

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. PGR2023-00048
Patent 11,649,626

**DECLARATION OF W. ANDREW FENNELL IN SUPPORT OF
PETITION FOR POST-GRANT REVIEW OF
U.S. PATENT NO. 11,649,626**

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Simpson Strong-Tie Company Inc. EX1003
Simpson Strong-Tie Co. v. Columbia Insurance Co.
U.S. Patent No. 11,649,626

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I, W. ANDREW FENNELL, declare as follows:

I. INTRODUCTION

1. I have been asked by Simpson Strong-Tie Company Inc. (“Petitioner”) to provide my opinions in the above-captioned post-grant review proceeding involving U.S. Patent No. 11,649,626 (“the ’626 patent,” EX1001), which is titled “Hanger for Fire Separation Wall.”

2. It is my understanding that the ’626 patent is a continuation of U.S. Patent No. 11,021,867 (“the ’867 Patent”), which is a continuation of U.S. Patent No. 10,316,510 (“the ’510 Patent”).

3. I am being compensated at the rate of \$425 per hour for the time I spend in connection with the proceeding. My compensation does not depend in any way on the substance of my opinions or on the outcome of this proceeding.

II. SUMMARY OF MY OPINIONS

4. To assist and orient the reader in reviewing this declaration, I have provided a summary of my main opinion below. A person of ordinary skill in the art (“POSITA”) at the time of the alleged invention would have found the subject matter of claims (the “challenged claims”) obvious in view of the prior art.

5. The specific grounds of unpatentability that I refer to are identified below:

Ground	References	Basis	Claims Challenged
1	Yamaguchi, Bundy	§103	1, 39–44, 53, 92–97
2	Yamaguchi, Bundy, Adams	§103	22–27, 45, 50–52, 74–79, 98, and 103–105
3	Cullen, Bundy	§103	1, 22–27, 39–45, 50–53, 74–79, 92–98, 103–105
4	Adams, Bundy	§103	1, 22–27, 39–45, 50–53, 74–79, 92–98, 103–105

III. QUALIFICATIONS AND EXPERIENCE

6. A copy of my *curriculum vitae* is provided as Exhibit 1004.

7. I am Principal Engineer and President of Engineered Research Group, Inc. (ERG), which is an engineering/materials science/construction consulting company located in Walnut Creek, California. I am a Registered Professional Engineer (Civil) in California, Hawaii, and Nevada; a Chartered Professional Engineer (Civil, Structural) in Australia; a Licensed General Contractor (B License) in California; an ICC-Certified Building Inspector; and a construction consultant. I have more than twenty-five years of experience in design, construction, and construction administration. I am also a Lecturer at the University of California at Berkeley, teaching a course on “Structural Design in Timber” in the Department of Civil and Environmental Engineering.

8. I have a Bachelor's degree in Civil Engineering from Queensland University of Technology in Australia. Over the course of my career, I have worked with, installed, specified, and gained knowledge of a wide array of structural connectors used in wood-frame and light-gauge steel-frame construction, including hangers. In particular, during the course of reviewing and analyzing plans to structurally retrofit residential and commercial structures, I have developed extensive knowledge and expertise in selecting connection hardware. In the course of that work, I have also had to design and specify special, custom-designed connectors when and where the off-the-shelf solution did not exist. I thus have over twenty years of experience in the design of structural connectors.

9. I also have extensive experience on technical committees relating to structural connectors, including evaluating code change proposals and acceptance criteria relating to the use of structural connectors in the construction of wood-frame structures. These committees include the Structural Engineers Association of California (SEAOC) Light Frame Construction Sub-Committee, the SEAOC Code Evaluation Report Committee, and the American Concrete Institute (ACI) Residential Concrete Committee.

10. I have also been the lead author on a number of journal articles and research reports relating to structural connectors. For example, I was the principal

investigator working on a project analyzing the way certain structural connectors (anchor bolts) behave in engineered load paths in wood-frame assemblies.

IV. MATERIALS CONSIDERED

11. In formulating my opinions, I have relied upon my training, knowledge, and experience that are relevant to the '626 patent. Furthermore, I have specifically considered the following documents, in addition to any other documents cited in this declaration:

Exhibit No.	Description
1001	U.S. Patent No. 11,649,626 to Brekke et al. ("the '626 patent")
1002	Prosecution History of the '626 patent
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")

Post-Grant Review of U.S. Patent No. 11,649,626

Exhibit No.	Description
1016	<i>Fire-Rated Assemblies in Commercial Construction (“The Purple Book”)</i> , National Gypsum Properties, LLC (November 5, 2013)
1017	<i>GA-600-2012 Fire Resistance Design Manual, 20th Ed.</i> , Gypsum Association (June 2012).
1018	<i>2012 International Building Code</i> , International Code Council, June 2011 (“IBC-2012”)
1019	Prosecution History of Brekke’049
1020	Prosecution History of the Brekke’242
1021	U.S. Patent No. 804,451 to Carlson
1022	U.S. Patent No. 3,601,428 to Gilb
1023	U.S. Patent No. 3,633,950 to Gilb
1024	U.S. Patent No. 3,752,512 to Gilb
1025	U.S. Patent No. 4,480,941 to Gilb
1026	U.S. Patent No. 4,717,279 to Commins
1027	U.S. Publication No. 2015/0184370 to Brekke (“Brekke’370”)
1028-1029	<i>Intentionally Left Blank</i>
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, <i>Columbia Insurance Company et al v. Simpson Strong-Tie Company Inc.</i> , 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.

Exhibit No.	Description
1034	Complaint for Patent Infringement, <i>Columbia Insurance Company et al v. Simpson Strong-Tie Company Inc.</i> , 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 <i>et al.</i> (“the ’510 Patent”)
1037	Oxford Compact English Dictionary, Second Edition, Oxford University Press, (2000).
1038	U.S. Patent No. 11,021,867 to Brekke <i>et al.</i> (“the ’867 patent”)
1039	GB Patent App. Pub. No. 2,451,853A (Cullen)
1040	EP Patent No. 0210744 B1 to Adams (Adams)
1041	Japanese Design Patent No. D1213894 to Yamaguchi (Yamaguchi)
1042	Complaint for Patent Infringement, <i>Columbia Insurance Company et al v. Simpson Strong-Tie Company Inc.</i> , 3-23-cv-02432 (N.D. Cal.), filed May 17, 2023.
1043	U.S. Patent No. 5,341,619 to Dunagan <i>et al.</i> (Dunagan)
1044	U.S. Patent No. 5,220,766 to Hills, Sr. (Hills)
1045	Simpson Strong-Tie, “Connector Update,” Vol. 2, No. 3 (November 1990)

V. RELEVANT LEGAL STANDARDS

12. In forming my opinions, I have relied upon various legal principles (as explained to me by Petitioner’s counsel). My understanding of these principles is summarized below.

13. I understand that a patent claim defines the scope of an alleged invention. I further understand that a claimed invention must be new, useful, and

non-obvious over the prior art as of its earliest filing date for it to be patentable. I understand that in this proceeding, Petitioner has the burden of proving that the challenged claims would have been unpatentable over the prior art by a preponderance of the evidence. I understand that “a preponderance of the evidence” is evidence sufficient to show that a fact is more likely true than not.

14. In determining the patentability of a claim, I understand that the first step is to understand the claim from the perspective of a POSITA to determine its meaning and scope. With that understanding, I will consider the claims at issue against the prior art from the perspective of a POSITA, as further summarized below.

A. Level of Ordinary Skill

15. A person of ordinary skill in the art at the time of the earliest claimed filing date of the '626 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.

B. Claim Construction

16. I have been informed by Petitioner’s counsel that in this proceeding, the United States Patent and Trademark Office (“USPTO”) interprets the claims of an

unexpired patent, such as the '626 patent, under the same standards used in a United States District Court. This includes interpreting the claims through the lens of a POSITA in view of the entire patent. Accordingly, in formulating my opinions, I have reviewed the claims of the '626 patent as I perceive a POSITA would have understood them at the time of the earliest claimed priority date (December 31, 2013) of the '626 patent, after reading the entire '626 patent specification.

17. Finally, I have been informed that claim construction is ultimately a question of law. Accordingly, I understand that a tribunal may choose to construe certain terms to provide clarity to the proceeding should any dispute arise between the parties over how a term should be construed. If the tribunal chooses to construe any term, then I reserve my right to review and potentially modify any opinions below in view of such constructions.

Constructions from Prior Proceedings

1) Constructions from PGR2019-00063 Proceeding

18. It is my understanding that in the proceeding for the '510 Patent under case heading PGR2019-00063, the Board construed the following terms:

- “extend through”: “in the context of element A ‘extend[ing] through’ element B, [] ‘element A extends into one side and out the other side

of element B’,” *Simpson Strong-Tie Co. v. Columbia Ins. Co.*,

PGR2019-00063, FWD, 45 (P.T.A.B. Mar. 11, 2021);

- “configured to extend through” the sheathing: “extend[ing] into one side of the sheathing and out the other side of the sheathing,”

PGR2019-00063, 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,”

PGR2019-00063, FWD, 110;

- “rigidly fixed”: “components are connected such that they do not move freely with respect to one another,” PGR2019-00063, FWD, 98.

2) Constructions from PGR2021-00109 Proceeding

19. It is my understanding that in the proceeding for the ’867 patent under case heading PGR2021-00109, the Board construed the following terms as noted:

- “each extension flange lying in an extension flange plane”: “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,” FWD, 31;
- “configuring extension flanges to extend into one side and out the other side of sheathing”: “the extension flanges define a space

between the back flange of the connection portion and the channel-shaped portion to receive sheathing therein,” FWD, 68.

20. It is my understanding that the Specification is identical between the present patent and the ’510 and ’867 Patents (the subject of the Board’s prior decision). Accordingly, in formulating my opinions as to the patentability of the claims of the ’626 patent, I applied the same construction to the same terms in the present claims.

C. Indefiniteness

21. I understand that a claim is indefinite if it fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention. Moreover, I also understand that claims must particularly and distinctly set out what is claimed so that the public has fair notice of the claimed invention. For example, if the language of a claim may be read and understood in more than one way by a POSITA, then that claim is indefinite. I understand that the claim must be read in light of the disclosure of the application, the teachings of the prior art, and the knowledge of a POSITA at the time of the invention of the claim. Further, I understand that each term in a claim must find clear support or antecedent basis in the specification.

D. Written Description

22. I understand each claim must be analyzed to determine its effective priority date by comparing each of its elements to the application from which the patent issued and/or any alleged priority applications.

23. I understand that in order for a claim to claim priority to a previously filed application, the claim must have written description support in that priority document, and the written description needs to have been carried over into the application in which the claim appears.

24. I understand that claims are required to be supported by a written description in the specification that 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. I further understand that claimed subject matter must be expressly or inherently disclosed.

E. Anticipation

25. I have been informed by Petitioner's counsel that a patent claim is unpatentable if every element is actually disclosed in a prior art reference as recited in the claims. The disclosure may be explicit, implicit, or inherent. I understand that a reference is read from the perspective of a POSITA at the time of the invention.

F. Obviousness

26. I understand that an obviousness analysis involves properly construing a patent claim and then comparing that claim to the prior art to determine whether the claimed invention would have been obvious to a skilled person in view of the prior art and in light of the general knowledge in the art.

27. I also understand that obviousness can be established by combining or modifying the teachings of the prior art to achieve the claimed invention. I understand that the reason to combine prior art references must be shown. This reason to combine can come from a variety of sources, not just the prior art itself or the specific problem the applicant or patentee was trying to solve. And I understand that the references themselves need not provide a specific hint or suggestion of the alteration needed to arrive at the claimed invention; the analysis may include recourse to logic, judgment, and common sense available to a POSITA that does not necessarily require explanation in any reference. It is also my understanding that where there is a reason to modify or combine the prior art to achieve the claimed invention, there must also be a reasonable expectation of success in so doing.

28. I also understand that a combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. I also understand that when there is a design need or market pressure to

solve a problem and there are a finite number of identified, predictable solutions, a skilled person has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated outcome, then that outcome is likely a product not of innovation, but of ordinary skill and common sense, and therefore is considered obvious according to patent laws.

29. I understand that when a skilled person would have reached the claimed invention through routine optimization, the invention may be deemed obvious. I also understand that such routine optimization involves testing an element or parameter that is termed a “results-effective” variable (that is, a variable that achieves a recognized result). And I understand that routine optimization involves using only routine techniques and ordinary skill of one in the relevant art.

30. I understand that courts have held that when there is a “design need” or “market demand” and there are a “finite number” of solutions, it would have been obvious for a person of ordinary skill in the art to try such solutions. Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.

31. I understand that when considering the obviousness of an invention, one should also consider whether there are any objective indicia (also known as secondary considerations) that support the non-obviousness of the invention. I understand that objective indicia of non-obviousness include commercial success,

long-felt but unmet need, failure of others, praise in the industry, and unexpected superior results. I am not aware of any objective indicia that change my opinion regarding the claims of the '626 patent. I am aware that the Patent Owner has argued in a court action involving Petitioner and Patent Owner that a purported commercial embodiment of the claimed invention experienced commercial success. However, I have no way to verify this argument because it is based only on a conclusory declaration submitted by the Patent Owner without any documentation, financial information, consumer attestations, or other supporting evidence. Moreover, even if the Patent Owner's argument were true, it would not change my opinion regarding the invalidity of the claims of the '626 patent.

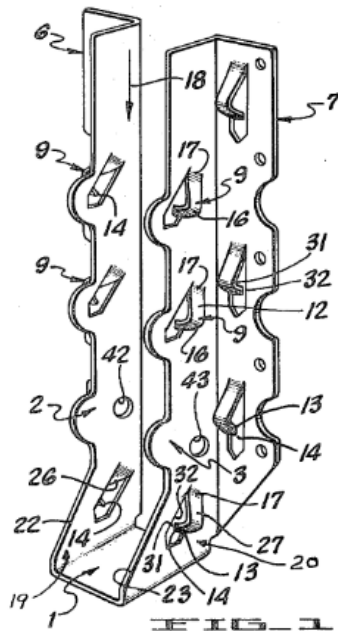
VI. TECHNOLOGY BACKGROUND

A. Joist Hangers for Supporting Structural Components Were Well Known in Construction and Engineering

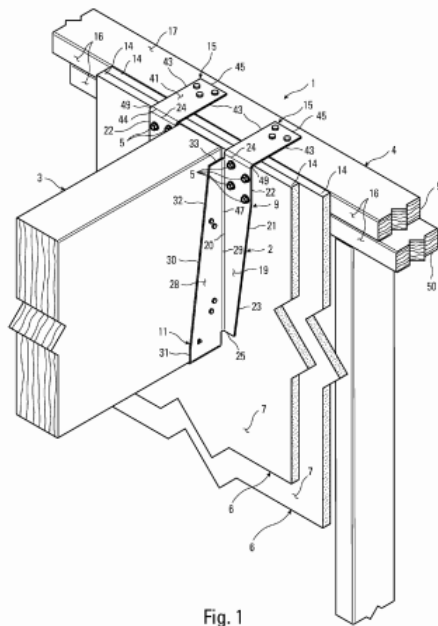
32. Hangers for supporting structural components in construction have been well known in construction and engineering for a long time. EX1007, 1:15-21; EX1022, FIGs. 1-2, 1:6. Traditionally, joist and truss hangers have been used in building construction to secure the ends of joists, trusses, or other structural members to headers, walls, or other support members. EX1022, Abstract, FIG. 2; EX1007, 1:15-17.

33. 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. EX1022, FIG. 2, 1:32-38; EX1007, 1:17-21 (“Typically, the joist hanger includes a u-shaped portion that receives the joist.”). Conventional hangers also include mechanisms for connecting the hanger to a wall and stabilizing the hanger thereon, such as a back flange and a top flange. EX1007, FIG. 1, 1:33-2:9; EX1023, FIGs. 5-7; EX1033, FIG. 1.



EX1022, FIG. 1.



EX1007, FIG. 1.

34. Generally, hangers manufactured from a single sheet of metal are standard or conventional. EX1022, 1:40-42; EX1023, 3:23-25; EX1024, FIG. 2, 1:51-57; EX1025, FIG. 9, 8:36-39; EX1026, FIG. 9, 2:20-22. For example, Gilb '428 states “[t]he basic form of the hanger is standard, being made from a single sheet of metal and is formed as shown in the drawings and as herein described.” EX1022, 1:40-42.

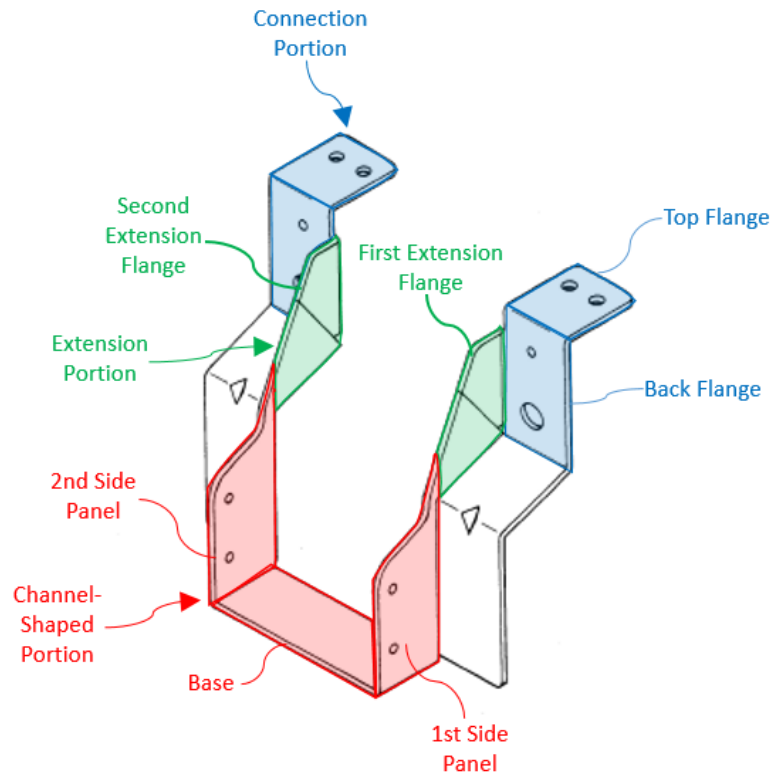
35. In view of the fire-retardant and sound-proofing characteristics of drywall or gypsum sheathing, it has historically been important to maintain the integrity of sheathing. EX1018, Table 721.1(2); EX1017, Gypsum Association Fire Resistance Design Manual, 49; EX1016, 17-28. Hangers for connecting a structural component to a wall while maintaining sheathing largely intact were also well known. EX1007, 1:17-21, 2:10-32; EX1016, 17-28.

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

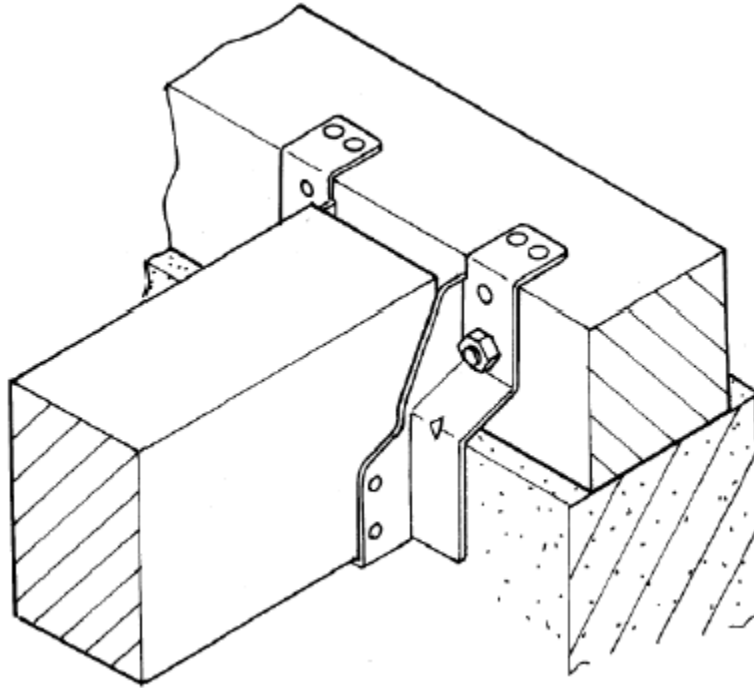
36. Long before the '626 patent, joist hangers commonly included an extension portion that interconnected a channel-shaped portion and a back flange in a fixed, spaced apart relation, as evidenced by Yamaguchi, Cullen, and Adams, and as taught by Bundy.

37. Yamaguchi relates to “a joist bracket [i.e., a hanger] that is attached to sills and bears a joist bridging the sills.” EX1041, 1. As shown below, Yamaguchi’s hanger includes a channel-shaped portion (annotated red) that is separated from a connection portion (annotated blue) via an extension flange (annotated green). A POSITA would have understood that the channel-shaped portion of Yamaguchi’s hanger is configured to receive an end of the joist because the channel-shaped portion includes two parallel, spatially-separated sidewalls to define a space for receiving the joist’s end and a base extending perpendicularly

between the bottom of the sidewalls to support the joist's end. A POSITA would have understood that the connection portion of Yamaguchi's hanger is configured to be secured to a top plate of wall structure because the connection portion has a vertically-extending back flange to engage the front face of the top plate and a horizontally-extending top flange to rest on the top face of the top plate. These functionalities of Yamaguchi's hanger is illustrated in its usage view, reproduced below.



EX1041, 2, Perspective View (annotated).

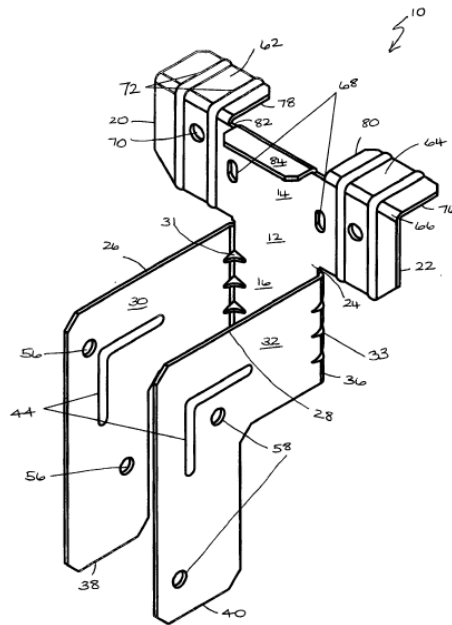


EX1041, 5, Usage View.

38. A POSITA would have understood that the extension portion of Yamaguchi's hanger spatially separates its channel-shaped portion from the back flange of its connection portion to define a space therebetween.

39. Cullen relates to "a bracket [i.e., a hanger] for use in timber construction." EX1039, 3:1–3. Cullen's hanger 10 includes "a back plate 12 for location against a support heading member or bearing member." EX1039, 10:16–18. Cullen's hanger 10 includes "side walls 30, 32 extend[ing] forward of the back plate 12 sitting parallel to each other and perpendicular to the back plate 12." EX1039, 10:25–27. Cullen's hanger 10 includes legs 38, 40 "extend[ing] downwardly" from sidewalls 30, 32 to "provide an increased surface area to

support a joist.” EX1039, 10:29–11:2. While not shown in the figures, Cullen’s hanger 10 is described as including “a seat is located on the legs 38, 40 ... to cradle a joist.” EX1039, 17:20–23. As shown below, Cullen’s legs 38, 40 are spatially separated from back plate 12 by a distance corresponding to the length of sidewalls 30, 32. EX1039, FIG. 1.

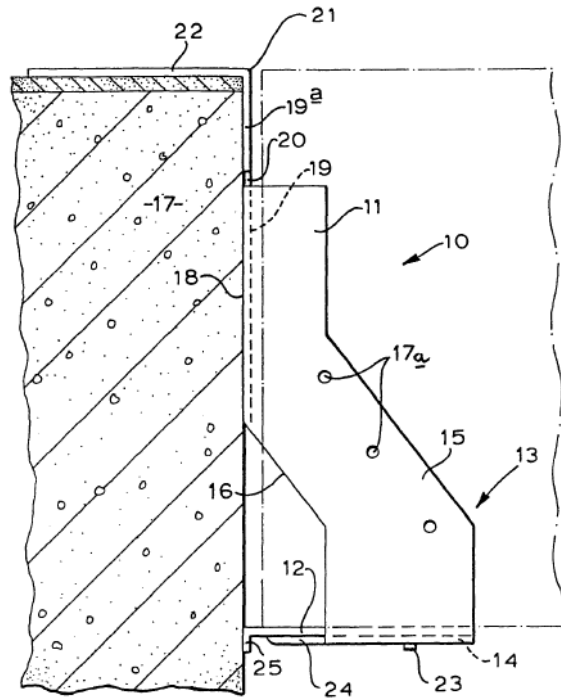


EX1039, FIG. 1.

40. Adams “relates to a joist hanger ... for supporting a generally horizontal structural timber ... from a load bearing wall of a building.” EX1040, 1:1–8.

Adams’s hanger 10 includes “a stirrup part ... which includes a base 14 and a pair of substantially upright sidewalls 15 spaced to form a seating for a joist.” EX1040, 4:2–10. Adams’s hanger 10 includes “an abutment portion 19 which lies against the forward face of [the wall’s] support element 17.” EX1040, 4:22–26. Adams’s

sidewalls 15 “extend upwardly and rearwardly ... away from the base 14” so that “base 14 is positioned away from the supporting element 17” such that “the end of the joist can be ventilated through the opening behind the inclined edge 16 of the sidewalls.” EX1040, 4:11–19.



EX1040, FIG. 2.

41. A POSITA would have understood that each of Yamaguchi, Cullen, and Adams disclose hangers defining a space between a wall member’s vertical face and a channel-shaped portion by including an extension portion extending from the hanger’s channel-shaped portion to the back flange of hanger’s connection portion.

C. Hangers Permitting Drywall between its Channel-Shaped Portion and a Vertical Face of a Wall Member

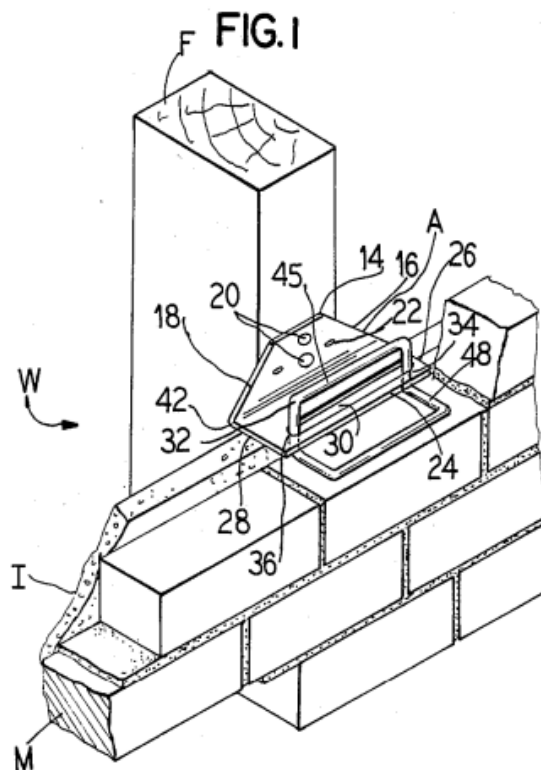
42. As I discussed above in Section VI.B, defining a space between a wall member's vertical face and a channel-shaped portion was well known. Using the space defined between the hanger's channel-shaped portion and the wall member's vertical face to receive drywall was also well known, as evidenced by Bundy. Similar to Yamaguchi, Cullen, and Adams, Bundy discloses a hanger for supporting a joist's end away from a wall. EX1007, Abstract. Bundy's joist hanger expressly describes an extension portion accommodating two layers of 5/8" thick fire-resistant drywall between the hanger's channel-shaped portion and the wall member's vertical face. EX1007, FIG. 1, 5:16–20-18. 52. By receiving drywall the hanger's channel-shaped portion and connection portion, Bundy's hanger allows the "drywall ... [to] simply be applied to the front face of the supporting member, completing covering and shielding it." EX1007, 2:20–24.

