatus claim directed to "[a] hanger"—just the hanger—and there is no evidence of record that the structure of that hanger, as one may find for sale in a local home center, includes a "structural component" (like a joist), a "wall," or "sheathing" (like gypsum board), mounted on a wall. *See* Ex. 1002, 347, 353 ("[T]o clarify the claim is drawn solely to the hanger . . . and not the combination of the hanger and frame wall."); Tr. 43:18–44:2. Similarly, in the Related Litigation, Patent Owner accuses certain of Petitioner's hangers—just the hangers—of infringing the related '510 patent with similar claims to a "hanger." *See* Ex. 1031. Having reviewed the Specification, we find no description in the Specification, and the parties do not direct us to any, disclosing what structural features of the extension flanges (let alone the full scope of such features) are required for such flanges not only to be configured to extend through sheathing, but further configured to extend through sheathing "while maintaining a 2 hour fire resistance rating of the sheathing [or "of a wall assembly including the wall[/frame wall] and the sheathing"]."

Accordingly, we conclude that Petitioner has demonstrated by a preponderance of evidence that claims 5 and 17 are unpatentable under 35 U.S.C. § 112(a) for lack of written description.

In addition, as noted above in Sections I and II.D.3, Patent Owner obtained a Certificate of Correction that, in part, amended the phrase "while maintaining a 2 hour fire resistance rating of the sheathing" in claims 5 and 17 to instead recite "while maintaining a 2 hour fire resistance rating of *a wall assembly including the frame wall and* the sheathing." Ex. 2032

(emphasis added). As discussed above, we find this change does not affect our written description analysis here. Thus, we need not and do not decide herein whether the Certificate of Correction, which issued subsequent to the filing of the Petition, has effect in this proceeding.

F. Obviousness of Claims 1–12, 15–17, and 21–23 Over Gilb '792 and Bundy[5]

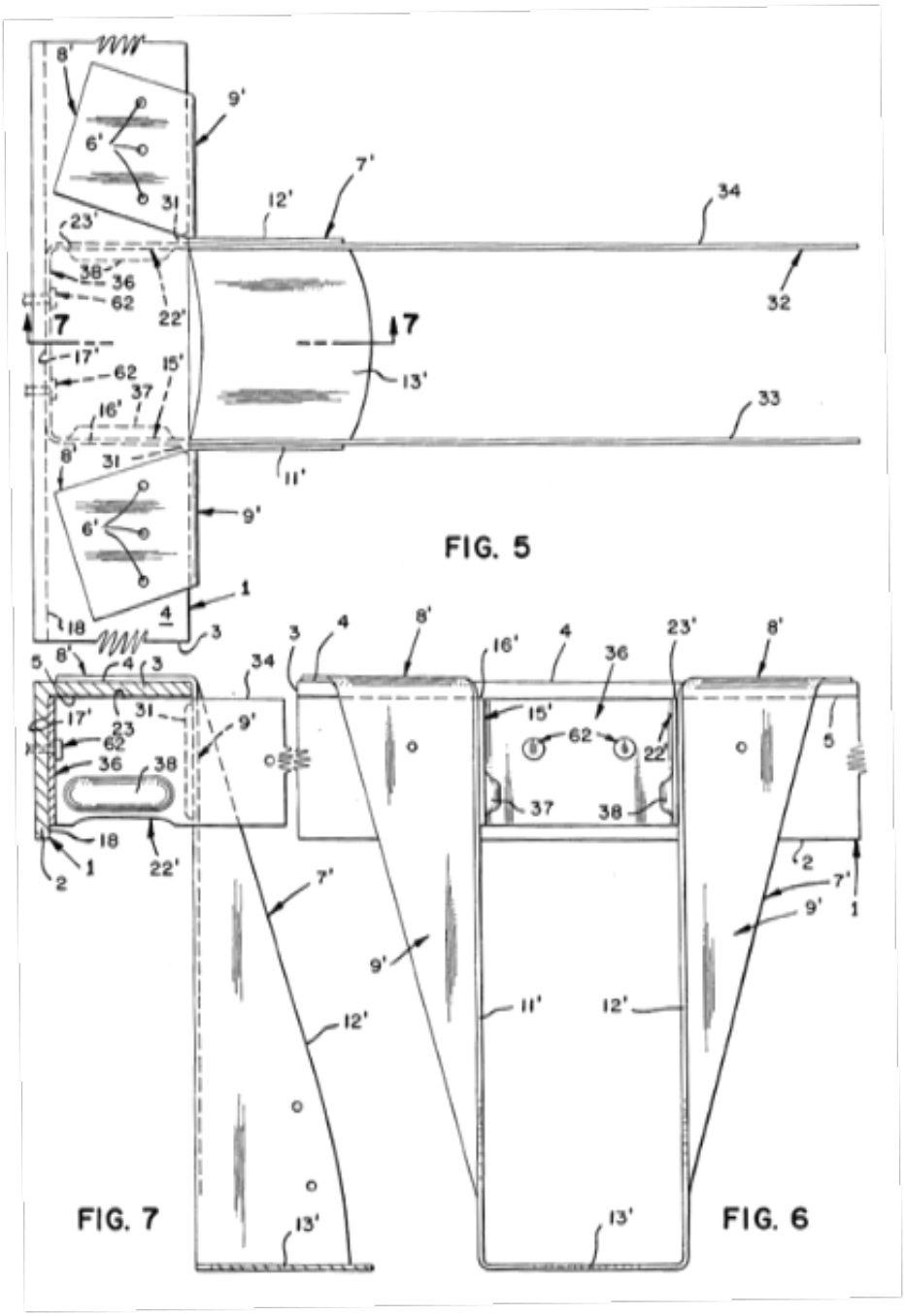
Petitioner contends claims 1–12, 15–17, and 21–23 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Gilb '792 (Ex. 1035) and Bundy (Ex. 1007). Pet. 13–15, 28–59; Pet. Reply 16–21. Patent Owner opposes Petitioner's contentions. PO Resp. 39–49, 71–84; PO Sur-Reply 23–25. For the reasons expressed below, and based on the complete record before us, we determine that Petitioner has demonstrated by a preponderance of evidence that claims 1–12, 15–17, and 21–23 are unpatentable as obvious over the combination of Gilb '792 and Bundy. We turn first to an overview of Gilb '792 and Bundy.

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[5] As noted above in Section I, a Certificate of Correction was filed and issued after Petitioner filed the Petition. The Certificate of Correction concerns claims 5, 11, 16, and 17 of the '867 patent. Our determinations as to Petitioner's prior art grounds of unpatentability are based on the original phrasing of these claims. As discussed in Sections II.D and II.E above, we would reach the same results regardless of whether the Certificate of Correction has effect in this proceeding. In any event, we need not and do not decide herein whether the Certificate of Correction has effect in this proceeding.

1. Overview of Gilb '792

Gilb '792 generally is directed to a "gusset metal ledger hanger" that may attach to a metal ledger, as shown, for example, in Figures 5, 6, and 7, reproduced below. Ex. 1035, 2:29–30, 3:22–55.



> Figures 5, 6, and 7 of Gilb '792 are top plan, front elevational, and partial cross sectional (line 7—7) views of the same hanger.

Id. at 2:7–12. Petitioner contends that Gilb '792 discloses "each and every structural element listed in claim 1 of the '867 Patent, but does not explicitly disclose that the space between its hanger's channel-shaped portion and back flange is sized and shaped to receive sheathing therein," for which Petitioner relies on Bundy. Pet. 28.

2. Overview of Bundy

Bundy generally is directed to "a joist hanger adapted to secure a joist to a header or other support member with a first drywall panel between the back of the joist hanger and the front of the header," as shown, for example, in Figure 1, reproduced below. Ex. 1007, 1:5–11.

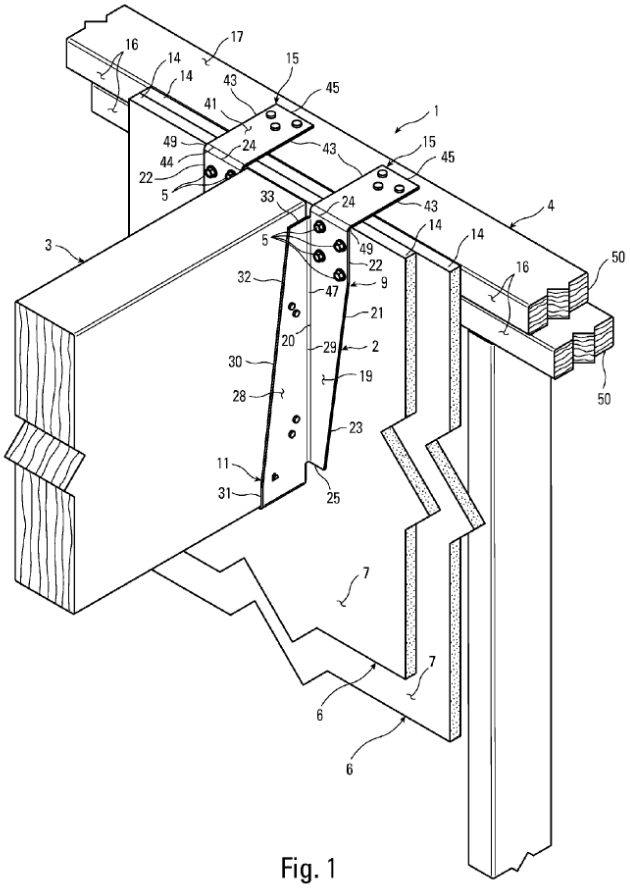


Figure 1 of Bundy is an upper right perspective view of a connection formed in which the joist hanger has a pair of top flanges.

Id. at 3:7–9, 3:55–67. Bundy discloses that "[t]he one or more panels 6 preferably are drywall panels 6," and explains "[c]ommon panel thicknesses are 1/2-inch and 5/8-inch," and "[i]n the present invention, *two layers of 5/8-inch drywall is preferred*." *Id.* at 5:10–22 (emphasis added).

We further discuss below the disclosures of Gilb '792 and Bundy in connection with the parties' arguments.

3. Independent Claim 1

a) "A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:"

The preamble of claim 1 recites "[a] hanger *for connecting a structural component to a wall adapted to have sheathing mounted thereon.*" Ex. 1001, 12:15–17 (emphasis added). Gilb '792 discloses a "gusset metal ledger hanger 7'" "adapted for holding a structural beam member" to a wall. Ex. 1035, 3:22–38, Figs. 5, 6, 7; *see* Pet. 8 (citing Ex. 1003 ¶ 37; Ex. 1035, code (57), 1:5–11, 3:22–50). Petitioner argues that the phrase "for connecting a structural component to a wall adapted to have sheathing mounted thereon" is not a limitation, but rather "recites an intended use of the claimed invention [i.e., a hanger], satisfied by any prior art structure capable of performing the intended use." Pet. 30 (citing, in part, Ex. 1003 ¶¶ 46, 98, 99).

"Whether to treat a preamble as a limitation is a determination 'resolved only on review of the entire[] . . . patent to gain an understanding of what the inventors actually invented and intended to encompass by the claim.'" *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (quoting *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989)) (alterations in original). "In general, a preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim." *Id*. (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)). "Conversely, a preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses

the preamble only to state a purpose or intended use for the invention.'" *Id.* (quoting *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997)). "No litmus test defines when a preamble limits claim scope." *Id.* (citing *Corning Glass*, 868 F.2d at 1257).

In this case, we determine the above preamble phrase is not limiting, because the patentee recites a structurally complete invention in the body of claim 1, and uses the preamble only *to state a purpose or intended use for the claimed invention*. Claim 1 is an apparatus claim directed to "[a] hanger"—just the hanger—and, as noted above, there is no evidence of record that the structure of that hanger, as one may find for sale in a local home center, includes a "structural component" (like a joist), a "wall," or "sheathing" (like gypsum board), mounted on a wall. *See* Ex. 1002, 347, 353 ("[T]o clarify the claim is drawn solely to the hanger . . . and not the combination of the hanger and frame wall."). Indeed, in the Related Litigation, where claim 1 of the related '510 patent also recites this same hanger preamble, Patent Owner accuses certain of Petitioner's hangers—just the hangers—of infringing the '510 patent. *See* Ex. 1031. If a hanger, standing separate from any joist, wall, or installed sheathing, may fall within the scope of such a claim for infringement purposes, then a prior disclosure of the structure of such a hanger (alone) may anticipate or in combination with other prior art render obvious that claim. *See Int'l Seaway Trading Corp. v. Walgreens Corp.*, 589 F.3d 1233, 1239 (Fed. Cir. 2009) (citing *Peters v. Active Mfg. Co.*, 129 U.S. 530, 537 (1889)) ("[I]t has been well established for over a century that the same test must be used for both infringement and anticipation," and "[t]his general rule derives from the

Supreme Court's proclamation 120 years ago in the context of utility patents: '[t]hat which infringes, if later, would anticipate, if earlier.'").

In addition, Patent Owner agrees that the preamble of claim 1 is not limiting and that the scope of claim 1 does not require any sheathing (e.g., drywall). Tr. 43:18–44:2.

For the reasons expressed above, and based on the complete record before us, we conclude that the preamble phrase "for connecting a structural component to a wall adapted to have sheathing mounted thereon" in claim 1 is not a limitation, and find Gilb '792 discloses a "hanger," as recited in claim 1.

> b) *"a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;"*

Petitioner contends Gilb '792 discloses a channel shaped portion (e.g., stirrup members 11'/12' and depending flanges 9') configured to receive the structural component (e.g., structural beam), as shown, for example, in Figures 5, 6, and 7, reproduced above. Pet. 31 (citing Ex. 1003 ¶¶ 101–102; Ex. 1035, 3:29–31 ("First and second stirrup members 11' and 12' are attached to the depending flanges 9' and are adapted for holding a structural beam member . . . .")). Petitioner contends Gilb '792 discloses the channel-shaped portion (stirrup members 11'/12' and depending flanges 9') includes a base (seat member 13') configured to receive an end portion of the

structural component (beam) thereon to support the structural component. Pet. 32 (citing Ex. 1003 ¶¶ 103–104; Ex. 1035, 3:51–52). Petitioner contends Gilb '792 discloses the base (seat member 13') has an upper surface (its two-dimensional top surface) configured to engage the structural component, and that the upper surface of the base lies in a base plane. Pet. 32–33 (citing Ex. 1003 ¶¶ 105–106; Ex. 1035, 3:51–52).

Patent Owner does not contend that the subject "channel-shaped portion" limitation is absent in Gilb '792. *See* PO Resp. 39–49, 71–84; PO Sur-Reply 23–25. Any such argument has been waived. *See* 37 C.F.R. § 42.23(a) ("Any material fact not specifically denied may be considered admitted."); *In re NuVasive, Inc.*, 842 F.3d 1376, 1379–82 (Fed. Cir. 2016) (holding that patent owner waived arguments on an issue that were not raised in its response after institution); *see also Papst Licensing GmbH & Co. KG v. Samsung Elecs. Am., Inc.*, 924 F.3d 1243, 1250 (Fed. Cir. 2019) (holding patent owner forfeited argument for patentability not presented to the Board); *Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1048 (Fed. Cir. 2019) (explaining that arguments not presented to the Board are waived).

Based on the foregoing evidence, Petitioner contends, and we find, Gilb '792 discloses "a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane," as recited in claim 1. Pet. 31–33 (citing, *inter alia*, Ex. 1003 ¶¶ 101–106).

> c) *"a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane, the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another; and"*

Petitioner contends Gilb '792 discloses a connection portion (base 36) configured for attachment to the wall. Pet. 33 (citing Ex. 1003 ¶¶ 107–110; Ex. 1035, 3:43–44; 3:47–50 ("First and second gusset members 15' and 22' are held in position by shooting nail means 62 through base 36 of the U-shaped member into lower leg 2 of the metal ledger.")). Petitioner argues the skilled artisan "would have understood that Gilb'792's base 36 corresponds to the recited 'connection portion,' and that nail means 62 extend past the ledger into the wall." Pet. 33 (citing Ex. 1003 ¶¶ 107–108; Ex. 1035, Figs. 5, 6); *see* Ex. 1001, Fig. 7. Petitioner contends Gilb '792 discloses that the connection portion (base 36) includes a back flange having an upper edge (i.e., the very top of the back flange) and that the back flange extends downward from the upper edge in a direction generally toward the base plane. Pet. 35 (citing Ex. 1003 ¶¶ 111–112; Ex. 1035, 3:39–49). Petitioner contends Gilb '792 discloses that the connection portion (base 36) and channel-shaped portion (stirrup members 11'/12' with flanges 9') are in a fixed, spaced apart relation relative to one another, noting that the "elements are welded sheet metal and thus are fixed." Pet. 35–36 (citing Ex. 1003 ¶¶ 113–114; Ex. 1035, 3:39–44).

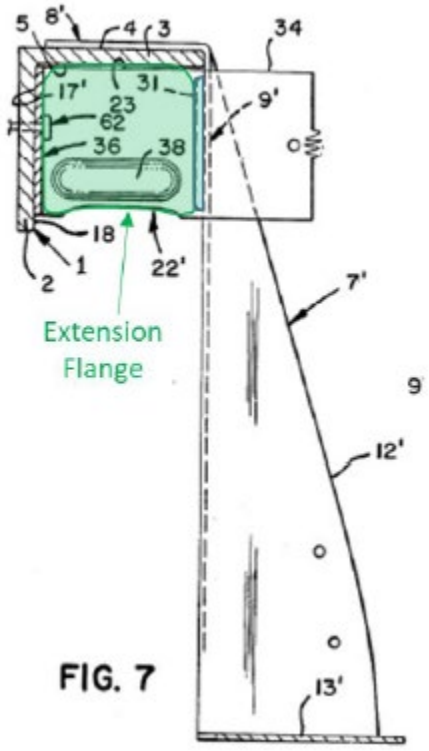
Patent Owner does not contend that the subject "connection portion" limitation is absent in Gilb '792. *See* PO Resp. 39–49, 71–84; PO

Sur-Reply 23–25. Any such argument has been waived. *See* 37 C.F.R. § 42.23(a).

Based on the foregoing evidence, Petitioner contends, and we find, Gilb '792 discloses "a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane, the connection portion and channel-shaped portion being in a fixed, spaced apart relation relative to one another," as recited in claim 1. Pet. 33–36 (citing Ex. 1003 ¶¶ 107–113).

d) "an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion,"

Petitioner contends Gilb '792 discloses an extension portion (gusset members 15'/22') including first and second extension flanges (gusset members 15'/22') extending from the channel-shaped portion (stirrup members 11'/12') to the connection portion (base 36), as shown, for example, in Petitioner's annotated version of Figure 7, reproduced below. Pet. 36–37 (citing Ex. 1003 ¶¶ 115–117; Ex. 1035, 3:[31]–42 ("A first gusset member 15' is . . . directly connected to stirrup member 11' by weld 31."), Figs. 5–7).

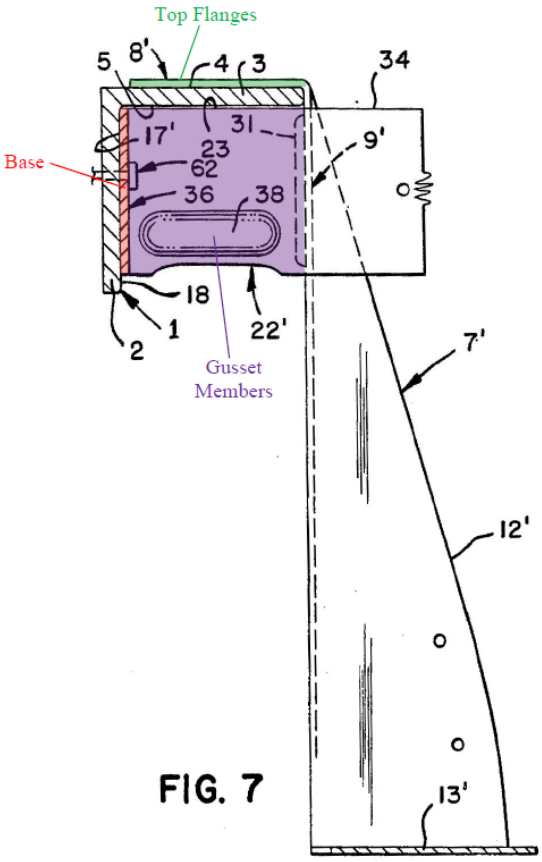


The above illustration shows Figure 7 of Gilb '792 annotated by Petitioner to show an alleged "extension portion."

Ex. 1035, Fig. 7 (annotated); Pet. 37. Petitioner argues the skilled artisan "would have understood that the Gilb'792's gusset members 15'/22' (along with weld 31), correspond to the recited first and second extension flanges." Pet. 37 (citing Ex. 1003 ¶¶ 115–116).

Patent Owner argues "the connection portion of Gilb '792 is not limited to just base (36)," "[r]ather, the connection portion of Gilb'792 includes the top flange (8') and the gusset members (15'/22') (which [Petitioner] incorrectly identifies as extension portion/extension flanges)," as shown, for example, in Patent Owner's annotated version of Figure 7,

reproduced below. PO Resp. 83 (citing Ex. 2057 ¶ 109; Ex. 1035, Fig. 7); *see id.* at 80–84.



The above illustration shows Figure 7 of Gilb '792 annotated by Patent Owner to show an alleged "connection portion."

Ex. 1035, Fig. 7 (annotated); PO Resp. 83. Patent Owner argues, "[a]s the gusset members (15'/22') are themselves part of the connection portion, they do not extend from the connection portion of the hanger to channel-shaped portion of the hanger," and thus, "Gilb '792 does not disclose an extension portion as recited in the claims of the '867 Patent." PO Resp. 84 (citing Ex. 2057 ¶¶ 110–111).

Petitioner responds that "[t]he '867 patent claims recite the transitional phrase 'comprising,' rendering the scope of the claims open-ended," and "[t]he open-ended nature of claims 1 and 16 does not preclude extension flanges that register with a ledger leg, and base [36] alone satisfies the claimed 'connection portion'." Pet. Reply 21. Petitioner also argues "Gilb'792's hanger does not require a ledger, and in such case would connect to the wall only via the back flange (base 36)." *Id.* (citing Ex. 1038, 167:25–168:9; Ex. 1039 ¶¶ 80–82). We agree with Petitioner and find Patent Owner's argument unavailing.

We also note that Patent Owner alleges in this case that its own hanger as depicted in the '867 patent, which only shows hanger structures having both back flanges 66 and connector tabs 74 (i.e., top flanges), does not require both back flanges and top flanges, and instead could mount to a wall using only its back flanges (like Gilb '792's base 36, per Petitioner). *See* RMTA Reply 7–8 ("The '867 Patent's specification never identifies the top flange as essential."), 9 ("Critically, [the skilled artisan] was aware of other methods of attachment, such as face mounted hangers."); Tr. 58:12–18 ("[T]his was so well known in the art that the [skilled artisan] would look at the '867 Patent's disclosures and go, yes, I see that they're only disclosing top flange embodiments, but I don't see why I couldn't just easily do it with a face mount hanger. And that's how [the skilled artisan] would view the embodiments."); Ex. 1001, 12:15–44 (claim 1) (top flange not recited).

Based on the foregoing evidence, Petitioner contends, and we find, Gilb '792 discloses "an extension portion including first and second extension flanges extending from the channel-shaped portion to the

connection portion," as recited in claim 1. Pet. 36–37 (citing, *inter alia*, Ex. 1003 ¶¶ 115–117); Pet. Reply 20–21 (citing, *inter alia*, Ex. 1039 ¶¶ 80–82).

> *e) "each extension flange being configured to extend through the sheathing, each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall"*

This limitation recites, *inter alia*, that the "extension portion," and more specifically "each extension flange" thereof, is "*configured to extend through the sheathing* [mounted on a wall];" and that "the back flange and the channel-shaped portion defin[e] a *sheath space sized and shaped to receive the sheathing therein* so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing *when* the hanger and sheathing *are installed* on the wall." Ex. 1001, 12:32–41 (emphases added). But, as argued by Petitioner, claim 1 is directed to and claims only "[a] hanger." *See* Pet. 30 ("[T]he limitation 'for connecting a structural component to a wall adapted to have sheathing mounted thereon' recites an intended use of the claimed invention."), 4–5 ("[T]he claimed hanger of the '867 Patent is not limited to a specific wall configuration."). Based on the complete record before us, we find the claimed hanger's *structure* does not include a "wall." It does not include

"sheathing." And it does not include "sheathing" between certain portions of the hanger. *See* Tr. 43:18–44:2. In addition, claim 1 recites no limitation on the size of any sheathing cutout or opening necessary to allow a hanger's extension portion to "extend through the sheathing." In other words, claim 1 recites a hanger having certain structural features, and would cover a hanger having the structural limitations of claim 1 whether that hanger were on a shelf in a hardware store or installed as shown, for example, in Figure 1 of the '867 patent (or even incorrectly installed). *See ParkerVision, Inc. v. Qualcomm, Inc.*, 903 F.3d 1354, 1361 (Fed. Cir. 2018) (The Federal Circuit "explained long ago that '[a]pparatus claims cover what a device *is*, not what a device *does*.'" (quoting *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1468 (Fed. Cir. 1990))).

Nevertheless, as in PGR2019-00063, the parties continue to dispute whether the prior art discloses extension flanges configured to extend through the sheathing and a sheath space sized and shaped to receive the sheathing therein. We discuss these and other disputes concerning the extension flanges below.

(1) "each extension flange being configured to extend through the sheathing"

(a) Claim Construction: "configured to extend through the sheathing"

Claim 1 recites that each "extension flange" is "*configured to* extend through the sheathing [mounted on a wall]." Ex. 1001, 12:34–35 (emphasis added). The parties dispute whether the phrase "*configured to* extend through the sheathing" is (1) a purpose or intended use of the "extension flanges" (e.g., a *capability* of the extension flange); or (2) a function of the

"extension flange" that provides additional structural attributes to the extension flange (e.g., a particular *configuration* of the extension flange); and if (2), what is that claimed configuration. *See* PO Resp. 39–49, 71–78; PO Sur-Reply 23–25; Pet. 30, 36–42; Pet. Reply 5–6.

In PGR2019-00063, we construed "configured to extend through the sheathing," in the context of "an extension portion extending from the channel-shaped portion and configured to extend through the sheathing," to mean (or require structurally) "an extension portion extending from the channel-shaped portion towards the connection portion and defining a space to receive sheathing." Ex. 2006, 51; *see id.* at 41–52. In this case, we maintain the same construction, and thus construe "each extension flange being configured to extend through the sheathing" to mean (or require structurally) "each extension flange defines a space between the back flange of the connection portion and the channel-shaped portion to receive sheathing." For completeness, below we review (and supplement or clarify) our claim construction analysis for the subject limitation.

(i) Capability or Intended Use vs. Configuration

Patent Owner argues "[c]ontrolling authority[] has established that the claim language 'configured to' (*i.e.*, a structure configured to perform a function) should be construed to require that the claimed structure is specifically 'meant to' or 'designed to' perform the claimed function." PO Resp. 40–43 (citing *Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d. 1335, 1349 (Fed. Cir. 2012); *In re Giannelli*, 739 F.3d 1375, 1379

(Fed. Cir. 2014); *Acclarent, Inc. v. Ford Albritton*, IV, IPR2017-00498, 2018 Pat. App. LEXIS 9828, at *19–22 (PTAB July 9, 2018)).

Petitioner generally relies on our constructions of "extend through" and "configured to extend through" in PGR2019-00063 (Pet. 13–14), and otherwise appears to argue that claims, which recite no structural limitations that would preclude a prior art reference that discloses a different structure from performing the claimed function, require nothing more than that a structure be *capable of* performing that claimed function. Pet. Reply 6 (citing *ParkerVision*, 903 F.3d at 1361).

As explained by the Federal Circuit, case law "distinguish[es] between claims with language that recites *capability*, and those that recite *configuration*." *ParkerVision*, 903 F.3d at 1361 (emphases added). "The language used in the claims is critical to deciding on which side of this line the claims fall." *Id.* In this case, the claim language itself would at least *appear* to suggest a narrower construction by expressly reciting the "configured to" language. Precedent makes clear that the "configured to" phrase itself connotes the narrower meaning (i.e., configuration), as opposed to the broader meaning (i.e., capability), and simply *presumes* this is the case. For example, in *Aspex Eyewear*, the court treated "configured to" as synonymous with the narrower "made to" and "designed to" phrases. *Aspex Eyewear*, 672 F.3d at 1349 ("In common parlance, the phrase 'adapted to' is frequently used to mean 'made to,' 'designed to,' or 'configured to,' but it can also be used in a broader sense to mean 'capable of' or 'suitable for.'"); *see Giannelli*, 739 F.3d at 1379 (same); *In re Man Machine Interface Technologies LLC*, 822 F.3d 1282, 1286 (Fed. Cir. 2016) (same).

But the principles of construing terms like "configured to" as used in claim 1 cannot be interpreted and applied in a vacuum, without resort to the many other competing principles of claim construction. In particular, despite reciting the words "configured to" in this limitation, Patent Owner concedes that the preamble language of "for connecting a structural component to *a wall adapted to have sheathing mounted thereon*" is merely an intended use of the claimed hanger and does not limit the scope of claim 1. Tr. 43:18–44:2. In other words, using the claimed hanger *with sheathing*, such as drywall, is admittedly only an intended use (which makes sense, since the hanger may be mounted to a wall and used without any sheathing ever being applied to the wall). Given this, we find the subsequent recitation in the claim of "each extension flange being configured *to extend through the sheathing*" merely mirrors the intended use of the hanger itself, and more specifically, reflects the intended use of the extension flanges in the hanger. Indeed, despite this being the second post-grant review proceeding between the same parties and involving this same hanger subject matter and subject limitation, when the Board asked Patent Owner during the oral hearing how the limitation "configured to extend through the sheathing" further limits the structure of the claimed hanger or how the skilled artisan would know whether a given hanger's "extension flanges" were "configured" to do so, Patent Owner responded, to paraphrase, the skilled artisan *would just know*:

> [Question:] So my understanding is these claims are being asserted against brackets, standalone brackets, without any method of installation or what have you. So somehow staring at a bracket by itself without a tag on it that says "this bracket is

> intended to receive drywall between these two pieces here," how does the skilled artisan know reading that claim [and] looking at a bracket, whether it's configured to extend through drywall beyond having the flange, the receiving part for the joist and the extension portion?
>
> [Patent Owner's Counsel:] Well, he's going to look at that bracket and he is going to say, look, that the way this extension flange is constructed and arranged on that bracket, that it is made to and designed to extend through sheathing as applied to the wall. *He's going to know that.* Yeah, the wall is not there, the sheathing is not there, but this is something that the skilled person in the construction art has seen hundreds, if not thousands, of times *so they're going to know immediately*.

Tr. 47:8–24 (emphases added); *see, e.g.*, *id.* at 48:8–24, 73:12–25[6].

Accordingly, we conclude that the limitation "configured to extend through

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[6] Petitioner's counsel:

> I also want to raise this point that was made several times. The question came up, sitting on a shelf or looking at an assembled hanger, how would a skilled artisan know whether this hanger is intended to be used with sheathing? What's the structural distinction? And time and again, the answer was they just would. There wasn't any specific structural element that would indicate whether it was intended to extend through sheathing, how much sheathing, just create a space. It was just a skilled artisan would know.
>
> Well, I submit to you that you have Tsukamoto with an extension flange. You have Timony, you have Gilb '792, all with extension flanges. What's the difference between those and without anything more from Patent Owner, the hanger [described in] the '867 patent? Why wouldn't a skilled artisan just know that you would put sheathing in it? There's no distinction there.

the sheathing" is an intended use of the claimed extension flanges and does not further limit the scope of claim 1.

To the extent that the limitation "configured to extend through the sheathing" were interpreted *not* to be an intended use of the claimed extension flanges, we find the limitation "each extension flange being configured to extend through the sheathing" *superfluous*. It is true that "interpretations that render some portion of the claim language superfluous are disfavored." *Power Mosfet Techs., L.L.C. v. Siemens AG*, 378 F.3d 1396, 1410 (Fed. Cir. 2004); *see also Merck & Co. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so." (citations omitted)). "The preference for giving meaning to all terms, however, is not an inflexible rule that supersedes all other principles of claim construction." *SimpleAir, Inc. v. Sony Ericsson Mobile Commc'ns AB*, 820 F.3d 419, 429 (Fed. Cir. 2016) (citing *Power Mosfet*, 378 F.3d at 1410).

In this case, claim 1 already explicitly recites structural requirements for the hanger's extension flanges, namely, that the extension flanges (1) "extend[] from the channel-shaped portion to the connection portion," and (2) "[lie] in . . . extension flange plane[s], [where] the extension flange planes [are] generally perpendicular to the base plane." Ex. 1001, 12:32–44. Claim 1 also requires that the extension flanges do so where "the back flange [of the connection portion] and the channel-shaped portion defin[e] a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing

are installed on the wall." *Id.* Neither party directs us to any evidence of how the subject limitation "configured to extend through the sheathing" allegedly further limits the scope claim 1 *beyond the foregoing explicit structural requirements*. During oral hearing in this case, the Board asked, "if my hypothetical bracket meets all the structural limitations of your claim, Claim 1, isn't it a given that it would necessarily be configured to extend through drywall if it has all the structural features of [Claim] 1?" Tr. 48:8–11. Patent Owner did not (or could not) identify with clarity and particularity any further structural restriction that this subject limitation places on claim 1, but for, as noted above, arguing that the skilled artisan *would just know*. *See* Tr. 48:12–24; *see also, e.g.*, Tr. 47:8–24; 73:12–25. We discern no additional restriction to the scope of apparatus claim 1 by the recitation of "configured to extend through the sheathing," and conclude this "limitation" is superfluous.[7]

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[7] Patent Owner does argue, "[t]o the extent additional structural attributes need to be identified, the extension flanges would need to (1) have sufficient length to extend into one side and out the other side of the sheathing, and (2) be constructed and arranged relative to the other components of the hanger (particularly, the connection portion) such that they would actually do so when installed." PO Resp. 48–49. We find this attempt to assign structural attributes to the subject limitation unavailing. First, as discussed above, claim 1 explicitly requires that the extension flanges extend from the channel-shaped portion to the connection portion, and that a sheath space for receiving sheathing is formed between the back flange of the connection portion and the channel-shaped portion; thus, the extension flanges necessarily would have sufficient length to extend into one side and out the other side of the sheathing. Second, claim 1 applies to a hanger alone; thus, extension flanges having the structure explicitly recited in claim 1

To the extent that the limitation "configured to extend through the sheathing" were interpreted *not* to be an intended use of the claimed extension flanges and *not* to be superfluous, then the subject limitation requires additional structure configured to accomplish the claimed function. For this scenario, we next turn to construing "extend through" in the function of "*extend through* the sheathing," and then to determining the structural attributes of an "extension portion" that allow it to extend through sheathing (keeping in mind that sheathing is not part of the claimed hanger's structure).

(ii) "Extend Through"

Claim 1 recites that the "extension portion" is "configured to *extend through* the sheathing [mounted on a wall]." Ex. 1001, 12:34–35 (emphasis added). The parties both rely on our construction of "extend through" in PGR2019-00063, where we determined that in the context of element A "extend[ing] through" element B, "extend through" means "element A extends into one side and out the other side of element B" (Ex. 2006, 44–45). *See* Pet. 13–14; PO Resp. 45–46. We maintain this same construction in this case.

Although we find the skilled artisan would have understood "extend through" to have the above meaning in the art, the context in which this term is used poses yet another claim interpretation hurdle. Claim 1 recites a

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necessarily would have sufficient length to extend into one side and out the other side of the sheathing whether installed and used with sheathing or not.

hanger with "each extension flange being configured to extend through the sheathing," but the hanger is made (i.e., a structure satisfying the structural limitations of apparatus claim 1) *before* the introduction of any sheathing (if used at all). Although Patent Owner seems to argue that the extension flanges of claim 1 are structured ("being configured") so as to conform to certain opening(s) in sheathing and "extend through" such opening(s), this is backwards, as discussed above (*see supra* Section II.D.3). Patent Owner does not direct us to any evidence of any standard, pre-made openings or cutouts in conventional sheathing (e.g., drywall) through which the claimed extension flanges would extend. Indeed, it is not the claimed hanger that has structure defined by how each one of countless users applies sheathing around the hanger or that forces or enforces application of sheathing in a particular manner relative to the hanger; instead, it is the *users* of the hanger (e.g., construction workers) that may, at their discretion, apply or conform sheathing or other material around the structure of the claimed hanger. *See* Pet. Reply 7; Ex. 1039 ¶¶ 32–33; Ex. 1038, 148:3–24. We provide below, in Table 1, our own basic illustration of the claimed hanger's extension flanges (red solid lines) in conjunction with sheathing (outlined by black dotted lines) for purposes of further analyzing the proper interpretation of "configured to extend through the sheathing."

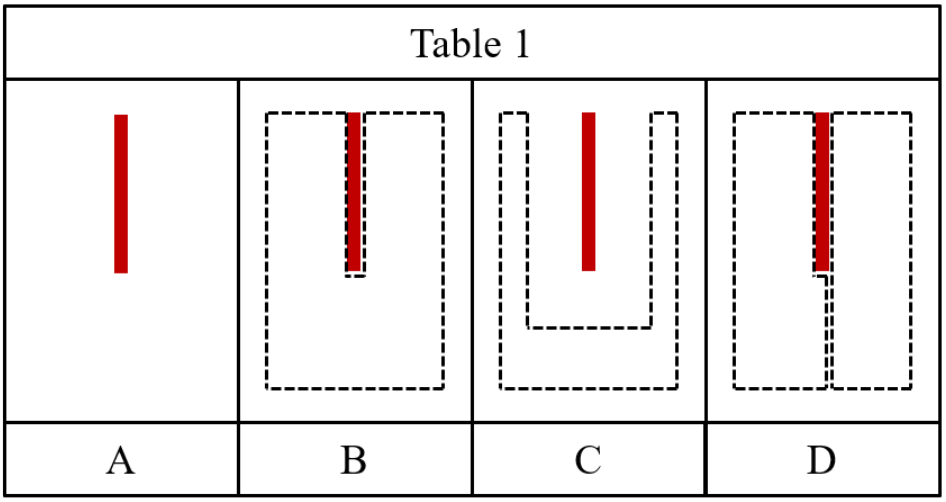


Table 1 is an illustration prepared by the Board for use in analyzing the phrase "each extension flange being configured to extend through the sheathing."

Table 1 includes four illustrations, A through D, which depict only the two extension flanges of the claimed hanger, and do so as a single (red) unit that is viewed from the perspective of a person directly facing the hanger when hung on a wall, either without (A) or with (B–D) surrounding sheathing attached to the wall.

Illustration A above represents the extension flanges of the hanger of claim 1 of the '867 patent as found, for example, in such an uninstalled hanger available in a hardware store, without any sheathing thereabout. Patent Owner argues in the Related Litigation that certain of Petitioner's hangers—just the hangers—infringe the related '510 patent. *See* Ex. 1031. Patent Owner argues the skilled artisan, holding only a hanger itself and by "look[ing]" at "the way [the] extension flange is constructed and arranged on that bracket," would just "know immediately" whether the extension flanges were configured to extend through sheathing, i.e., to extend into one side

and out the other side of sheathing (even without knowing anything about the type, thickness, or number of layers of sheathing intended by a user for use with the hanger). Tr. 47:8–24.

Illustration B represents the *same* extension flanges of the hanger of claim 1, but mounted to a wall assembly having sheathing conformed around the extension flanges with "only a minimal gap" between the sheathing and extension flanges (PO Resp. 67), as shown, for example, in Figure 1 of the '867 patent (Ex. 1001, Fig. 1). Patent Owner argues the extension flange/sheathing scenario in Figure 1 of the '867 patent, which is the configuration depicted in illustration B, exemplifies extension flanges configured to extend into one side and out the other side of sheathing. *See generally* PO Resp. 39–49, 66–68, 71–78. But given the skilled artisan already would have known immediately from the illustration A concept that the extension flanges were configured to extend through sheathing (according to Patent Owner), the user's (installer's) choice to closely conform the sheathing around the extension flanges as shown in illustration B would have no bearing on the structural configuration of the hanger's extension portions. The parties also do not appear to dispute that illustration B (representing Fig. 1 of the '867 patent) represents extension flanges configured to extend into one side and out the other side of sheathing.

Illustration C also represents the *same* extension flanges of the hanger of claim 1, but mounted to a wall assembly having sheathing substantially spaced apart from the extension flanges. Again, given the skilled artisan already would have known immediately from the illustration A concept that

the extension flanges were configured to extend through sheathing (according to Patent Owner), such substantial spacing due to the "notch" in the sheathing around the extension flanges would not change the fact that the extension flanges were configured to extend into one side and out the other side of sheathing. At least in the scenario of illustration C there remains a "notch" in the sheathing through which the extension flanges pass, so be it separated from the sheathing by a substantial distance.

Illustration D also represents the *same* extension flanges of the hanger of claim 1, but mounted to a wall assembly having sheathing merely abutting the extension flanges (rather than presenting a "notch" through which the extension flanges pass). But yet again, given the skilled artisan already would have known immediately from the illustration A concept that the extension flanges were configured to extend through sheathing (according to Patent Owner), this scenario likewise would not change the fact that the extension flanges were configured to extend into one side and out the other side of sheathing. We find this would be true in this illustration D scenario even though the extension flanges merely pass along the outer edges of the left and right side pieces of sheathing rather than pass *through* a single piece of sheathing.

Based on the foregoing, and as informed by illustrations A–D, we conclude that *configuring* extension flanges *to extend through* sheathing, i.e., to extend into one side and out the other side of sheathing, means that the extension flanges define a space between the back flange of the connection portion and the channel-shaped portion to receive sheathing therein. We find that it is this defined space (in combination with the other

limitations of claim 1) that allows such extension flanges of the claimed hanger to be considered to extend into one side and out the other side of sheathing, regardless of whether (1) sheathing were even used with the hanger (illustration A), (2) sheathing were applied by a user in close or distant conformance with the extension flanges (illustrations B and C), or (3) sheathing were merely abutted to the extension flanges (illustration D), and regardless of the type, thickness, or number of layers of sheathing that a user may choose to apply. We note Patent Owner agrees that the extension portion, which includes the extension flanges, provides for such "spacing." *See* PO Resp. 7 ("Because the extension portion *spaces* the joist a sufficient distance from the wall framing, the fire barrier does not require a cutout corresponding to the entire cross section of the joist." (emphasis added)). We also find this construction supported by the Specification. *See* Ex. 1001, 1:67–2:3 ("The extension portion separates the back wall of the channel-shaped portion from the back flange of the connection portion *to define the space sized to receive the sheathing*." (emphasis added)), Figs. 1, 2, 10A.

(b) Disclosure of Gilb '792

Petitioner argues that although Gilb '792 "does not explicitly disclose extending gusset members 15'/22' through sheathing," the skilled artisan "would have found it obvious to use Gilb'792's hanger 7' with sheathing." Pet. 38 (citing Ex. 1003 ¶ 119). Petitioner relies on "Bundy's use with sheathing," and argues this "would simply have been applying a known technique . . . to a known device (Gilb'792's hanger), yielding the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby 'cover[ing] and protect[ing] the structural members of a

building.'" Pet. 38 (citing Ex. 1007, 5:18–20; Ex. 1003 ¶ 119); *see* Pet. 28–29.