D. Hangers that Extend Through Drywall Were Well Known Prior to the '626 Patent

43. It is my understanding that the background section of the '626 patent specification asserts that the installation process for attaching floor trusses and joists to the walls typically required large cutouts through the mounted sheathing. EX1001, 1:25-41. Contrary to what Patent Owner purports in the background section of the '626 patent specification, hangers that include portions extending

through sheathing without requiring entire joist- or truss-sized cutouts to be made in the sheathing were well known as of the filing date. *See, e.g.*, EX1008; EX1012.

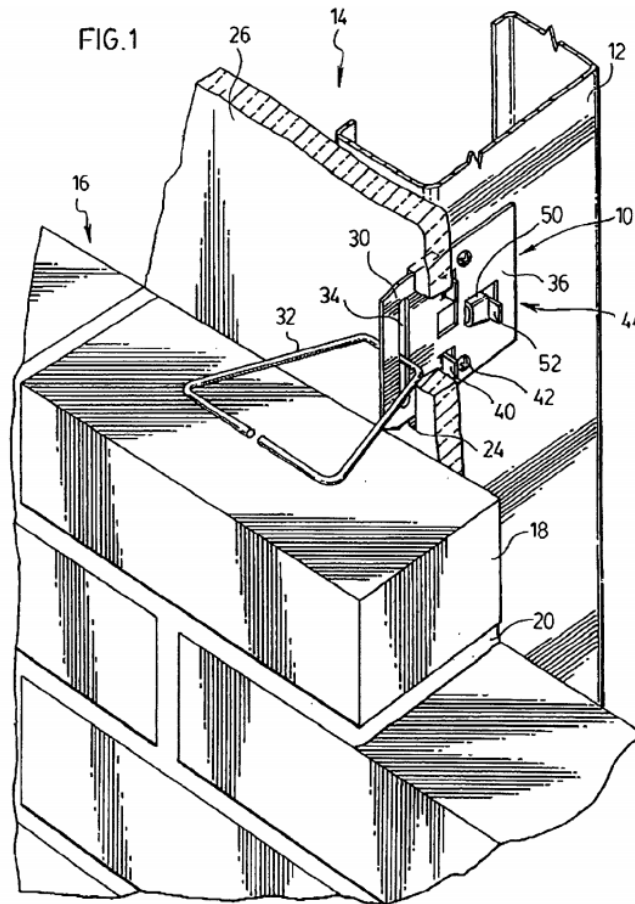
44. In addition to the above documents that explicitly illustrate hanger components extending through sheathing, it was a common practice for builders installing sheathing (such as drywall, which is a type of fire resistant sheathing) to cut or notch that sheathing in order to fit around any obstructions or wall installations that might exist. For example, U.S. Patent No. 4,827,684 to Allan teaches notching plasterboard such as drywall to fit around a flange or hanger (e.g., a wall anchor device). EX1012, 3:15-17, 4:1-14, FIG. 1 (reproduced below).



EX1012, FIG. 1.

45. U.S. Publication No. 2001/0054270 to Rice also describes cutting slots in an outer covering 24 to allow a hanger to extend through (e.g., anchor 10).

EX1015, ¶26, FIG. 1 (reproduced below). Rice's outer covering 24 encompasses a wall having a width from $\frac{1}{2}$ to 2 inches. EX1015, ¶¶26-27, FIG. 1.



EX1015, FIG. 1.

46. Given that extension portions of prior art hangers have been configured to extend through sheathing, a POSITA would have understood that extension portions in analogous hangers, such as Yamaguchi, Cullen, and Adams, would also be configured to extend through sheathing.

E. Two Layers of 5/8” Drywall Is A Well Known Fire-Rated Construction

47. In my opinion, a wall composed of two layers of 5/8” sheathing is a well-known standard for fire-rated construction. For example, the 2012 International Building Code (IBC-2012) teaches the standard of attaching two layers of 5/8” Type X gypsum (gypsum is the same as drywall). EX1018, Table 721.1(2). In the IBC-2012's standard, one layer (the “base” layer) of sheathing is placed vertically. EX1018, Table 721.1(2). The second 5/8” layer of gypsum is placed horizontally. EX1018, Table 721.1(2). Additionally, as discussed above, drywall is a known type of fire-resistant sheathing. EX1007, 5:18-20.

VII. OVERVIEW OF THE CLAIMED INVENTION

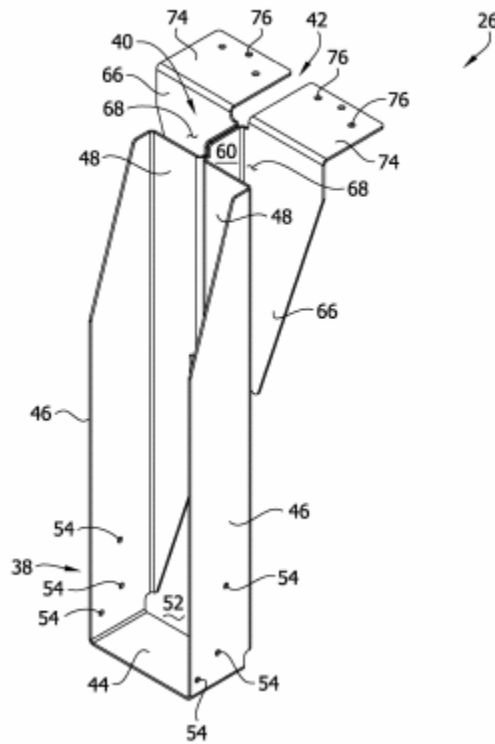
A. Summary of Claimed Invention

48. Despite the well-known characteristics of joist hangers prior to December 31, 2013, Patent Owner claims to have invented a joist hanger for connecting a structural component to a frame wall adapted to have two layers of 5/8-inch-thick drywall mounted thereon. EX1001, 12:14–36, 18:16–38.

49. 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.

FIG. 2



EX1001, FIG. 2.

50. While the claimed hanger is described as useful for connecting a structural element to a frame wall adapted to have drywall mounted thereon, a POSITA would have understood, in view of the specification, that the claims do

not restrict the use of the hanger to a wood-frame construction only. EX1001, 4:18-29. Indeed, the '626 patent specification explicitly describes that “[o]ther wall configurations, including different wall constructions and materials, are within the scope of the present invention.” EX1001, 4:24-29. Therefore, in my opinion, the claimed hanger of the '626 patent is not limited to a specific wall configuration.

B. Challenged Claims of the '626 Patent

51. The '626 patent issued with 105 claims, of which claims 1 and 53 are independent claims. Each independent claim 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. Claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105 (the “Challenged Claims”) of the '626 patent are set forth below:

1) Independent Claim 1

Independent claim 1 recites:

[1.p] 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:

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

[1.2.A] 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

[1.3.A] an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion,

[1.3.B] 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;

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

2) Independent Claim 53

Independent Claim 53 recites:

[53.P] 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:

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

[53.2] an extension portion extending from the channel-shaped portion and configured to extend through the two layers of 5/8-inch-thick drywall; and

[53.3.A] a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and

[53.3.B] 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 5/8-inch-thick drywall of the fire separation wall to be received between the channel-shaped portion and the back flange plane;

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

3) Dependent Claims 22, 26, 74, and 78

Dependent Claim 22 recites:

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.

Dependent Claim 26 recites

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

Dependent Claim 74 recites

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.

Dependent Claim 78 recites

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

4) Dependent Claims 23 and 75

Dependent Claim 23 recites:

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.

Dependent Claim 75 recites:

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

5) Dependent Claims 24, 27, 76, and 79

Dependent Claim 24 recites

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.

Dependent Claim 27 recites:

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.

Dependent Claim 76 recites:

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.

Dependent Claim 79 recites:

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.

6) Dependent Claims 25 and 77

Dependent Claim 25 recites:

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.

Dependent Claim 77 recites:

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.

7) Dependent Claims 39 and 92

Dependent Claim 39 recites:

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.

Dependent Claim 92 recites:

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.

8) Dependent Claims 40 and 93

Dependent Claim 40 recites:

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.

Dependent Claim 93 recites:

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.

9) Dependent Claims 41 and 94

Dependent Claim 41 recites:

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.

Dependent Claim 94 recites:

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.

10) Dependent Claims 42 and 95

Dependent Claim 42 recites:

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 are parallel to each other and the first and second side panels are parallel to each other.

Dependent Claim 95 recites:

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 are parallel to each other and the first and second side panels are parallel to each other.

11) Dependent Claims 43 and 96

Dependent Claim 43 recites:

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.

Dependent Claim 96 recites:

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.

12) Dependent Claims 44 and 97

Dependent Claim 44 recites:

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.

Dependent Claim 97 recites:

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.

13) Dependent Claims 45 and 98

Dependent Claim 45 recites:

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.

Dependent Claim 98 recites:

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.

14) Dependent Claims 50 and 103

Dependent Claim 50 recites:

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 5/8-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.

Dependent Claim 103 recites:

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 5/8-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.

15) Dependent Claims 51 and 104

Dependent Claim 51 recites:

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 5/8-inch-thick drywall therein, the channel-shaped portion, the first and second extension flanges and the back flange plane bounding the drywall space.

Dependent Claim 104 recites:

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 5/8-inch-thick drywall therein, the channel-shaped portion, the first and second extension flanges and the back flange plane bounding the drywall space.

16) Dependent Claims 52 and 105

Dependent Claim 52 recites:

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 are parallel to each other and the first and second side panels are 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.

Dependent Claim 105 recites:

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 are parallel to each other and the first and second side panels are 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.

VIII. OVERVIEW OF THE '626 PATENT PROSECUTION HISTORY

52. Based on my review of the prosecution record of the '626 patent, the Office issued a single Non-Final Office Action before ultimately allowing the application. *See generally* EX1002. Prior to receiving the Office Action, Applicant filed a preliminary amendment canceling originally-filed claims 1–20 and adding

new claims 21-40, which included five independent claims—claims 21, 25, 29, 33, and 37. EX1002, 125-138.

53. In the Non-Final Office Action, the Office rejected claims 21-45 on multiple grounds, the Examiner rejected independent claims 21, 29, 33, and 37 as being obvious over Japanese App. Pub. No. JPH0314482Y2 to Tsukamoto, in view of U.S. Patent No. 9,394,680 to Bundy. EX1002, 239–265. The Examiner allowed independent claim 25. EX1002, 263-264.

54. In its Response to the Non-Final Office Action, Applicant made the following amendments: (1) canceled independent claims 21, 25, and 29; (2) amended independent claims 33 and 37 to recite a “the back flange arranged to engage a vertical face of the top plate of the frame wall;” and (3) added new dependent claims 41-144. EX1002, 390-429. I have been informed that Applicant argued in its remarks that Tsukamoto fails to disclose “a back flange extending from an edge of the top flange,” as recited in independent claims 33 and 37. EX1002, 414-426. I have also been informed that Applicant also raised patentability arguments in its remarks against references—U.S. Patent No. 4,422,792 to Gilb and U.K. Pub. Patent App. No. GB 2433522A to Robinson—that were applied in the prior proceeding PGR2021-00109 for the ’867 patent. EX1002, 414-415.

55. After receiving Applicant's Response to the Non-Final Office Action, the Office issued a Notice of Allowance. EX1002, 579-581. I have been informed that the Examiner did not identify any limitations that made the claims patentable over the cited art. EX1002, 579-581.

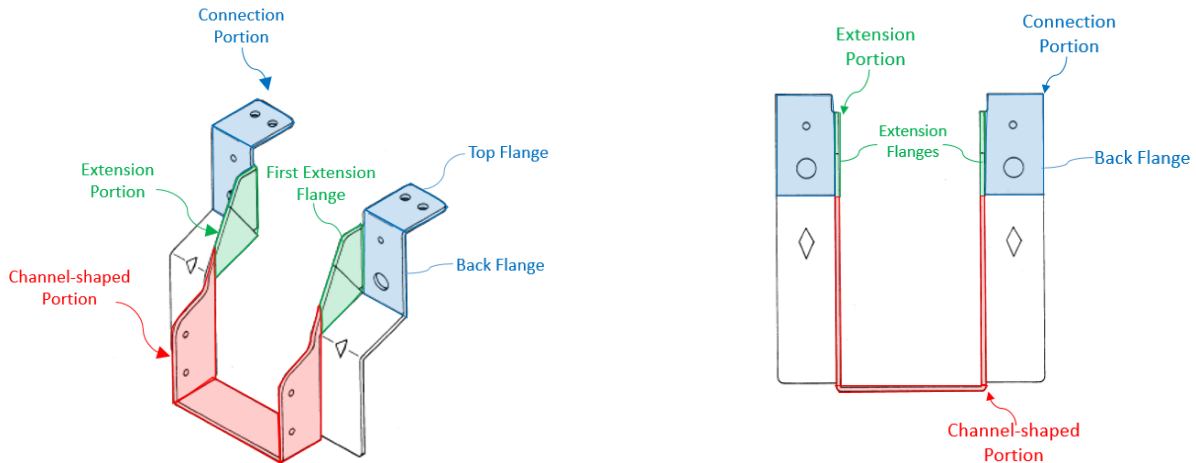
IX. OVERVIEW OF THE PRIOR ART

56. I will now review the prior art upon which I rely to show that the subject matter of the '626 patent claims would have been obvious to a POSITA, at least by the '626 patent's earliest claimed priority date of December 31, 2013.

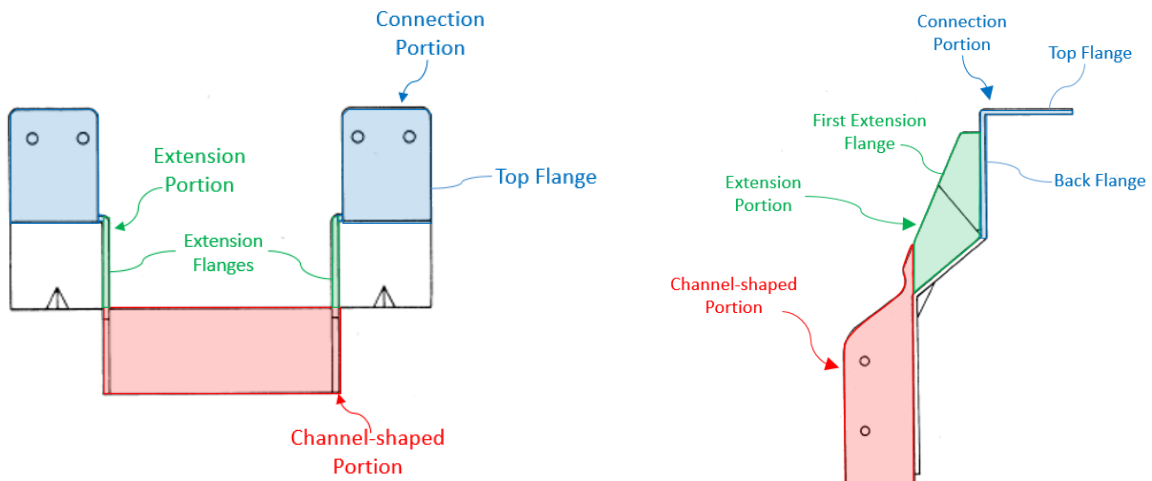
A. Japanese Design Patent No. D1213894 to Yamaguchi (EX1041)

57. Yamaguchi was issued on August 9, 2004. I understand that Yamaguchi is prior art to the '626 patent based on my discussion of the legal standards above and discussions with counsel. In particular, I understand that Yamaguchi was issued more than one year prior to the earliest possible priority date of the '626 patent (December 31, 2023), and so Yamaguchi qualifies as prior art at least for this reason.

58. Yamaguchi, like the '626 patent, is directed to a joist hanger for connecting a joist to a sill plate on top of a foundation wall. EX1041, 1 (55). It is my understanding Yamaguchi is a design patent, which does not include a written description section describing the disclosed invention.



EX1041, 2, Perspective, Front Views (annotated).

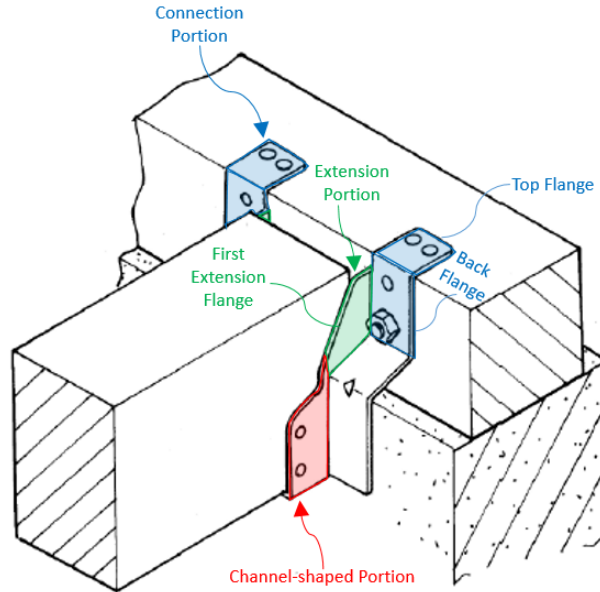


EX1041, 4, Plan, Side Views (annotated).

59. While Yamaguchi does not include a written description section, a POSITA would have understood with reasonable certainty particular aspects about Yamaguchi's hanger based on the Figures shown in pages 2–5 of the application. For example, a POSITA would have understood that Yamaguchi's hanger includes a connection portion (highlighted in blue) to secure the hanger to a top plate of wall, a channel-shaped portion (highlighted in red) to receive and support a joist

member, and an extension portion extending from the connection portion to the channel-shaped portion to define a space therebetween.

60. A POSITA would have understood that Yamaguchi's connection portion (highlighted in blue above) includes a top flange (blue—horizontal portion) arranged to engage a top surface of a top plate of the frame wall and a back flange (blue—vertical portion) extending from an edge of the top flange. A POSITA would have understood that Yamaguchi's channel-shaped portion (red) includes a base (red-horizontal) extending in a horizontal direction and first and second panels (red-vertical portion) extending in a vertical direction from the ends of the base. A POSITA would have understood that Yamaguchi's extension portion (green) includes first and second extension flanges (green—vertical) extending parallel to each other from the side panels of the channel-shaped portion to the back flange of the connection portion.

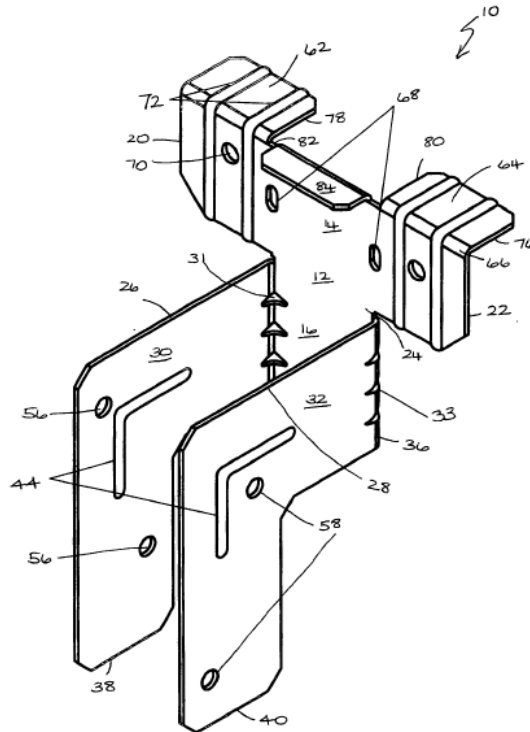


EX1041, 5, Usage View.

B. U.K. Patent App. Pub. No. 2451853A to Cullen et. al. (EX1039)

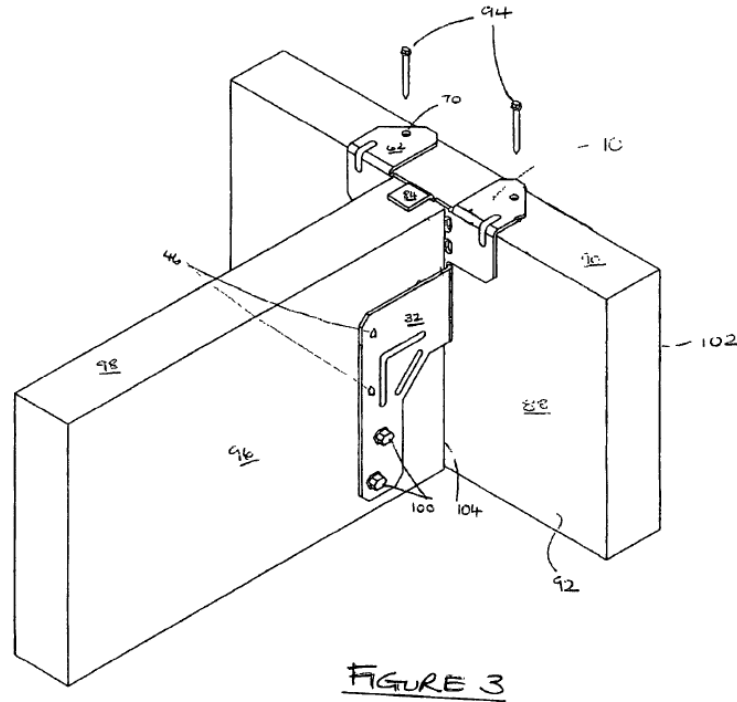
61. Cullen was published on February 18, 2009. I understand that Cullen is prior art to the '626 patent based on my discussion of the legal standards above and discussions with counsel. In particular, I understand that Cullen was published more than one year prior to the earliest possible priority date of the '626 patent (December 31, 2023), and so Cullen qualifies as prior art at least for this reason.

62. Cullen, like the '626 patent, is directed to a hanger for hanging a joist against a bearing member or wall. EX1039, 5:6–9.



EX1039, FIG. 1.

63. Cullen discloses “a bracket, generally indicated by reference numeral 10.” EX1039, 10:10–12. A POSITA would have understood that the term “bracket” as described in pages 10–14 of Cullen to be a joist hanger, as explicitly mentioned in other sections of Cullen’s application. See e.g., EX1039, 2:30–8:19; 14:4–24. Cullen’s “[b]racket 10 includes a back plate 12 for location against a supporting heading member or bearing member.” EX1039, 10:16–17. Cullen describes forming sidewalls 30, 32 “by folding the lower portion 16 of the back plate 12 along [the] vertical fold lines 34, 36” such that “side walls 30, 32 extend forward of the back plate 12 sitting parallel to each other and perpendicular to the back plate 12.” EX1039, 10:22–28.



EX1039, FIG. 3.

64. Cullen further describes legs 38, 40 that “extend downwardly” from sidewalls 30, 32 “to support a joist located” therebetween. EX1039, 10:29–11:2. Cullen’s hanger 10 includes “two bearing plates 62, 64” that “are extensions of the back plate 12 ... by folding the folding plate horizontally along line 66 in a rearward direction.” EX1039, 11:24–27. Cullen’s “bearing plates 62, 64 sit perpendicularly to the back plate 12 so that the bracket 10 can be easily located against a sill.” EX1039, 11:27-29.

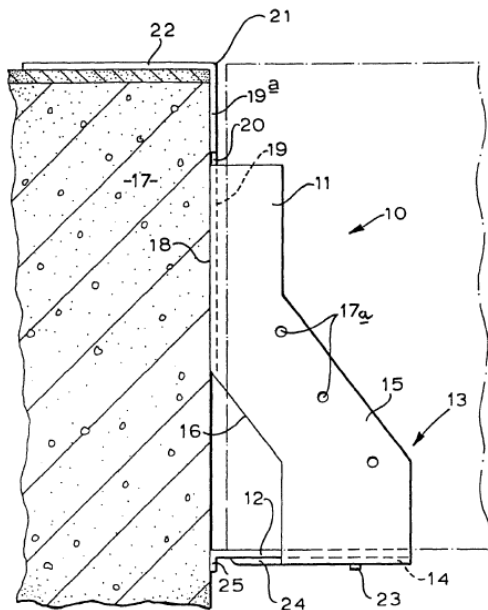
65. Cullen’s “joist hanger may include a seat portion” that “is located on the legs 38, 40 of the side walls 30, 32 to cradle a joist.” EX1039, 5:25–26, 17:20–24.

Cullen describes that “[w]here the joist hanger is formed from sheet metal[,] the seat ... can be folded into position.” EX1039, 5:26–27, 7:20–22.

C. European Patent Pub. No. 0210744B1 to Adams (EX1040)

66. Adams was issued on February 27, 1991. I understand that Adams is prior art to the ’626 patent based on my discussion of the legal standards above and discussions with counsel. In particular, I understand that Adams was issued more than one year prior to the earliest possible priority date of the ’626 patent (December 31, 2023), and so Adams qualifies as prior art at least for this reason.

67. Adams, like the ’626 patent, is directed to a joist hanger used for securing a joist to “a masonry wall, timber, concrete beam or the like.” EX1040, 1:3, 4:14–16.



EX1040, FIG. 2.

68. Adams describes “a joist hanger generally indicated at 10 compris[ing] a main part formed from a single sheet metal blank 11.” EX1040, 3:55–58. Adams’s “blank 11 is formed into a stirrup part generally indicated at 13 which includes a base 14 and a pair of substantially upright side walls 15 spaced to form a seating for a joist of a specific size.” EX1040, 4:2–5. Adams’s sidewalls 15 “extend upwardly and rearwardly as shown at 16, away from the base 14” such that “base 14 is positioned away from the supporting element 17.” EX1040, 4:11–15.