Patent Owner, on the other hand, again argues that extension flanges in the prior art must "be specifically 'meant to' or 'designed to' extend into one side and out of the other side of the sheathing," and not simply be capable of doing so. PO Resp. 71; *see id.* at 71–78; PO Sur-Reply 23–25. Patent Owner argues "[n]either Gilb '792, nor Bundy discloses a hanger with an extension flange that is 'designed to' or 'meant to' extend through sheathing." PO Resp. 71 (citing Ex. 2001 ¶¶ 195, 207–208); *see id.* ("Gilb '792 is entirely silent as to *the use of* the disclosed hanger with sheathing." (citing Ex. 2001 ¶ 196) (emphasis added)). We find Patent Owner's arguments unavailing.

First, we addressed Patent Owner's proposed construction of "configured to," along with its arguments and cited support, in PGR2019-00063, and found them unpersuasive. *See* Ex. 2006, 39–52. As discussed above, we continue to find them unpersuasive in the context of the same apparatus—a hanger—at issue in this proceeding.

Second, Patent Owner cannot show nonobviousness by attacking references individually where unpatentability is based on a *combination* of references. *See In re Keller*, 642 F.2d 413, 425–26 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). We agree with Petitioner that "[Patent Owner] attacks the references individually by contending that Gilb'792 does not disclose the use of sheathing, and that Bundy's extension flanges extend over sheathing [and "not *through* it"],"

and that "[Patent Owner] does not properly consider the combination." Pet. Reply 19; PO Resp. 71. We also agree with Petitioner that:

> Gilb'792's gusset members create a space between a top plate and a structural member, and [the skilled artisan] 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. EX1007, FIG. 1. Thus, in applying the *combination*, [the skilled artisan] would have found it obvious to add sheathing to the wall around Gilb'792's gusset members. EX1039, ¶77.

Pet. Reply 19–20. Thus, we find Patent Owner's arguments concerning the subject limitation unavailing (and not commensurate with Petitioner's challenge to patentability).

Third, Patent Owner still does not explain why a hanger having the *structural* features recited in claim 1, particularly the recited "extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion" such as disclosed in Gilb '792 (*see* Pet. 36–37 (citing Ex. 1003 ¶¶ 115–117; Ex. 1035, 3:[31]–42, Figs. 5–7 (gusset members 15'/22'))), would not necessarily be *configured to* extend through sheathing mounted on a wall (and provide a space sized and shaped to receive the sheathing therein), regardless of whether anyone installs sheathing around the extension portion. Indeed, in the Related Litigation, Patent Owner accuses certain of Petitioner's hangers—just the hangers—of infringing the related '510 patent. *See* Ex. 1031. As noted above, if a hanger, standing separate from any wall or installed sheathing, may fall within the scope of a claim for infringement purposes, then a prior disclosure of such a hanger may anticipate or in combination with other art render obvious that claim. *See Int'l Seaway*, 589 F.3d at 1239 (citing *Peters*,

129 U.S. at 537). In this case, Patent Owner repeatedly argues that the claimed extension flanges are "specifically 'meant to' or 'designed to' extend into one side and out of the other side of the sheathing," but does not explain with clarity and particularity what that means structurally for the claimed apparatus (hanger), i.e., how the skilled artisan would know *based only on the structure of an alleged extension flange* whether it is "meant to" or "designed to" extend through sheathing. *See* PO Resp. 71; *see id.* at 71–78; PO Sur-Reply 23–25; Tr. 47:8–24, 48:8–24, 73:12–25.

We further address Patent Owner's dispute over the "use" of Gilb '792 with sheathing in connection with our analysis of the "sheath space" limitation below. *See infra* Section II.F.3.e.3.

(c) Summary

Based on the foregoing evidence, we determine that the phrase "each extension flange being configured to extend through the sheathing" is an *intended use* of the claimed extension flanges and does not further limit the scope of claim 1; to the extent that this phrase were interpreted *not* to be an intended use of the claimed extension flanges, we determine that the subject limitation is *superfluous*; and to the extent that the subject limitation were interpreted *not* to be superfluous, Petitioner contends, and we find, the combination of Gilb '792 and Bundy teaches or at least suggests "each extension flange being configured to extend through the sheathing," as recited in claim 1.

(2) "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane"

Petitioner contends the extension flanges (gusset members 15'/22') disclosed in Gilb '792 "maintain the same generally perpendicular relationship with the base plane as is illustrated in the '867 Patent." Pet. 39 (citing Ex. 1003 ¶¶ 121–122; Ex. 1035, Fig. 7 (annotated)).

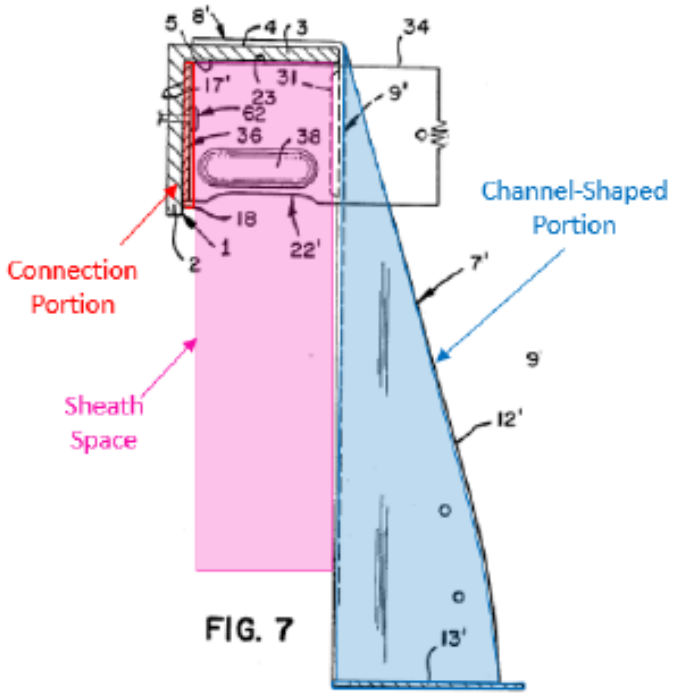
Patent Owner does not contend that the subject "lying in an extension flange plane" limitation is absent in Gilb '792, except as otherwise discussed above in Section II.F.3.d. *See* PO Resp. 39–49, 71–84; PO Sur-Reply 23–25. Any such argument has been waived. *See* 37 C.F.R. § 42.23(a).

Based on the foregoing evidence, Petitioner contends, and we find, Gilb '792 discloses "each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane," as recited in claim 1. Pet. 39 (citing, *inter alia*, Ex. 1003 ¶¶ 121–122).

(3) "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall"

Petitioner contends Gilb '792 discloses positioning base 36 (the back flange) at one end of gusset members 15'/22' and welding stirrup members

11'/12' (the channel-shaped portion) at opposite ends of gusset members 15'/22'. Pet. 40 (citing Ex. 1035, 3:31–44; Ex. 1003 ¶ 59). Petitioner argues "gusset members 15'/22' define a space that would permit sheathing to be inserted so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall," as shown, for example, in Petitioner's annotated version of Figure 7, reproduced below. Pet. 40–41 (Ex. 1003 ¶ 59; Ex. 1035, 3:23–55).



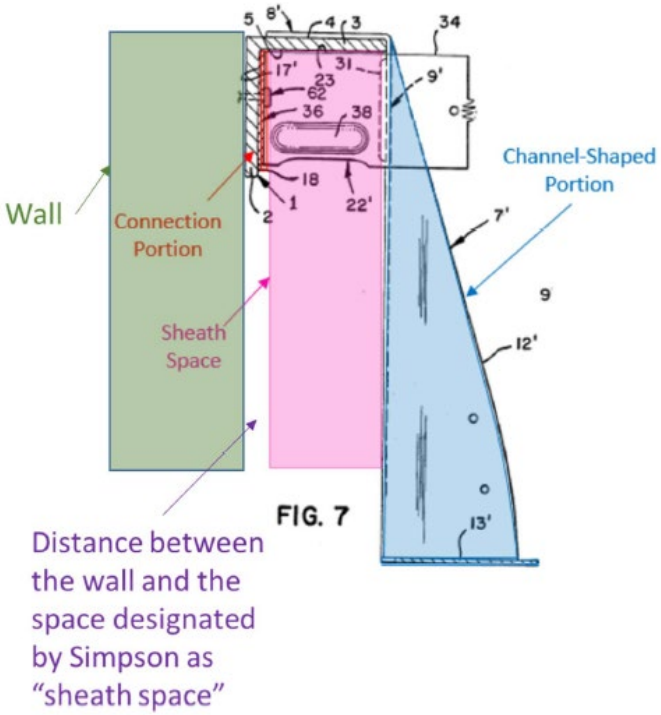
The above illustration shows Figure 7 of Gilb '792 annotated by Petitioner to show a "sheath space."

Ex. 1035, Fig. 7 (annotated); Pet. 41.

Petitioner argues, "[w]hile Gilb'792 does not explicitly disclose installing sheathing between Gilb'792's stirrup members 11'/12' and

base 36, [the skilled artisan] would have found it obvious to size the length of Gilb'792's gusset members 15'/22' to define a sheathing space therein for receiving sheathing based on Bundy." Pet. 41 (citing Ex. 1003 ¶ 123). Petitioner argues Bundy discloses "installing two layers of 5/8" sheathing between a hanger's channel shaped portion (Bundy's side members 11) and wall frame." Pet. 41 (citing Ex. 1007, 5:18–20; Ex. 1003 ¶ 123).

Patent Owner argues "[t]he Gilb '792 hanger is intended to attach to a metal ledger ('typified by 3X3X¼ inch up through 3X6X¼ inch angled sections' (EX1035: 1:22-25)[])] that is in turn secured to a concrete or masonry wall." PO Resp. 72. Patent Owner argues the intended use of the Gilb '792 hanger would be impractical with extending the gusset members 15'/22' through sheathing, and with the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein, as shown, for example, in Patent Owner's annotated version of Figure 7, reproduced below. *Id.* at 73–74 (citing Ex. 2001 ¶¶ 198–200).



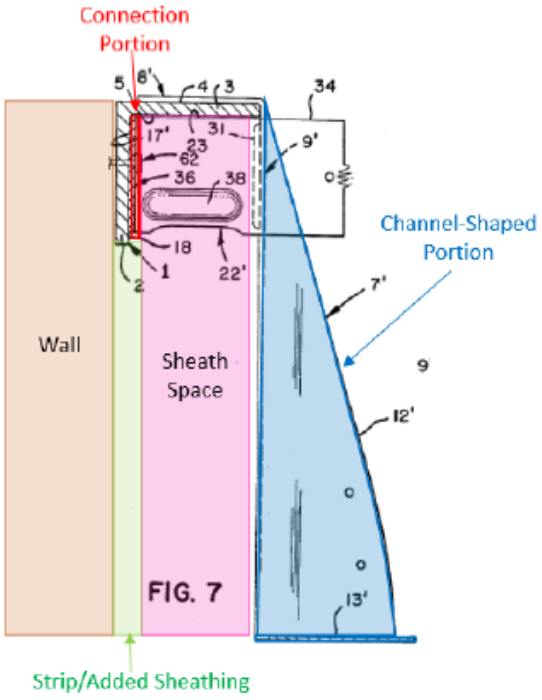
The above illustration shows Figure 7 of Gilb '792 annotated by Patent Owner to show a gap between a wall and alleged "sheath space."

Ex. 1035, Fig. 7 (annotated); PO Resp. 73–74; Ex. 2001 ¶ 200.

According to Patent Owner, "the presence of the ¼ inch thick ledger (2) together with the 7-gauge base (36) would separate the sheathing from the wall by nearly half an inch," and the skilled artisan "would readily recognize that sheathing is secured flush to the wall, not floating in space approximately half an inch away from the wall." PO Resp. 74 (citing Ex. 2001 ¶¶ 202–203). Patent Owner argues, as such, "the gusset members (15'/22') terminate within the sheathing, they don't extend through it," because "the installation of sheathing (to the extent that sheathing would be installed at all) would be stopped below the ledger and gusset members (15'/22')." *Id.* at 74–75 (citing Ex. 2001 ¶¶ 202–203, 205). Patent Owner

submits that "it would require a significant modification of the Gilb '792 hanger (e.g., omitting the metal ledger) to make the hanger compatible with installing sheathing up to and around the gusset members (15'/22')." *Id.* at 76 (citing Ex. 2001 ¶ 206).

Petitioner responds that "[Patent Owner's] arguments ignore that *the ledger is merely an intended use* of Gilb'792's hanger," and that "[the skilled artisan] 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'*." Pet. Reply 17 (citing Ex. 1003 ¶ 53) (emphases added); *see* Ex. 1038, 167:25–168:9; Ex. 1039 ¶¶ 71–72, 78–82. Petitioner submits "[Patent Owner's] declarant admitted that Gilb'792's hanger can 'absolutely' be attached to a top plate without a ledger." *Id.* (citing Ex. 1038, 167:25–168:9). Petitioner further responds that "even if Gilb'792's hanger was attached to the ledger, [the skilled artisan] would still have understood how and been motivated to install sheathing in the space defined by Gilb'792's gusset members 15'/22'," and "should such a gap be large enough to merit mitigation, [the skilled artisan] would have understood that sheathing, shims, or furring strips can be applied directly against the wall to account for [Patent Owner's] alleged 'gap,'" as shown, for example, in Petitioner's annotated version of Figure 7, reproduced below. Pet. Reply 18–19 (citing Ex. 1038, 171:4–172:14; Ex. 1039 ¶¶ 69–73, 75).



The above illustration shows Figure 7 of Gilb '792 annotated by Petitioner to show a "sheath space."

Ex. 1035, Fig. 7 (annotated); Pet. Reply 18. Petitioner further responds that "[the skilled artisan] 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." Pet. Reply 19 (citing Ex. 1039 ¶ 75).

In response, Patent Owner maintains that "[the skilled artisan] would not consider the arrangement of Gilb'792's hanger—even as modified in view of Bundy—to have an extension portion arranged such that it would extend through sheathing," because "the design of the Gilb '792 patent would prevent sheathing from being reasonably capable of being applied past the bottom of the ledger and gusset members (15'/22')." PO Sur-Reply 23; *see id.* at 23–25. Patent Owner argues Petitioner's proposals to

fill the "gap," such as "by applying an additional layer of sheathing, shims, or furring strips to the wall framing or by creating a recess for the ledger," "would prove abhorrently expensive and burdensome—especially when considering that they would require implementation throughout an entire multifamily structure." *Id.* at 24 (citing Ex. 2058, 107:17–111:13). Patent Owner argues Petitioner's potential solutions to address the "gap" that Patent Owner identifies amount to "hindsight aided reconstructions," and "[i]t is more reasonable to conclude that one of skill in the art would apply sheathing to the bottom of the ledger and use the ledger as a fire barrier." PO Resp. 77–78.

Patent Owner also argues, contrary to Petitioner, that the skilled artisan would not consider the Gilb '792 hanger "to be configured for attachment to a wood framed wall without the metal ledger." PO Resp. 79–80 (citing Ex. 2057 ¶ 97). Patent Owner argues "[t]he load path of Gilb '792 is reliant on the connection of the top flange (8) to the outstanding ledger leg (3) to provide vertical support for the imposed load," and "modifying the Gilb '792 hanger to eliminate its reliance on the ledger to provide vertical support would impermissibly 'change the basic principles under which [it] was designed to operate.'" *Id.* at 79–80 (citing Ex. 2057 ¶¶ 97–100; Ex. 2055, 45:13–48:1) (quoting *Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 F. App'x 755, 758 (Fed. Cir. 2015)). Based on the complete record before us, we find Patent Owner's arguments unavailing.

In a first scenario (discussed above) where the hanger of Gilb '792 is not used with a metal ledger, but instead attached directly to a wall top plate, without a metal ledger, using nail means 62', we are persuaded by

Petitioner's evidence and expert testimony discussed above. Petitioner's expert testifies that the skilled artisan would understand Gilb '792 to teach this (Ex. 1039 ¶¶ 59–62, 71–72, 78–82; Ex. 1003 ¶ 109), and under cross-examination, Patent Owner's expert agreed, "absolutely," that the hanger of Gilb '792 may attach directly to a wall top plate without using a ledger (Ex. 1038, 167:25–168:9). Moreover, Petitioner's expert testifies that "there are no structural distinctions between Gilb'792's base 36 and the back flange disclosed in the '867 patent specification," and that back flange is used to mount the hanger to a wall. Ex. 1039 ¶ 78 (*compare* Ex. 1035, 3:42–44, *with* Ex. 1001, 5:19–23).

Although Patent Owner's expert testifies that "[t]he load path of Gilb '792 is reliant on the connection of the top flange (8') to the outstanding ledger leg (3) to provide vertical support for the imposed load" (Ex. 2057 ¶ 98 (cited at PO Resp. 79–80); *see id.* ¶¶ 94–100), we find this testimony unpersuasive and afford it little weight. First, as discussed above, this testimony is contradicted by his cross-examination testimony (Ex. 1038, 167:25–168:9). Second, this testimony ignores (or does not meaningfully address) that in the context of a wooden wall top plate, the lower leg (or vertical leg) of the ledger would attach to the same plate to which nail means 62 would attach, and ignores the disclosure of Gilb '792 explicitly stating that structure like base 36 mounted to the lower leg of the ledger via nail means 62 provides "a surprisingly substantial increase in holding capacity of the hanger" (Ex. 1035, 3:9–21). *See* Tr. 15:18–19 (Petitioner's counsel arguing "to the extent they're saying that it relies on load support from the ledger, well, the ledger here only connects to the wall as well.").

Third, Patent Owner's arguments and its expert's testimony that Gilb '792's hanger must have its top flange 8 engaged with the ledger's outstanding (or horizontal) leg, not only its base 36 attached via nail means 62 (*see, e.g.*, PO Resp. 78–80), is contradicted by its arguments that face mounted hangers were well known in the art and its own hanger, as shown and claimed in the '867 patent, may dispense with its top flanges and rely solely on its back flanges for attaching to a wall. *See, e.g.*, RMTA Reply 7–9; Tr. 58:4–18 (Patent Owner arguing, "hangers that use back flanges or hangers that use top flanges and back flanges were all just conventional within the art. . . . [T]his was so well known in the art that the person of skill in the art would look at the '867 Patent's disclosures and go, yes, I see that they're only disclosing top flange embodiments, but I don't see why I couldn't just easily do it with a face mount hanger."); Ex. 1007, Figs. 1, 10 (showing Bundy's hanger in versions with top flanges (top mount) and without top flanges (face mount)).

Thus, in this first scenario, we find Petitioner sufficiently evidences that gusset members 15'/22' define a space that would permit sheathing to be inserted so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall. We also find that, where this first scenario is credited, Patent Owner concedes Gilb '792's gusset members 15'/22' define such a space and would extend through the sheathing. *See* PO Resp. 73–74 (acknowledging that where "sheathing [is] installed overlapping . . . base 36 . . . of the hanger," "the gusset members (15'/22') would extend through the sheathing.").

In a second scenario (discussed above) where Petitioner's identified sheath space between Gilb '792's connection portion and channel-shaped portion would, according to Patent Owner, separate the sheathing from a wall by nearly half an inch, we also are persuaded by Petitioner's evidence and expert testimony discussed above. In particular, Petitioner argues Bundy teaches using two layers of 5/8" drywall and its expert testifies that sheathing may be applied directly against the wall to account for Patent Owner's alleged gap (Ex. 1039 ¶¶ 69–73, 75)—in this case, the first layer of 5/8" drywall would abut the bottom of the ledger's lower leg and the second layer would extend between Gilb '792's connection portion and channel-shaped portion, thus satisfying the subject claim limitation. *See* Tr. 51:23–52:9 (Patent Owner conceding that applying two layers of drywall in this way would be "capable" of satisfying the subject limitation).

Further, as noted above, Petitioner's expert testifies that, if such a "gap" merited mitigation, among other techniques (e.g., sheathing, shims, or furring strips), "[the skilled artisan] 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." Pet. Reply 19 (citing Ex. 1039 ¶ 75). Patent Owner attempts to controvert this expert testimony based on cross-examination testimony where Petitioner's expert agreed that such techniques have labor and material (i.e., cost) implications. *See* PO Sur-Reply 24 (citing Ex. 2058, 107:17–111:13). Notably, Patent Owner does not dispute that these techniques were well-known to the skilled artisan, and if employed, would result in sheathing being installed so as to

satisfy the subject limitation. We note that claim 1 is a "comprising" claim, and does not preclude elements in addition to those required by the claim. Patent Owner also charges that Petitioner engages impermissible hindsight in relying on these techniques to mitigate such a "gap." PO Resp. 77–78. We find this argument unavailing, because such knowledge of assembling wall layers and establishing the plane of an outer finished wall was not gleaned only from the '867 patent, but already known to the skilled artisan. *See In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971) ("Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper.").

Thus, in this second scenario, we find Petitioner sufficiently evidences that gusset members 15'/22' define a space that would permit sheathing to be inserted so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall.

Based on the foregoing evidence, Petitioner contends, and we find, the combination of Gilb '792 and Bundy teaches or at least suggests "the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed

on the wall," as recited in claim 1. Pet. 40–42 (citing, *inter alia*, Ex. 1003 ¶¶ 59, 123–124).

(4) Reason to Combine Gilb '792 and Bundy

Petitioner argues Gilb '792 "already discloses a space between its back flange (base 36 having side face 17') and its channel-shaped portion (stirrup members 11'/12'), the width of the space defined by gusset members 15'/22'." Pet. 28–29 (citing Ex. 1003 ¶ 92). Petitioner argues the skilled artisan "would have found it obvious to receive sheathing between Gilb'792's stirrup members 11'/12' and base 36, as Bundy teaches receiving sheathing between a channel-shaped portion of a hanger and the wall." Pet. 29 (Ex. 1003 ¶¶ 93–94). Petitioner argues "it would have been obvious to optimize the size of the spacing between Gilb'792's stirrup members 11'/12' and base 36 to accommodate two layers of 5/8" thick sheathing according to the size preference described by Bundy." Pet. 29. Petitioner argues "[t]his modification would have been nothing more than applying a known technique (Bundy's spacing to accommodate two sheets of 5/8" sheathing) to a similar device (Gilb'792's space defined by gusset members 15'/22') to obtain the predictable result of optimizing the size of the hanger's spacing to receive sheathing, thereby '*protect[ing] the structural members of a building.*'" Pet. 29 (citing Ex. 1007, 5:18–20; Ex. 1003 ¶ 94) (emphasis added); *see id.* ("Bundy teaches this preferred construction *for optimal wall integrity.*" (emphasis added)).

Petitioner also argues the skilled artisan "would have had an expectation of success in defining a sheath space between Gilb'792's stirrup members 11'/12' and base 36, because Gilb'792's and Bundy's hangers are

used for similar purposes (e.g., hanging a structural object to a wall) and Gilb'792's stirrup members 11'/12', flanges 9', and base 36 already define a space therebetween." Pet. 41 (citing Ex. 1003 ¶ 123; Ex. 1007, 4:46–51; Ex. 1035, 1:5–11, 3:23–55); *see* Pet. 29 (citing Ex. 1003 ¶ 95; Ex. 1007, 4:47–51; Ex. 1035, 2:33–58).

Patent Owner argues Petitioner's combination of Gilb '792 (and its other primary references, Timony and Tsukamoto) and Bundy is "the epitome of an impermissible hindsight reconstruction." PO Resp. 103; *see id.* at 102–107, 111–112. Patent Owner argues that "the motivation for making the prior art combinations proffered by [Petitioner] is to make the modified base reference hangers useful for a firewall application," but "[n]one of the walls for which the Gilb '792, Timony, and Tsukamoto hangers were expressly designed need a fire barrier." *Id.* at 104–105. Patent Owner argues Petitioner "provides no reason—other than its desire to combine the references with Bundy—as to why [the skilled artisan] would use Gilb '792, Timony, or Tsukamoto on wood frame walls." *Id.* at 106. According to Patent Owner, "[i]n what is nothing more than circular reasoning, the justification for using Gilb '792, Timony, or Tsukamoto on wood frame walls is to solve the very problem that is created by doing so." *Id.* at 106–107. Patent Owner argues "[the skilled artisan] would recognize that Gilb '792 is incompatible for installation directly to a top plate of a wood framed wall" (as already discussed above, we find the evidence contradicts this argument (*see* Pet. Reply 14)). *Id.* at 107.

Petitioner responds that "[the skilled artisan] would have recognized that Bundy's suggestion to 'cover and protect' structural members goes

beyond just fireproofing," and "would have understood that sheathing can be used for soundproofing, insulation, and aesthetic applications, which all collectively achieve 'optimal wall integrity.'" Pet. Reply 12–13 (citing Ex. 1003 ¶ 94; Ex. 1038, 32:12–33:2; Ex. 1039 ¶¶ 48–55; Ex. 1007, 5:17–21). Petitioner contends "[t]his rationale of improving wall integrity comes directly from the art." *Id.* at 13. Petitioner argues [the skilled artisan] would have been motivated to combine drywall with masonry or concrete walls to provide cover for the wall structure," and that Patent Owner's expert "admitted that you can apply sheathing to anything, including masonry or foundation walls, for other purposes besides fire resistance." *Id.* (citing Ex. 1039 ¶¶ 50–59; Ex. 1038, 32:12–33:2); *see id.* ("[The skilled artisan] would have understood that drywall is also commonly applied to masonry or concrete walls to satisfy code requirements for a particular fire rating." (citing Ex. 1039 ¶¶ 56–58; Ex. 1040, 4 (Table 1), 5 (Table 3); Ex. 1041, 17, Fig. 8(a))).

Patent Owner in turn responds that Petitioner's rationales based on using sheathing for "'soundproofing, insulation, and aesthetic applications'" are "new," "were not expressed in the petition," and should be "disregarded" by the Board. PO Sur-Reply 10–13, 15. Patent Owner argues "[e]ach of Gilb '792's, Tsukamoto's, and Timony's hangers were designed specifically for use on masonry or concrete walls," and thus, "[t]here would have been no reason for [the skilled artisan] to have considered constructing [such] hangers to receive drywall between a connection portion and channel shaped portion of the hanger." *Id.* at 14. Patent Owner does, however, acknowledge that sheathing is applied to masonry or concrete walls: "While

[Petitioner] may be capable of conjuring a one-off application in which sheathing would be attached directly to a masonry or concrete wall, such applications are a gross deviation from standard practices." *Id.* Patent Owner also reiterates its argument that the skilled artisan would not have been motivated to configure the hanger of Gilb '792 for attachment to a top plate of a wood framed wall. *Id.* at 16–20.

Obviousness requires, among other things, a finding that a skilled artisan would have been motivated to combine the teachings of prior art to arrive at the claimed invention. *See OSI Pharms., LLC v. Apotex Inc.*, 939 F.3d 1375, 1382 (Fed. Cir. 2019) (quoting *Regents of Univ. of Cal. v. Broad Inst., Inc.*, 903 F.3d 1286, 1291 (Fed. Cir 2018)). The inquiry into the existence of a motivation to combine is a flexible one—we assume a skilled artisan is a person of ordinary creativity with common sense, common wisdom, and common knowledge. *See Fleming v. Cirrus Design Corp.*, 28 F.4th 1214, 1223 (Fed. Cir. 2022) (citing *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013); *KSR*, 550 U.S. at 421). In light of the skilled artisan's knowledge and creativity, an obviousness determination does not require prior art to expressly state a motivation for every obvious combination. *See, e.g.*, *id.* Moreover, there is no requirement that a motivation to combine must be separately expressed in *each* prior art reference.

The Federal Circuit has recognized that an obviousness showing "does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention." *Novartis Pharms. Corp. v. West-Ward*

Pharms. Int'l Ltd., 923 F.3d 1051, 1059 (Fed. Cir. 2019) (quoting *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004)). Here, Petitioner is required to show only that "'there is something in the prior art as a whole to suggest the *desirability* . . . of making the combination,' not whether there is something in the prior art as a whole to suggest that the combination is the *most desirable* combination available." *Fulton*, 391 F.3d at 1200 (quoting *In re Beattie*, 974 F.2d 1309, 1311 (Fed. Cir. 1992)).

The Board also must "recognize that we cannot allow hindsight bias to be the thread that stitches together prior art patches into something that is the claimed invention." *Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1367 (Fed. Cir. 2017) ("Without any explanation as to how or why the references would be combined to arrive at the claimed invention, we are left with only hindsight bias that *KSR* warns against."); s*ee KSR*, 550 U.S. at 421 ("A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning."). Our reviewing court has instructed that the Board "should consider a range of real-world facts to determine 'whether there was *an apparent reason* to combine the known elements in the fashion claimed by the patent at issue.'" *Intercont'l Great Brands LLC v. Kellogg N. Am. Co.*, 869 F.3d 1336, 1344 (Fed. Cir. 2017) (citing *KSR*, 550 U.S. at 418) (emphasis added); *see KSR*, 550 U.S. 418 ("[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does."); *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements;

instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness") (quoted with approval in *KSR*, 550 U.S. at 418).

In this case, it is indisputable that Bundy teaches, *inter alia*, joist hanger 2 attaches to top plate (or header) 4 of a wooden structural support (e.g., wall) (Ex. 1007, 3:55–5:9, code (57)); teaches using, for example, two layers of 5/8" drywall 6 between the wall frame and the hanger's back plate members (flanges) 9 "to cover and protect the structural members of a building" and "to extend up far enough to cover the front surface of the header" (*id.* at 1:9–11, 5:16–20; *see* Pet. 29 (citing same; Ex. 1003 ¶ 94)); teaches joist hanger 2 may attach to top plate 4 via back flanges 9 only (i.e., a face-mount hanger) (Ex. 1007, 1:46–51, 1:54–56, Figs. 10–20) *or* via both back flanges 9 and top flanges 15 (i.e., a top-flange hanger) (*id.* at 1:52–54, 5:38–64, Figs. 1–9); and teaches "top flanges may be attached to the back flanges to aid in attaching the hanger to the header" (*id.* at 1:52–53), as shown, for example, in Bundy's Figures 1 and 10, reproduced in Table 2 below. It also is indisputable that Gilb '792 teaches, *inter alia*, joist hanger 7' that holds a structural beam member (e.g., joist) and spaces the joist a certain distance from a wall based on gusset members 15', 22' (Ex. 1035, 3:22–44, Figs. 5–7); teaches "gusset members 15' and 22' are held in position by shooting nail means 62 through base 36 of the U-shaped member into lower leg 2 of the metal ledger," which ledger is attached to the wall (*id.* at 3:47–50); and teaches by placing base 36 "in face to face contact with the ledger lower leg 2 and fastening [it] to the lower ledge leg by fastening means 62, a surprisingly substantial increase in holding capacity of

the hanger could be obtained" (*id.* at 3:7–21), as shown, for example, in Gilb '792's Figures 5–7, reproduced in Table 2 below.

Table 2

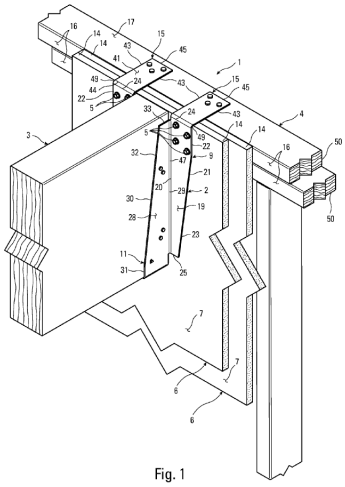
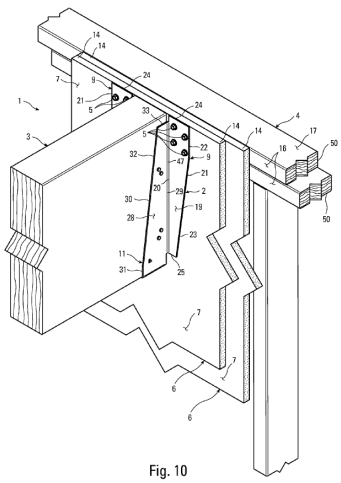
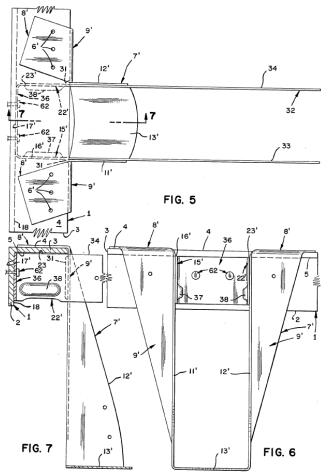
		
Ex. 1007, Fig. 1 (Bundy)	Ex. 1007, Fig. 10 (Bundy)	Ex. 1035, Figs. 5–7 (Gilb '792)

Table 2 depicts Bundy's Figures 1 and 10 and Gilb '792's Figures 5–7.

We agree with Petitioner that the skilled artisan, in view of these indisputable teachings, would have recognized the desirability of combining such teachings to size the hanger of Gilb '792, and particularly *the length* of its gusset members 15', 22', to define a sheath space therein for receiving sheathing (and to extend therethrough), such as one or more layers of drywall, for the explicitly stated purpose in Bundy of "cover[ing] and protect[ing] the structural members of a building" (Ex. 1007, 5:16–20), and allowing the drywall "to extend up far enough to cover the front surface of the header" (but for accounting for gusset members 15', 22') (*id.* at 1:9–11). We find the skilled artisan also would have appreciated Gilb '792's teaching of the benefits of increased strength by mounting base 36 directly to a wall

interface, and Bundy's teaching of extending drywall as continuous as possible across a wall (e.g., behind a joist), and would have recognized the desirability of combining these teachings to arrive at a hanger that mounts to a wall interface (whether via ledger or directly to the face of a wooden top plate), and that also provides a space (via gusset members 15'/22') that would permit sheathing to be inserted and positioned as set forth in claim 1 (i.e., so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall).

We disagree with Patent Owner that Petitioner relies on improper hindsight to reconstruct the invention of claim 1. Rather, as discussed more fully above, Petitioner's proffered rationale and underlying basis for doing so comes explicitly from the asserted prior art. *See* Pet. 38 (citing Ex. 1007, 5:18–20 ("cover[ing] and protect[ing] the structural members of a building"); Ex. 1003 ¶ 119); *see also* Pet. 28–29; Ex. 1007, 1:9–11 (allowing drywall "to extend up far enough to cover the front surface of the header"); Ex. 1003 ¶¶ 93–94; Pet. Reply 13. Patent Owner seeks to limit this rationale to only a firewall application, which it argues would be inapplicable in the context of a metal ledger and concrete wall in Gilb '792. PO Resp. 103–107. We find this argument unavailing. First, Patent Owner ignores the broader teaching to the skilled artisan of "covering and protecting" structural members. Second, Patent Owner acknowledges that sheathing is applied to masonry or concrete walls at least in certain settings (PO Sur-Reply 14). Finally, Patent Owner essentially argues that the skilled artisan would not have physically substituted a firewall from Bundy into

Gilb '792's hanger as mounted to a metal ledger and concrete wall, but in trying to force an actual, physical substitution here, ignores how the proffered rationale would have influenced the skilled artisan *to combine the teachings of both references to achieve the invention of claim 1*. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) ("It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements."); *In re Sneed*, 710 F.2d 1544, 1550 (Fed.Cir.1983) ("[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review."); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) ("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.").

Patent Owner also seeks to preclude Petitioner from arguing that the skilled artisan would have understood "cover[ing] and protect[ing] the structural members of a building" (Pet. 38 (citing Ex. 1007, 5:18–20)) includes using sheathing, such as drywall, in "soundproofing, insulation, and aesthetic applications" (Pet. Reply 12–13). PO Sur-Reply 10–13, 15. Although we rely herein on Bundy's explicit disclosure of "cover[ing] and protect[ing]" as supporting the rationale to combine the teachings of Gilb '792 and Bundy, we disagree with Patent Owner that Petitioner's additional arguments on using sheathing for soundproofing, insulation, and aesthetic applications should be disregarded. Instead, we find such arguments properly respond to Patent Owner's challenge that the skilled artisan would have understood "cover[ing] and protect[ing]" in Bundy to

implicate firewalls only. Patent Owner's expert agreed that the skilled artisan would have known that the installation of drywall over wall structures serves several purposes, such as "sound mitigation and fire resistance." Ex. 1038, 32:12–33:2. That said, we find these additional aspects of "cover[ing] and protect[ing]" structural members of a wall or building provide additional rational underpinning for why the skilled artisan would have combined Bundy's teachings of sheathing/drywall layers covering as much of a wall as possible (e.g., up to the top of a wooden-framed wall's top plate) with Gilb '792's teachings of a hanger that provides for a space between the wall and the joist being held by the hanger.

(5) Summary

Based on the foregoing evidence, Petitioner contends, and we find, the combination of Gilb '792 and Bundy teaches or at least suggests "each extension flange being configured to extend through the sheathing, each extension flange lying in an extension flange plane, the extension flange planes being generally perpendicular to the base plane, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall," as recited in claim 1. Pet. 37–42 (citing, *inter alia*, Ex. 1003 ¶¶ 118–124).

f) Conclusion – Independent Claim 1

For the reasons expressed above, we conclude that Petitioner has demonstrated by a preponderance of the evidence that the combined teachings of Gilb '792 and Bundy render claim 1 unpatentable as obvious.

In addition, because we agree with Petitioner that Gilb '792 teaches all *structural* elements of claim 1 (*see supra* Section II.F.3.a–e); because we conclude in the alternative that the phrase "configured to extend through the sheathing" is an intended use of the claimed extension flanges and does not further limit the scope of claim 1 or, if not, is superfluous of other structural limitations in claim 1 (*see supra* Section II.F.3.e.1); and because we find the length of gusset members 15', 22' as taught in Gilb '792 would necessarily provide a space to receive sheathing (even multiple layers of drywall) (*see, e.g.*, Ex. 1035, 1:23–30 (teaching the typical ledger has an outstanding (horizontal) leg measuring 3", and hanger gusset members 15', 22' extend substantially this length), Figs. 5–7; Ex. 1007, 5:14–18 (disclosing standard drywall thicknesses of 1/2" and 5/8")), we conclude, in the alternative, that there is no need to turn to any teachings in Bundy and, therefore, no need to identify any reason to combine teachings of Bundy and Gilb '792. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1372–73 (Fed. Cir. 2019) (finding "the Board was not required to make any finding regarding a motivation to combine" when the petitioner argued and the Board found that a single reference taught all the claim elements in an obviousness ground based on a combination of references). Unless the phrase "configured to extend through the sheathing" were found to further limit the scope of claim 1 (whereupon we rely on our analysis of reasons to combine Gilb '792 and Bundy (*see supra* Section II.F.3.e.4)), Gilb '792 alone would have rendered obvious the structure recited in apparatus claim 1.

4. Independent Claim 16

Petitioner contends independent claim 16 would have been unpatentable as obvious over the combination of Gilb '792 and Bundy. Pet. 53–58. The Petition provides a detailed assessment of claim 16, with references to the Petition's analysis of claim 1, disclosures in Gilb '792 and Bundy, and the declaration testimony of Mr. Fennell. Pet. 53–58.

In particular, independent claim 16 recites, in part, a "back flange configured for engaging a vertical face of the upper plate of the frame wall." Ex. 1001, 13:46–49. Petitioner argues Gilb '792 discloses a back flange (base 36), and "base 36 is configured to engage a vertical surface to secure hanger 7' to a wall via nails." Pet. 56 (citing Ex. 1003 ¶ 162; Ex. 1035, 3:23–55, Figs. 5–7). Petitioner argues that, "[w]hen installed to an upper plate of a frame wall, Gilb'792's base 36 would be configured to engage the vertical face of the upper plate by securing the hanger to the wall via nails." Pet. 56 (citing Ex. 1003 ¶ 162).

Patent Owner argues that "[Gilb '792's] base (36) is configured to engage the lower leg (2) of the ledger, not a vertical face of the upper plate of the frame wall." PO Resp. 78–79 (citing Ex. 1035, 1:5–63, 2:29–47; Ex. 2057 ¶¶ 92–96). Patent Owner argues, contrary to Petitioner, that the skilled artisan would not consider the Gilb '792 hanger "to be configured for attachment to a wood framed wall without the metal ledger." *Id.* at 79–80 (citing Ex. 2057 ¶ 97). Patent Owner argues "[t]he load path of Gilb '792 is reliant on the connection of the top flange (8) to the outstanding ledger leg (3) to provide vertical support for the imposed load," and "modifying the Gilb '792 hanger to eliminate its reliance on the ledger to provide vertical

support would impermissibly 'change the basic principles under which [it] was designed to operate.'" *Id.* (citing Ex. 2057 ¶¶ 97–100; Ex. 2055, 45:13–48:1). Based on the complete record before us, we agree with Petitioner and find Patent Owner's arguments unavailing for the same reasons already set forth above in Section II.F.3.e.3 (see discussion of "first scenario" where the hanger of Gilb '792 is not used with a metal ledger).

Patent Owner otherwise does not present any separate arguments that are distinct to claim 16, and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *NuVasive*, 842 F.3d at 1379–82; *Papst Licensing*, 924 F.3d at 1250; *Bradium*, 923 F.3d at 1048. Rather, Patent Owner generally is of the view that the alleged deficiencies in the Petition with respect to claim 1 are also applicable to claim 16. *See generally* PO Resp. 71–84.

For the same reasons provided above for independent claim 1, as well as the foregoing arguments and evidence submitted by Petitioner concerning independent claim 16, we conclude that Petitioner has demonstrated by a preponderance of the evidence that independent claim 16 is unpatentable as obvious over the combination of Gilb '792 and Bundy.

5. Dependent Claims 2–12, 15, 17, and 21–23

Petitioner contends claims 2–12, 15, 17, and 21–23, which depend directly or indirectly from independent claims 1 or 16, would have been unpatentable as obvious over the combination of Gilb '792 and Bundy. Pet. 42–53, 58–59. The Petition provides a detailed assessment of these claims, with references to the Petition's analysis of claims 1 and 16,

disclosures in Gilb '792 and Bundy, and the declaration testimony of Mr. Fennell. Pet. 42–53, 58–59.

Of these dependent claims, the parties dispute whether the skilled artisan would have had a rational reason to combine Gilb '792 and Bundy to achieve the inventions of claims 7 and 21. Both claims 7 and 21 recite:

> wherein the back flange has a front surface lying in a back flange plane and wherein the hanger further comprises *a stop* configured to engage the end of the structural component to space the end of the structural component from the back flange plane by a distance sized large enough to permit the sheathing to be received between the end of the structural component and the back flange plane.

Ex. 1001, 12:60–67 (emphasis added).