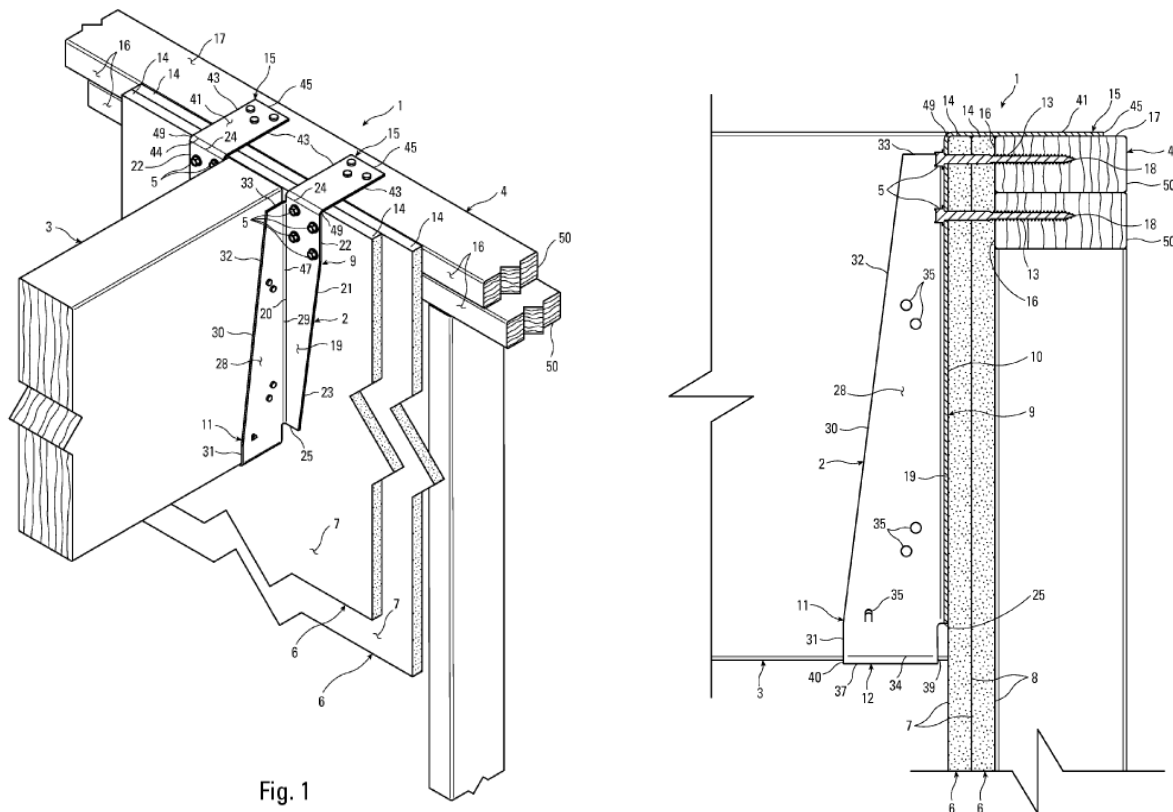
69. Adams’s sidewalls 15 are each “integrally contacted at a generally upright fold line 18, to an abutment portion 19 which lies against the forward face of the supporting element 17 in use.” EX1040, 4:22–25. Adams’s “abutment portions are turned inwardly towards each other so as to lie at least partly within the boundary of the stirrup defined by the base and side walls.” EX1040, 4:25–28. Adams’s abutment portions 19 are each “integrally connected by a horizontal fold line 21 to a bearing portion 22 which rests on the supporting element 17.” EX1040, 4:34–36. When used in wood frame constructions, Adams’s bearing portion 22 is “bolted or nailed in place to timber.” EX1040, 4:37–41.

D. U.S. Patent No. 9,394,680 to Bundy et al. (EX1007)

70. Bundy was filed on December 14, 2013. I understand that Yamaguchi is prior art to the ’626 patent based on my discussion of the legal standards above and discussions with counsel. In particular, I understand that Bundy was filed prior to

the earliest possible priority date of the '626 patent (December 31, 2023), and so Bundy qualifies as prior art at least for this reason.

71. Bundy, like the '626 patent, is directed to a hanger for supporting a joist or beam from a wood structural support member of a wall, such as a top plate or header. 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.



EX1007, FIGs. 1 and 3.

72. Bundy illustrates that it was known for a structural hanger's extension distance to be sized to allow for the insertion of precisely two 5/8" layers within a structural hanger prior to December 31, 2013. EX1007, 5:16-18. Additionally, Bundy illustrates that it was known for a structural hanger to include top flanges to stabilize and distribute the load of a joist on a top of a wall plate. EX1007, 1:33-2:9.

X. CLAIMS 1, 39–44, 53, AND 92–97 WOULD HAVE BEEN OBVIOUS OVER YAMAGUCHI IN VIEW OF BUNDY.

73. In my opinion, Yamaguchi, as modified in view of Bundy, renders obvious claims 1, 39–44, 53, and 92–97 for the following reasons.

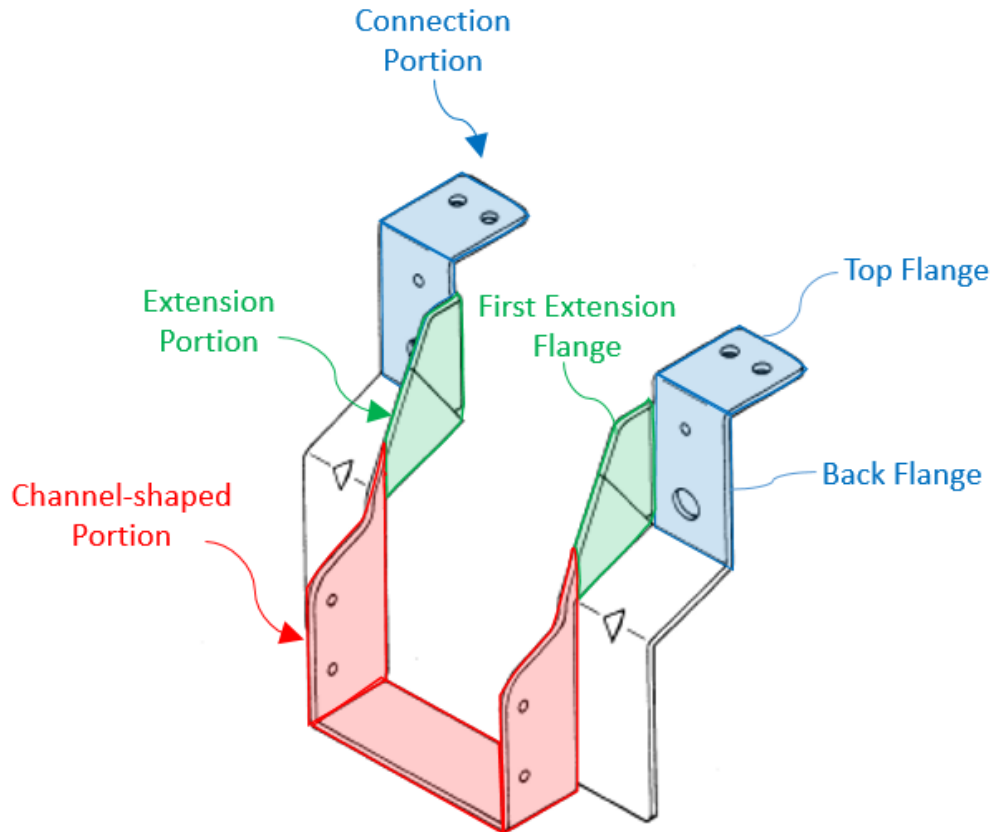
74. Yamaguchi discloses each and every structural element listed in independent claims 1 and 53¹ but does not explicitly disclose that the space defined between its channel-shaped portion and back flange is sized large enough to

¹ Yamaguchi's captions appear above its figures. For example, the figures on Yamaguchi, page 2, are its "[Perspective View]" and its "[Front View]," respectively, although the captions on page 2 read "[Front View]" followed by "[Back View]." I hereby note that Yamaguchi's figures are referenced in this Declaration using the captions appearing immediately *above* the figure itself. For example, Petitioner refers to the first figure on Yamaguchi, page 2 as the "perspective view."

receive two layers of 5/8-inch-thick drywall therein. But providing drywall, particularly two layers of 5/8-inch-thick-drywall, in a space defined between a wall frame and a channel-shaped portion of a joist hanger was well known, as evidenced by Bundy. A POSITA would have sought to combine the teachings of Bundy with Yamaguchi's hanger to define a space large enough for receiving two layers of 5/8-inch-thick drywall with a reasonable expectation of success, as explained below.

A. Motivation to Modify Yamaguchi Based on the Teachings of Bundy.

75. Yamaguchi and Bundy are both from the same field of endeavor, namely joist hangers. As shown below, Yamaguchi's hanger includes a channel-shaped portion (annotated red) that is separated from a connection portion (annotated blue) via an extension flange (annotated green). A POSITA would have understood that Yamaguchi's hanger defines a space between its back flange and channel-shaped portion corresponding to the length of its extension portion.



EX1041, 2, Perspective View (annotated).

76. Yamaguchi does not explicitly disclose 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

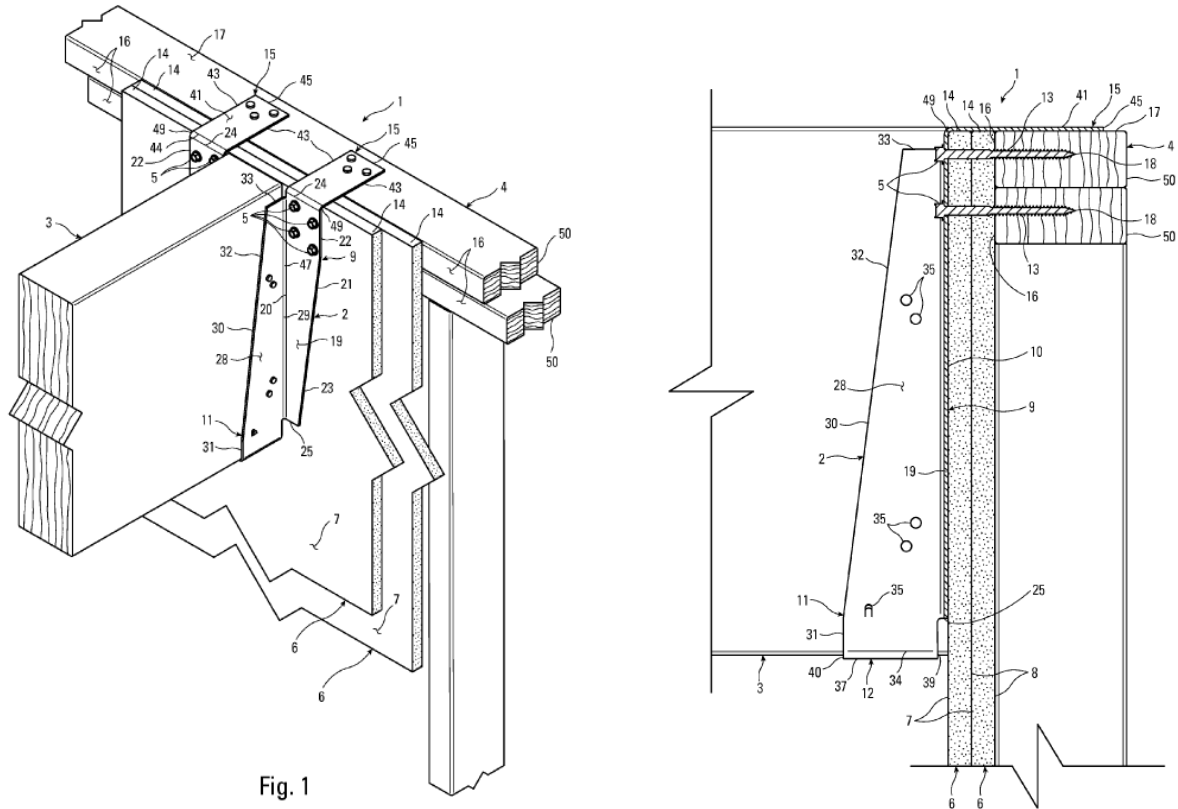


Fig. 1

EX1007, FIGs. 1 and 3.

77. Bundy discloses an analogous hanger that includes a channel-shaped portion (e.g., side members 11 and seat member 12) for receiving a joist and an extension portion (e.g., top flanges 15) that extend from the channel-shaped portion to a support member 4 of a wall frame. EX1007, 5:38-52. Bundy also discloses sizing the extension portion (e.g., top flanges 15) of the analogous hanger to receive two layers of 5/8" thick sheathing between the support member 4 and the channel-shaped portion (e.g., side members 11 and seat member 12). EX1007, 5:10-21, 5:37-43. A POSITA would have understood that two 5/8" thick layers of drywall are commonly used for a fire separation wall. See e.g., EX1017, 16 ("60

min. for a double layer of 5/8 inch (15.9 mm) Type X gypsum board.”). In view of Bundy, a POSITA would have understood that the extension portion of a joist hanger can be sized optimally to define a two 5/8”-thick-layer drywall space between the channel-shaped portion and a wall.

78. While Yamaguchi’s described setting is a sill plate, a POSITA would have recognized that the hanger’s structure is nonetheless useful in a variety of constructions, such as on a top plate of a frame wall, and would have been motivated to use Yamaguchi’s hanger on a wood frame wall in particular so that drywall could be installed in the space behind the joist as taught by Bundy. Given that Yamaguchi’s hanger is intended for securing a joist to a wall (EX1041, 1), a POSITA would have sought to use Yamaguchi’s hanger to secure a joist to a wooden frame wall, and therefore, seek to combine the teachings of Bundy’s drywall space.

79. Bundy teaches receiving drywall between a hanger’s channel-shaped portion and the front surface of the top plate to shield the frame wall, and discloses advantages for accommodating two layers of 5/8” drywall between a wall frame and a structural member held by a hanger for fire resistance in a fire separation wall. For example, Bundy describes that drywall is “naturally fire resistant and can be used to cover and protect the structural members of a building.” EX1007, 5:16–20. Notably, drywall primarily serves as a thermal barrier for the wall member that

impedes the spread of fire, ultimately enhancing the safety of the building from fire damage. Being “used to cover and protect the structural members of a building,” drywall goes beyond just fireproofing. EX1007, 5:16–20. Drywall can also be used to enhance soundproofing, insulation, and aesthetic applications. Accordingly, a POSITA would have been motivated to receive drywall between Yamaguchi’s back flange and channel-shaped portion to provide a shielded fire resistant wooden frame wall, while also enhancing the wall for other applications, such as sounding proofing or improved aesthetic appeal. EX1007, 2:10–24.

80. In combining the teachings of Bundy’s drywall space with Yamaguchi, a POSITA would have optimized the size of the spacing between Yamaguchi’s back flange and channel-shaped portion to accommodate two layers of 5/8”-thick-drywall according to the size preference described by Bundy for optimal fire protection and wall integrity. EX1007, 5:10-22. This modification to Yamaguchi would have been nothing more than applying a known technique (Bundy’s spacing a hanger seat from a wall frame by distance sufficient to accommodate two 5/8”-thick-drywall sheets for fire resistance) to a similar device (Yamaguchi’s hanger having a spacing of indeterminate length) to obtain the predictable result of a firewall hanger having a space between its channel-shaped portion and a wall frame large enough for receiving drywall therebetween, thereby “protect[ing] the structural members of a building.” EX1007, 5:18-20.

81. A POSITA would have had an expectation of success in modifying Yamaguchi's hanger to include a space large enough to receive two layers of 5/8"-thick drywall between its channel-shaped portion and back flange, because doing so would still allow Yamaguchi's hanger to perform its intended function of securing a joist to a wall. EX1041, 1. First, as shown in its Usage View (EX1041, 5), Yamaguchi illustrates a space between an installed joist and a back flange of its hanger. Adding drywall between the end of the joist and the connection portion of Yamaguchi's hanger would not disrupt the connection portion of Yamaguchi's hanger from being secured to the wall member. Second, Yamaguchi's and Bundy's hangers are constructed from sheet metal blanks. Recognizing this similarity, a POSITA would have understood how to modify the size of Yamaguchi's extension portions to accommodate two layers of 5/8"-thick-drywall while still allowing Yamaguchi's hanger to secure a joist's end to a frame wall. EX1007, 4:47-51. I believe that this modification would have been well within the level of ordinary skill in the art.

82. Not only would a POSITA have been motivated to use Yamaguchi's hanger on a wood frame wall, as taught by Bundy, but a POSITA would also have been motivated to make similar modifications for the addition of drywall when using Yamaguchi's hanger in its illustrated setting—a sill plate. A POSITA would have had a reasonable expectation of success because drywall is commonly

attached to foundation walls to which sills are commonly mounted, even in basements. When applying drywall to foundation walls, it was well known to provide drywall with moisture-retarding paint/claddings to preserve the integrity of the drywall, even when exposed to moisture. A POSITA would have sought to increase the distance between the back flange and the channel shaped portion to accommodate drywall in the construction shown in Yamaguchi's Usage View (EX1041, 5) where finishing, soundproofing, or vibration-proofing is desired. *See* EX1007, 5:10-22.

83. Accordingly, in my opinion, a POSITA would have been motivated to configure Yamaguchi's hanger to include sufficient space for receiving two layers of 5/8-inch-thick-drywall between Yamaguchi's back flange and channel-shaped portion so that any underlying wall frame—including wooden frame and basement foundation walls—is covered and protected.

B. Independent Claim 1

[1.P] “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,”

84. It is my understanding that the preamble “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” recites an intended use of the claimed invention, and therefore, is satisfied by any prior art structure capable of

performing the intended use. I have been informed that the Board found the preamble not limiting in the '510 and '867 patents (-00109 FWD, 48; -00063 FWD, 36). In my opinion, the preamble of claim 1 is not limiting because the patentee recites a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use.

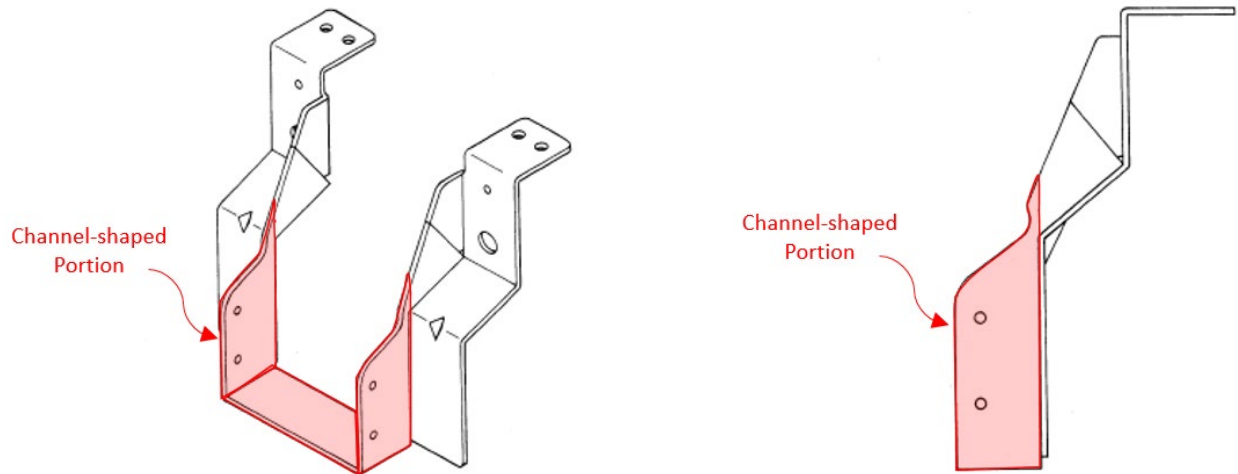
85. To the extent that the preamble is limiting, the Yamaguchi-Bundy combination renders obvious a hanger for connecting a structural component to a wall. EX1041, 1–5. Yamaguchi explicitly discloses using hanger 10 for “bear[ing] a joist” but not explicitly for securing the joist to a wall adapted to have two-layers of 5/8-inch-thick drywall mounted thereon. EX1041, 1. A POSITA not only would have understood that Yamaguchi’s hanger would be applicable to a wall covered with drywall, as suggested by Bundy, but that Yamaguchi’s hanger would be applicable to a fire separation wall having two layers of 5/8”-thick drywall mounted on a frame wall, as further suggested by Bundy. EX1007, 2:37-41. A POSITA would have also understood that Yamaguchi’s hanger is configured to secure to a top plate of a frame wall by connecting Yamaguchi’s hanger directly to the top plate. As I explained in Section X.A., it would have been obvious to a POSITA to use Yamaguchi’s hanger to connect a structural component to a top plate of a frame wall adapted to have two layers of 5/8”-thick drywall mounted thereon. Such a modification would have been simply applying a known technique

(Bundy's use of a hanger on a frame wall with two layers of 5/8" thick drywall to create a fire separation wall) to a known device (Yamaguchi's hanger) to obtain the predictable result of optimizing the size of the hanger's spacing to receive drywall, thereby shielding wall structures from fire. *See, e.g.*, EX1007, 5:18-19. A POSITA would have had an expectation of success in using Yamaguchi's hanger with drywall-covered wall because Bundy's and Yamaguchi's hangers serve similar purposes—supporting a floor joist/structural beam at a top end of a wall.

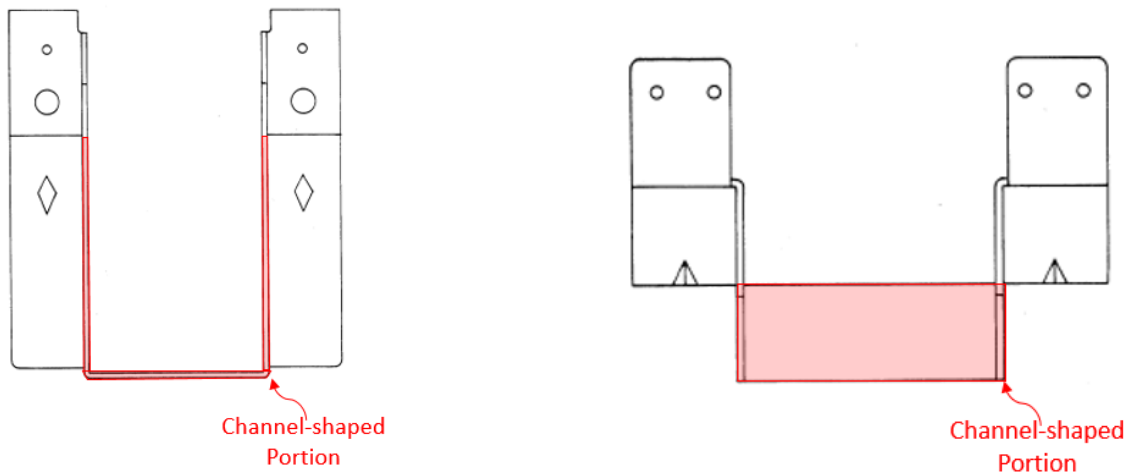
86. Thus, Yamaguchi in view of Bundy combination renders obvious element [1.P].

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

87. As annotated below, Yamaguchi discloses a channel shaped portion (highlighted in red below) configured to receive the structural component. EX1041, 1–5 (“joist bracket that ... bears a joist.”). A POSITA would have understood that the channel-shaped portion (red) of Yamaguchi's hanger is configured to receive an end of a structural component because the channel-shaped portion includes two parallel, spatially-separated sidewalls to define a space for receiving the joist's end, as shown in its Usage View. EX1041, 5.



EX1041, 2, Perspective, Side Views (annotated).

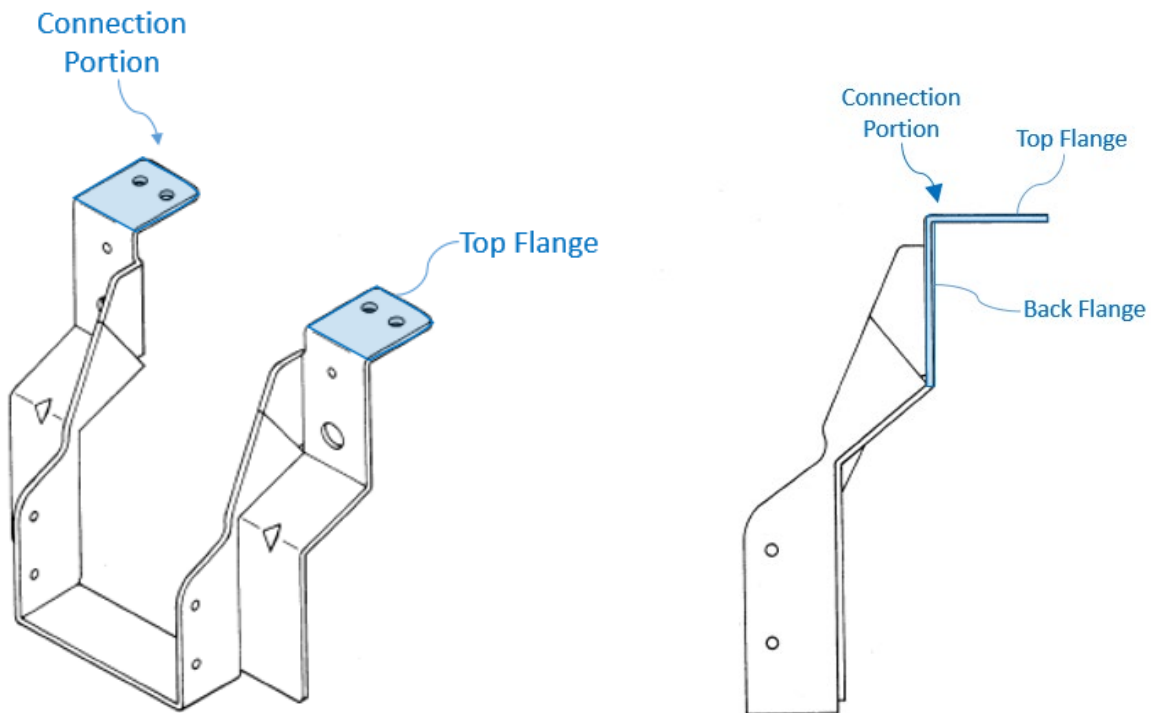


EX1041, 2-3, Front, Plan views (annotated).

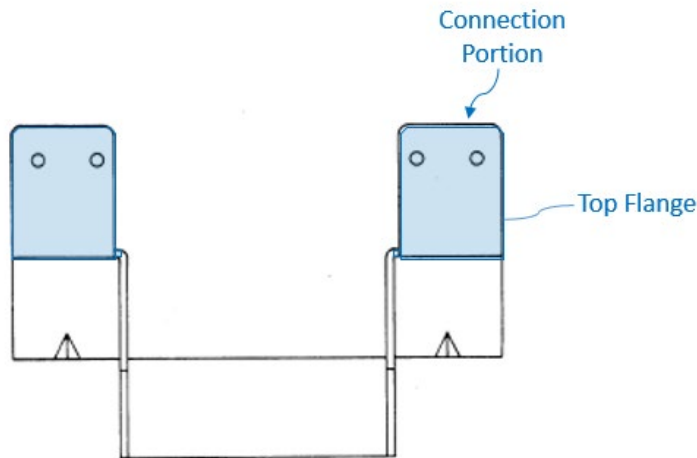
88. Accordingly, in my opinion, Yamaguchi discloses claim element [1.1].

[1.2.A] “a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and,”

89. As annotated below, Yamaguchi discloses a connection portion (highlighted in blue below) that includes a top flange (blue–horizontal portion) arranged to engage a top surface of a top plate of the frame wall, as suggested by Bundy. EX1041, 2–5. A POSITA would have understood that the top flange of Yamaguchi’s hanger is arranged to engage a top surface of a top plate of the frame wall because its top flange extends from a top edge of a back flange in a horizontal direction, allowing the top flange to rest on the top plate of the frame wall, as shown its usage view. EX1041, 5.



EX1041, 2-4, Perspective, Side Views (annotated).