Petitioner argues "Gilb'792 discloses that the back flange (base 36) has a front surface lying in a back flange plane." Pet. 47 (citing Ex. 1003 ¶ 137; Ex. 1035, Fig. 5). Petitioner argues "Gilb'792 does not explicitly disclose a stop configured to engage the end of the structural component," but "Bundy teaches an analogous hanger that includes a stop," via back plate members 9, which Bundy states "could both be bent inward to face each other between the first and second side members 11." Pet. 47 (quoting Ex. 1007, 4:39–46; citing Ex. 1003 ¶ 138). Petitioner contends "it would have been obvious for [the skilled artisan] to modify Gilb'792 by providing a stop to engage an end of the structural element, as taught by Bundy, *to ensure that the end of the structural component 17 is spaced from the back flange*." Pet. 48 (citing Ex. 1003 ¶¶ 139–140). According to Petitioner, "[s]uch a modification would have been applying a known technique (Bundy's channel-shaped portion having stops bent inwards to

face each other) to a known device (Gilb'792's channel-shaped portion without stops) to obtain [a] predictable result of providing support at the end of a structural element." Pet. 48; *see* Pet. 58 (claim 21).

Patent Owner argues "Bundy does not identify these back plate members as being a stop," and that the skilled artisan allegedly would not have considered a stop to be necessary in Bundy, because "Bundy's hanger was designed for installation after the drywall was already installed." PO Resp. 114 (citing Ex. 1007, 2:20–25, Fig. 2; Ex. 2055, 64:8–18; Ex. 2057 ¶¶ 114–115, 191–192). Patent Owner argues Petitioner's rationale for providing a "stop" in the combination of Gilb '792 and Bundy "is simply an impermissible hindsight reconstruction." *Id.* at 116–119; *see id.* at 119 ("That [Petitioner] now pulls bending only a portion of Gilb '792's depending flanges . . . out of thin air exemplifies that Simpson is using the claims of the '867 Patent as a roadmap to invalidate claims 7 and 21.").

Petitioner responds that "[a]dding a stop would allow the hangers in [Gilb'792] to control the end of the structural element, and [the skilled artisan] would have been motivated to do so without the benefit of hindsight, *so as to protect any wall element behind the hanger*." Pet. Reply 15 (citing Ex. 1003 ¶¶ 138–139, 217–219, 294–296; Ex. 1039 ¶¶ 65–68) (emphasis added). Petitioner contends "[Patent Owner] erroneously asserts that Petitioner's rationale for bending only a portion of [Gilb'792's] channel-shaped portions arrives 'out of thin air,'" but Patent Owner "*overlooks the skill of a POSITA [i.e., the skilled artisan], who would have known that select portions of a hanger section may be bent*." *Id.* at 15–16 (citing Ex. 1039 ¶ 67) (emphasis added); *see* Ex. 1039 ¶¶ 65–67.

Patent Owner in turn responds that "[Petitioner's] alleged motivation has no support anywhere in the prior art, and instead is merely a *post haec* excuse to incorporate a claim limitation that was entirely missing from the asserted prior art." PO Sur-Reply 20; *see id.* at 20–21. We agree with Petitioner and find Patent Owner's arguments unavailing.

The law does not require that the references expressly articulate a motivation to combine. *See, e.g.*, *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1359 (Fed. Cir. 2017). "Motivation to combine may be found in many different places and forms." *Allergan, Inc. v. Sandoz, Inc.*, 726 F.3d 1286, 1292 (Fed. Cir. 2013); *see also Cross Med. Prod., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1322 (Fed. Cir. 2005) ("It has long been the law that the motivation to combine need not be found in prior art references, but equally can be found 'in the knowledge generally available to one of ordinary skill in the art.'"). Indeed, an obviousness analysis may "consider a range of real-world facts to determine 'whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.'" *Intercont'l Great Brands*, 869 F.3d at 1344 (quoting *KSR*, 550 U.S. at 418).

In this case, we already determined above that the skilled artisan—without improper hindsight—would have had sufficient reasons to combine the teachings of Gilb '792 and Bundy to achieve the invention of independent claim 1, which includes "the back flange and the channel-shaped portion *defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the*

sheathing when the hanger and sheathing are installed on the wall." *See supra* Section II.F.3.e.4 ("Reason to Combine Gilb '792 and Bundy"). Given this sheath space and given that joists may be installed in the hangers before drywall installation, we agree with Petitioner that the skilled artisan (e.g., a Mechanical Engineer with at least four years of work experience in construction connector design/development) would have recognized the desirability of providing "a stop to engage an end of the structural element, as taught by Bundy, to ensure that the end of the structural component 17 is spaced from the back flange." Pet. 48. In other words, we find the skilled artisan would have desired to *stop* joists, during their installation, from intruding into the sheath space so as not to block or impede subsequent installation of sheathing/drywall into the sheath space. *See KSR*, 550 U.S. at 419–21 (An obviousness analysis must account for the teachings of the prior art as a whole in light of the common sense and creativity of a person of ordinary skill in the art.).

We note that in the prior post-grant proceeding, PGR2019-00063, Patent Owner did not dispute that a "stop," such as at issue here, was known in the art. *See* Ex. 2006, 74–75 (concluding that Petitioner demonstrated by a preponderance of the evidence that the asserted prior art disclosed a "stop"). Similarly, in this case, Patent Owner does not point to any evidence of record that including a "stop" in the hanger of independent claim 1 would have been "uniquely challenging or difficult for one of ordinary skill in the art" or "represented an unobvious step over the prior art." *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007).

Patent Owner otherwise does not present any separate arguments that are distinct to remaining dependent claims 2–6, 8–12, 15, 17, 22, and 23, and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *NuVasive*, 842 F.3d at 1379–82; *Papst Licensing*, 924 F.3d at 1250; *Bradium*, 923 F.3d at 1048. Rather, Patent Owner generally is of the view that the alleged deficiencies in the Petition with respect to claims 1 and 16 are also applicable to these claims. *See generally* PO Resp. 71–84, 102–123. For the same reasons provided above for independent claims 1 and 16, as well as the foregoing arguments and evidence submitted by Petitioner concerning dependent claims 2–12, 15, 17, and 21–23, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 2–12, 15, 17, and 21–23 are unpatentable as obvious over the combination of Gilb '792 and Bundy.

6. Overall Summary

For the reasons expressed above, we conclude that Petitioner has demonstrated by a preponderance of the evidence that the combined teachings of Gilb '792 and Bundy render claims 1–12, 15–17, and 21–23 unpatentable as obvious.

G. Summary of Analysis of Original Claims 1–23

In our analysis above of original claims 1–23 of the '867 patent, we determine that Petitioner *has* demonstrated by a preponderance of the evidence:

(1) claims 5 and 17 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness;

(2) claims 5 and 17 are unpatentable under 35 U.S.C. § 112(a) for lack of written description; and

(3) claims 1–12, 15–17, and 21–23 are unpatentable as obvious over the combination of Gilb '792 and Bundy.

We also determine that Petitioner *has not* demonstrated by a preponderance of the evidence:

(1) claims 1–4, 6–16, and 18–23 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness.

We note that Petitioner's only challenge to patentability of dependent claims 13, 14, and 18–20 is based on indefiniteness under Section 112(b). Petitioner does not assert any prior-art-based challenges under Section 102 or 103 against these claims. *See* Pet. 2–3. Because we find Petitioner *has not* demonstrated by a preponderance of the evidence that these claims are indefinite (*see supra* Section II.D), these original dependent claims 13, 14, and 18–20 stand.

Given Patent Owner's stated contingency of its proposed substitute claims in the RMTA (RMTA 1), for efficiency purposes, we need not and do not address in this section Petitioner's remaining prior-art-based unpatentability arguments directed to original claims 1–12, 15–17, and 21–23, and instead hereinafter turn to proposed substitute claims 24–46, as discussed below in Section III. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner "is entitled to a final written decision addressing all of the claims it has challenged"); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, Nos. 2019-1594, -1604, -1605, 2020 WL 2071962, at *4 (Fed. Cir. Apr. 30, 2020) (non-precedential) (recognizing that the

"Board need not address issues that are not necessary to the resolution of the proceeding" and, thus, agreeing that the Board has "discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims"). Nevertheless, in Section III, because all proposed substitute claims are narrower than their corresponding original claims, our findings and conclusions as to prior-art-based unpatentability of proposed substitute claims apply equally to their corresponding original claims. We now turn to Patent Owner's Revised Contingent Motion to Amend.

III. REVISED CONTINGENT MOTION TO AMEND

Patent Owner requests that we grant entry of proposed substitute claims 24–46, which correspond to original claims 1–23. RMTA 1, App. A, 2. In particular, Patent Owner requests that "[i]f, after considering Patent Owner's briefing, the Board finds any of issued claims unpatentable, Patent Owner respectfully requests the Board replace each unpatentable claim with its corresponding substitute claim, as indicated in Appendix A." RMTA 1. Because Patent Owner proposed substitute claims 36, 37, and 41–43 contingent upon Petitioner demonstrating the unpatentability of original claims 13, 14, and 18–20, respectively, and because Petitioner has not demonstrated the unpatentability of claims 13, 14, and 18–20 by a preponderance of the evidence, we do not consider proposed substitute claims 36, 37, and 41–43. Rather, we turn only to Patent Owner's proposed substitute claims 24–35, 38–40, and 44–46.

A. Applicable Law

In a post-grant review, amended claims are not added to a patent as of right, but rather must be proposed as a part of a motion to amend. 35 U.S.C.

§ 326(d). The Board must assess the patentability of proposed substitute claims "without placing the burden of persuasion on the patent owner." *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1328 (Fed. Cir. 2017) (en banc); *see also Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 3–4 (PTAB Feb. 25, 2019) (precedential). Subsequent to the issuance of *Aqua Products*, the Federal Circuit issued a decision in *Bosch Automotive Service Solutions, LLC v. Matal*, 878 F.3d 1027 (Fed. Cir. 2017) ("*Bosch*"), as well as a follow-up order amending that decision on rehearing. *See Bosch Auto. Serv. Sols., LLC v. Iancu*, No. 2015-1928 (Fed. Cir. Mar. 15, 2018) (Order on Petition for Panel Rehearing).

In accordance with *Aqua Products*, *Bosch*, and *Lectrosonics*, a patent owner does not bear the burden of persuasion to demonstrate the patentability of the substitute claims presented in the motion to amend. Rather, ordinarily, "the petitioner bears the burden of proving that the proposed amended claims are unpatentable by a preponderance of the evidence." *Bosch*, 878 F.3d at 1040 (as amended on rehearing); *Lectrosonics*, Paper 15 at 3–4. In determining whether a petitioner has proven unpatentability of the proposed substitute claims, the Board focuses on "arguments and theories raised by the petitioner in its petition or opposition to the motion to amend." *Nike, Inc. v. Adidas AG*, 955 F.3d 45, 51 (Fed. Cir. 2020). Ultimately, the Board determines whether the proposed substitute claims are unpatentable by a preponderance of the evidence based on the entirety of the record, including any opposition made by the Petitioner. *See Lectrosonics*, Paper 15 at 4.

Notwithstanding the foregoing, Patent Owner's proposed substitute claims 24–35, 38–40, and 44–46 must meet the statutory requirements of 35 U.S.C. § 326(d) and the procedural requirements of 37 C.F.R. § 42.221. *Lectrosonics*, Paper 15 at 4–8. Accordingly, Patent Owner must demonstrate: (1) the amendment proposes a reasonable number of substitute claims; (2) the amendment responds to a ground of unpatentability involved in the trial, (3) the proposed claims are supported in the original disclosure (and any earlier filed disclosure for which the benefit of filing date is sought); and (4) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter. *See* 35 U.S.C. § 326(d); 37 C.F.R. § 42.221.

B. Proposed Substitute Claims

Proposed substitute independent claim 24 would replace independent claim 1, and is reproduced below with underlining indicating text added to claim 1.

> 24. A hanger for connecting a structural component to a wall adapted to have sheathing mounted thereon, the hanger comprising:
>
> a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;
>
> a connection portion configured for attachment to the wall, the connection portion including a back flange having an upper edge, the back flange extending from the upper edge in a direction generally toward the base plane, the connection portion

and channel-shaped portion being in a rigidly fixed, spaced apart relation relative to one another as manufactured; and

an extension portion including first and second extension flanges extending from the channel-shaped portion to the connection portion, each extension flange being configured to extend through the sheathing, each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion, the extension flange planes being generally perpendicular to the base plane, the first and second extension flanges and the channel-shaped portion being formed as one piece of sheet metal, the back flange and the channel-shaped portion defining a sheath space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing when the hanger and sheathing are installed on the wall.

RMT A, App. A, 3–4.

Proposed substitute independent claim 39 would replace independent claim 16, and is reproduced below with underlining indicating text added to claim 16.

39. A hanger to connect a ~~joist~~ structural component to a frame wall adapted to have sheathing mounted thereon so that an interior side of the sheathing faces the frame wall and an exterior side of the sheathing faces away from the frame wall, the frame wall including a wooden upper plate and wooden studs extending down from the upper plate, the hanger comprising:

a channel-shaped portion configured to receive the structural component, the channel-shaped portion including a base configured to receive an end portion of the structural component thereon to support the structural component and side panels extending upward from the base, the base having an upper surface configured to engage the structural component, the upper surface lying in a base plane;

> a connection portion configured for attachment to the frame wall, the connection portion including a back flange configured for engaging a vertical face of the upper plate of the frame wall, the connection portion and channel-shaped portion being in a rigidly fixed, spaced apart relation relative to one another, the connection portion including a top flange, the top flange extending in a direction rearwardly away from the channel-shaped 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; and
>
> first and second extension flanges interconnecting the connection portion and the channel-shaped portion and holding the connection portion and channel-shaped portion in spaced apart relation to each other, the first and second extension flanges being configured to extend through an opening in the sheathing to the wall frame, 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, the back flange, the first and second extension flanges and the channel-shaped portion defining a sheathing space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing, the back flange being sized and arranged to at least partially block the opening in the sheathing to reduce the exposure of the wooden top plate and wooden studs to an exterior through the opening in the sheathing.

RMTA, App. A, 9–11.

According to Patent Owner, "the amendments only add elements to the issued claims of the '867 patent that narrow their scope," and "do not delete limitations from the issued claims." RMTA 2.

C. Statutory and Regulatory Requirements

1. Reasonable Number of Claims (35 U.S.C. § 326(d)(1)(B); 37 C.F.R. § 42.221(a)(3))

"There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim." *Lectrosonics*, Paper 15 at 4–5 (citing 37 C.F.R. § 42.221(a)(3)). Petitioner challenges claims 1–23 of the '867 patent, and Patent Owner proposes claims 24–46, as potential substitutes for claims 1–23, respectively. RMTA 1. Patent Owner thus proposes no more than 1 substitute claim for each challenged claim, and proposes to replace two independent claims and twenty-one dependent claims with two independent claims and twenty-one dependent claims. *See* RMTA, App. A. We find Patent Owner proposes a reasonable number of substitute claims.

2. Respond to a Ground of Unpatentability (37 C.F.R. § 42.221(a)(2)(i))

Patent Owner contends that proposed substitute claims 24–46 are responsive to the grounds in this trial because they "address [Petitioner's] indefiniteness ground (Ground 1) and obviousness grounds (Grounds 3–6)." RMTA 18. We agree that proposed substitute claims 24–46 adequately assert additional limitations relevant to the issues in the instituted grounds. Thus, the proposed claims satisfy the requirement.

3. Scope of Amended Claims (35 U.S.C. § 326(d)(3); 37 C.F.R. § 42.221(a)(2)(ii))

"A substitute claim will meet the requirements of § 42.221(a)(2)(i) and (ii) if it narrows the scope of at least one claim of the patent, for example, the challenged claim it replaces, in a way that is responsive to a

ground of unpatentability involved in the trial." *Lectrosonics*, Paper 15 at 6–7. Patent Owner contends "no substitute claim enlarges the scope of the claim that it replaces in any respect," because "the amendments only add elements to the issued claims of the '867 patent that narrow their scope" and "do not delete limitations." RMTA 2; *see* RMTA, App. A. Patent Owner submits that "[t]he substitute claims presented herein also show the corrections made by the Certificate of Correction (EX2032)." RMTA, App. A, 3. We agree that proposed substitute independent claims 24 and 39 include additional limitations not recited in challenged claims 1 and 16, respectively, and do not strike any original limitations. Proposed substitute dependent claims 25–29, 32–35, 40, 41, and 46 add further amendments to their original claim counterparts, and proposed substitute dependent claims 30, 31, 36–38, and 42–45 merely change the dependency of their original claim counterparts. RMTA, App. A. Thus, we agree with Patent Owner that proposed substitute claims 24–46 are of narrower scope than challenged claims 1–23, respectively.

4. New Matter or Written Description (35 U.S.C. § 326(d)(3); 37 C.F.R. § 42.221(b)(1))

An amendment cannot introduce new matter. 35 U.S.C. § 326(d)(3). Thus, the motion to amend must set forth the support in the original disclosure of the patent for each claim that is added or amended. 37 C.F.R. § 41.121(b)(1); *Lectrosonics*, Paper 15 at 7. "Amendments should clearly state where the specification and any drawings support all the limitations in the proposed substitute claims. If the Board is unable to determine how the specification and drawings support the proposed substitute claims, the

motion to amend may be denied." Consolidated Trial Practice Guide ("CTPG")[8] at 71; *see also* 84 Fed. Reg. 64,280 (Nov. 21, 2019).

Under 35 U.S.C. § 112(a), a patent specification shall contain a "written description" of the invention. The purpose of the written description requirement is to "ensure that the scope of the right to exclude, as set forth in the claims, does not overreach the scope of the inventor's contribution to the field of art as described in the patent specification." *Univ. of Rochester*, 358 F.3d at 920 (quoting *Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1345 (Fed. Cir. 2000)). This requirement protects the *quid pro quo* between inventors and the public, whereby the public receives "*meaningful disclosure* in exchange for being excluded from practicing the invention for a limited period of time." *Enzo Biochem*, 323 F.3d at 970 (emphasis added).

a) Citations to Show Written Description Support

In its RMTA, Patent Owner provides citations to U.S. Patent Application No. 16/433,799 (Ex. 1002 (file history) at 30–101 ("'799 application")) and to earlier-filed applications to which the '867 patent claims priority, to show written description support for proposed substitute claims 24–46. *See* RMTA 2–18. Except as determined in analyzing written description for original claims 1–23 (*see supra* Section II.E) and as otherwise identified below (*see infra* Section III.C.4.b), we find Patent Owner's citations to the '799 and earlier applications are

[8] Available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

sufficient to show written description support for the noted limitations (*see* RMT A 2–15).

b) Petitioner's "New Matter" Challenges

Petitioner contends that certain limitations in the proposed substitute claims lack written description support and thus represent new matter, as discussed below. *See* RMT A Opp. 1–3; RMT A Sur-Reply 1–3.

(1) Independent Claim 24: "each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion"

Patent Owner's proposed substitute independent claim 24 adds the limitation (underlined), "each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion." RMT A, App. A, 4. Petitioner contends that Patent Owner fails to show sufficient written description support for this newly added limitation of "throughout its extent" *from* the channel-shaped portion *to* the connection portion. RMT A Opp. 1–2; RMT A Sur-Reply 1–2. Patent Owner opposes Petitioner's contentions. RMT A Reply 1–3.

Petitioner argues that because (1) the subject limitation requires extension flanges to lie in extension flange planes the entire distance *from* the hanger's channel-shaped portion *to* the connection portion, (2) the '799 application's disclosure only describes the extension flanges as having "bends" at their ends to transition to other structural members of the hanger, and (3) such bends allegedly would make it impossible for the extension flanges to lie in such planes over that entire distance, i.e., including through the "bent" portion, then the skilled artisan would not have recognized that

the inventor possessed this feature of the invention in proposed substitute claim 24. *See* RMTA Opp. 1–2 ("[T]he extension flange cannot lie along a 2-D extension flange plane *throughout its extent*, due to the bent ends."); RMTA Sur-Reply 1–2.

As we explain above in Section II.D.1, in the context of indefiniteness of the originally issued claims, we do not agree with Petitioner that such "bends" necessarily preclude each extension flange from lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion. For example, in that section we determine that the bends (or bent portions) at the ends of the extension flanges disclosed in Figure 7 of the '867 patent, for example, have radiuses small enough to allow an extension flange plane to remain *within the extent* of the extension flange *from* the channel-shaped portion *to* the connection portion. *See supra* Section II.D.1. Thus, at least Figure 7 and its accompanying text provide sufficient written description support for the subject limitation. *See Lockwood*, 107 F.3d at 1572 ("One does that [i.e., shows possession] by such descriptive means as words, structures, *figures*, diagrams, formulas, etc., that fully set forth the claimed invention." (emphasis added)).

Based on the foregoing, and on the complete record before us, we are persuaded that the '799 and benefit applications adequately support the limitation "each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion." Accordingly, we find that this limitation does not introduce new matter; and for this limitation, Patent Owner satisfies the requirements of 35 U.S.C. § 326(d)(3) and 37 C.F.R. § 42.221(a)(2)(ii).

(2) Dependent Claim 25: "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"

Patent Owner's proposed substitute dependent claim 25 adds the limitation (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." RMTA, App. A, 4–5. Petitioner contends that Patent Owner fails to show sufficient written description support for this newly added limitation of "unbent." RMTA Opp. 2–3; RMTA Sur-Reply 2. Patent Owner opposes Petitioner's contentions. RMTA Reply 6.

Petitioner argues "unbent" is a negative limitation, and any alleged support therefor in the Specification is belied by the '799 application describing the extension flanges as having "bends" at their ends to transition to other structural members of the hanger. *See* RMTA Opp. 2–3; RMTA Sur-Reply 2. Patent Owner responds that "[Petitioner's] identified 'bend' occurs at an end of the extension flange—*e.g.*, at the channel-shaped portion—not between the channel-shaped portion and back flange." RMTA Reply 6. We agree with Petitioner that the limitation "unbent," i.e., *not* bent, is a negative limitation, because it speaks to the absence of a feature, i.e., bends, as opposed to positively reciting the presence of a feature in the claimed hanger.