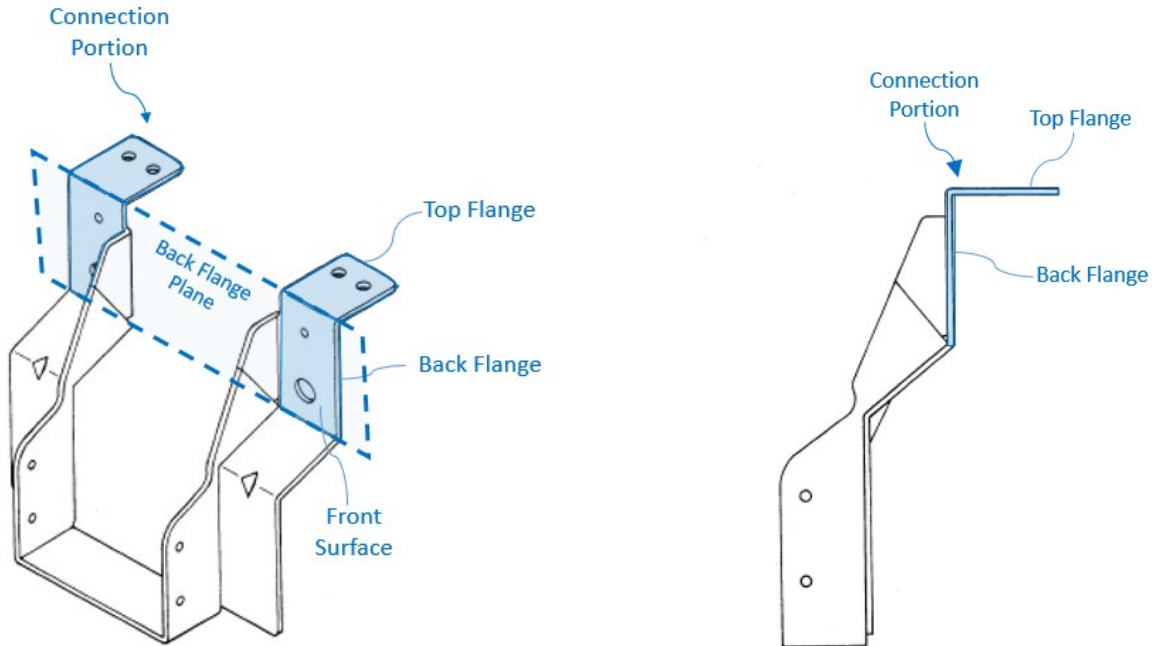


EX1041, 3, Plan View (annotated).

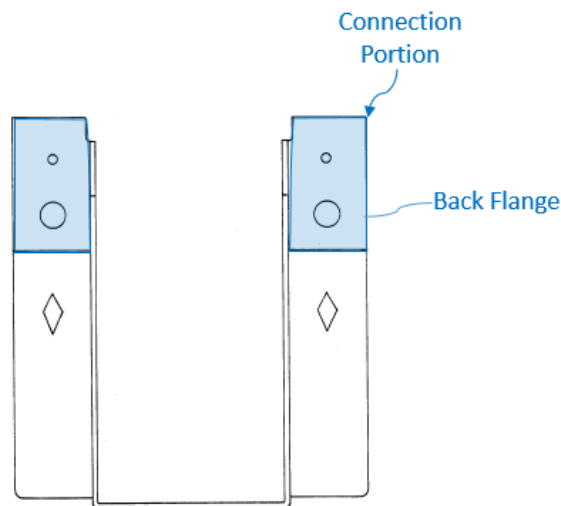
90. Accordingly, in my opinion, Yamaguchi in view of Bundy discloses claim element [1.2A].

[1.2.B] “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,”

91. As annotated below, Yamaguchi discloses a back flange (highlighted in blue below—vertical portion) extending from an edge of the top flange (blue), the back flange arranged to engage a vertical face of the top plate of the frame wall, when installed on a frame wall as taught by Bundy, the back flange having a front surface (blue) lying in a back flange plane (annotated below). EX1041, 2–5.



EX1041, Perspective, 2, 4, Side Views (annotated).



EX1041, 2, Front View (annotated).

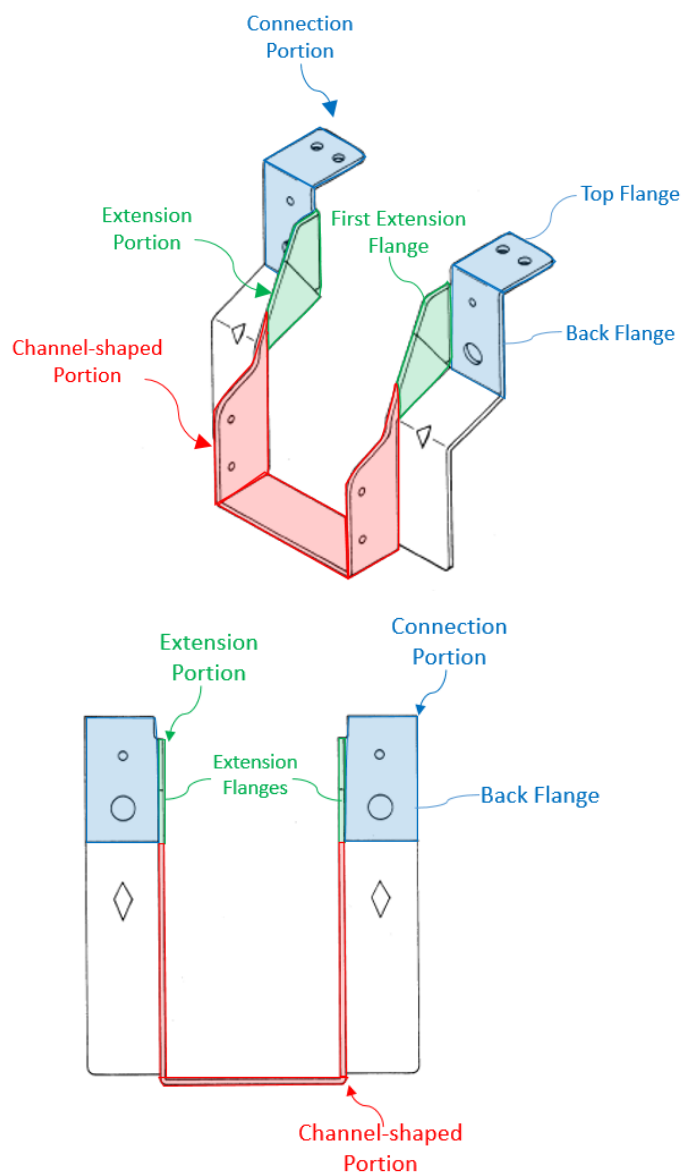
92. A POSITA would have understood that Yamaguchi's back flange is arranged to engage a vertical face of the top plate of the frame wall because its

back flange extends in a vertical direction and is located rearward of the remaining portions of Yamaguchi's hanger. Accordingly, in my opinion, Yamaguchi in view of Bundy discloses claim element [1.2.B].

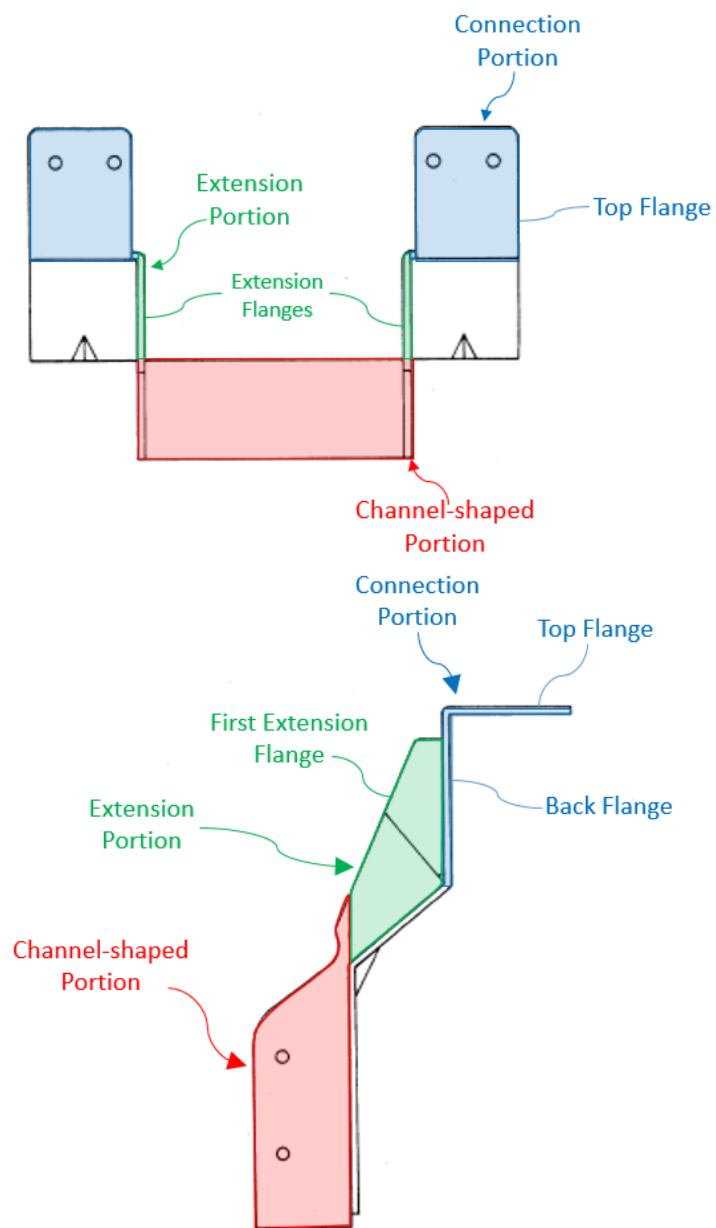
[1.3.A] “an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion;”

93. As annotated below, Yamaguchi discloses an extension portion (highlighted in green below) including a first extension flange (green-vertical portion) extending from the back flange (blue-vertical portion) of the connection portion to the channel-shaped portion (red) (and vice versa). EX1041, 1–5. Specifically, a POSITA would have understood that Yamaguchi's extension portion begins at a fold line (annotated in Usage View) defined along a vertical edge of its back flange and ends at a rear edge of its channel-shaped portion, thereby extending from the back flange to the channel-shaped portion.

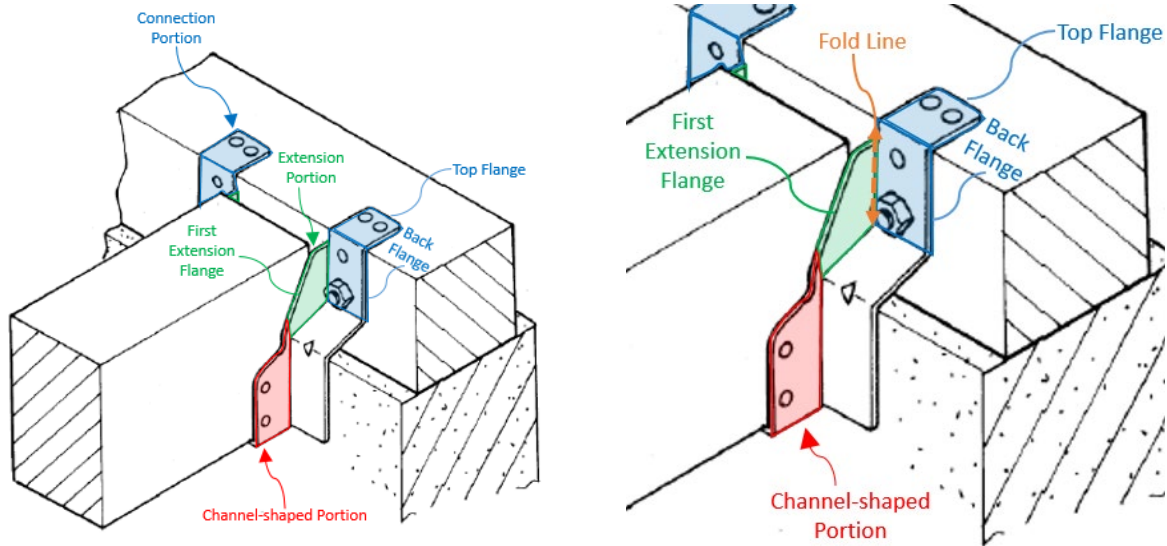
Post-Grant Review of U.S. Patent No. 11,649,626



EX1041, 2, Perspective, Front Views (annotated).



EX1041, 3-4, Plan, Side Views (annotated).



EX1041, 5, Usage View (annotated).

94. A POSITA would have understood in view of all Yamaguchi's figures that its extension flange may be formed in multiple ways to define a planar-shaped flange extending from the channel-shaped portion (red) to the connection portion (blue). *See generally* EX1041. A POSITA would have understood from Yamaguchi's figures that one embodiment of its extension flange is a combination of two abutting pieces of sheet metal (that may or may not be joined together; e.g., via welding), as shown by the line on the vertical portion of the extension flange on pages 2-4, to define a planar-shaped flange extending from the channel-shaped portion (red) to the connection portion (blue) with no intervening components therebetween (and vice versa). EX1041, 2-4. Furthermore, a POSITA would have understood that from the embodiment shown in the Usage View which has no join line crossing the flange, that the extension flange is alternatively formed by

bending a contiguous piece of sheet metal along a fold line (annotated above) defined along the side edge of its back flange, such that the extension portion spans between the back flange and the channel-shaped portion with no intervening components therebetween. EX1041, 5. In this case, there may be weld lines along one or more other portions, such as the side flap, to form the hanger into its final shape.

95. Accordingly, in my opinion, under either embodiment, Yamaguchi discloses the recited “extension flange” of claim 1. EX1041, 1–5.

[1.3.B] “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”²

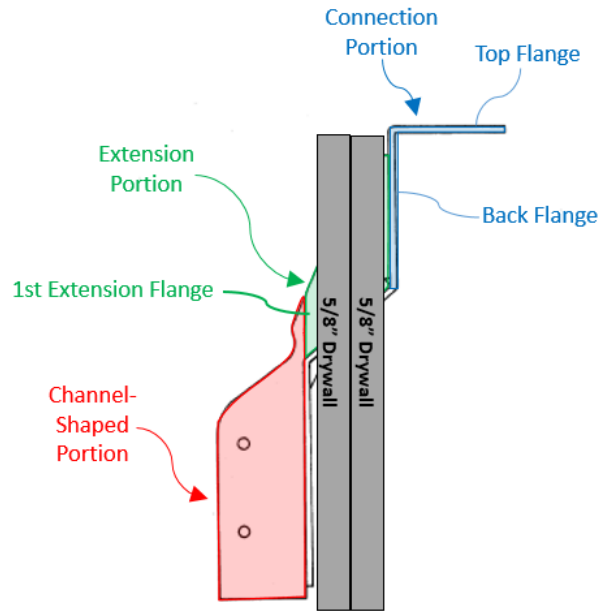
96. A POSITA would have understood that Yamaguchi’s extension portion (green below) defines a space that would permit drywall to be inserted between its back flange (blue—vertical portion) and channel-shaped portion (red). EX1041, 2–5. While Yamaguchi does not explicitly disclose installing two layers of 5/8-inch-

² I have been informed that Patent Owner alleges in its district court complaint that drywall located outside of Simpson’s hanger and *offset from the channel-shaped portion* of Simpson’s hanger constitutes “drywall ... received between the channel-shaped portion and the back flange plane.” EX1042, ¶¶43–48.

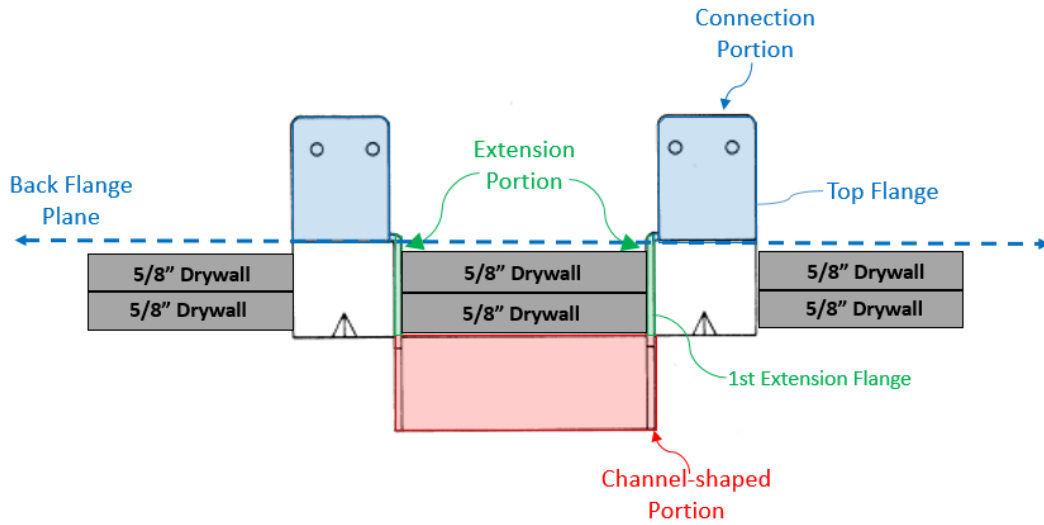
thick drywall between its back flange plane (blue) and channel-shaped portion (red), a POSITA would have found it obvious to size the length of Yamaguchi's extension flanges (green) to define a space sufficient for receiving two layers of 5/8-inch-thick drywall therein based on Bundy, as I explained in Section X.A.

Bundy teaches installing two layers of 5/8" sheathing between a hanger's channel shaped portion (Bundy's side members 11) and a wall frame. EX1007, 5:18-20. A POSITA would have had an expectation of success in defining a specifically-sized drywall space between Yamaguchi's back flange plane (blue) and channel-shaped portion (red), because Yamaguchi's and Bundy's hangers are used for similar purposes (e.g., hanging a joist to a wall), and because Yamaguchi's extension portion (green) already defines a space between Yamaguchi's back flange plane (blue) and channel-shaped portion (red). EX1007, 4:46-51; EX1041, 1-5.

Accordingly, in my opinion, Yamaguchi in view of Bundy renders obvious element [1.3.B].



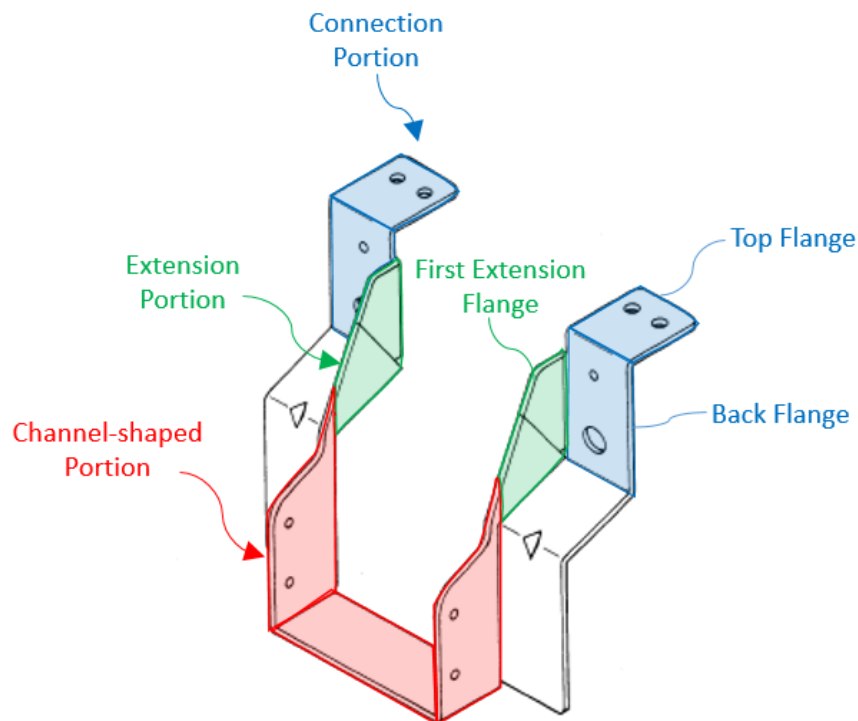
EX1041, 4, Side View (annotated).



EX1041, 3, Plan View (annotated).

[1.4] “wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another”

97. Based on the hanger shown in the figures of Yamaguchi and its description as a “bracket that ... bears a joist,” a POSITA would have understood that all portions of Yamaguchi’s hanger are connected such that they do not move freely with respect to each other. EX1041, 1–5. Specifically, a POSITA would have understood that all portion of Yamaguchi’s hanger would need to be fixed with respect to each other to have sufficient stability for supporting a joist. Accordingly, in my opinion, Yamaguchi discloses the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another, as recited in claim element [1.4].



EX1041, 2, Perspective View (annotated).

98. Therefore, in my opinion, Yamaguchi in view of Bundy renders obvious all the recited limitations of claim 1.

C. Independent Claim 53

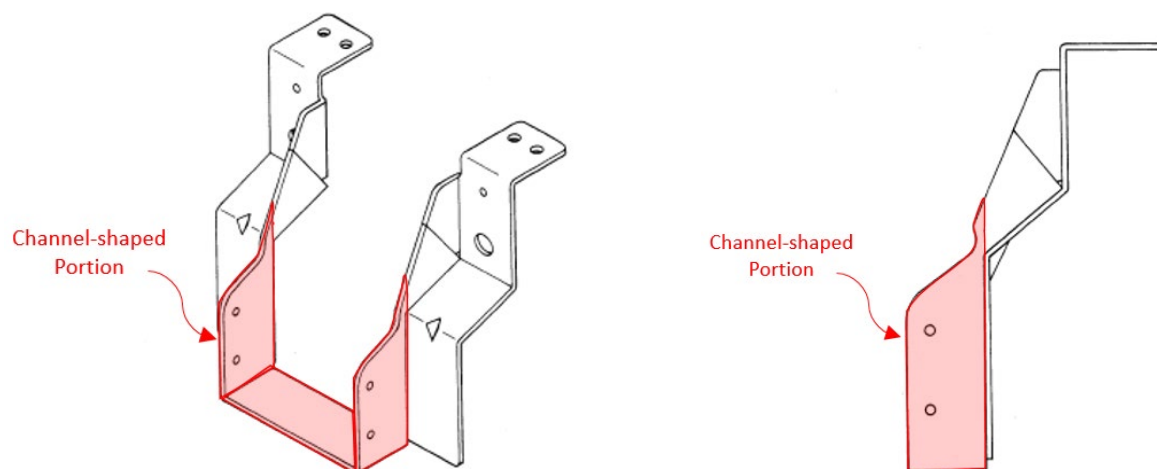
[53.P] “A fire wall hanger for connecting a structural component to a frame wall adapted to have two layers of 5/8-inch-thick drywall mounted thereon to form a fire separation wall,”

99. As I discussed above with respect to claim 1, element [1.P], it is my understanding that the preamble “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” recites an intended use of the claimed invention, and therefore, is satisfied by any prior art structure capable of performing the intended use.

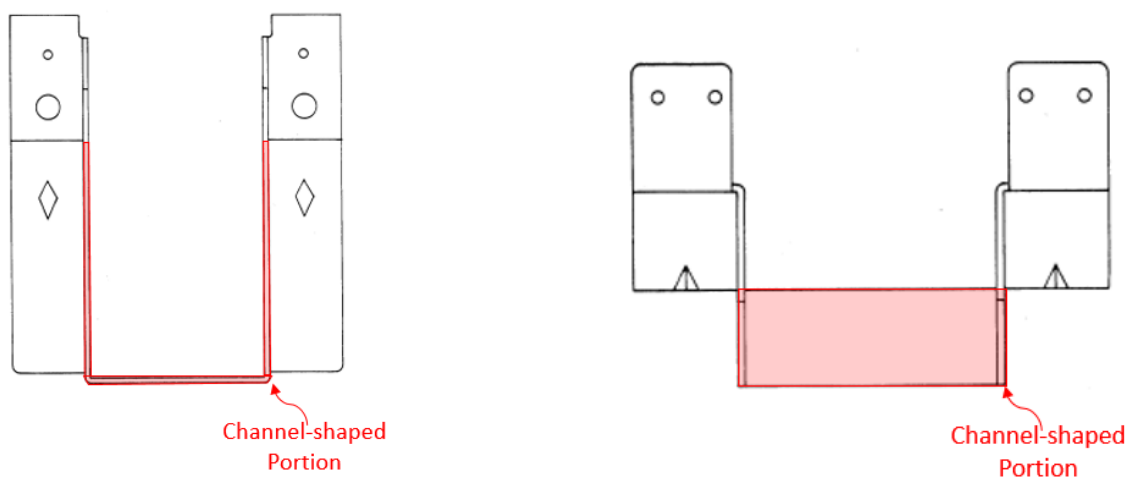
100. As I discussed above with respect to claim 1, element [1.P], Yamaguchi in view of Bundy renders obvious this limitation. EX1041, 1–4.

[53.1] “a channel-shaped portion configured to receive the structural component,”

101. As I discussed with respect to claim 1, element [1.1.A], Yamaguchi discloses this limitation. EX1041, 2–5.



EX1041, 2, 4, Perspective, Side Views (annotated).

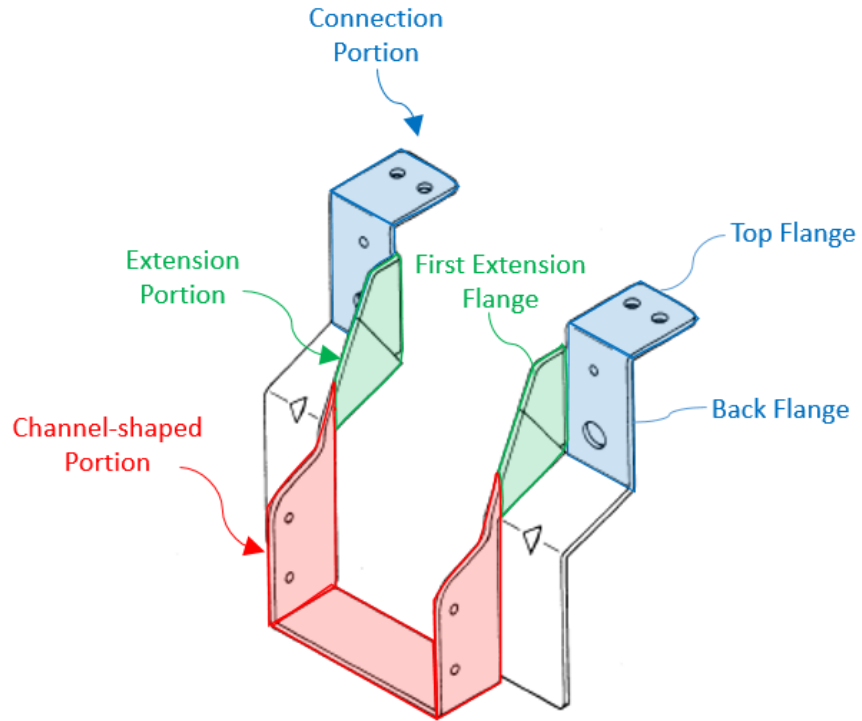


EX1041, 2-3, Front, Plan Views (annotated).

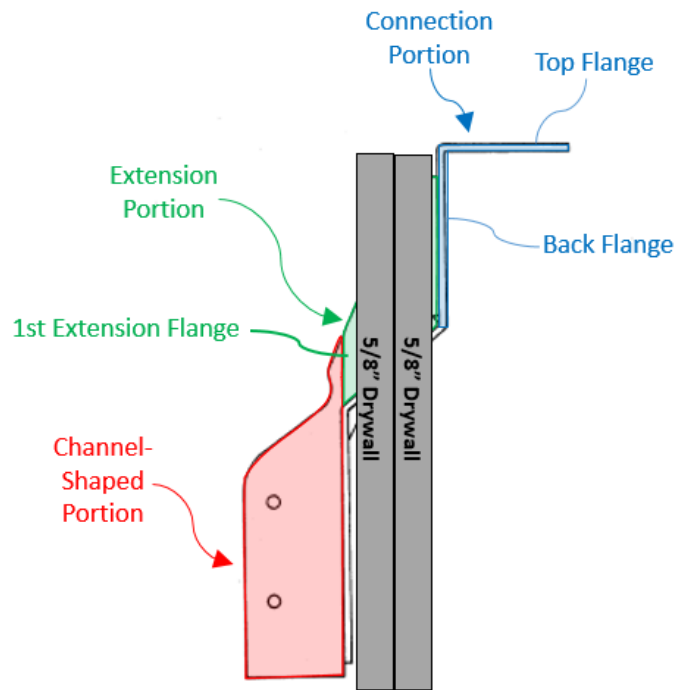
[53.2] “an extension portion extending from the channel-shaped portion and configured to extend through the two layers of 5/8-inch-thick drywall;”

102. Yamaguchi discloses the extension portion extending from the channel-shaped portion. EX1041, 2–5.

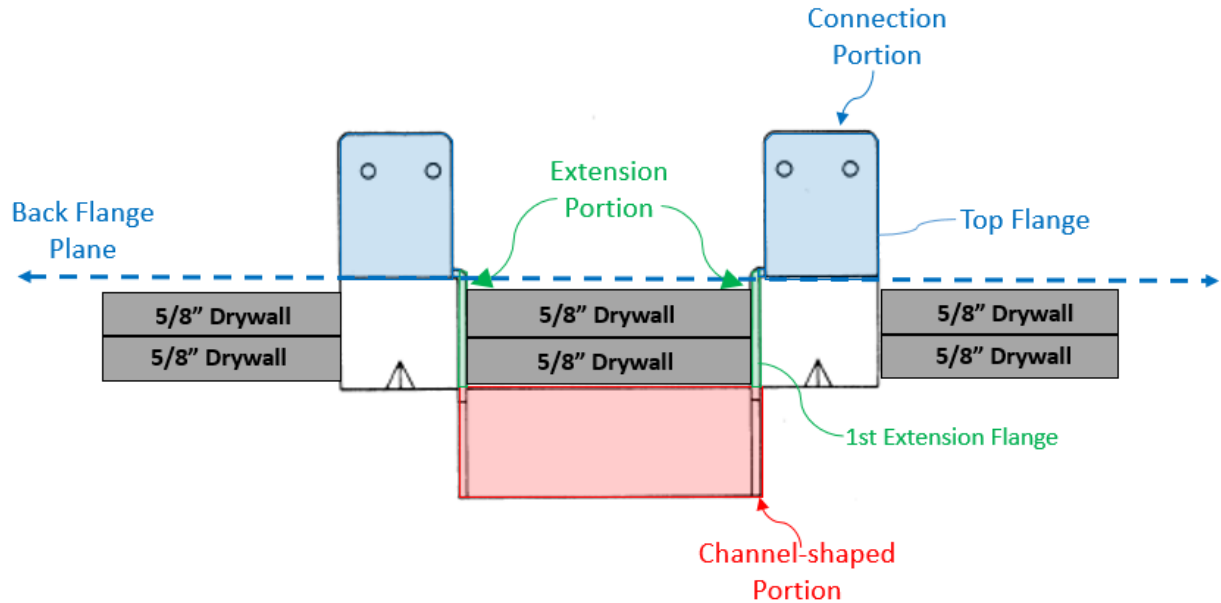
103. While Yamaguchi does not explicitly disclose extending its extension portion through drywall, a POSITA would have been motivated to size the length of Yamaguchi’s extension portion (green) long enough to define a space sufficient to receive two layers of 5/8-inch-thick drywall between Yamaguchi’s back flange (blue) and channel-shaped portion (red), as taught by Bundy, for the same reasons discussed in Section X.A. EX1007, 5:18-20. In doing so, a POSITA would have understood that Yamaguchi’s extension portion (green), sized as taught by Bundy, is configured to extend into one side of the drywall and out of the other side of the drywall because Yamaguchi’s extension portion is flat sheet metal extending continuously from its channel-shaped portion to its connection portion, just as the extension flanges described in the ’626 patent. For these reasons, Yamaguchi-Bundy’s extension portion is configured to extend through the two layers of 5/8-inch-thick drywall.



EX1041, 2, Perspective View (annotated).



EX1041, 4, Side View (annotated).

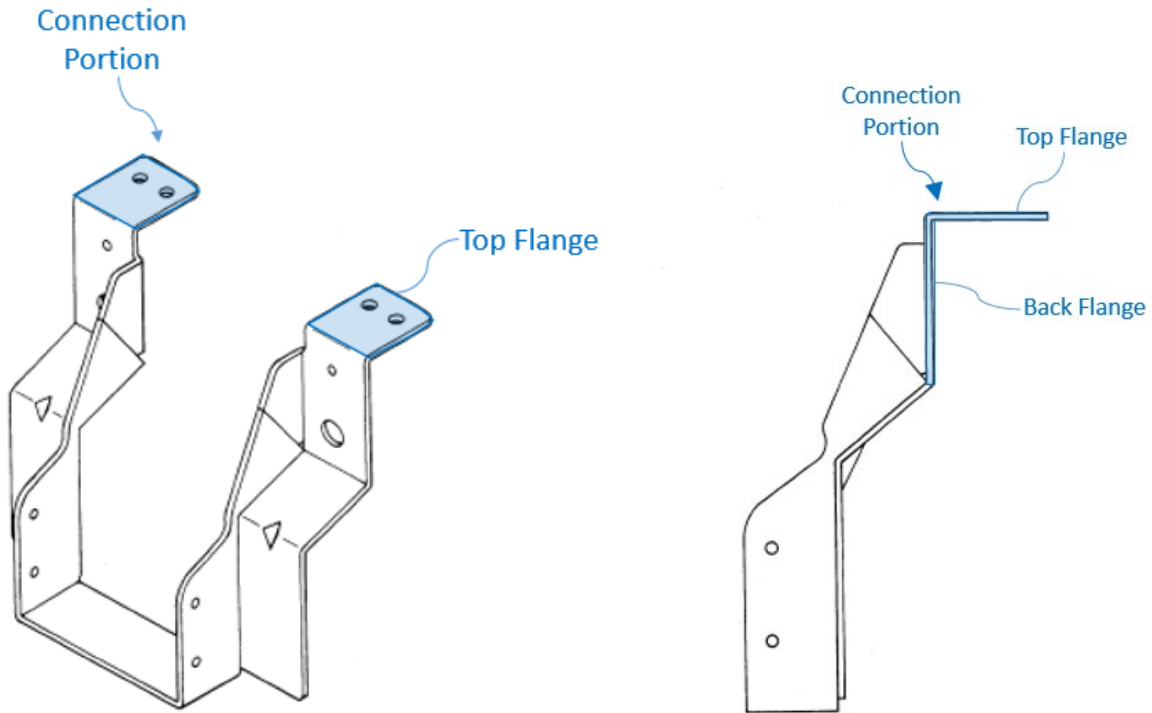


EX1041, 3, Plan View (annotated).

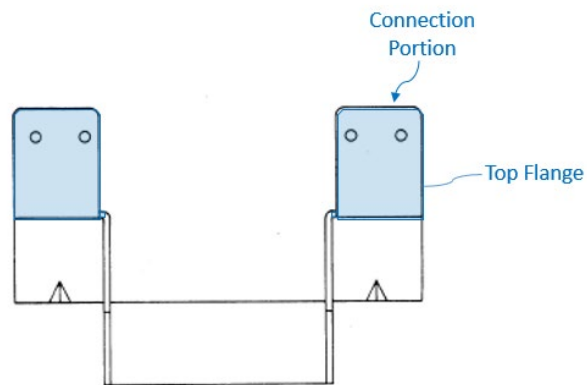
104. Accordingly, in my opinion, Yamaguchi in view of Bundy renders obvious claim element [53.2].

[53.3.A] “a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and,”

105. As I discussed above with respect to claim 1, element [1.2.A], Yamaguchi in view of Bundy renders obvious this limitation. EX1041, 2–5.



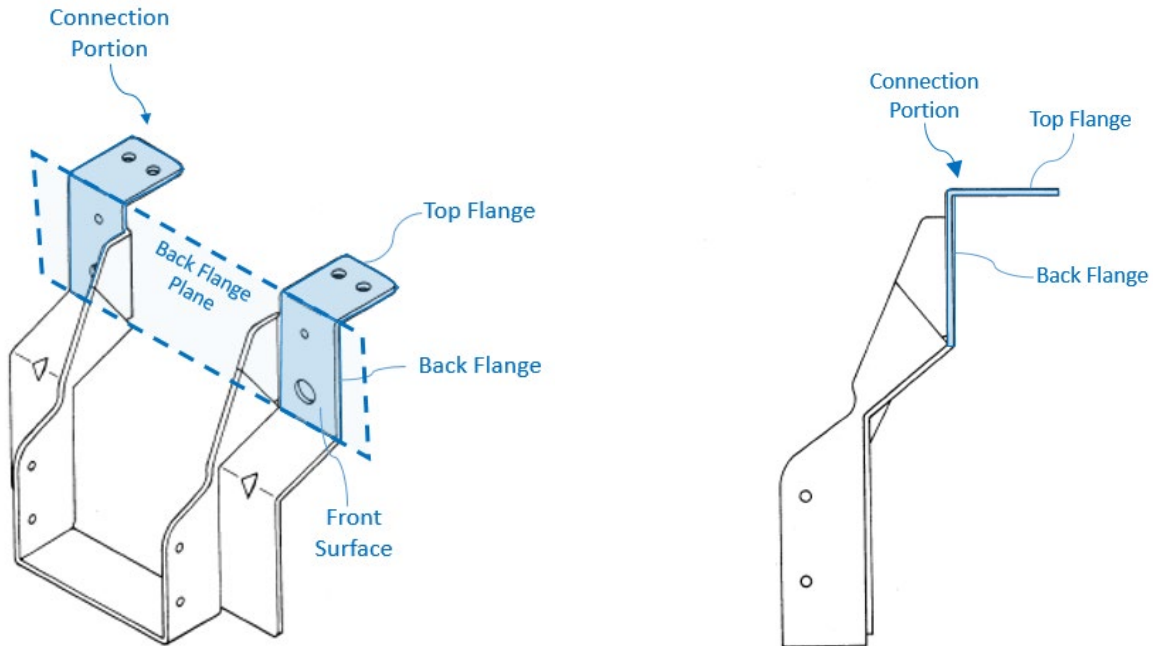
EX1041, 2, 4, Perspective, Side Views (annotated).



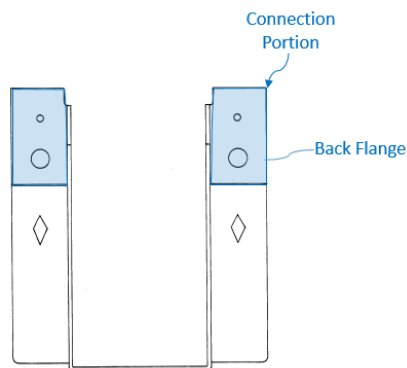
EX1041, 3, Plan View (annotated).

[53.3.B] “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,”

106. As I discussed above with respect to claim 1, element [1.2.B], Yamaguchi in view of Bundy renders obvious this limitation. EX1041, 2–5.



EX1041, 2, 4, Perspective, Side Views (annotated).

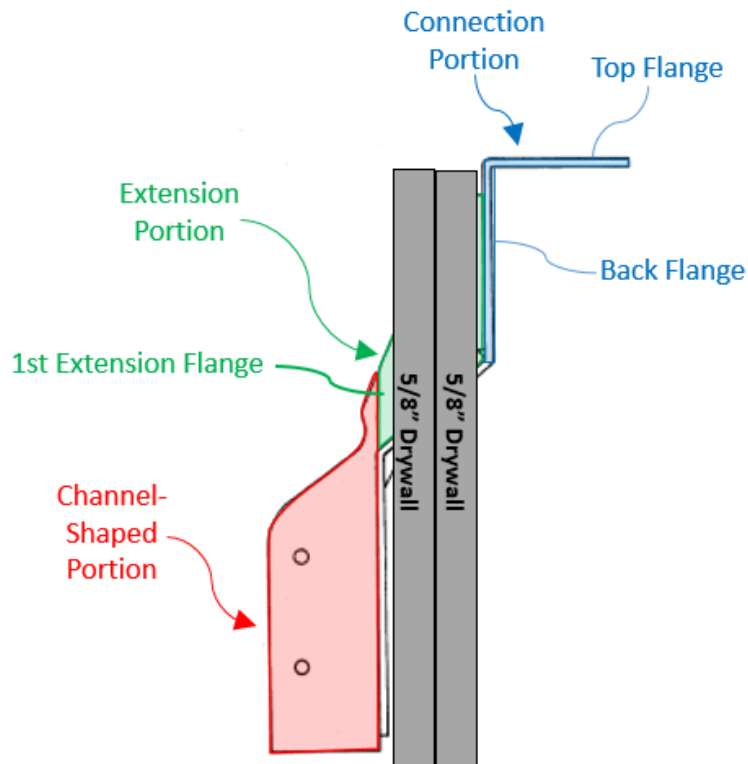


EX1041, Front View (annotated).

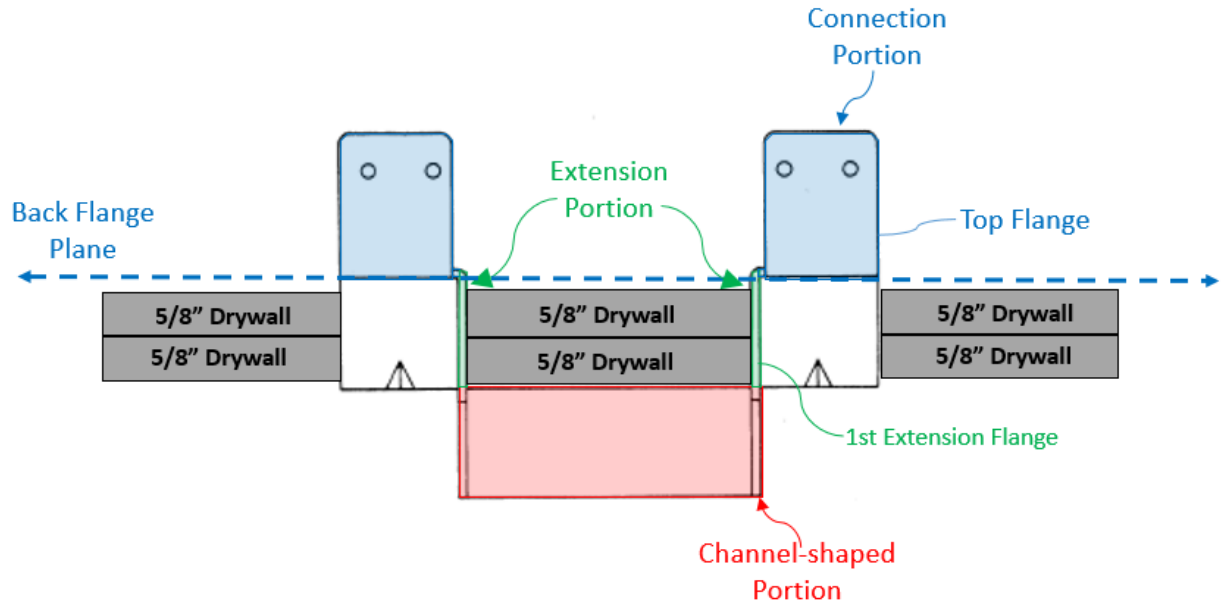
[53.4] “the extension portion spacing the channel-shaped portion from the back flange plane by a distance sized large enough to permit the two layers of 5/8-inch-thick drywall of the fire

separation wall to be received between the channel-shaped portion and the back flange plane”

107. As discussed above with respect to claim 1, element [1.3.B], Yamaguchi in view of Bundy renders obvious this limitation. EX1041, 2–5.



EX1041, 4, Side View (annotated).



EX1041, 3, Plan View (annotated).

[53.5] “wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another”

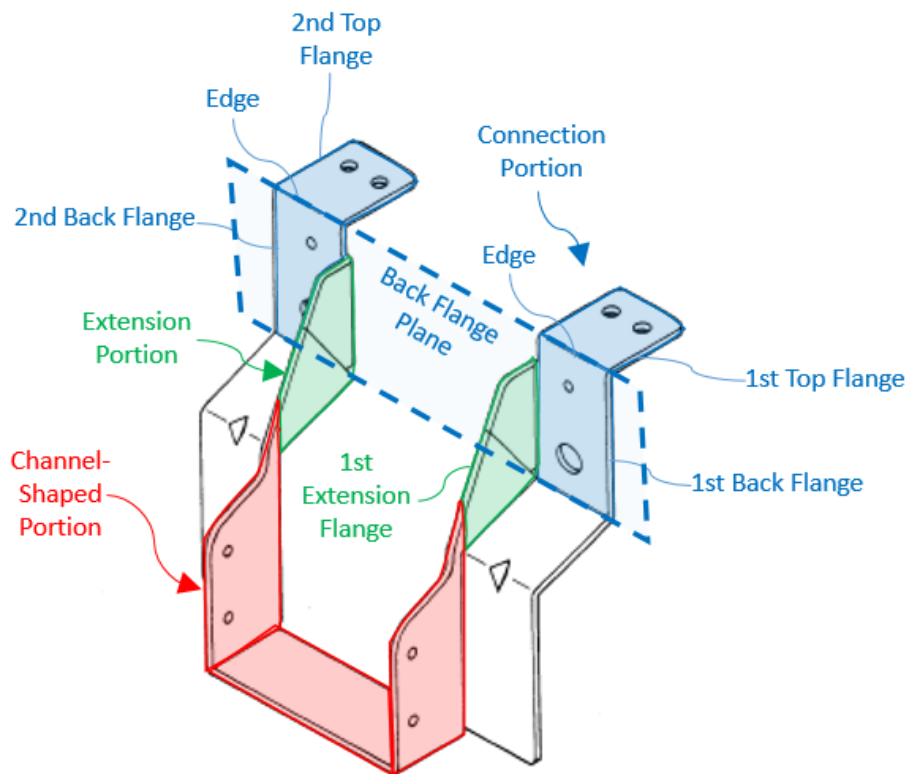
108. As I discussed above with respect to claim 1, element [1.4],

Yamaguchi discloses this limitation. EX1041, 1–5.

D. Claims 39 and 92

109. Yamaguchi discloses that the back flange (blue) is a first back flange (blue–right back flange) and the top flange (blue) is a first top flange (right top flange). EX1041, 2–5. When mounted on a frame wall as taught by Bundy, Yamaguchi-Bundy discloses that the connection portion (blue) includes a second top flange (blue–left top flange) arranged to engage the top surface of the top plate of the frame wall and a second back flange (blue–left back flange) extending from

an edge (annotated below) of the second top flange (blue—horizontal) and arranged to engage the vertical face of the top plate of the frame wall, shown below. Being constructed from sheet metal and symmetric with the first back flange³, Yamaguchi's second back flange (blue—left vertical) has a front surface lying in the same back flange plane as the first back flange. EX1041, 2–5.



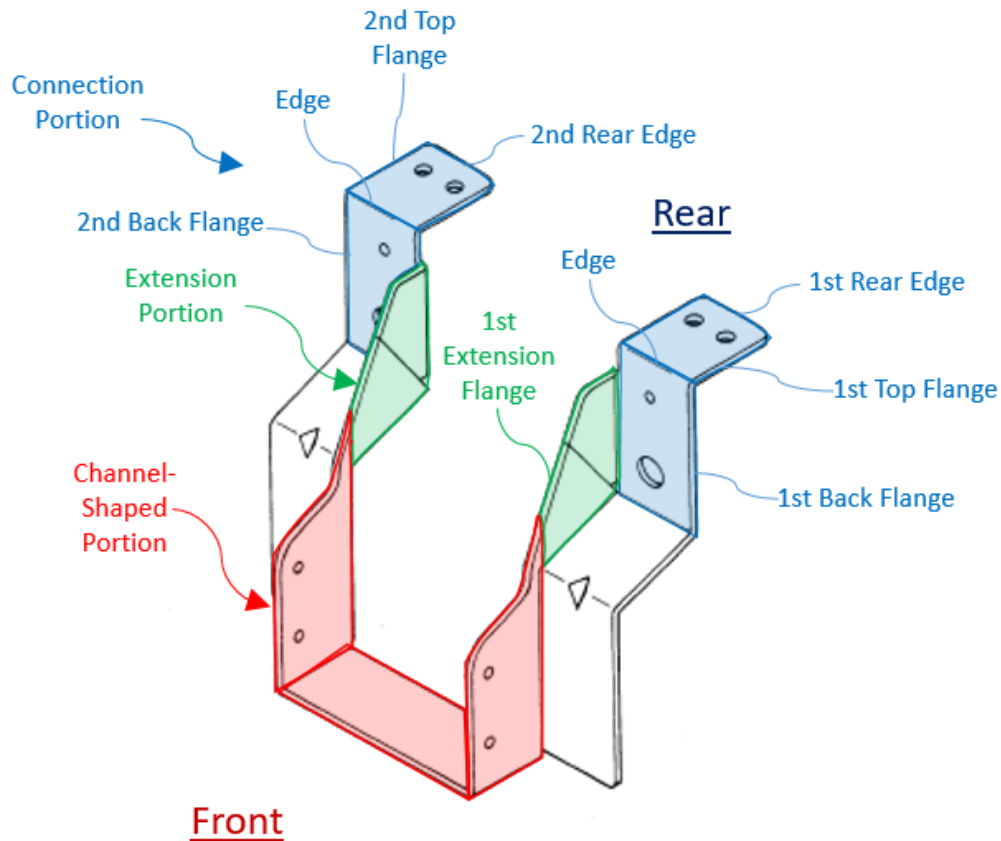
EX1041, 2, Perspective View (annotated).

110. Accordingly, in my opinion, Yamaguchi in view of Bundy renders obvious claims 39 and 92.

³ “The left side view is symmetrical to the right side view.” EX1041, 1.

E. Claims 40 and 93

111. Yamaguchi discloses that the first top flange (blue–right horizontal) includes a first rear edge (annotated below) located rearwardly of the edge (annotated below) of the first top flange (blue–right horizontal) from which the first back flange (blue–right vertical) extends and that the second top flange (blue–left horizontal) includes a second rear edge (annotated below) located rearwardly of the edge (annotated below) of the second top flange (blue–left) from which the second back flange (blue–left vertical) extends. EX1041, 2–5. Yamaguchi discloses the first rear edge (annotated below) being located rearwardly of the first back flange (blue–right vertical) and the second rear edge (annotated below) being located rearwardly of the second back flange (blue–left vertical). EX1041, 2–5.



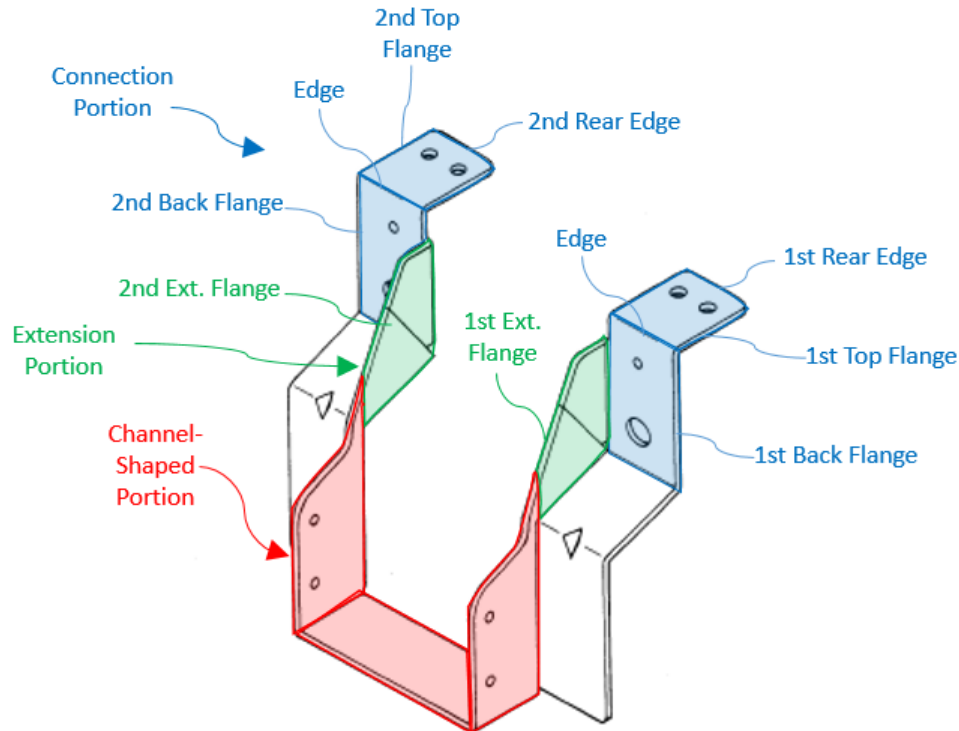
EX1041, 2, Perspective View (annotated).

112. Accordingly, in my opinion, Yamaguchi in view of Bundy renders obvious claims 40 and 93.

F. Claims 41 and 94

113. For the reasons discussed for [1.3.A], Yamaguchi discloses that the extension portion (green) includes a first extension flange (green—right extension flange) extending from the channel-shaped portion to the first back flange (blue—right vertical) of the connection portion (and vice-versa, from the first back flange to the channel-shaped portion). As the two sides of Yamaguchi's hanger are symmetric, Yamaguchi similarly discloses a second extension flange (green—left

extension flange) extending from the second back flange (blue–left vertical) to the channel-shaped portion (red) (and vice-versa, from the channel-shaped portion to the second back flange), shown below. EX1041, 2–5.



EX1041, 2, Perspective View (annotated).

114. Accordingly, in my opinion, Yamaguchi in view of Bundy renders obvious claims 41 and 94.

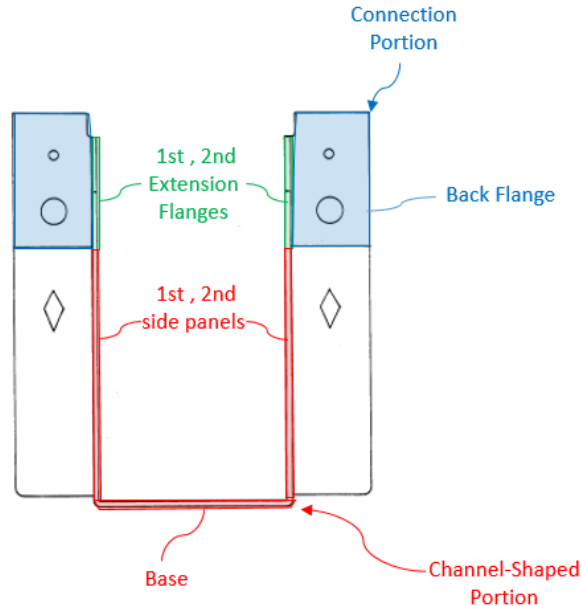
G. Claims 42 and 95

115. Yamaguchi discloses the channel-shaped portion (red) including a base (annotated below) configured to receive and support the structural component's end portion. EX1041, 1–5 (“joist bracket that...bears a joist”).