"Negative claim limitations are adequately supported when the specification describes a reason to exclude the relevant limitation," although "[s]uch written description support need not rise to the level of disclaimer."

Santarus, Inc. v. Par Pharm., Inc., 694 F.3d 1344, 1351 (Fed. Cir. 2012); *see* MPEP § 2173.05(i) ("Negative Limitations"). Negative claim limitations also are supported when the specification describes a number of excludable alternatives. *See Inphi Corp. v. Netlist, Inc.*, 805 F.3d 1350, 1356 (Fed. Cir. 2015). In this case, Patent Owner does not identify any description in the '799 application that provides a reason to exclude "bent" extension flanges, and does not explain why this "unbent" requirement does not plainly contradict the "bends" provided at the extension flanges' ends. Patent Owner also does not identify any such description of excludable alternatives to the extension flanges shown in Figure 2, for example. Although Figures 2 and 7 of the '799 application may show an "unbent" first extension flange, but for the "bends" provided at the extension flanges' ends as discussed above, based on the complete record before us, we are persuaded by Petitioner that Patent Owner's cited evidence and arguments do not show sufficiently that the subject disclosure would have *reasonably conveyed* to the skilled artisan that the inventor possessed the subject feature as of the filing date.

Based on the foregoing, and on the complete record before us, we are not persuaded that the '799 and benefit applications adequately support the limitation "the first extension flange being unbent between the channel-shaped portion and the back flange." Accordingly, we find that this limitation introduces new matter; and for this limitation, Patent Owner does not satisfy the requirements of 35 U.S.C. § 326(d)(3) and 37 C.F.R. § 42.221(a)(2)(ii).

(3) *Dependent Claims 28 and 40: "wherein the first and second extension flanges each have an exterior side face configured to extend through a cutout through the sheathing with the exterior side faces of the first and second extension flanges arranged to face the sheathing everywhere within the cutout for maintaining a 2 hour fire resistance rating of a wall assembly including the wall and the sheathing"*

Patent Owner's proposed substitute dependent claim 28 adds the limitations (underlined), "wherein the first and second extension flanges each have an exterior side face ~~are~~ configured to extend through a cutout through the sheathing with the exterior side faces of the first and second extension flanges arranged to face the sheathing everywhere within the cutout for ~~while~~ maintaining a 2 hour fire resistance rating of a wall assembly including the wall and the sheathing." RMTA, App. A, 6. Petitioner contends that Patent Owner fails to show sufficient written description support for this newly added limitation of such exterior side faces of the extension flanges facing the sheathing "everywhere within the cutout." RMTA Opp. 3; RMTA Sur-Reply 2–3. Patent Owner opposes Petitioner's contentions. RMTA Reply 5. Although Petitioner here points only to proposed substitute claim 28, which replaces original claim 5, we note that proposed substitute claim 40, which replaces original claim 17, recites the same limitations. *See* RMTA, App. 6, 11.

Petitioner argues that the '799 application does not describe "extension flanges arranged to *face the sheathing everywhere* within the cutout of the sheathing," and points to Figure 10A thereof, reproduced

below, which Petitioner annotated to "show[] that portions of the sheathing cutout (highlighted) do not face the extension flanges."

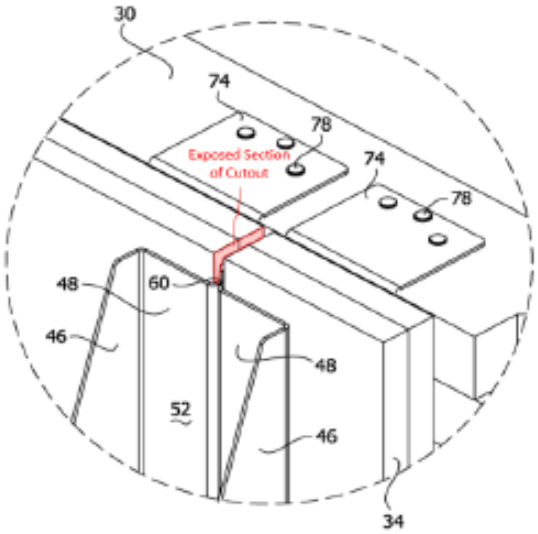


Figure 10A (annotated by Petitioner) depicts an enlarged fragmentary perspective of a hanger mounted to a wall with sheathing installed.

RMTA Opp. 3; Ex. 1001, Fig. 10A.

Patent Owner argues Petitioner "labors to misread this limitation to require every part of the sheathing to face the exterior side faces." RMTA Reply 5. According to Patent Owner, "the limitation's plain meaning is that the exterior side faces are arranged such that every part of each exterior side face that will be disposed in the cutout (*i.e.*, 'everywhere within the cutout') will face the sheathing" (*id.*)—the problem here is that this simply is not what the amended claim limitation recites, even though Patent Owner itself submitted that claim language. We agree with Petitioner: "If [Patent Owner] wanted to claim that only 'part' of the extension flanges face only a part of the sheathing, [Patent Owner] could have done so in its amendment. Instead, the claims recite that the flanges 'face the sheathing ***everywhere***

within the cutout'" (RMTA Sur-Reply 2–3). We find no description in the '799 application, and Patent Owner does not direct us to any, that would have reasonably conveyed to the skilled artisan that the inventor possessed the subject feature as of the filing date.

Based on the foregoing, and on the complete record before us, we are not persuaded that the '799 and benefit applications adequately support the limitation "wherein the first and second extension flanges each have an exterior side face configured to extend through a cutout through the sheathing with the exterior side faces of the first and second extension flanges arranged to face the sheathing everywhere within the cutout for maintaining a 2 hour fire resistance rating of a wall assembly including the wall and the sheathing." Accordingly, we find that this limitation introduces new matter; and for this limitation, Patent Owner does not satisfy the requirements of 35 U.S.C. § 326(d)(3) and 37 C.F.R. § 42.221(a)(2)(ii).

In addition, in Section II.E above, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 5 and 17 are unpatentable under 35 U.S.C. § 112(a) for lack of written description. In particular, we find no description in the Specification, and the parties do not direct us to any, disclosing what structural features *of the extension flanges* (let alone the full scope of such features) are required for such flanges not only to be configured to extend through sheathing, but further configured to extend through sheathing "while maintaining a 2 hour fire resistance rating of the sheathing [or "of a wall assembly including the wall[/frame wall] and the sheathing"]." Because proposed substitute claims 28 and 40 do not amend original claims 5 and 17 in any manner that

resolves these deficiencies, we determine that proposed substitute claims 28 and 40 lack the requisite written description support, for the same reasons as discussed above in Section II.E.

5. Conclusion

For the reasons expressed above, we conclude Patent Owner has failed to meet its burden to identify written description support for proposed substitute dependent claims 25, 28, and 40, but has met its burden to identify written description support for the remaining proposed substitute claims. Accordingly, we deny Patent Owner's Revised Contingent Motion to Amend as to proposed substitute dependent claims 25, 28, and 40.

We address below Petitioner's unpatentability arguments directed to Patent Owner's proposed substitute claims.

D. Unpatentability of Proposed Substitute Claims 24–35 as Lacking Enablement Under 35 U.S.C. § 112(a)

Petitioner argues "claim 24 is not enabled because it does not recite a top flange having fastening elements." RMTA Opp. 4. Petitioner contends, "[a]ccording to PO's own expert, a top flange having fastening elements is essential for the described hanger to be operable because the patented hanger provides no other means of fastening to the wall, and it was impossible to place fastening elements on the back flange." *Id.* (citing Ex. 1038, 132:20–137:19, 142:1–144:19, 141:17–145:5 ("if I were to remove element 74, [the hanger of Figure 2] is inoperable")). Petitioner asserts that "[e]ach hanger embodiment of the '799 Application includes a top flange," and "the specification never describes the top flange as being an optional feature used in a preferred embodiment." *Id.* (citing Ex. 1002, 35–58).

Petitioner also asserts that the skilled artisan "would have considered the 'top flange' essential, because no other location is suitable for fastening the hanger to the wall." *Id.* Petitioner submits "the scope of the enabling disclosure is not commensurate with the scope of claim 24," and that because claim 24 "omit[s] a feature that is taught by the specification to be essential," the claim necessarily "lacks enablement." *Id.* (citing *In re Mayhew*, 527 F.2d 1229, 1233 (CCPA 1976)).

"The requirement of enablement, stated in 35 U.S.C. § 112, enforces the essential '*quid pro quo* of the patent bargain' by requiring a patentee to teach the public how 'to practice the full scope of the claimed invention.'" *McRO, Inc. v. Bandai Namco Games America Inc.*, 959 F.3d 1091, 1099–100 (Fed. Cir. 2020) (quoting *AK Steel Corp. v. Sollac*, 344 F.3d 1234, 1244 (Fed. Cir. 2003)). "To prove that a claim is invalid for lack of enablement, a challenger must show . . . that a person of ordinary skill in the art would not be able to practice the claimed invention without 'undue experimentation.'" *Alcon Research Ltd. v. Barr Labs., Inc.*, 745 F.3d 1180, 1188 (Fed. Cir. 2014) (quoting *In re Wands*, 858 F.2d 731, 736–37 (Fed. Cir. 1988)). "Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations." *Wands*, 858 F.2d at 737. Those factual considerations, which have come to be known as the "*Wands* factors," are:

(1) the quantity of experimentation necessary,
(2) the amount of direction or guidance presented,
(3) the presence or absence of working examples,
(4) the nature of the invention,
(5) the state of the prior art,
(6) the relative skill of those in the art,

(7) the predictability or unpredictability of the art, and
(8) the breadth of the claims.

Id.

The Federal Circuit has explained that, "[a]fter the challenger has put forward evidence that some experimentation is needed to practice the patented claim, the factors set forth in *Wands* then provide the factual considerations that a court may consider when determining whether the amount of that experimentation is either 'undue' or sufficiently routine such that an ordinarily skilled artisan would reasonably be expected to carry it out." *Alcon Research*, 745 F.3d at 1188 (quoting *Wands*, 858 F.2d at 737). Although a specification does not need to "describe how to make and use every possible variant of the claimed invention, when a range is claimed, there must be reasonable enablement of the scope of the range." *McRO*, 959 F.3d at 1100 (citing *AK Steel*, 344 F.3d at 1244) (internal quotations omitted). "An artisan's knowledge of the prior art and routine experimentation can often fill gaps, interpolate between embodiments, and perhaps even extrapolate beyond the disclosed embodiments, depending upon the predictability of the art, and a patent need not teach, and preferably omits, what is well known in the art." *Id.* at 1102 (internal quotations and citations omitted).

Patent Owner responds, "[Petitioner] provides no analysis on what 'undue experimentation' would be required," and its reliance on *Mayhew* is "inapposite," because the '867 Patent "never identifies the top flange as essential." RMTA Reply 7–8. Patent Owner argues that "[t]he specification uses broad language—'a connection portion [] configured for attachment to

the wall'—to describe the hanger's portion that attaches to the wall"; "both the Abstract and portions of the 'Summary' section omit the top flange"; and the Specification states that the scope of the invention includes "other appropriate structure for fastening the hanger to the wall." *Id.* at 8 (citing Ex. 1001, code (57), 2:4–23, 2:45–50, 6:44–46, 6:53–57; Ex. 2069 ¶¶ 56–59). Patent Owner also complains that Petitioner is taking the testimony of Patent Owner's expert, Dr. Serrette, out of context, in that when Dr. Serrette testified that removing the top flanges from the hanger in Figure 2 would render the hanger "inoperable," he was referring to the specific hanger as drawn in Figure 2. *Id.*; *see* Ex. 2069 ¶ 60.

Petitioner in turn reiterates its position that the impossible cannot be enabled, and argues, "[a]s explained by both experts, it is *impossible* for the '867 patent's disclosed hanger to be mounted to a wall and support a joist without having a top flange." RMTA Sur-Reply 3–7.

We agree with Patent Owner that Petitioner is mischaracterizing the experts' testimony here. First, Patent Owner's expert, Dr. Serrette, was asked, "Do you believe that the hanger *shown in Figure 2* would be operable without the top flange?" To which, Dr. Serrette testifies, "without that, *for this hanger it would not be -- as configured*, would not work." Ex. 1038, 141:21–142:5 (emphases added); *see id.* at 144 ("*As shown*, if I were to remove element 74, it is inoperable." (emphasis added)). In other words, Dr. Serrette testifies that the specific hanger shown in the drawings of the '867 patent, specifically Figure 2, would be inoperable if one simply cut off the top flanges. Notably, Petitioner cites no testimony from Dr. Serrette that the skilled artisan would not have been able to practice the claimed

invention, where it includes hangers without top flanges, without undue experimentation. Second, Petitioner's expert, Mr. Fennell, testifies: "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," and that "[t]his 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." Ex. 1045 ¶ 46. Mr. Fennell essentially testifies that if one were to cut off the top flanges shown and described in the '799 application, the hanger would be inoperable. But here too, Petitioner cites no testimony from Mr. Fennell that the skilled artisan would not have been able to practice the claimed invention, where it includes hangers without top flanges, without undue experimentation.

Contrary to Petitioner's "impossibility" argument, in discussing the hanger's "connection portion," shown with "connector tabs" (i.e., top flanges) in Figure 2, the '867 patent discloses that "*[o]ther configurations are within the scope of the present invention*, such as a different number of nail holes, or alternate fastening structure such as nailing teeth *or other appropriate structure for fastening the hanger to the wall*." Ex. 1001, 6:37–57 (emphases added); see RMTA Reply 8 (citing same). Petitioner does not sufficiently address this disclosure or other broad disclosure cited by Patent Owner (noted above). *See* Ex. 1001, 2:49–50 ("A connection portion is configured for attachment to the wall."); *In re Goffe*, 542 F.2d 564, 567 (CCPA 1976) ("In determining whether an unclaimed feature is critical, the entire disclosure must be considered. Broad language in the

disclosure (including the abstract) omitting an allegedly critical feature tends to rebut the argument of criticality."); RMTA Sur-Reply 5–7. We find Petitioner's "impossibility" argument lacks sufficient evidentiary support, and thus, unavailing.

We also find Petitioner's belated and incomplete *Wands* factor analysis unavailing. Petitioner offers no evidence on the quantity of experimentation that would be necessary for the skilled artisan to practice the claimed invention, where it includes hangers without top flanges. Petitioner ignores many other *Wands* factors, such as the nature of the invention, the state of the prior art, the relative skill of those in the art (e.g., Mechanical Engineers with at least four years of work experience in construction connector design/development), and the predictability (or unpredictability) of the art. As for the state of the prior art, we note that Petitioner, in its "Wood Construction Connectors" catalog, states: "Top flange hangers may cause unevenness. *Possible remedies should be evaluated by a professional and include using a face mount hanger* . . . ." Ex. 2067, 11 (emphasis added); *see* RMTA Reply 9 (citing same). In this regard, Petitioner's asserted Bundy reference depicts its hanger in versions with top flanges (top mount) and without top flanges (face mount), and describes the alternative use of face mount and top mount hangers in the field:

> In perhaps the simplest hangers, the back flanges extend outwardly from the side flanges, providing an easily-accessed fastening face. Fasteners are then driven though the back flanges into the header. In other instances, design considerations dictate which particular attachment method is used for attaching the joist and the hanger to the header.

> In addition, top flanges may be attached to the back flanges to aid in attaching the hanger to the header. Hangers with top flanges are generally referred to as top-flange hangers. Hangers without top flanges are generally referred to as face-mount hangers.

Ex. 1007, 1:46–56 ("Background"); *see id.* at Figs. 1, 10. Petitioner's expert also testifies that face-mounted hangers were known in the art and that the skilled artisan would have been familiar with face-mounted hangers. Ex. 2068, 44:4–9. This evidence plainly contradicts Petitioner's allegation that it would have been "impossible" or would have required undue experimentation for the ordinarily skilled artisan to have practiced the claimed invention, where it includes hangers without top flanges (i.e., is a face mount hanger rather than a top mount hanger).

Accordingly, we conclude that Petitioner has not demonstrated by a preponderance of the evidence that proposed substitute claims 24–35 are unpatentable under 35 U.S.C. § 112(a) for lack of enablement.

E. Unpatentability of Proposed Substitute Claims 24–35, 38–40, and 44–46 as Indefinite[9]

Petitioner contends that several terms or phrases in the proposed substitute claims are indefinite, as discussed below. RMTA Opp. 5–10;

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[9] Because Patent Owner proposed substitute claims 36, 37, and 41–43 contingent upon Petitioner demonstrating the unpatentability of original claims 13, 14, and 18–20, respectively, and because Petitioner has not demonstrated the unpatentability of claims 13, 14, and 18–20 by a preponderance of the evidence, we do not consider proposed substitute claims 36, 37, and 41–43. Rather, we consider only Patent Owner's proposed substitute claims 24–35, 38–40, and 44–46.

RMTA Sur-Reply 7–10. Patent Owner opposes Petitioner's contentions. RMTA 15–18; RMTA Reply 1–7.

1. Independent Claim 24: "the connection portion and channel-shaped portion being in a rigidly fixed, spaced apart relation relative to one another as manufactured"

Patent Owner's proposed substitute independent claim 24 recites, in part, "the connection portion and channel-shaped portion being in a rigidly fixed, spaced apart relation relative to one another *as manufactured*." RMTA, App. A, 4 (emphasis altered). Petitioner contends the phrase "as manufactured" renders claim 24 indefinite. RMTA Opp. 5–6; RMTA Sur-Reply 7–8. Patent Owner opposes Petitioner's contentions. RMTA 15–18; RMTA Reply 3–5.

Petitioner argues "the phrase 'as manufactured' is a temporal limitation attempting to specify when the connection portion and channel-shaped portion become rigidly fixed relative to each other," and that the subject limitation "fails to inform with reasonable certainty what constitutes 'as manufactured' in regard to the time frame of completion of the hanger manufacturing process." RMTA Opp. 5; RMTA Sur-Reply 7–8.

Patent Owner argues the skilled artisan would have understood "that certain hangers, such as Timony, have separate parts that are assembled on site and that other hangers, such as Gilb '155, Gilb '792, and Tsukamoto, have fixed orientations set at the factory." RMTA Reply 3. Patent Owner argues that "[Petitioner's] argument that it is unclear when 'as manufactured' is completed is contrived," because "'[a]s manufactured' is

commonly used—including in the building arts—to refer to the state of a device as it comes from the factory." *Id.* at 3–4 (citing various evidence).

We begin our analysis of whether Petitioner has evidenced sufficiently that the phrase "as manufactured" renders claim 24 indefinite by emphasizing two guiding legal principles. First, a claim, read in light of the patent's specification and prosecution history, need only inform the skilled artisan about the scope of the invention with *reasonable* certainty, recognizing that absolute precision is unattainable. *Nautilus*, 572 U.S. at 898–99. Second, Patent Owner does not need to establish definiteness, rather the burden of proving indefiniteness *is on Petitioner*. *See Dynamic Drinkware*, 800 F.3d at 1378.

In this case, Petitioner cites no authority to support its position that a "temporal" limitation, such as "as manufactured" or "at the time of manufacture," is indefinite. To the contrary, the Federal Circuit has affirmed the construction of claim limitations defined by the phrase, "at the time of manufacture," and otherwise given plain meaning to the phrase without finding the phrase indefinite or requiring further construction. *See, e.g.*, *Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1373 (Fed. Cir. 2009) ("Because the district court correctly construed the claim term 'relatively resilient end edge portion' to require only that the frame of the shelf be flexible *at the time of manufacture*, because there was undisputed evidence that the frames of Saint-Gobain's accused shelves were flexible *at the time of manufacture*, and because the district court did not err in denying Saint-Gobain's motions concerning obviousness, *we affirm*." (emphases added)); *Janssen Pharmaceutica, N.V. v. Eon Labs Mfg., Inc.*, 134 F. App'x

425, 429 (Fed. Cir. 2005) ("[O]ne having ordinary skill in this art would interpret 'a diameter of from about 600 to 700 ¢m (25–30 mesh)' to describe cores 1) labeled 25–30 mesh *at the time of manufacture* and classification, and 2) having a particular diameter, about 600–700 ¢m." (emphasis added)).

We find Petitioner's arguments that the skilled artisan would not understand the scope of "as manufactured" with *reasonable* certainty also lacking. For example, Petitioner argues, "it is unclear whether a hanger formed from two separately manufactured pieces that are welded together *before the hanger is shipped from the manufacturing facility* falls within the limitation." RMTA Opp. 5. But Petitioner's argument here belies its own position, in that it apparently recognizes what "manufacturing" means and answers the question of what "as manufactured" includes by recognizing that that would have occurred at the time of "ship[ment] from the manufacturing facility" of the finished hanger product. We are persuaded that the skilled artisan, holding joist hangers or hanger components as found for sale in a hardware store, for example, would be reasonably certain that such hangers or hanger components are in a state of "as manufactured." Whatever that skilled artisan does next with those hangers or hanger components would constitute *post*-manufacturing steps. Indeed, the skilled artisan could purchase a complete, one-piece, metal hanger from a hardware store and subsequently cut it into several pieces—that does not change the fact that the one-piece hanger was in its "as manufactured" state when purchased, and the cutting of it into pieces constitutes a post-manufacturing step or action (i.e., the pieces are not in the hangers' "as manufactured" state).