Yamaguchi discloses that the channel-shaped portion further includes first and

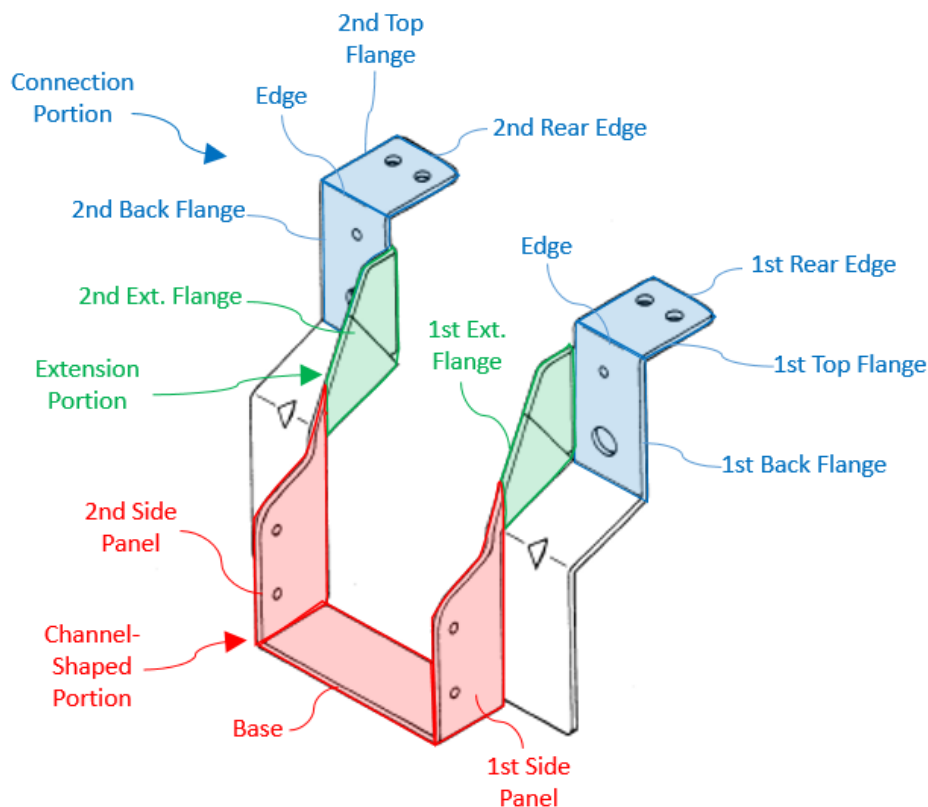
second side panels (red, annotated below) extending upward from the base.

EX1041, 2-5.



EX1041, 2, Front View (annotated).

116. Yamaguchi discloses that its extension flanges (green-vertical) are parallel to each other and that its side panels are parallel to each other (“[t]he left side view is symmetrical to the ride side”), and thus the second extension flange (green-left) is parallel to the first extension flange (green-right) and the second side panel is parallel to the first side panel, shown below. EX1041, 1-5.

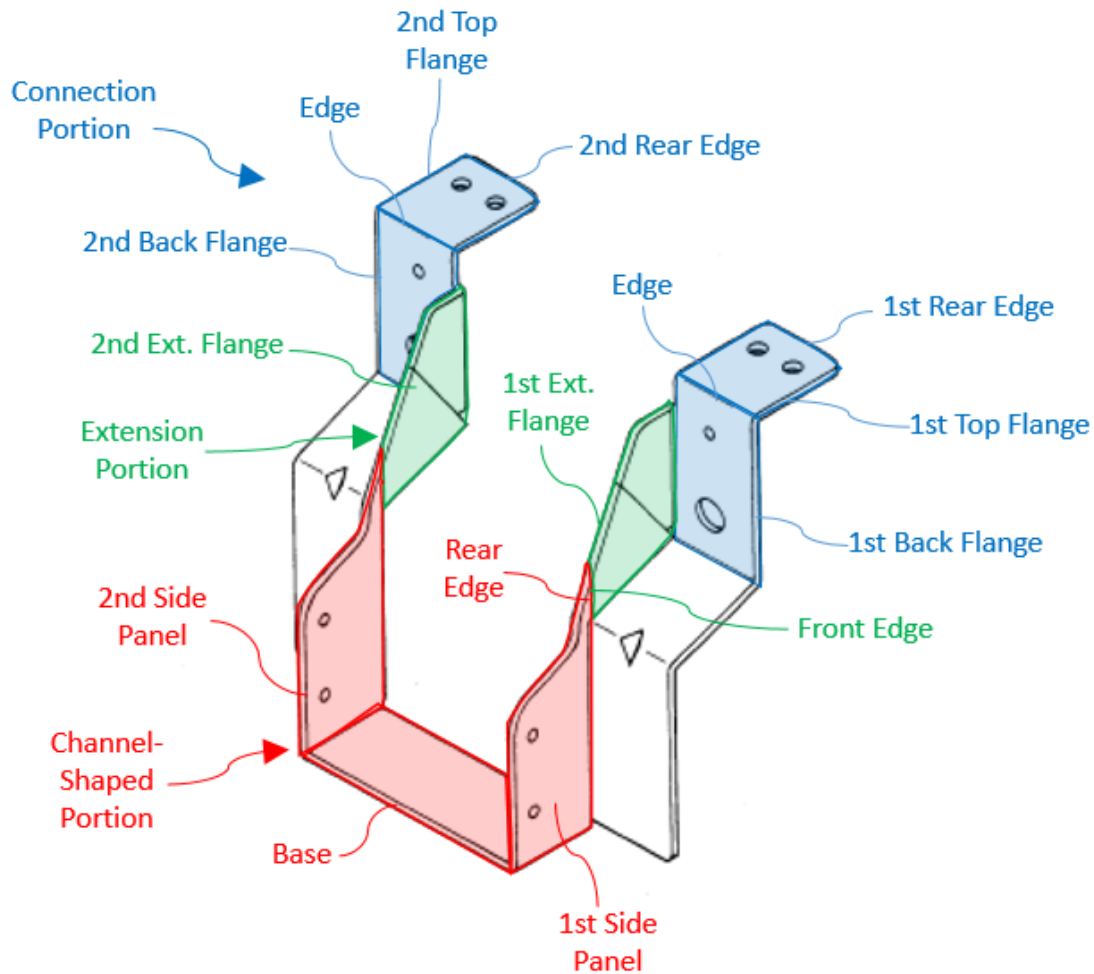


EX1041, 2, Perspective View (annotated).

117. Accordingly, in my opinion, Yamaguchi in view of Bundy renders obvious claims 42 and 95.

H. Claims 43 and 96

118. Yamaguchi discloses a front edge (annotated below) of the first extension flange (green—right vertical) abuts a rear edge (annotated below) of the first side panel (red—right vertical), as they join with no intervening structures therebetween. EX1041, 2–5.



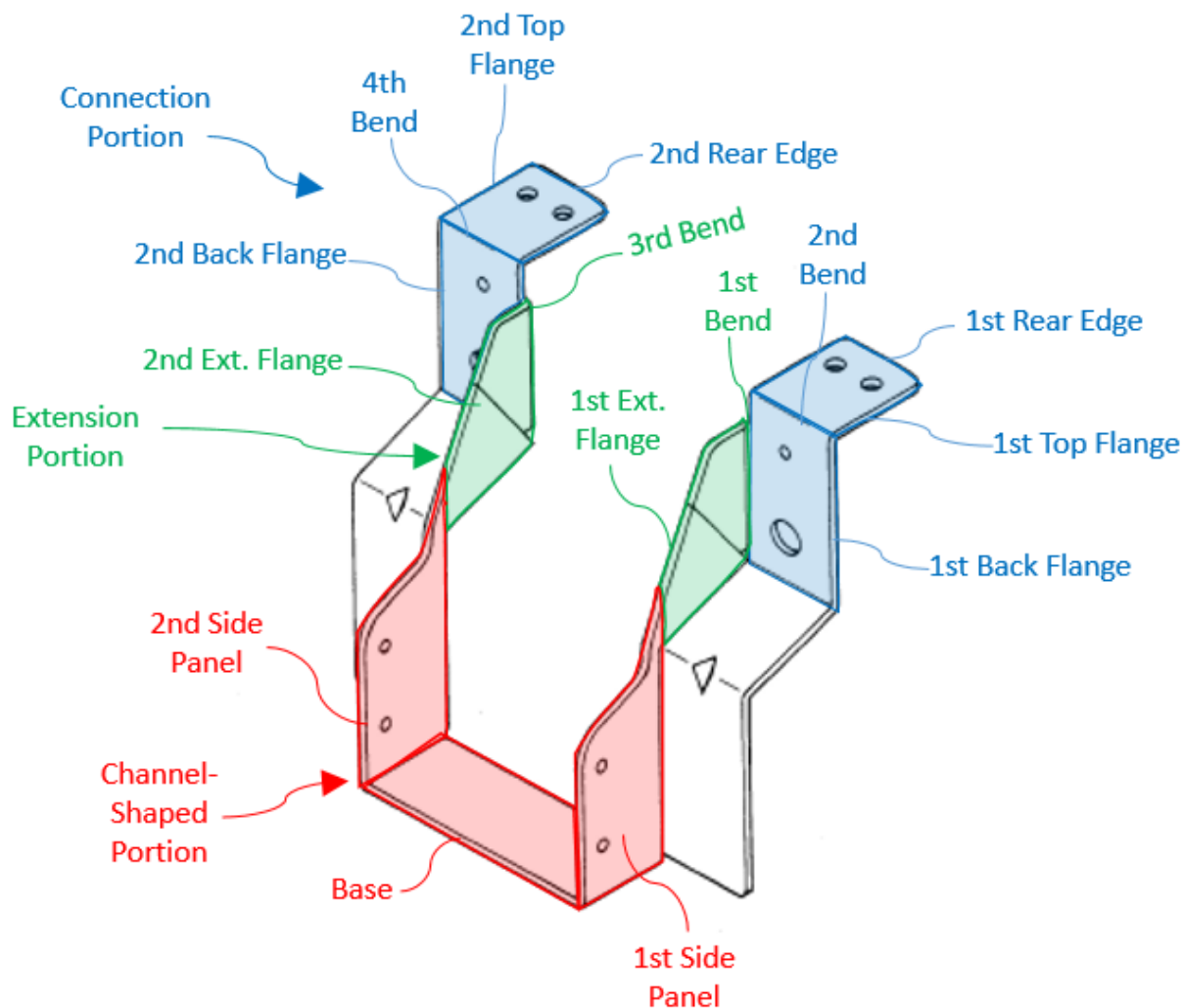
EX1041, 2, Perspective View (annotated).

119. Accordingly, in my opinion, Yamaguchi in view of Bundy renders obvious claims 43 and 96.

I. Claims 44 and 97

120. Yamaguchi discloses that the first extension flange (green—right green) and the first back flange (blue—right vertical) are directly attached to each other by a first bend (annotated below) and that the first back flange (blue—right

blue vertical) and the first top flange (blue—right horizontal) are directly attached to each other by a second bend (annotated below). EX1041, 2–5.



EX1041, 2, Perspective View (annotated).

121. Yamaguchi discloses that the second extension flange (green–left vertical) and the second back flange (right–left vertical) are directly attached to each other by a third bend (annotated above) and that the second back flange (blue–left vertical) and the second top flange (blue–left horizontal) are directly

attached to each other by a fourth bend (annotated above). EX1041, 2–5.

Accordingly, in my opinion, Yamaguchi in view of Bundy renders obvious claims 44 and 97.

XI. CLAIMS 22–27, 45, 50–52, 74–79, 98, AND 103–105 WOULD HAVE BEEN OBVIOUS OVER YAMAGUCHI IN VIEW OF BUNDY, FURTHER IN VIEW OF ADAMS.

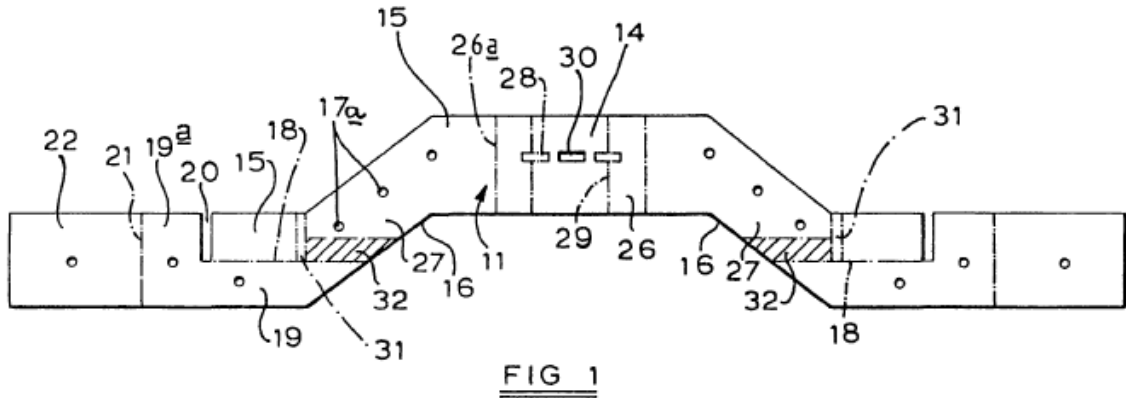
122. As discussed above, each element of independent claims 1 and 53 would have been obvious based on Yamaguchi-Bundy.

A. Motivation to Modify Yamaguchi, as Modified by Bundy, Based on the Teachings of Adams.

123. In my opinion, combining the teachings of Adams’s hanger manufacturing process with Yamaguchi, as modified by Bundy, renders obvious claims 22–27, 45, 50–52, 74–79, 98, and 103–105, as explained below.

124. Yamaguchi, Bundy, and Adams are all directed to joist hangers. EX1041, 1; EX1007, 1:5–11; EX1040, 3:55–56. Accordingly, a POSITA would have recognized that the teachings of Adams are analogous to both Yamaguchi’s and Bundy’s hanger. Patent Owner may argue that Yamaguchi does not explicitly disclose how its hanger is manufactured. While Yamaguchi does not explicitly disclose how its hanger is manufactured, a POSITA would have understood that Yamaguchi’s hanger may be manufactured by two alternative processes: (1) folding one piece of sheet metal, or (2) cutting and combining two pieces of metal. EX1040, 1:12–14, 3:55–58. A POSITA would have been motivated to manufacture

Yamaguchi's hanger by folding a single piece of sheet metal in view of Adams to yield the hanger with less waste and reduced costs. EX1040, 3:55–58.



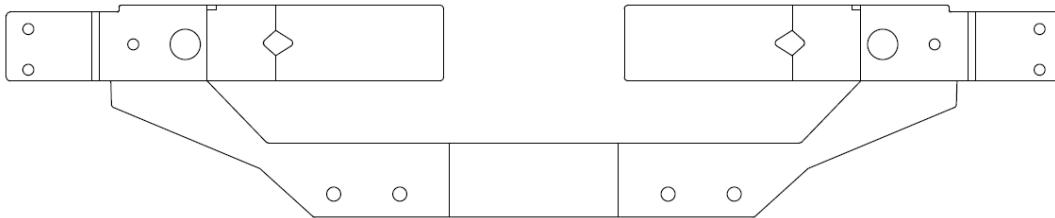
EX1040, FIG. 1.

125. Adams teaches manufacturing a joist hanger “from a single sheet metal blank 11,” shown below in Figure 1. EX1040, 3:55–58, 6:4–22. In doing so, Adams teaches that “[a] series of blanks can be cut side-by-side from a metal sheet without substantial wastage.” EX1040, 6:2–3. A POSITA would have understood in view of Adams that forming a hanger as a single piece of sheet metal that is then bent into shape provides the most pragmatic, economically-efficient way to manufacture a high number of hangers. Reducing wastage of material and cost of manufacturing are leading factors for manufacturers, and therefore, a POSITA would have sought Adams’s single steel sheet process to form Yamaguchi’s hanger. Thus, a POSITA would have been motivated to form Yamaguchi’s hanger as one of piece of sheet metal, as taught by Adams, to yield a hanger with less wastage and manufacturing complexity. EX1040, 5:55–6:3.

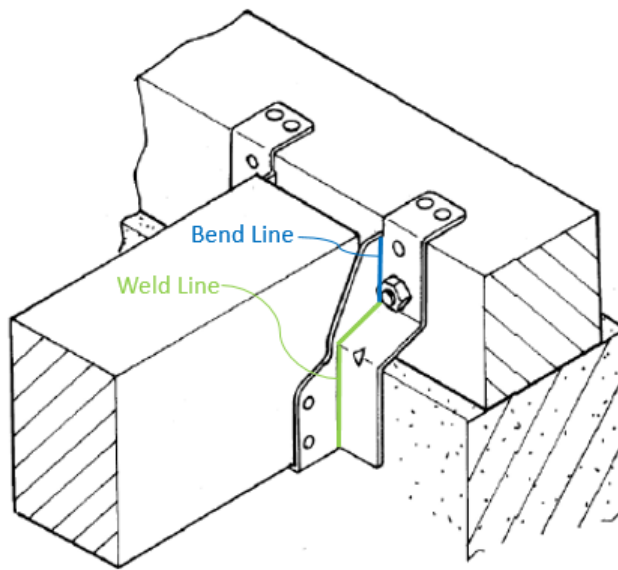
126. A POSITA would have had a reasonable expectation of success in doing so because Adams provides a blueprint (Figure 1) for sectioning a single piece of metal into a hanger having a shape—specifically, a channel-shaped portion, an extension portion, and a connection portion—analogueous to Yamaguchi’s hanger. EX1040, 3:55–58, 6:4–22. Specifically, Adams describes defining a “central part 26” on blank 11 to form “base 14 and the lower upright sections of the sidewalls 15” and then providing “angled parts 27” to “form the rearwardly inclined parts of the side walls 15 having their inclined edges 16, ... which also form the lowermost regions of the abutment portions 19.” EX1040, 6:4–10. A POSITA would have recognized that a similar approach can be used to form Yamaguchi’s hanger.

127. Furthermore, a POSITA would have been able to determine, using common CAD tools, how to create a single sheet blank that maintains the fundamental shape of the Yamaguchi’s hanger, as demonstrated below. Specifically, a POSITA would have understood that the bend line (blue, annotated below) between Yamaguchi’s extension flanges and back flanges allows the hanger to be formed as one continuous metal piece, and that, once bent into shape, the free edge of Yamaguchi’s laterally-extending flanges would be welded to the edges (green, annotated below) of the extension flange and channel-shaped portion to reinforce the hanger and maintain its shape. Doing so would have been well

within the level of ordinary skill in the art, as use of a known technique (forming as one piece of sheet metal) to improve similar devices (the Yamaguchi-Bundy hanger) in the same way.



Rendering of Metal Blank for Yamaguchi's Hanger.



EX1041, 5, Usage View (annotated).

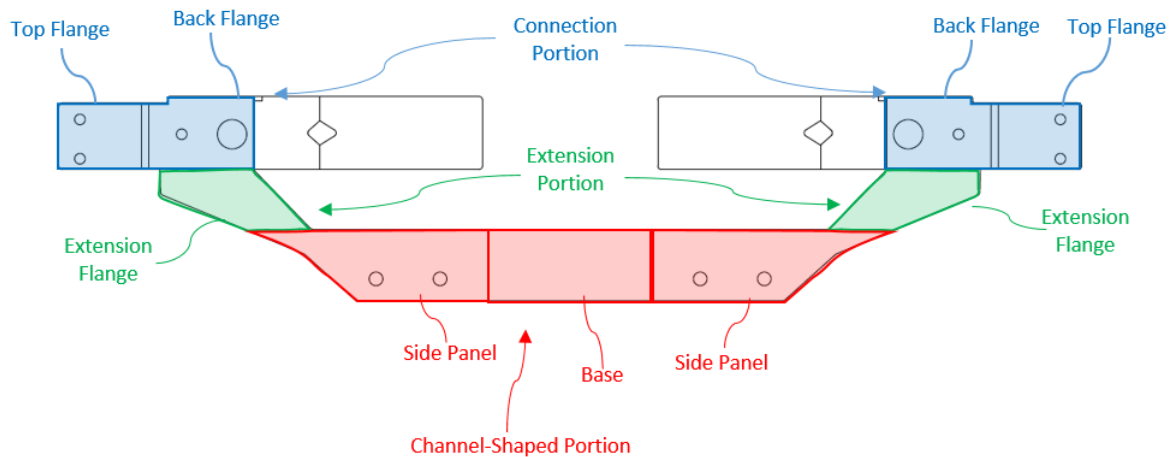
128. Accordingly, in my opinion, a POSITA would have been motivated to combine the teachings of Adams's manufacturing process with Yamaguchi, as modified by Bundy, with a reasonable expectation of success.

B. Claims 22-27 and 74-79

129. As I discussed above, claims 1 and 53, from which claims 22-27 and 74-79 respectively depend, would have been obvious based on Yamaguchi in view of Bundy. Because Yamaguchi is a joist hanger, a POSITA would have understood from Yamaguchi in view of Bundy that the combined hanger is made of sheet metal. EX1007, 4:46–49 (“The joist hanger 2 of the present invention is preferably formed from light gauge sheet steel and is designed to be cut from the sheet metal blank with little waste.”)

130. While Yamaguchi and Bundy are silent about the hanger’s manufacturing process, Adams discloses forming a joist hanger’s extension portion (sidewalls 15 above edge 16), including its first extension flange (first sidewall 15 above edge 16), its channel-shaped portion (base 14 and portions of sidewalls 15 thereabove), and its connection portion (abutment and bearing portions 19, 22) all as one-piece of sheet metal (blank 11). EX1040, 3:55–57, 6:3–22; *see also* §XIV.D below. Employing the teachings of Adams’s manufacturing process with the Yamaguchi-Bundy hanger would have rendered obvious (1) the hanger’s extension portion (green), including its first extension flange, and channel-shaped portion being formed as one-piece of sheet metal (claims 22/26/74/78); (2) the hanger’s extension portion (green), including its first extension flange, and connection portion being formed as one-piece of sheet metal (claims 23/75); and (3) the

hanger's channel-shaped portion (red), connection portion (blue), and extension portion (green), including its first extension flange, being formed as one-piece of sheet metal (claims 24/27/76/79), as illustrated in the metal-blank rendering below. A POSITA would have been motivated and had a reasonable expectation of success in doing so for the reasons set forth in §XIII.A.



Rendering of Yamaguchi's Hanger

131. For the same reasons, employing the teachings of Adams's manufacturing process with the Yamaguchi-Bundy hanger would also have rendered obvious the hanger's channel-shaped portion being made of sheet metal, and the extension portion, including its first extension flange, being an extension of the sheet metal forming the channel-shaped portion (claims 25/77), as illustrated in the metal-blank rendering above.

132. Accordingly, in my opinion, Yamaguchi in view of Bundy and Adams renders obvious claims 22–27 and 74–79.

C. Claims 45 and 98

133. As I discussed above, claims 44 and 97, from which claims 45 and 98 respectively depend, would have been obvious based on Yamaguchi in view of Bundy. As discussed for claims 22-27 and 74-79, employing Adams's manufacturing with the Yamaguchi-Bundy hanger would have rendered obvious the hanger's channel-shaped portion, connection portion, and extension portion being formed as one-piece of sheet metal. EX1040, 3:55-57, 4:2-36, 6:3-22. Accordingly, in my opinion, Yamaguchi in view of Bundy and Adams renders obvious claims 45 and 98.

D. Claims 50 and 103

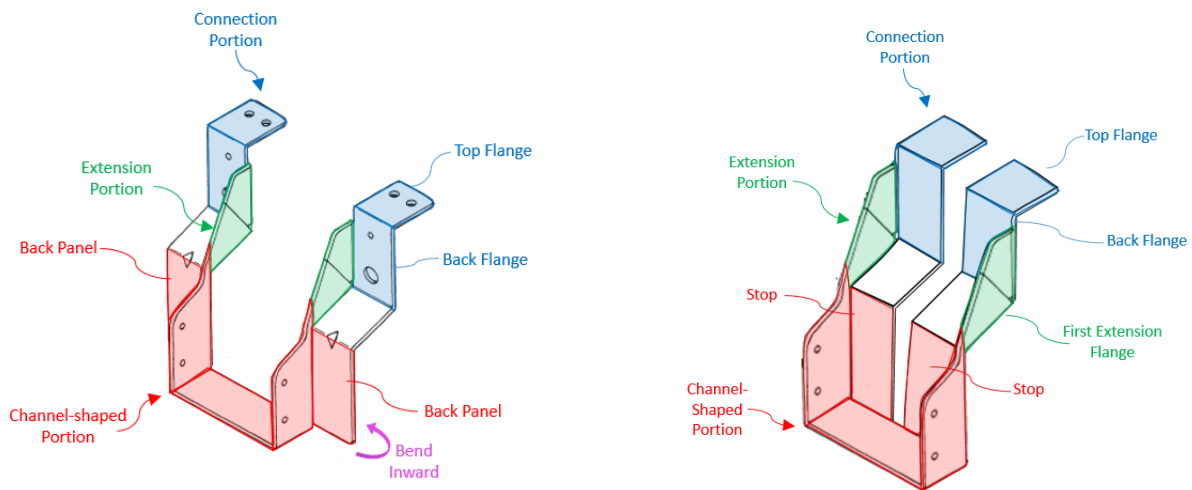
1) Stop Arranged To Engage an End of the Structural Component

134. While Yamaguchi does disclose a space between the end of the joist and the wall structure top, Yamaguchi does not explicitly disclose a stop. However, as discussed in §XI.A, Bundy teaches an analogous hanger. Bundy further teaches that its analogous hanger 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 by a distance sized large enough to permit the two layers of 5/8-inch-thick drywall to be received therebetween. 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. A

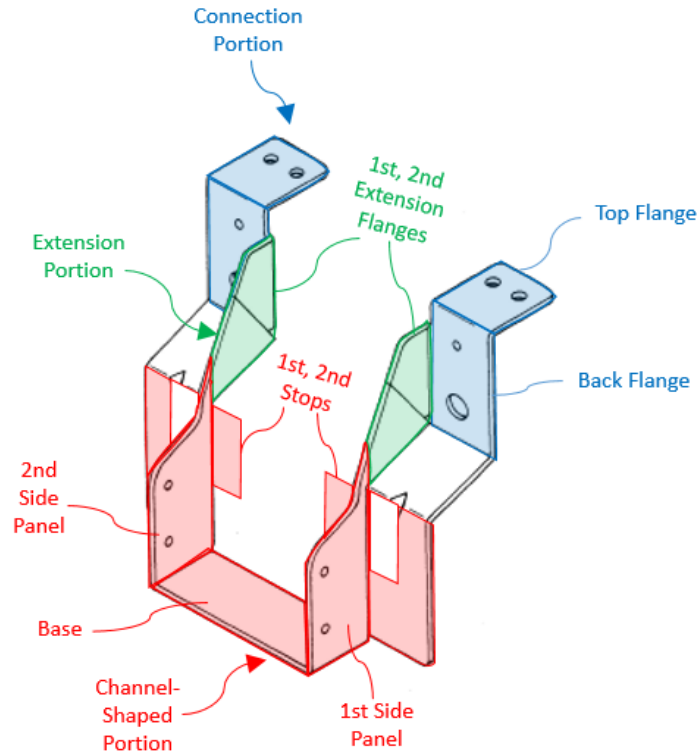
POSITA would have understood that bending back plate members 9 inward prevents a structural component installed thereon from extending past the back plate members, thereby acting as a stop.

135. In employing the teachings of Bundy's drywall space with Yamaguchi, a POSITA would have been motivated to bend Yamaguchi's outer flaps inward (entirely or a cutout thereof) to provide Yamaguchi's hanger 10 with a stop to engage the joist's end, thereby ensuring that joist's end does not impair drywall installed into the space defined between Yamaguchi's back flange and channel-shaped portion. This provides an obvious benefit of providing another support surface for Yamaguchi's hanger and protecting any material that may be located beneath the hanger. 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 (Yamaguchi's hanger) to obtain a predictable result of providing support at the end of a joist. Furthermore, a POSITA would have had a reasonable expectation of success in providing Yamaguchi's hanger with a stop to engage and space the joist's end from its back flange because doing so was well within the level of ordinary skill in the art. EX1007, 4:39-46; EX1008, ¶40. For example, a POSITA would have understood that the back panels extending outward from Yamaguchi's channel-shaped portion (or a cutout thereof) would be bent in the opposite direction to extend inward from Yamaguchi's

channel-shaped portion to form the stop, as explicitly taught in Bundy. EX1007, 4:39–46. How to implement this technique of folding back panels inward from the channel-shaped portion was well known in the prior art, for example, as taught by Gilb’941. EX1025, FIGs. 18–22, 7:61–67. Alternatively, a POSITA would have understood to cut a section of a side panel of the channel-shaped portion and fold the section inward to form a stop analogous to Bundy’s. How to implement this technique of cutting a section of side panel to form a stop was well known in the prior art as well, for example, as taught by Timony. EX1008, ¶40. Employing one or more of these techniques to form a stop in Yamaguchi’s hanger as taught by Bundy would have still allowed Yamaguchi’s channel-shaped portion to achieve its intended function of receiving and holding an end of a joist.



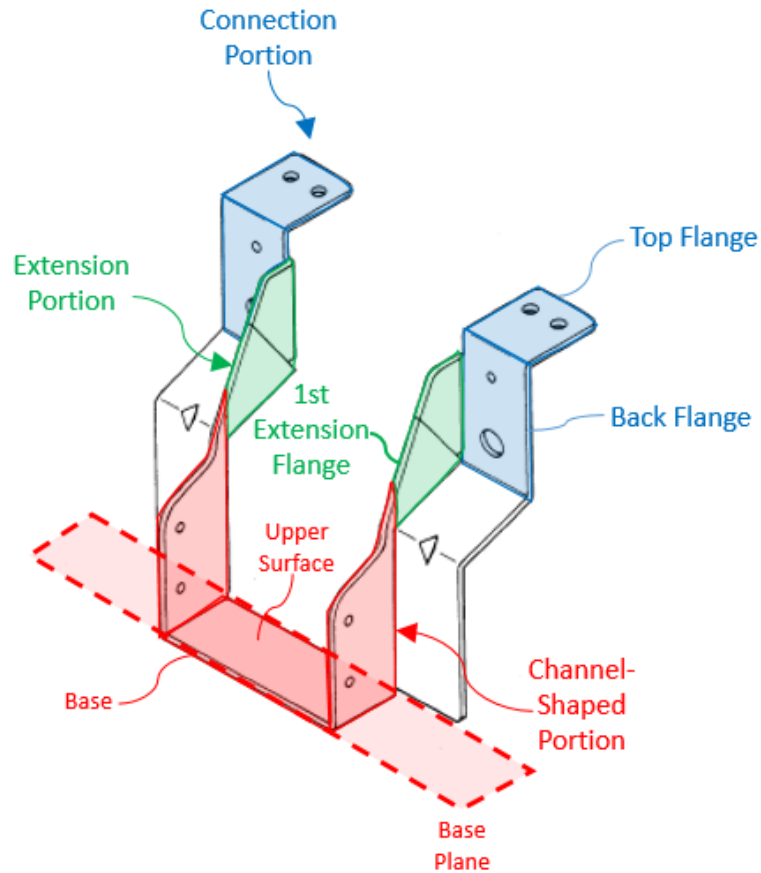
EX1041, 2, Perspective View (annotated, rendering).



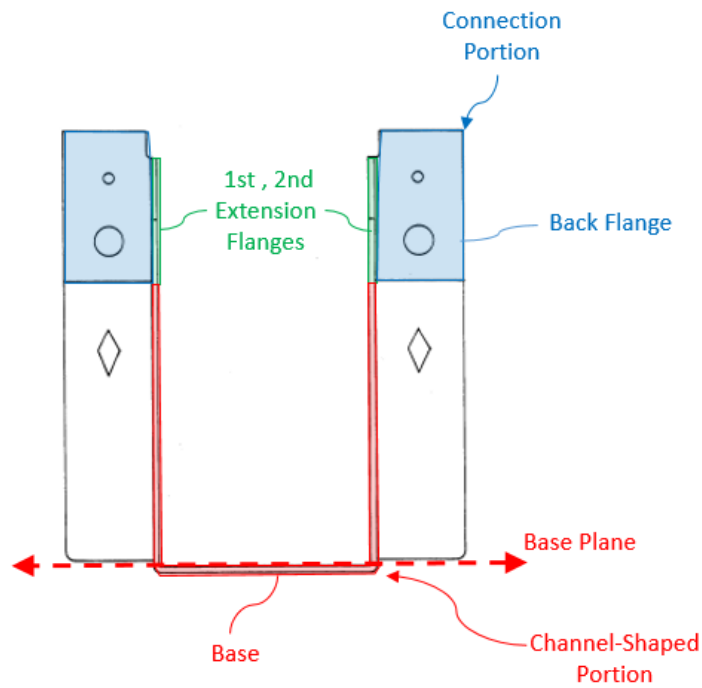
EX1041, 2, Perspective View (rendering)

2) Base to Receive End Portion of Structural Component

136. As discussed above for claims 42 and 95, Yamaguchi discloses the channel-shaped portion (red) including a base (annotated below) configured to receive and support the structural component's end portion. EX1041, 1–5. As illustrated below, Yamaguchi's base (red–horizontal) includes an upper surface lying in a horizontal base plane and arranged to engage the structural component by receiving the end portion thereof. EX1041, 1–5.



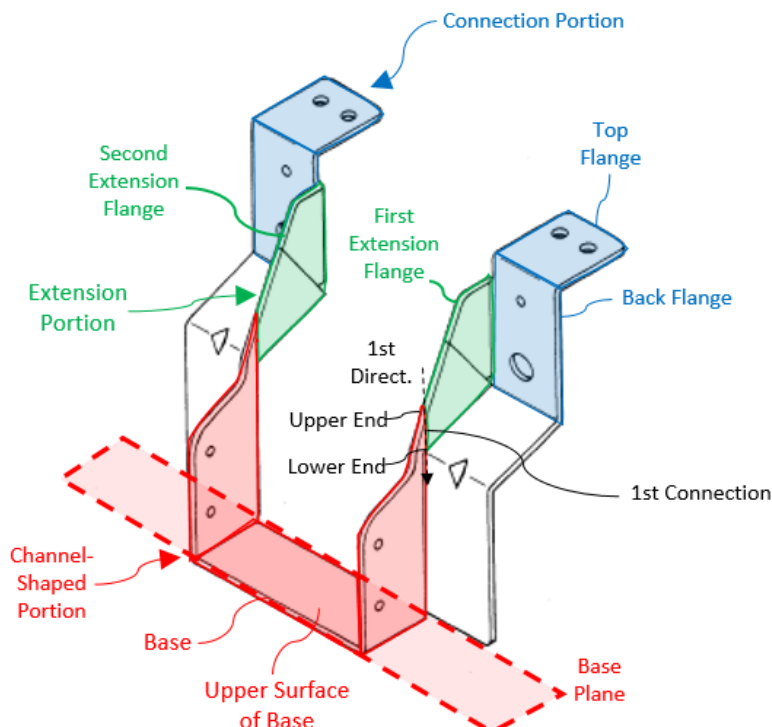
EX1041, 2, Perspective View (annotated).



EX1041, 2, Front View (annotated)

3) First Extension Flange Directly Attached to Channel-Shaped Portion

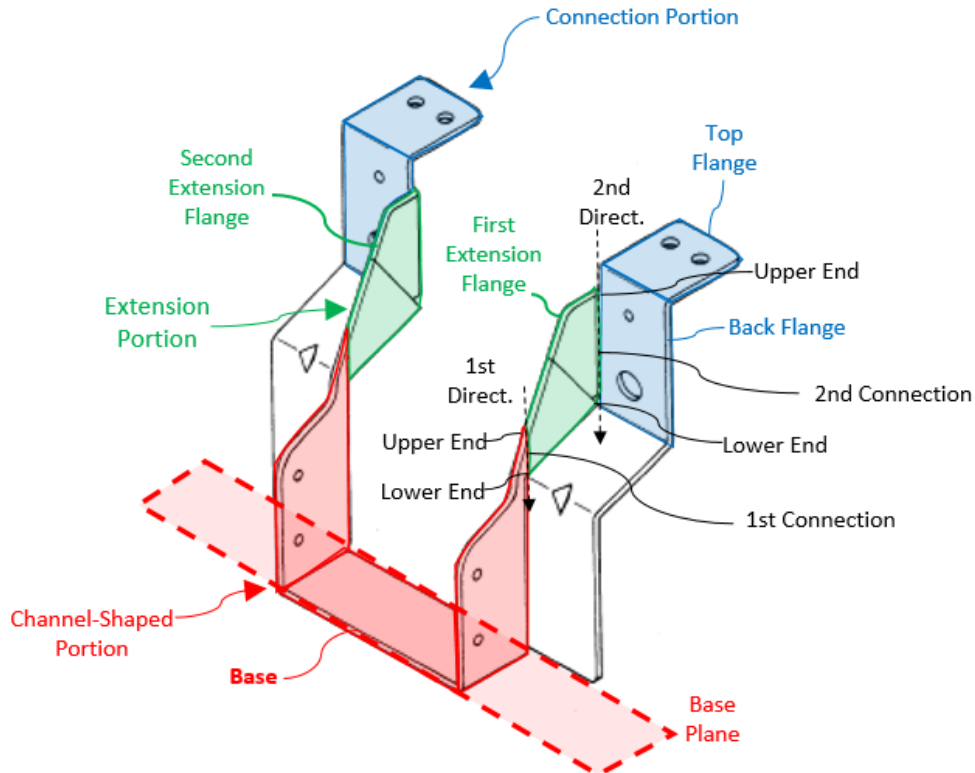
137. As discussed regarding claim 1, Yamaguchi discloses that the extension portion (green) includes a first extension flange (green–right vertical). Yamaguchi further discloses that the first extension flange (green–right vertical) is directly attached to the channel-shaped portion (red) by a first connection (annotated below), as there are no intervening parts therebetween. EX1041, 2–5. The first connection (annotated below) has an upper end and a lower end and extends from the upper end to the lower end in a first direction (i.e., vertically or “downwardly”) that is perpendicular to the horizontal base plane, shown below. EX1041, 2–5.



EX1041, 2, Perspective View (annotated).

4) First Extension Flange Directly Attached to Connection Portion

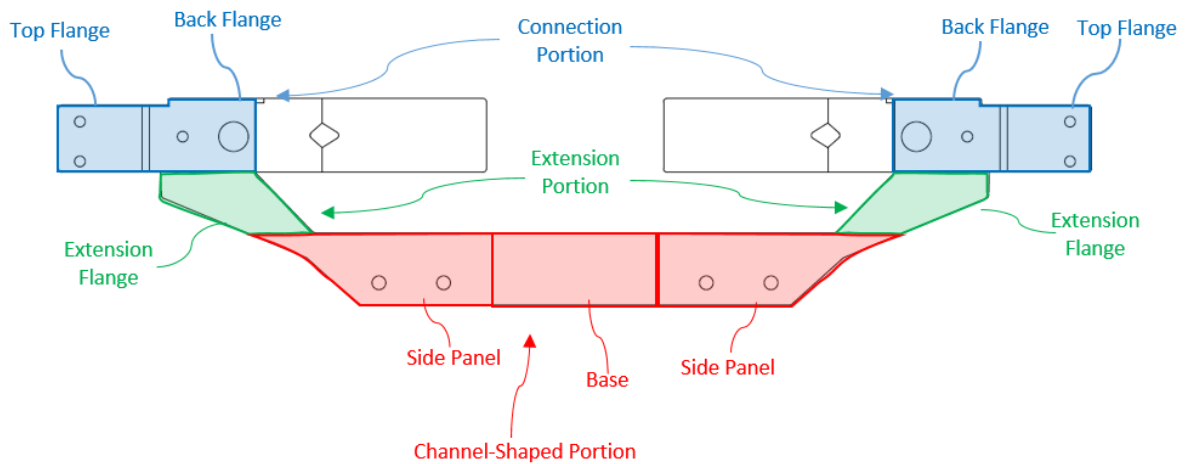
138. Yamaguchi discloses that the first extension flange (green—right vertical) is directly attached to the connection portion (blue) by a second connection (annotated below), shown below, as no intervening components are therebetween. EX1041, 2–5. The second connection (annotated below) has an upper end (annotated below) and a lower end (annotated below) and extends from the upper end to the lower end in a second direction (annotated below) that is parallel to the first direction (i.e., vertical) and perpendicular to the horizontal base plane. EX1041, 2–5.



EX1041, Perspective View (annotated)

5) First Extension Flange and Channel-Shaped Portion as One Piece

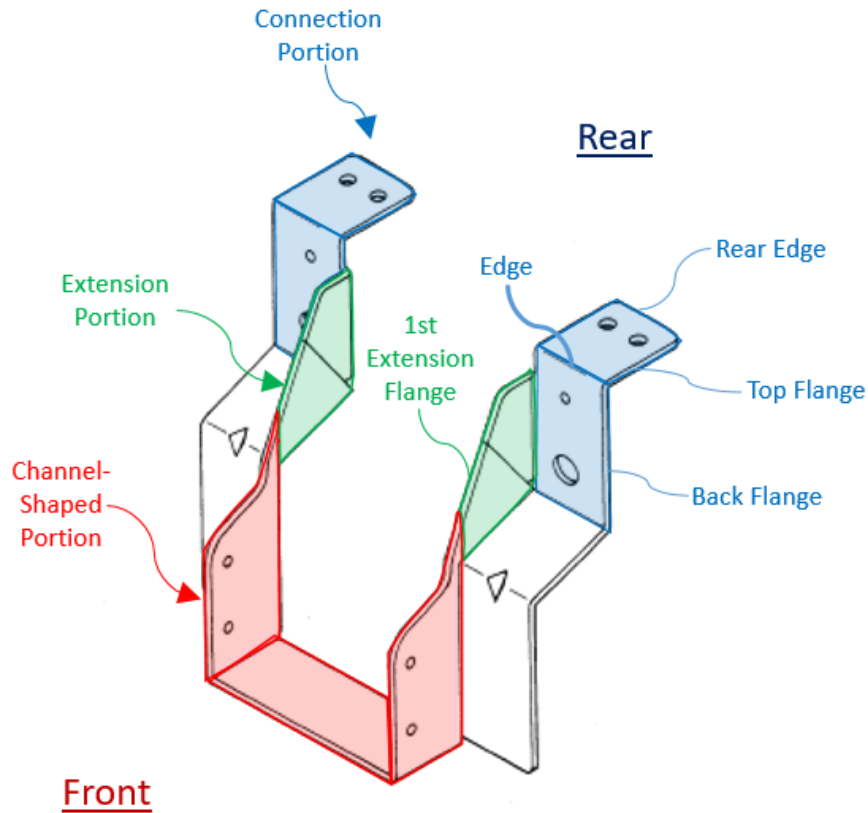
139. As discussed for claims 22-27 and 74-79, employing the teachings of Adams's manufacturing process with Yamaguchi-Bundy would have rendered obvious Yamaguchi-Bundy's extension portion (green), including its first extension flange (green—right vertical), and channel-shaped portion (red) being formed as one-piece of sheet metal. EX1040, 3:55–57, 4:2–6.



Rendering of Yamaguchi's Hanger

6) Top Flange's Rear Edge

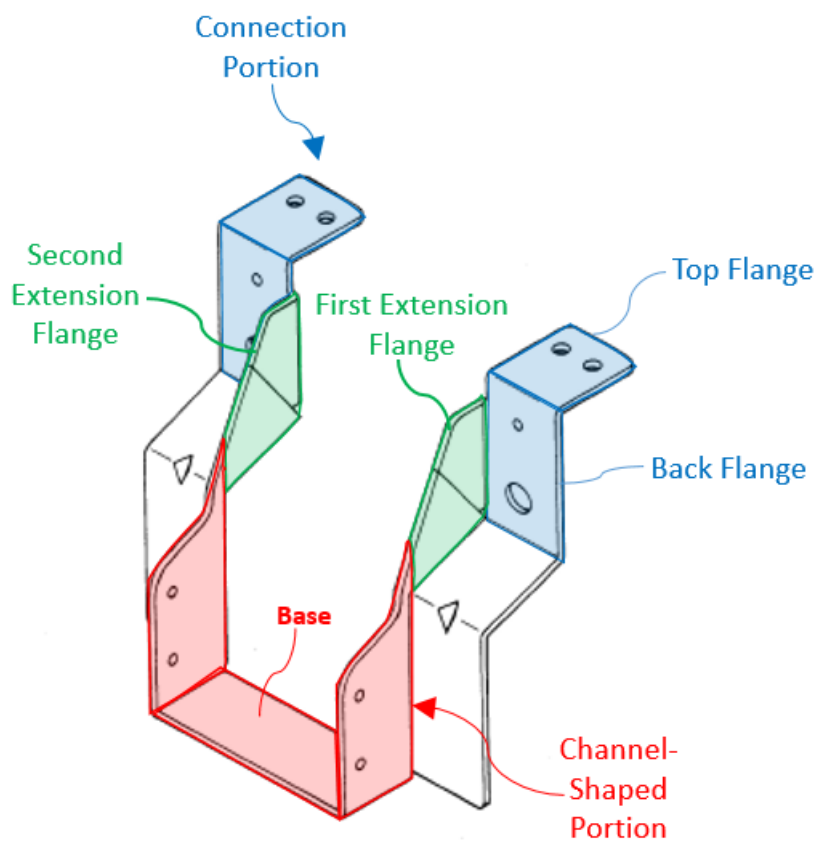
140. Yamaguchi discloses that the top flange (blue—horizontal) includes a rear edge (annotated below) located rearwardly of the edge of the top flange (annotated below) from which the back flange (blue—vertical) extends, the rear edge (annotated below) located rearwardly of the back flange. EX1041, 2-5.



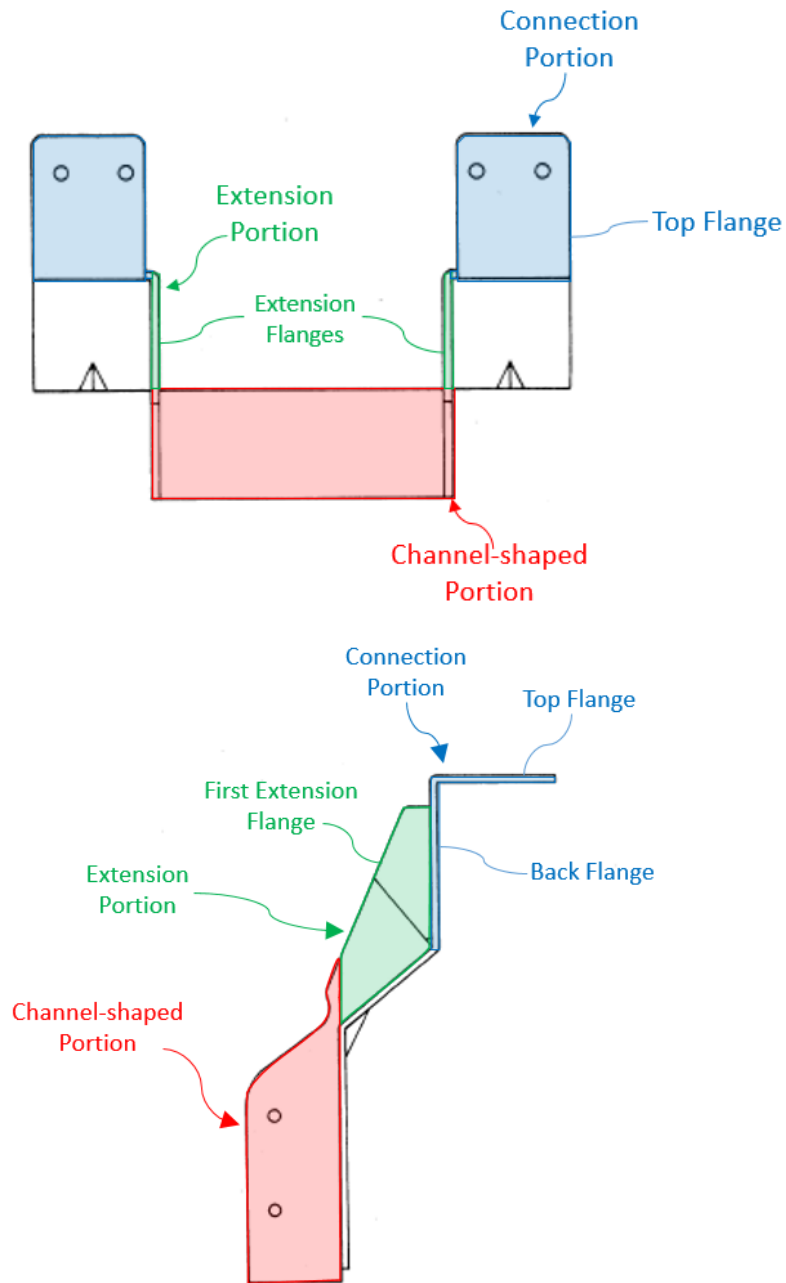
EX1041, 2, Perspective View (annotated).

7) Channel-shaped Portion Spaced Apart From Connection Portion

141. Yamaguchi discloses the channel-shaped portion (red) and the connection portion (blue) are spaced apart from one another by the distance defined by the extension portion (green) extending therebetween – long enough to allow two layers of 5/8” drywall to be inserted, as taught by Bundy. EX1041, 2–5.



EX1041, 2, Perspective View (annotated).



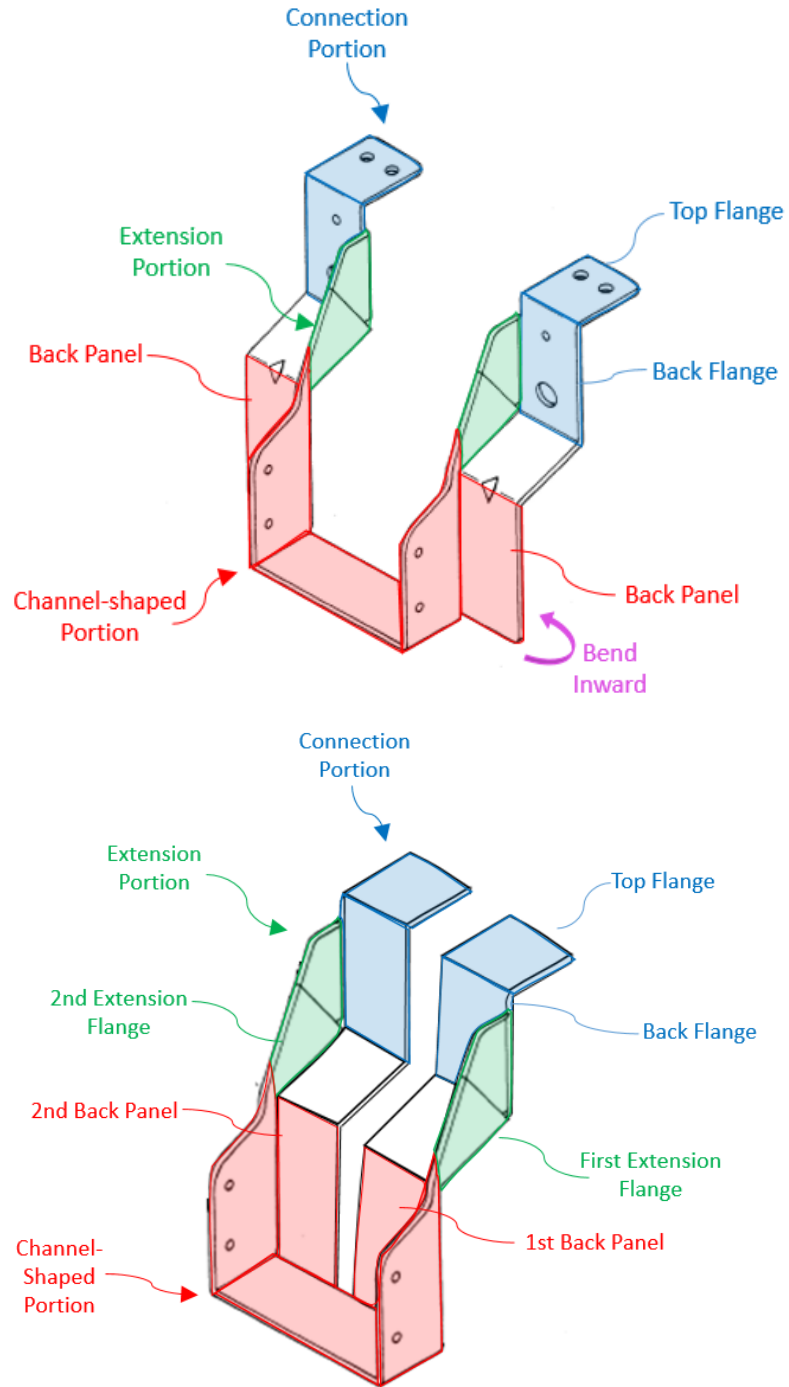
EX1041, 3-4, Plan, Side Views (annotated).