In our Preliminary Guidance on this issue, we preliminarily stated it would have been "unclear what constitutes 'as manufactured' in regard to the time frame of completion of hanger manufacture." Paper 51, 12. However, on further review of the Petition and further consideration of the parties' briefing on this issue and the relevant case law, and based on the complete record before us, we now conclude otherwise, as discussed above. To the extent that "as manufactured" requires any further explanation beyond its plain meaning *to the ordinarily skilled artisan*, we agree with Patent Owner that it means "as it comes from the factory" (RMTA Reply 3–4).

Accordingly, we conclude that Petitioner has not demonstrated by a preponderance of the evidence that proposed substitute independent claim 24 is unpatentable under 35 U.S.C. § 112(b) for indefiniteness based on the "as manufactured" limitation. For the same reasons, we likewise conclude that Petitioner has not demonstrated by a preponderance of the evidence that proposed substitute dependent claims 25–35 and 38, which depend directly or indirectly therefrom, are unpatentable for indefiniteness.

2. Independent Claim 24: "each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion"

Patent Owner's proposed substitute independent claim 24 recites, in part, "each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion." RMTA, App. A, 4. Petitioner contends "[s]ubstitute claim 24 does not cure the Petition's indefiniteness challenge to originally-issued claim 1." RMTA

Opp. 6–8. Patent Owner opposes Petitioner's contentions. RMTA 15–18; RMTA Reply 1–3.

The parties' arguments concerning indefiniteness of the subject limitation are the same as those presented for the limitation "each extension flange lying in an extension flange plane" in original independent claim 1, as construed herein. *See supra* Section II.D.1. Accordingly, for the same reasons set forth above in Section II.D.1, we conclude that Petitioner has not demonstrated by a preponderance of the evidence that proposed substitute independent claim 24 is unpatentable under 35 U.S.C. § 112(b) for indefiniteness based on the subject limitation. For the same reasons, we likewise conclude that Petitioner has not demonstrated by a preponderance of the evidence that proposed substitute dependent claims 25–35 and 38, which depend directly or indirectly therefrom, are unpatentable for indefiniteness.

3. Dependent Claims 28 and 40: "wherein the first and second extension flanges each have an exterior side face configured to extend through a cutout through the sheathing with the exterior side faces of the first and second extension flanges arranged to face the sheathing everywhere within the cutout for maintaining a 2 hour fire resistance rating of a wall assembly including the wall and the sheathing"

Patent Owner's proposed substitute dependent claims 28 and 40 recite, in part, "wherein the first and second extension flanges each have an exterior side face configured to extend through a cutout through the sheathing with the exterior side faces of the first and second extension flanges arranged to face the sheathing everywhere within the cutout for

maintaining a 2 hour fire resistance rating of a wall assembly including the wall and the sheathing." RMTA, App. A, 6, 11. Petitioner contends "[i]t is unclear how an exterior side face of an extension flange can 'face the sheathing everywhere within the cutout.'" RMTA Opp. 8–9; RMTA Sur-Reply 9–10. Patent Owner opposes Petitioner's contentions. RMTA Reply 5.

> In particular, Petitioner argues, and we agree:
>
> > [A]n exterior side face of an extension flange cannot 'face' everywhere within the sheathing cutout if the height of the sheathing cutout is greater than the height of the extension flange, as shown above in FIG. 10A of the '867 patent. *Id*. Nor can an exterior side face of an extension flange 'face' a portion of the sheathing on an opposite side of the extension flange. *Id.* The claim language also fails to specify whether each exterior face must individually face 'everywhere' or whether the combination of the exterior side faces collectively faces 'everywhere.' *Id*., ¶53.

RMTA Opp. 9.

Patent Owner argues Petitioner "labors to misread this limitation to require every part of the sheathing to face the exterior side faces." RMTA Reply 5. According to Patent Owner, "the limitation's plain meaning is that the exterior side faces are arranged such that every part of each exterior side face that will be disposed in the cutout (*i.e.*, 'everywhere within the cutout') will face the sheathing" (*id*.)—the problem here is that this simply is not what the amended claim limitation recites, even though Patent Owner itself submitted that claim language. As discussed above in Section III.C.4.b.3, we agree with Petitioner: "If [Patent Owner] wanted to claim that only 'part' of the extension flanges face only a part of the sheathing, [Patent Owner]

could have done so in its amendment. Instead, the claims recite that the flanges 'face the sheathing ***everywhere within the cutout***'" (RMT A Sur-Reply 2–3). We find that the skilled artisan, reading the subject "everywhere within the cutout" limitation, *as recited*, in light of the patent's specification and prosecution history, would not have been *reasonably certain* as to the scope thereof (and the invention as a whole).

Accordingly, we conclude that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute dependent claims 28 and 40 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness based on the subject "everywhere within the cutout" limitation.

In addition, in Section II.D.3 above, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 5 and 17 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness. In particular, we find no description in the Specification, and the parties do not direct us to any, disclosing what structural features *of the extension flanges* (let alone the full scope of such features) are required for such flanges not only to be configured to extend through sheathing, but further configured to extend through sheathing "while maintaining a 2 hour fire resistance rating of the sheathing [or "of a wall assembly including the wall[/frame wall] and the sheathing"]." Because proposed substitute claims 28 and 40 do not amend original claims 5 and 17 in any manner that resolves these deficiencies, we determine that proposed substitute claims 28 and 40 are unpatentable for indefiniteness for the same reasons discussed above in Section II.D.3.

4. Dependent Claim 35 and Independent Claim 39: "wherein the connection portion includ[ing] a top flange, the top flange extending in a direction rearwardly away from the channel-shaped portion and arranged to overlie a top plate of the wall when the hanger is installed on the wall, the top flange including a rear edge located rearwardly of the back flange"

Patent Owner's proposed substitute dependent claim 35 and proposed substitute independent claim 39 recite, in part, "[wherein] the connection portion includ[ing] a top flange, the top flange extending in a direction rearwardly away from the channel-shaped portion and arranged to overlie [a top plate of the wall / 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." RMTA, App. A, 8, 9–10. Petitioner contends the subject limitation "fail[s] to inform with reasonable certainty where the 'top flange' is located relative to the 'back flange.'" RMTA Opp. 9–10; RMTA Sur-Reply 10. Patent Owner opposes Petitioner's contentions. RMTA Reply 6–7.

In particular, Petitioner argues, and we agree:

> Without specifying the spatial arrangement between the "top flange" and the "back flange," claim 39 is open to alternative interpretations: (1) the top edge of the back flange intersects at a front end of the top flange; or (2) the top edge of the back flange intersects at a face of the top flange such that a front end of the top flange is located in front of the back flange. EX1045, ¶54. Indeed, the phrase "the top flange extending in a direction rearwardly away from the channel-shaped portion," rather than extending in a direction away from the connection portion, suggests that the top flange may extend from the channel-shaped portion. Accordingly, it is not clear in view of claim 35 or 39 where the top flange is located relative to the back flange. *Id.*

> Thus, claim 35, claim 39, and dependent claims 40–46 are indefinite.

RMTA Opp. 9–10. We also take this view a step further, and find that it is unclear from the subject limitation as recited by Patent Owner whether the top flange even needs to extend from or otherwise connect to the back flange.

Patent Owner responds, "[t]hat the claim does not state where the top flange is located relative to the back flange does not make the claim indefinite, it simply makes the claim broad." RMTA Reply 6 (internal quotation marks omitted). Although the mantra "breadth does not necessarily mean indefiniteness" is true, it does not apply here. The subject limitation is not merely broad, rather it would have left ordinarily skilled artisans scratching their heads searching for its meaning and scope. Notably, Patent Owner provides no explanation of, for example, what "the top flange including a rear edge located rearwardly of the back flange" allegedly means. This limitation is subject to many different interpretations, leaving the skilled artisan with no reasonable certainty as to its meaning and scope.

Accordingly, we conclude that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute dependent claim 35 and proposed substitute independent claim 39 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness based on the subject limitation. For the same reasons, we likewise conclude that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute dependent claims 40 and 44–46, which depend directly or indirectly from proposed substitute independent claim 39, are unpatentable for indefiniteness.

F. Obviousness of Proposed Substitute Claims 24–34 and 38 Over Gilb '792, Bundy, and Harrison

Petitioner contends proposed substitute claims 24–34 and 38 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Gilb '792 (Ex. 1035), Bundy (Ex. 1007), and Harrison (Ex. 2016). RMTA Opp. 12–19; RMTA Sur-Reply 10–12; *see* Pet. 13–15, 28–59; Pet. Reply 16–21. Patent Owner opposes Petitioner's contentions. RMTA 18–19, 22–23; RMTA Reply 9–11; *see* PO Resp. 39–49, 71–84; PO Sur-Reply 23–25. For the reasons expressed below and those above in Section II.F, and based on the complete record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute claims 24–31, 33, 34 and 38 (but not proposed substitute claim 32) are unpatentable as obvious over the combination of Gilb '792, Bundy, and Harrison. We turn first to an overview of Harrison.

1. Overview of Harrison

Harrison generally is directed to "a joist hanger for use in the construction industry," as shown, for example, in Figure 4A, reproduced below. Ex. 2016 ¶ 3.

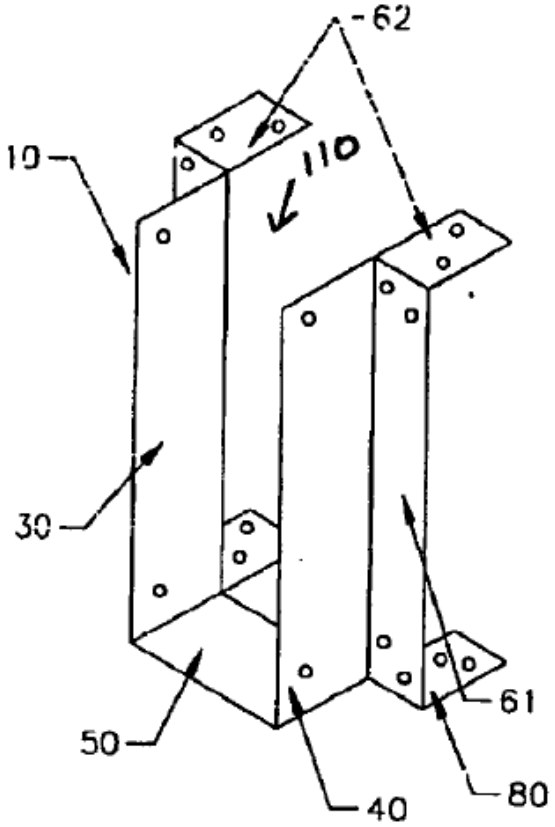


Figure 4A depicts an embodiment of a joist hanger for mounting to "I" joists.

Id. ¶ 22, Fig. 4A. Figure 4A shows "joist hanger (10) according to the invention is formed/folded from a single piece of metal (e.g. steel)." *Id.* ¶ 31. Harrison discloses that, because hanger 10 is formed from a single piece of sheet metal, "it is more economic and efficient to manufacture compared to the known joist hangers," and "unlike a welded two[-]part hanger it does not require secondary protective coatings such as hot dip galvanizing for durability, because unlike the known products an embodiment of the invention can be produced of steel sheet which is pre-galvanized." *Id.*

We further discuss below the disclosures of Harrison in connection with the parties' arguments.

2. Proposed Substitute Independent Claim 24

Patent Owner contends "Gilb '792 fails to disclose 'the first and second extension flanges and the channel-shaped portion being formed as one piece of sheet metal.'" RMTA 18. In view of Petitioner's additional reliance on Harrison in its combination of Gilb '792, Bundy, and Harrison to show unpatentability, Patent Owner argues, "[r]ather than there being a reasonable expectation of success [in combining these references to teach the subject limitation], it would be impossible *to make the Gilb '792's hanger* 'by folding one-piece of sheet metal.'" RMTA Reply 10 (citing Ex. 2069 ¶¶ 65–67, 74) (emphasis added). More specifically, Patent Owner argues, "the geometry and configuration of Gilb '792's base 36 and seat member 13', make it impossible *to form Gilb '792's hanger as illustrated in Figs. 5–7*, out of one-piece of sheet metal." *Id.* (citing Ex. 2069 ¶ 68) (emphasis added). Patent Owner concludes, "[g]iven it is impossible *to make the Fig. 5–7 Gilb '792 hanger* out of one-piece of sheet metal, [the skilled artisan] would not have had a reasonable expectation of success of modifying Gilb '792 in view of Harrison." *Id.* at 11 (citing Ex. 2069 ¶ 74) (emphasis added). We find Patent Owner's arguments unavailing, particularly because they are not commensurate with the scope of proposed substitute claim 24, which only requires "the first and second extension flanges" and "the channel-shaped portion" to be "formed as one piece of sheet metal," *not the entire hanger* to be formed as one piece of sheet metal, as further discussed below. *See* RMTA Sur-Reply 10.

"An obviousness determination requires finding that [an ordinarily skilled artisan] would have been motivated to combine or modify the teachings in the prior art and *would have had a reasonable expectation of success in doing so*." *Regents*, 903 F.3d at 1291 (emphasis added); *see also OSI Pharms.*, 939 F.3d at 1382–85; *Samsung Elecs. Co., Ltd. v. Elm 3DS Innovations, LLC*, 925 F.3d 1373, 1380–83 (Fed. Cir. 2019). "'[A] reasonable expectation of success, not absolute predictability' supports a conclusion of obviousness." *Yamanouchi Pharm. Co. v. Danbury Pharmacal, Inc.*, 231 F.3d 1339, 1343 (Fed. Cir. 2000); *see Intel Corp. v. Alacritech, Inc.*, 817 F. App'x 1014, 1016–17 (Fed. Cir. 2020). "The reasonable-expectation-of-success analysis must be tied to the scope of the claimed invention." *Teva Pharms. USA, Inc. v. Corcept Therapeutics, Inc.*, 18 F.4th 1377, 1381 (Fed. Cir. 2021). "Whether the prior art discloses a claim limitation, whether a skilled artisan would have been motivated to modify or combine teachings in the prior art, *and whether she would have had a reasonable expectation of success in doing so are questions of fact*." *Univ. of Strathclyde v. Clear-Vu Lighting LLC*, 17 F.4th 155, 160 (Fed. Cir. 2021) (emphasis added).

Petitioner argues "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. RMTA Opp. 13–14 (citing Ex. 1035, 3:22–35; Ex. 1007, 1:5–10; Ex. 2016 ¶¶ 3, 32). Petitioner argues that the skilled artisan "would have recognized that the teachings of Harrison are analogous to both Gilb'792's and Bundy's hanger," and that "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." *Id.* (citing Ex. 1035, 2:49–58, 3:23–25; Ex. 1045 ¶ 69). Petitioner submits that Harrison teaches both that forming a joist hanger from folding one piece of sheet metal provides economic and efficiency benefits, and that its joist hanger also may be "formed from multiple pieces which are connected by for example welding." *Id.* at 14 (citing Ex. 2016 ¶ 31). Petitioner's expert, Mr. Fennell, testifies that the skilled artisan "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." Ex. 1045 ¶ 70 (cited at RMTA Opp. 14).

Initially, Petitioner argued the skilled artisan "would have been motivated to modify Gilb'792's hanger so as to be constructed by folding one-piece of sheet metal, as taught by Harrison, to manufacture the hanger with less costs and more efficiency." RMTA Opp. 14 (citing Ex. 1045 ¶ 70). Petitioner also argued the skilled artisan "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," and the skilled artisan "would 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 [hanger] and its components." *Id.* at 14–15 (citing Ex. 1035, 2:52–53; Ex. 1045 ¶ 71).

Petitioner subsequently refined its argument, stating (correctly) that "the claims do not require that every part of Gilb '792's hanger must be

constructed from one piece of sheet metal," and that "[proposed substitute] [c]laim 24 only requires 'the first and second extension flanges and the channel-shaped portion being formed as one piece of sheet metal.'" RMTA Sur-Reply 10. Petitioner argues its combination rationale "never suggested forming depending flange 9 with the other components from one piece of sheet metal." *Id.* at 11. Petitioner concludes that "the fundamental shape of Gilb'792's hanger includes Gilb'792's gusset members 15'/22' and stirrup members 11'/12'," and "[b]ecause the fundamental shape of Gilb'792's hanger is maintained, [the skilled artisan] would have had a reasonable expectation of success in combining Harrison with Gilb'792-Bundy." *Id.* at 11–12 (citing, *inter alia*, Ex. 1045 ¶¶ 71, 74); *see* RMTA Opp. 15–16 ("[The skilled artisan] 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 and thus improve the manufacturing efficiency." (citing Ex. 2016 ¶ 31; Ex. 1045 ¶ 74)).

For the foregoing reasons, we agree with Petitioner, and find Petitioner sufficiently evidences that the skilled artisan would have had a rational reason to combine the teachings of Gilb '792, Bundy, and Harrison to achieve the limitation "the first and second extension flanges and the channel-shaped portion being formed as one piece of sheet metal," and that the skilled artisan would have had a reasonable expectation of success in doing so. Indeed, Patent Owner does not dispute that the first and second

extension flanges and the channel-shaped portion as designated in Gilb '792 may be formed from a single piece of sheet metal.

3. Undisputed / Remaining Limitations

Petitioner contends, and we agree, that Petitioner's contentions regarding the Gilb '792 and Bundy combination, as applied against original independent claim 1, apply equally to the same elements in proposed substitute independent claim 24. *See supra* Section II.F; RMTA Opp. 12–19. As for the "rigidly fixed . . . as manufactured" limitation, Petitioner contends, and we agree (and Patent Owner does not dispute), that Gilb '792 and the asserted combination teach that "the connection portion (base 36) and channel-shaped portion (stirrup members 11'/12') are rigidly fixed and spaced apart at the time of manufacturing." RMTA Opp. 15 (discussing element 24.b.3) (citing Ex. 1035, 2:49–58, 3:23–44 ("A first gusset member 15' is operatively ridgedly [sic] connected to the top flange 8' by being directly connected to stirrup member 11' by weld 31."); Ex. 2016 ¶ 31; Ex. 1045 ¶ 72). As for the limitation "each extension flange lying in an extension flange plane throughout its extent from the channel-shaped portion to the connection portion," our same determination applies here as for this limitation in original independent claim 1. *See supra* Section II.F.3.e; RMTA Opp. 15 (discussing element 24.c.3).

As for remaining proposed substitute claims 25–34 and 38, Petitioner contends any additional limitations in these dependent claims relative to their respective original dependent claims likewise are taught or at least suggested by the combination of Gilb '792, Bundy, and Harrison. RMTA Opp. 16–19; *see supra* Section II.F. The Opposition to the RMTA along

with the Petition provide a detailed assessment of these claims, with references to the Opposition's and Petition's analysis of original claim 1 and proposed substitute claim 24, disclosures in Gilb '792, Bundy, and Harrison, and the declaration testimony of Mr. Fennell. RMTA Opp. 16–19.

Of these dependent proposed substitute claims, the parties dispute whether the skilled artisan would have had a rational reason to combine Gilb '792, Bundy, and Harrison to achieve the invention of proposed substitute claim 32, which recites:

> wherein the stop comprises first and second back panels extending toward each other, the first back panel directly attached to the first extension flange and the second back panel directly attached to the second extension flange.

RMTA, App. A, 7 (emphasis omitted).

Petitioner argues that "Gilb'792-Bundy renders obvious a stop comprising back panels (e.g., Bundy's back plate members 9) extending toward each other," because the skilled artisan "would have found it obvious to bend back panels from Gilb'792's stirrup members 11'/12' such that a first back panel is directly attached to Gilb'792's first stirrup member 11' and a second back panel is directly attached to Gilb'792's second stirrup member 12." RMTA Opp. 18 (citing Ex. 1045 ¶¶ 82–83; Pet. 47–48). Patent Owner responds that Petitioner "has not shown or asserted any added back panels would be directly attached to Gilb '792's purported extension flanges (e.g., gusset members 15'/22')." RMTA Reply 11 (citing, *inter alia*, Ex. 1045 ¶ 83; Ex. 2069 ¶¶ 75–76). We agree with Patent Owner—Petitioner simply does not allege that the asserted art teaches a stop's back panels are directly attached *to extension flanges*, as claimed, only that they

are attached to Gilb '792's stirrup members 11'/12' (but Petitioner identifies gusset members 15'/22' in Gilb '792 as the extension flanges (*see* Pet. 37 ("Gilb'792's gusset members 15'/22' (along with weld 31), correspond to the recited first and second extension flanges.")).

Patent Owner otherwise does not present any separate arguments that are distinct to proposed substitute claims 24–31, 33, 34, and 38, and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *NuVasive*, 842 F.3d at 1379–82; *Papst Licensing*, 924 F.3d at 1250; *Bradium*, 923 F.3d at 1048. Rather, Patent Owner generally is of the view that the alleged deficiencies in the Opposition to the RMTA and in the Petition with respect to original claims 1 and 7 and proposed substitute claim 24 are also applicable to these claims. *See generally* RMTA Reply. For the same reasons provided above for original independent claim 1, original dependent claim 7, and proposed substitute claim 24, as well as the foregoing arguments and evidence submitted by Petitioner concerning proposed substitute claims 25–31, 33, 34, and 38, we conclude that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute claims 24–31, 33, 34, and 38 are unpatentable as obvious over the combination of Gilb '792, Bundy, and Harrison. We also conclude that Petitioner has not demonstrated by a preponderance of the evidence that proposed substitute claim 32 is unpatentable as obvious over the combination of Gilb '792, Bundy, and Harrison.

4. Conclusion

For the reasons expressed above and those in Section II.F, and based on the complete record before us, we determine that Petitioner has

demonstrated by a preponderance of the evidence that proposed substitute claims 24–31, 33, 34, and 38 (but not proposed substitute claim 32) are unpatentable as obvious over the combination of Gilb '792, Bundy, and Harrison.

G. Obviousness of Proposed Substitute Claims 39, 44, and 45 Over Robinson and Bundy

Petitioner contends proposed substitute claims 39 and 41–45 are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Robinson (Ex. 1046) and Bundy (Ex. 1007). RMTA Opp. 19–25; RMTA Sur-Reply 12. Patent Owner opposes Petitioner's contentions. RMTA Reply 11–12. Because Patent Owner proposed substitute claims 41–43 contingent upon Petitioner demonstrating the unpatentability of original claims 18–20, respectively, and because Petitioner has not demonstrated the unpatentability of claims 18–20 by a preponderance of the evidence, we do not consider proposed substitute claims 41–43. For the reasons expressed below, and based on the complete record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute claims 39, 44, and 45 are unpatentable as obvious over the combination of Robinson and Bundy. We turn first to an overview of Robinson.

1. Overview of Robinson

Robinson generally is directed to "a joist hanger for affixing a timber joist to masonry," where the hanger "addresses the need to drill holes in a joist in order to run cables, pipes and the like past the joist," as shown, for example, in Figure 2, reproduced below. Ex. 1046, code (57).

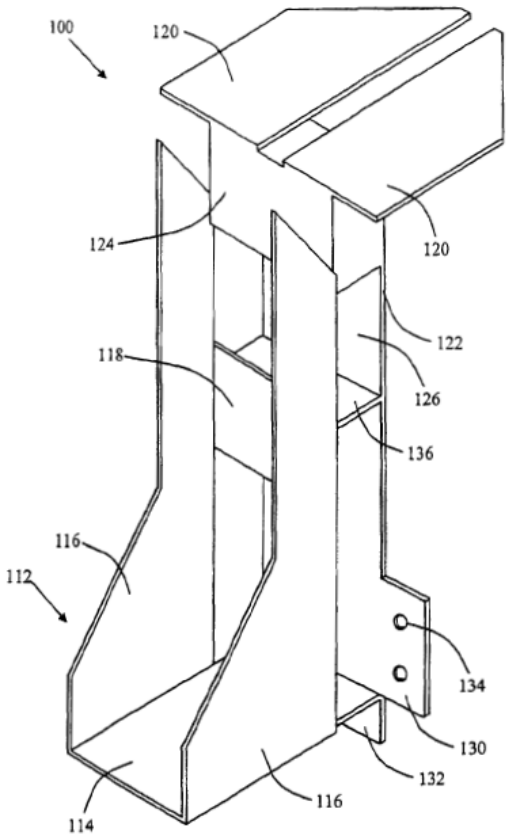


Figure 2

Figure 2 depicts a perspective view of an embodiment of a joist hanger.

Id. at 3:22–23, Fig. 2.

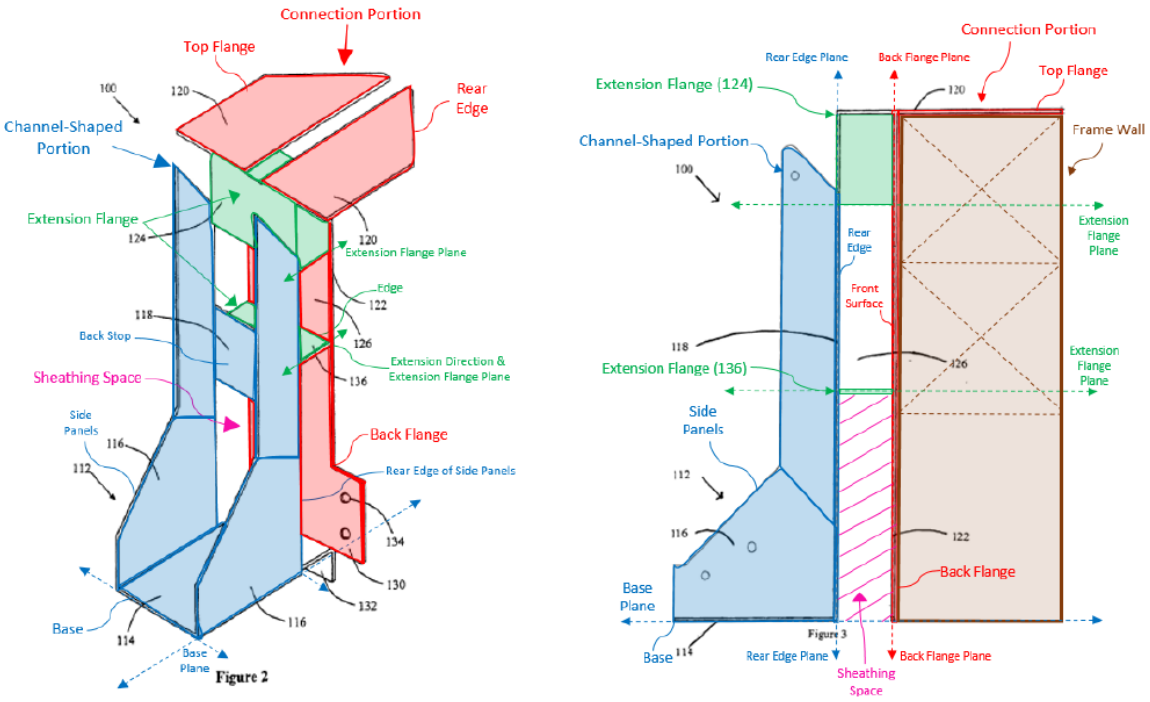
Figure 2 shows joist hanger 100 including shoe 112 for supporting a joist and flange 120 for suspending hanger 100 "from masonry or the like." Ex. 1046, 4:1–2; *see id.* at 6:1–5 (describing invention as applicable also to "timber-to-timber" joist hangers among others). Hanger 100 includes mount 124 to which second surface 122 and two side gussets 116 are attached. *Id.* at 4:9–10. Hanger 100 also includes second surface 122 spaced from first surface 118 "in a longitudinal direction relative to the joist when attached to the hanger 100, to define a duct opening 126." *Id.*

at 4:13–15. Duct opening 126 may include internal dividing wall 136 "to separate copper pipes carrying hot water from electrical cables, for example," and "is sufficiently wide to accommodate copper pipe, for example 22mm pipe, in addition to fixings for the pipe." *Id.* at 4:15–19. "[H]anger 100 may include one, both or neither of the first flange 130 and second flange 132." *Id.* at 5:2–3. Hanger 100 "may be made of metal, for example steel or stainless steel, or carbon fibre, and may be pressed, stamped, cast, bent or moulded." *Id.* at 4:25–26.

We further discuss below the disclosures of Robinson in connection with the parties' arguments.

2. Proposed Substitute Independent Claim 39

Petitioner contends that Robinson's hanger "defines a space between the channel-shaped portion (shoe 112) and the back flange (second surface 122) to receive other structures (e.g., pipes) between the joist end and the wall," and "is applicable to a 'timber-to-timber' setting, in which hanger 100 would be mounted to the wall frame's top plate," as shown, for example, in Petitioner's annotated versions of Figures 2 and 3, reproduced below. RMTA Opp. 19–20 (citing Ex. 1046, 5:10–14, 6:1–15).



The above illustration shows Figures 2 and 3 of Robinson annotated by Petitioner to show sheathing in a sheath space.

Id. Petitioner also contends "Bundy describes a known way to shield a wooden wall frame by placing sheathing in a space defined between the joist hanger's channel-shape[d] portion and the wall frame." *Id.* (citing Ex. 1007, 2:14–59).

As for the reason(s) the skilled artisan would have combined the teachings of Robinson and Bundy to achieve the invention of proposed substitute claim 39, and would have had a reasonable expectation of success in doing so, Petitioner argues:

> When using Robinson's hanger in a timber-to-timber setting, [the skilled artisan] would have been motivated to install sheathing in the space below dividing wall 136 defined between Robinson's backstop (first surface 118) and back flange (second surface 122), as taught by Bundy, *to "cover and protect" the*

> *wood frame*. EX1045, ¶¶87–88; EX1007, 5:10–18. [ ] While Robinson discloses a back part of platform 114 as extending all the way to second surface 122, [the skilled artisan] would have been motivated to terminate Robinson's platform 114 at the level of the backstop (first surface 118), as taught by Bundy, thereby opening the duct below dividing wall 136 through the bottom of the hanger to receive sheathing. EX1045, ¶¶88–89. *Indeed, Figure 6 of Robinson, where duct 226 of hanger 200 is open, shows this exact modification to the hanger which would allow sheathing to be received therein*. EX1046, FIG. 6. This modification would have been nothing more than applying a known technique (leaving the space between the hanger's channel-shaped portion and the wall frame open and disposing sheathing therein) to a similar device (Robinson's hanger) *to "protect the structural members of a building."* EX1007, 5:18-20; EX1045, ¶¶88-89.

RMTA Opp. 20–21 (emphases added).

Patent Owner contends Petitioner's Robinson–Bundy challenge fails for two reasons, both of which we find unavailing, as discussed below.

First, Patent Owner argues the asserted combination does not disclose "*the first and second extension flanges* and the channel-shaped portion *defining a sheathing space* sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing." RMTA Reply 11 (emphases added). In particular, Patent Owner argues the term "defining" "is synonymous with 'bounding.'" *Id.* (citing Ex. 2069 ¶¶ 77–79; Ex. 1001, Figs. 2 and 7, 1:62–64, 5:25–27). According to Patent Owner, per Petitioner's annotated Robinson figures (above), "only the [dividing] wall 136—one of the two identified extension flanges—bounds the purported sheathing space, while the other purported extension flange—

mount 124—does not bound this space." *Id.* at 12 (citing Ex. 2069 ¶¶ 80–82). We disagree, and find no basis in the '867 patent or the rest of the record before us to restrictively redefine "defining" to mean "bounding." *See* RMTA Sur-Reply 12 ("Never using the word 'bound,' the specification also does not describe the extension flanges performing such containment.").

Rather, we agree with Petitioner: "In light of the specification, 'defining' a sheathing space simply means creating a space by separating the noted portions," and "[p]roperly construed, Robinson's mount 124 [i.e., one extension flange] defines sheathing space in conjunction with dividing wall 136 [i.e., another extension flange] by stably separating its channel-shaped and connection portions." RMTA Sur-Reply 12 (citing Ex. 1045 ¶¶ 97–100); *see* Ex. 1001, 1:64–2:3 ("The extension portion separates the back wall . . . from the back flange . . . to define the space sized to receive the sheathing."). Thus, we find Petitioner evidences sufficiently that the combination of Robinson and Bundy teaches or at least suggests the limitation "the first and second extension flanges and the channel-shaped portion defining a sheathing space sized and shaped to receive the sheathing therein so that the channel-shaped portion is located on one side of the sheathing and the back flange is located on an opposite side of the sheathing," as recited in proposed substitute independent claim 39. *See* RMTA Opp. 23–24 (discussing element 39.c.4).

Second, Patent Owner argues that combining the teachings of Robinson and Bundy as argued by Petitioner would have rendered Robinson inoperable for its intended purpose, namely, to provide duct opening 126

through which to run cables, pipes and the like past the joist (Ex. 1046, code (57), 4:15–19). RMTA Reply 12. In particular, Patent Owner argues:

> [Petitioner] modifies the duct opening 126 to receive sheathing. Paper 56: 20. As any sheathing would extend "up to [dividing] wall 136 on [the] portion of the wall covered by the hanger" and "to the top or the top plate of the wall" everywhere else, the sheathing would block cables and pipes from accessing to the space between Robinson's shoe 112 and second surface 122. EX2069: ¶¶85-86; EX1045: ¶89. Thus, Simpson's modification "would change the basic principles under which the prior art was designed to operate, [and] . . . render the prior art inoperable for its intended purpose."

Id. at 12. We disagree and find Patent Owner's arguments unavailing.

The skilled artisan would "be able to fit the teachings of multiple patents together like pieces of a puzzle" since the skilled artisan is "a person of ordinary creativity, *not an automaton*." *KSR*, 550 U.S. at 420–21 (emphasis added). As argued by Petitioner and acknowledged by Patent Owner's expert, "inserting sheathing having a thickness less than the thickness of the space (i.e., narrower than dividing wall 136) maintains a gap between the sheathing's exterior side and Robinson's first surface 118, thereby allowing a pipe to pass therethrough." RMTA Sur-Reply 12 (citing Ex. 1047, 58:1–60:8, 51:16–55:19). Thus, we find that combining the teachings of Robinson and Bundy as set forth by Petitioner would not have rendered Robinson inoperable for its intended purpose.

3. Undisputed / Remaining Limitations

Petitioner contends the remaining limitations of proposed substitute independent claim 39 also are taught or at least suggested by the combination of Robinson and Bundy. RMTA Opp. 21–24 (discussing

elements 39.P through 39.c.5). Petitioner provides a detailed assessment of where it believes the features of these limitations reside in Robinson or how they are otherwise taught or suggested by the combination of Robinson and Bundy, and where relevant, provides sufficient rational reason(s) for modifying Robinson's teachings to arrive at the subject limitations, all with references to the declaration testimony of Mr. Fennell. *See id.* (citing, *inter alia*, Ex. 1045 ¶¶ 90–101). Patent Owner does not contend that these remaining limitations in proposed substitute independent claim 39 are absent in the combination of Robinson and Bundy (*see generally* RMTA Reply 11–12), and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *NuVasive*, 842 F.3d at 1379–82; *Papst Licensing*, 924 F.3d at 1250; *Bradium*, 923 F.3d at 1048. For the reasons set forth in the Opposition and Sur-Reply to the RMTA (RMTA Opp. 19–24; RMTA Sur-Reply 12), and based on the evidence cited therein (*see, e.g.*, Ex. 1045 ¶¶ 90–101), we are persuaded that Petitioner establishes that both (a) Robinson teaches or at least suggests each of these remaining limitations; and (b) where relevant, the skilled artisan would have had a rational reason to combine the teachings of Robinson and Bundy to achieve the invention as recited in proposed substitute independent claim 39 (i.e., to include the features of certain of the remaining limitations with the other features of claim 39). Accordingly, we conclude that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute independent claim 39 is unpatentable as obvious over the combination of Robinson and Bundy.

Petitioner also contends proposed substitute dependent claims 44 and 45 would have been unpatentable as obvious over the combination of

Robinson and Bundy. RMTA Opp. 24–25. The Opposition to the RMTA provides a detailed assessment of these claims, with references to the Opposition's analysis of proposed substitute independent claim 39, disclosures in Robinson and Bundy, and the declaration testimony of Mr. Fennell. *Id.* Patent Owner does not present any separate arguments that are distinct to any of these claims, and therefore, has waived such arguments. *See* 37 C.F.R. § 42.23(a); *NuVasive*, 842 F.3d at 1379–82; *Papst Licensing*, 924 F.3d at 1250; *Bradium*, 923 F.3d at 1048. Rather, Patent Owner generally is of the view that the alleged deficiencies in the Opposition with respect to proposed substitute independent claim 39 are also applicable to proposed substitute dependent claims 44 and 45. *See generally* RMTA Reply. For the same reasons provided above for proposed substitute independent claim 39, as well as the foregoing arguments and evidence submitted by Petitioner concerning proposed substitute dependent claims 44 and 45, we conclude that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute dependent claims 44 and 45 are unpatentable as obvious over the combination of Robinson and Bundy.

4. Conclusion

For the reasons expressed above, and based on the complete record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute claims 39, 44, and 45 are unpatentable as obvious over the combination of Robinson and Bundy.

H. Summary of Analysis of Proposed Substitute Claims 24–35, 38–40, and 44–46

In our analysis above of proposed substitute claims 24–35, 38–40, and 44–46, we determine that Patent Owner *has* satisfied the statutory and regulatory requirements for:

(1) reasonable number of claims;

(2) responding to a ground of unpatentability;

(3) not enlarging the scope of original claims; and

(4) written description support, for proposed substitute claims 24, 26, 27, 29–35, 38, 39, and 44–46.

We determine that Patent Owner *has not* satisfied the statutory and regulatory requirements for:

(1) written description support, for proposed substitute claims 25, 28, and 40.

On the merits, we determine that Petitioner *has* demonstrated by a preponderance of the evidence:

(1) proposed substitute claims 28, 35, 39, 40, and 44–46 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness;

(2) proposed substitute claims 24–31, 33, 34, and 38 are unpatentable as obvious over the combination of Gilb '792, Bundy, and Harrison; and

(3) proposed substitute claims 39, 44, and 45 are unpatentable as obvious over the combination of Robinson and Bundy.

We determine that Petitioner *has not* demonstrated by a preponderance of the evidence:

(1) proposed substitute claims 24–35 are unpatentable under 35 U.S.C. § 112(a) for lack of enablement;

(2) proposed substitute claims 24–27, 29–34, and 38 are unpatentable under 35 U.S.C. § 112(b) for indefiniteness; and

(3) proposed substitute claim 32 is unpatentable as obvious over the combination of Gilb '792, Bundy, and Harrison.

Accordingly, because Patent Owner has not satisfied all statutory and regulatory requirements for proposed substitute claims 25, 28, and 40, we *deny* Patent Owner's Revised Contingent Motion to Amend as to proposed substitute claims 25, 28, and 40. Because Petitioner has demonstrated unpatentability of proposed substitute claims 24–31, 33–35, 38–40, and 44–46 by a preponderance of the evidence, we *deny* Patent Owner's Revised Contingent Motion to Amend as to proposed substitute claims 24–31, 33–35, 38–40, and 44–46. Because Patent Owner has satisfied all statutory and regulatory requirements for proposed substitute claim 32 and Petitioner has not demonstrated unpatentability of this claim by a preponderance of the evidence, we *grant* Patent Owner's Revised Contingent Motion to Amend as to proposed substitute claim 32. Because Petitioner has not established by a preponderance of the evidence that original claims 13, 14, and 18–20 are unpatentable, we *dismiss* as moot Patent Owner's RMTA as to contingent proposed substitute claims 36, 37, and 41–43, which correspond to original claims 13, 14, and 18–20, respectively.

IV. PATENT OWNER'S MOTION TO EXCLUDE EVIDENCE

Patent Owner moves to exclude page 132, line 10 through page 145, line 5 of Exhibit 1038 (August 22, 2022 Deposition Testimony of Patent Owner's expert, Dr. Reynaud Serrette) as having been elicited through the use of improper questions. Mot. Excl. 1–4. We dismiss this motion as moot because, in this Decision, we do not rely upon any of Dr. Serrette's testimony that Patent Owner seeks to exclude to the detriment or prejudice of Patent Owner.

V. CONCLUSION[10]

Claims	35 U.S.C. §	Reference(s) / Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
5, 17	112(a)	Written Description	5, 17	
1–23	112(b)	Indefiniteness	5, 17	1–4, 6–16, 18–23
1–12, 15–17, 21–23	103	Gilb '792, Bundy	1–12, 15–17, 21–23	

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

Claims	35 U.S.C. §	Reference(s) / Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–4, 6, 10, 11	102[11]	Timony		
5, 7–9, 12, 15–17, 21–23	103[12]	Timony, Bundy		
1–12, 15–17, 21–23	103[13]	Tsukamoto, Bundy		
Overall Outcome			1–12, 15–17, 21–23	13, 14, 18–20

[11] As explained above, we do not reach this instituted prior art ground, because Petitioner already has prevailed on its challenge to the patentability of original claims 1–12, 15–17, and 21–23 based on the combination of Gilb '792 and Bundy, and this ground does not challenge any additional claims. *See SAS Inst.*, 138 S. Ct. at 1359 (holding a petitioner "is entitled to a final written decision addressing all of the claims it has challenged"); *Boston Sci.*, 2020 WL 2071962, at *4 (agreeing that the Board has "discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims"). Also, the parties' dispute over this ground includes, *inter alia*, the same heavily contested issue of whether the art discloses extension flanges configured to extend through sheathing.

[12] *See supra* n.11 (same). The parties' dispute over this ground also includes, *inter alia*, substantially the same challenge to whether a rational reason exists to combine the asserted prior art.

[13] *See supra* n.12 (same).

Revised Motion to Amend Outcome	Claims
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	24–46
Substitute Claims: Motion to Amend Granted	32
Substitute Claims: Motion to Amend Denied	24–31, 33–35, 38–40, 44–46
Substitute Claims: Not Reached	36, 37, 41–43[14]

VI. ORDER

Upon consideration of the record, it is:

ORDERED that claims 1–12, 15–17, and 21–23 of U.S. Patent No. 11,021,867 B2 are unpatentable;

FURTHER ORDERED that Patent Owner's Revised Contingent Motion to Amend is *granted* as to proposed substitute claim 32;

FURTHER ORDERED that Patent Owner's Revised Contingent Motion to Amend is *denied* as to proposed substitute claims 24–31, 33–35, 38–40, and 44–46;

[14] Because Patent Owner proposed substitute claims 36, 37, and 41–43 contingent upon Petitioner demonstrating the unpatentability of original claims 13, 14, and 18–20, respectively, and because Petitioner has not demonstrated the unpatentability of claims 13, 14, and 18–20 by a preponderance of the evidence, we do not consider proposed substitute claims 36, 37, and 41–43.

FURTHER ORDERED that Patent Owner's Revised Contingent Motion to Amend is *dismissed* as moot as to proposed substitute claims 36, 37, and 41–43;

FURTHER ORDERED that Patent Owner's Motion to Exclude Evidence (Paper 63) is *dismissed* as moot; and

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

For PETITIONER:

Michelle K. Holoubek
John Higgins
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
holoubek-ptab@sternekessler.com
jhiggins-PTAB@sternekessler.com

For PATENT OWNER:

Kurt F. James
Steven Levitt
John R. Schroeder
B. Scott Eidson
STINSON LLP
kurt.james@stinson.com
steven.levitt@stinson.com
john.schroeder@stinson.com
scott.eidson@stinson.com