142. Accordingly, in my opinion, Yamaguchi in view of Bundy and Bundy renders obvious claims 50 and 103.

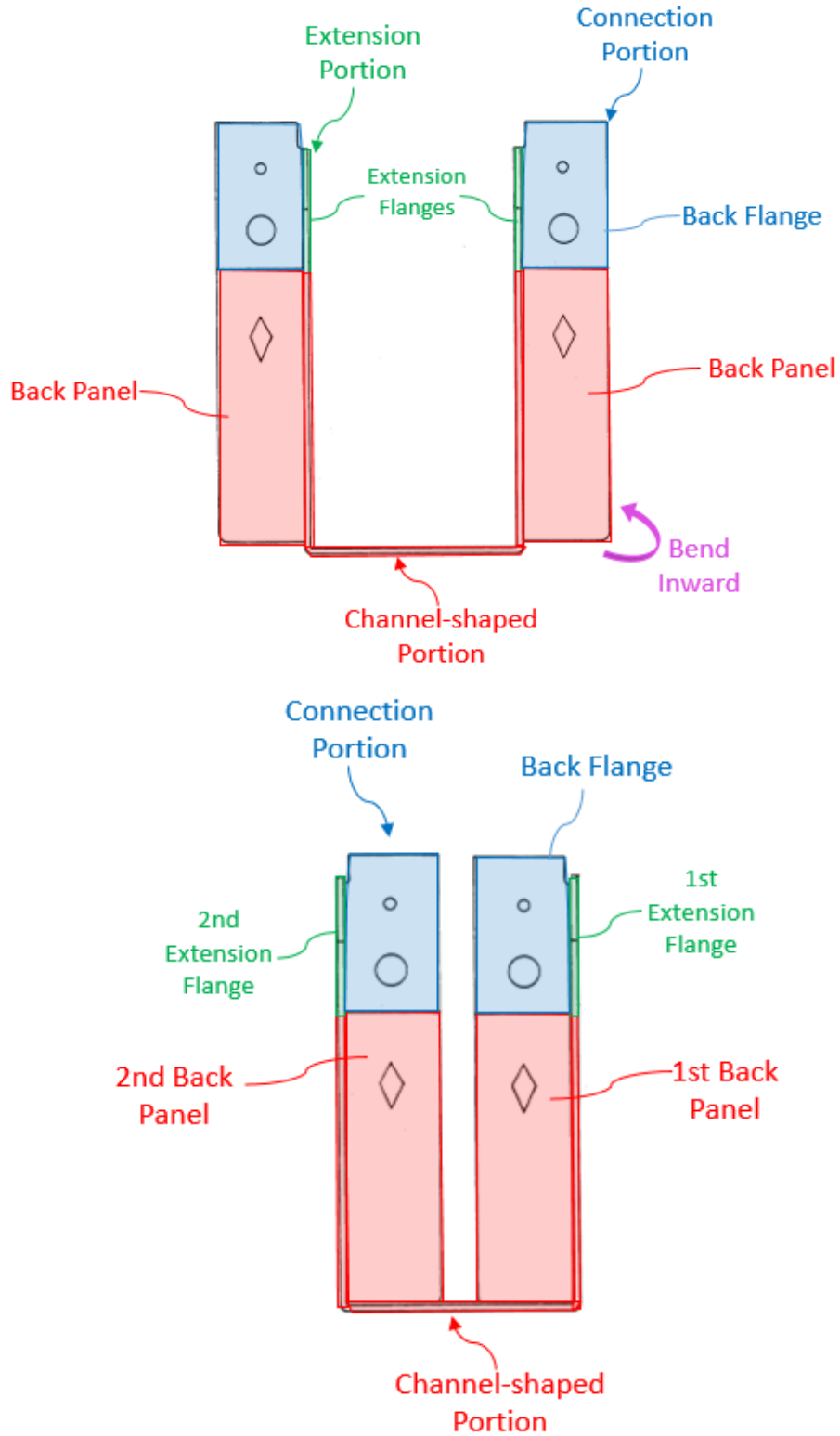
E. Claims 51 and 104

1) Stop Comprising First and Second Back Panels

143. Bundy discloses a stop in the form of first and second back panels (inward-bent back plate members 9) extending toward each other. EX1007, 4:39-46. Accordingly, combining the teachings of Bundy's inward-bent back plate members 9 with Yamaguchi's hanger as discussed for claims 50 and 103 would have resulted in first and second back panels extending toward each other. EX1007, 4:39-46 ("Although the back plate members 9 are shown as splayed outward in opposite direction, **they could both be bent inward to face each other between the first and second side members 11.**").



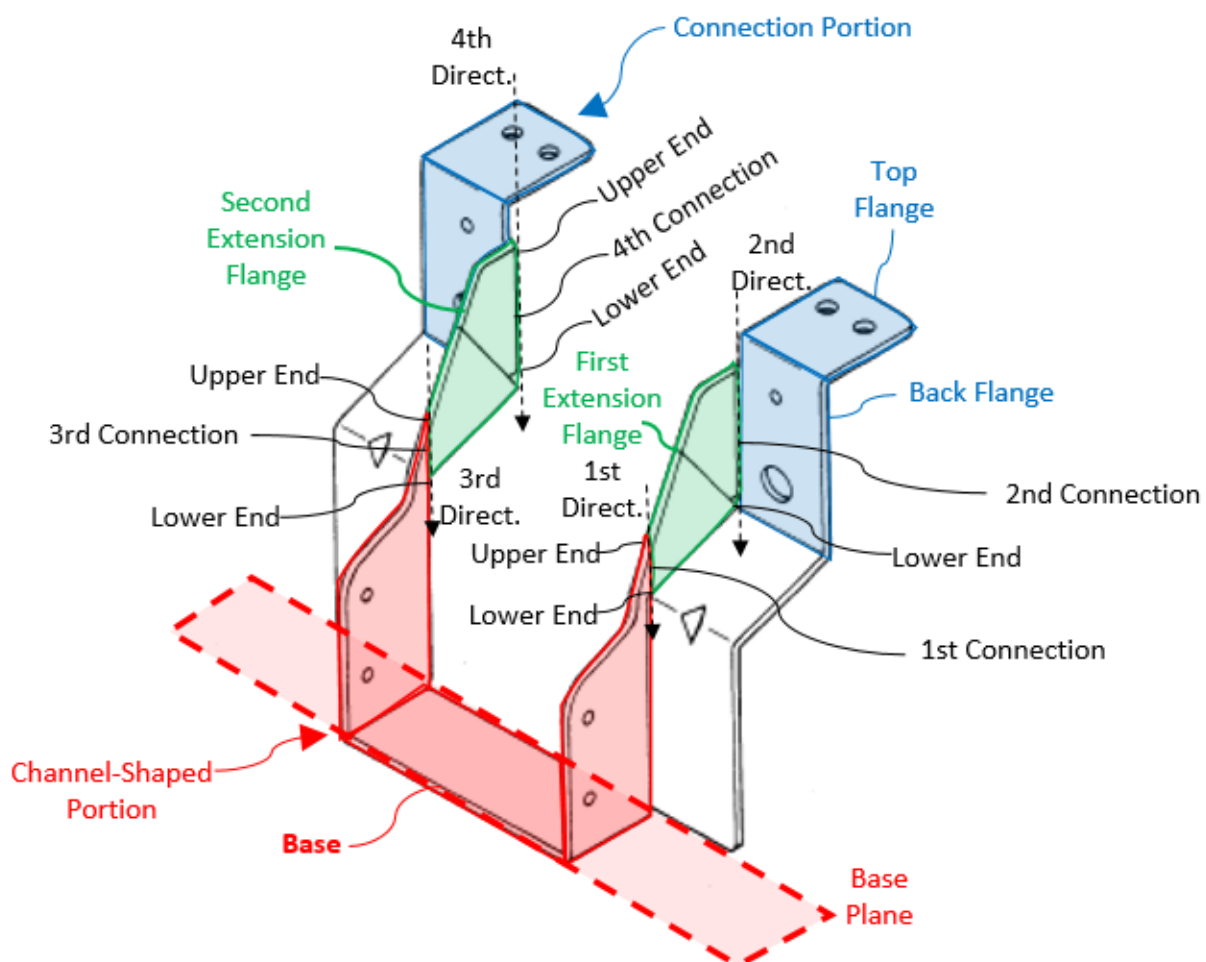
EX1041, 2, Perspective View (annotated, rendering).



EX1041, 2, Front View (annotated, rendering).

2) Second Extension Flange

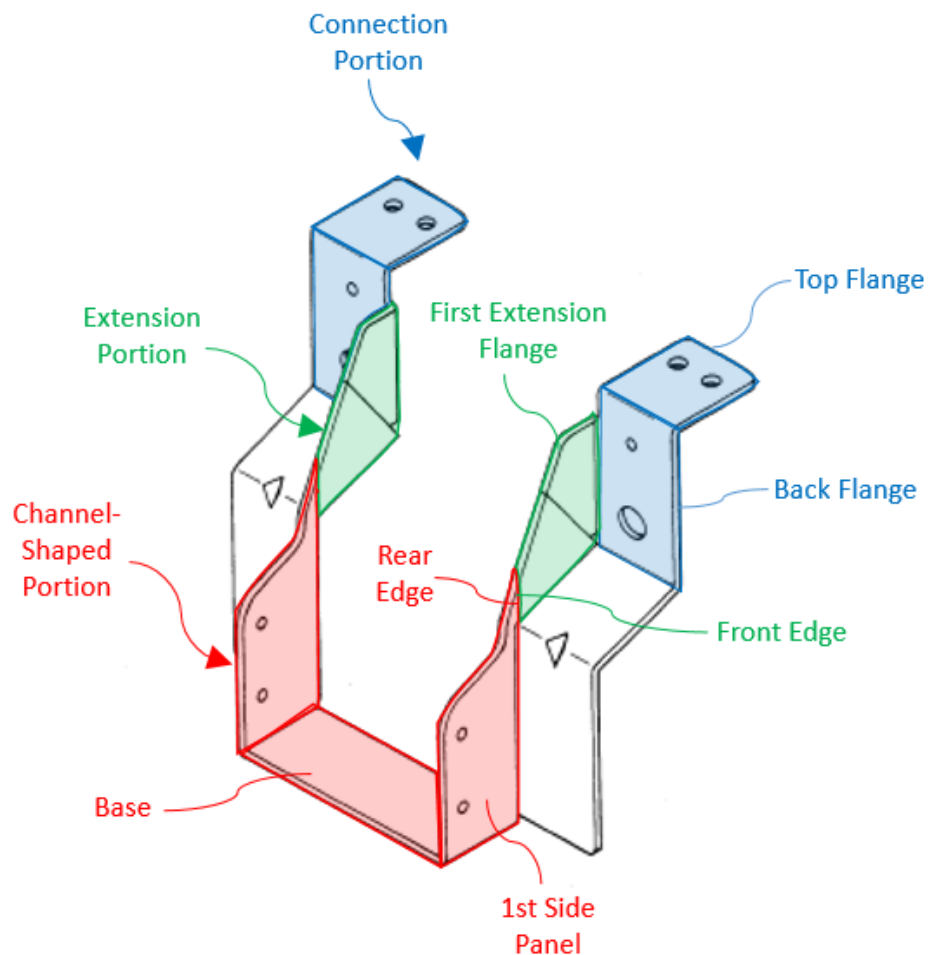
144. As discussed for claims 41 and 94, Yamaguchi discloses a second extension flange (green—left vertical) extending from the connection portion (blue) to the channel-shaped portion (red). The second extension flange (green—left vertical) is directly attached to the channel-shaped portion (red) by a third connection (annotated below) and to the connection portion (blue) by a fourth connection (annotated below) as no intervening components are therebetween. EX1041, 2–5. The third and fourth connections (annotated below) each have an upper end and a lower end and extending from the upper end to the lower end in a third direction and fourth direction, respectively, as shown below. EX1041, 2–5. As the first and second extension flanges are symmetrical, Yamaguchi discloses the third and fourth directions being parallel to the first and second directions (i.e., vertical) and being perpendicular to the base plane, shown below. EX1041, 1–5.



EX1041, 2, Perspective View (annotated).

3) First Side Panel

145. As discussed for claims 42 and 95, Yamaguchi discloses the channel-shaped portion (red) including a first side panel (red–right vertical) extending upward from the base (red–horizontal). EX1041, 2–5. Yamaguchi discloses a front edge (annotated below) of the first extension flange (green–right vertical) abutting a rear edge (annotated below) of the first side panel, as they join with no intervening structures therebetween. EX1041, 2–5.

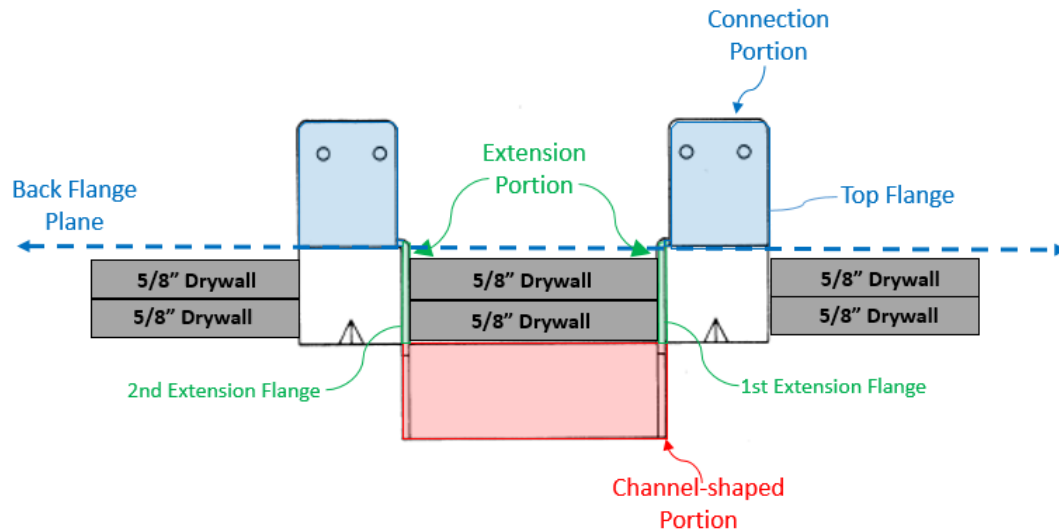


EX1041, 2, Perspective View (annotated).

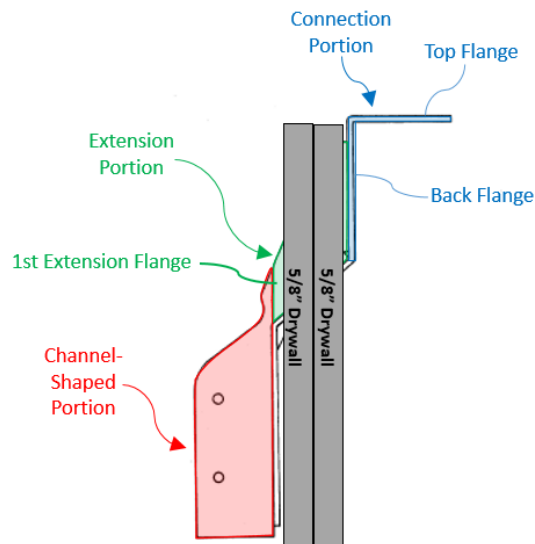
4) Drywall Space

146. Employing the teachings of Bundy's drywall space with Yamaguchi's hanger renders obvious a drywall space sized and shaped to receive the two layers of 5/8-inch-thick drywall therein. EX1007, 5:10–22. As the channel-shaped portion (red) and back flange plane (defined by the back flange) of Yamaguchi-Bundy define the drywall space's size and shape, they bound the drywall space. EX1041, 2–5; EX1007, 5:10-22. Because the first and second extension flanges of

Yamaguchi-Bundy further define the drywall space's size and shape, they also bound the drywall space.



EX1041, 3, Plan View (annotated).



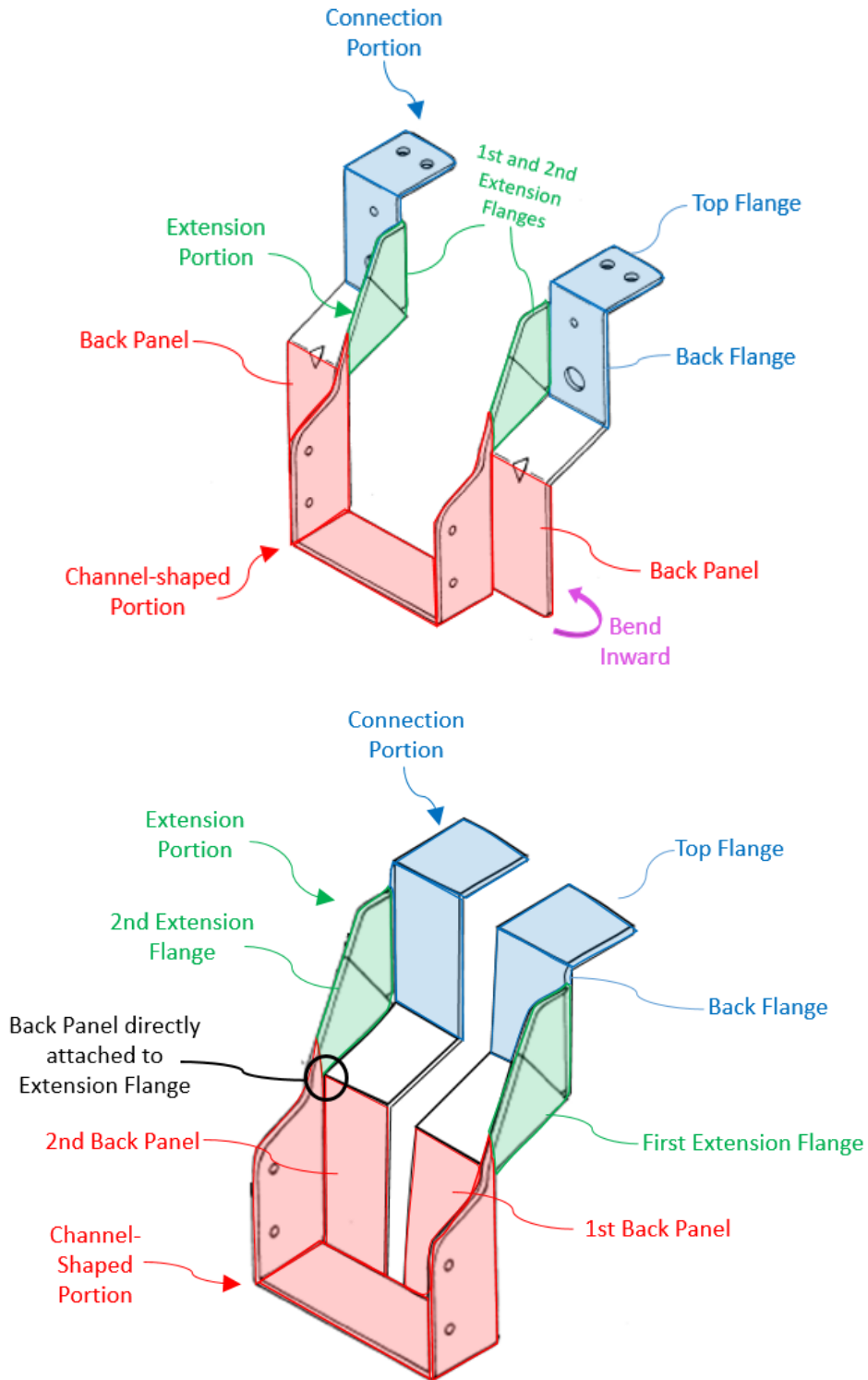
EX1041, 4, Side View (annotated).

147. Accordingly, in my opinion, Yamaguchi in view of Bundy and Adams renders obvious claims 51 and 104.

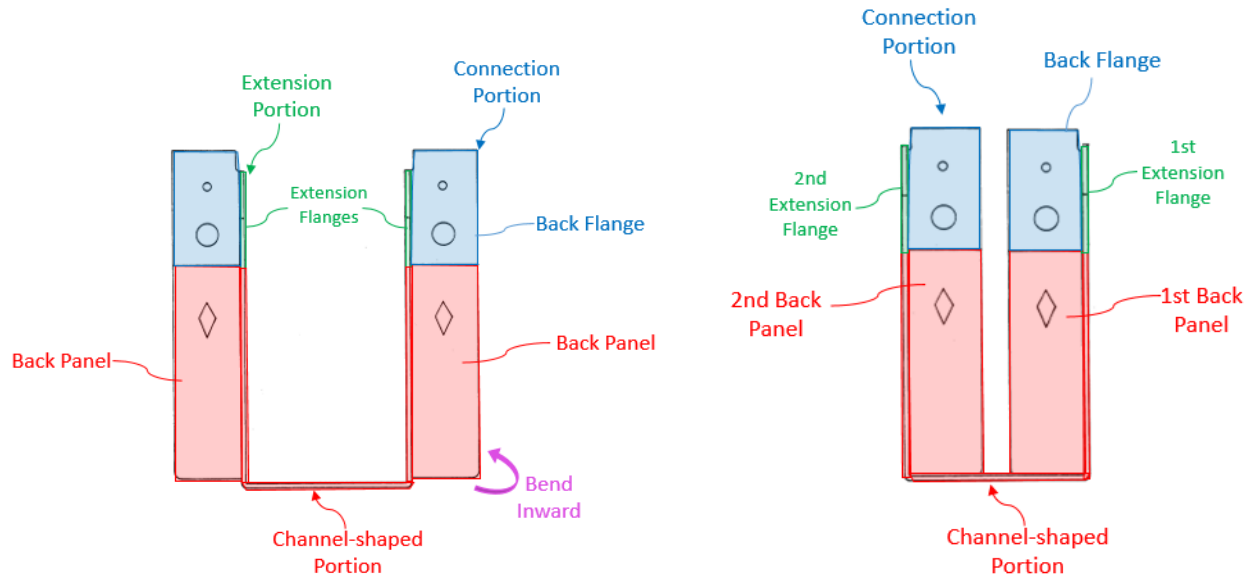
F. Claims 52 and 105

**1) First and Second Back Panels Directly Attached to
First and Second Extension Flanges**

148. As shown by the annotations below, Yamaguchi discloses that each back panel (red, parallel with back flange) is directly attached (no intervening components) to a respective extension flange (vertical elements in green), such as at the lower portion of the extension flange (green) at the fold line where the back panel (blue-vertical) is bent inwards as taught by Bundy (circled below), from which the bottom of the extension flange (green) extends to the connection portion (blue).



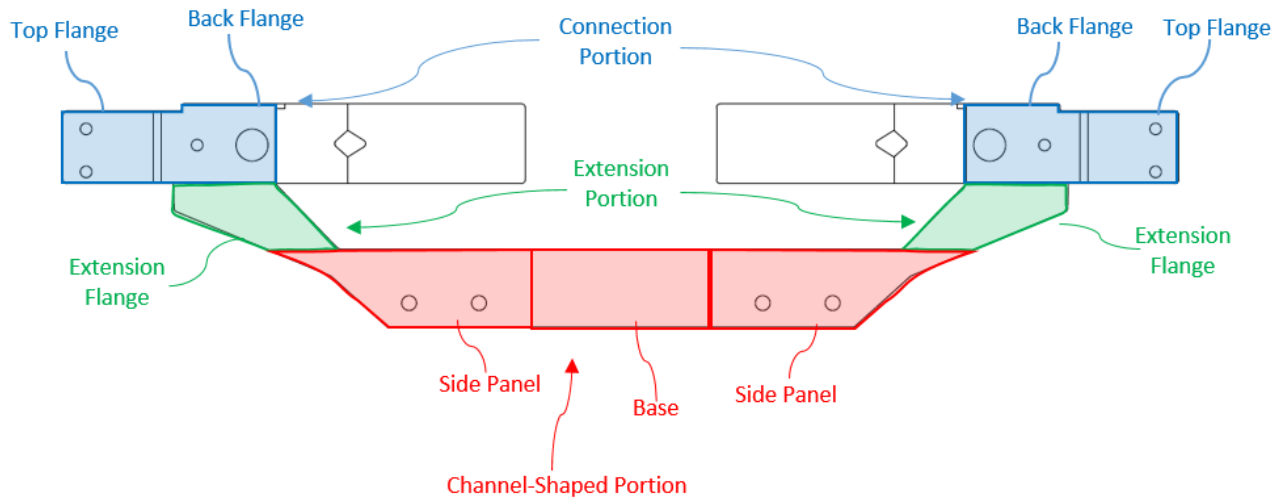
EX1041, 2, Perspective View (annotated, rendering).



EX1041, 2, Front View (annotated, rendering).

2) One-piece of Sheet Metal

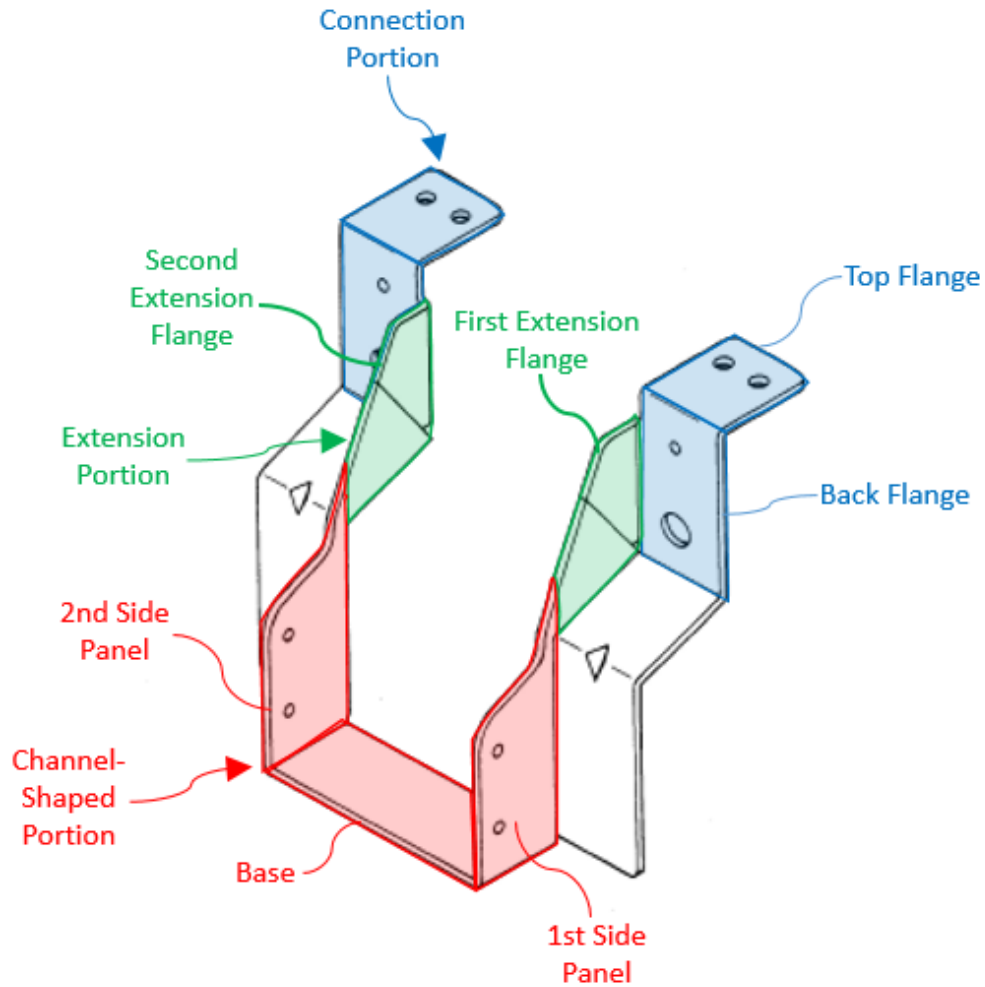
149. As discussed for claims 45 and 98, employing the teachings of Adams's manufacturing process with Yamaguchi-Bundy would have rendered obvious Yamaguchi-Bundy's channel-shaped portion, connection portion, and extension portion being formed as one-piece of sheet metal. EX1040, 3:55–57, 4:2–36, 6:3–22.



Rendering of Yamaguchi's Hanger

3) Second Side Panel

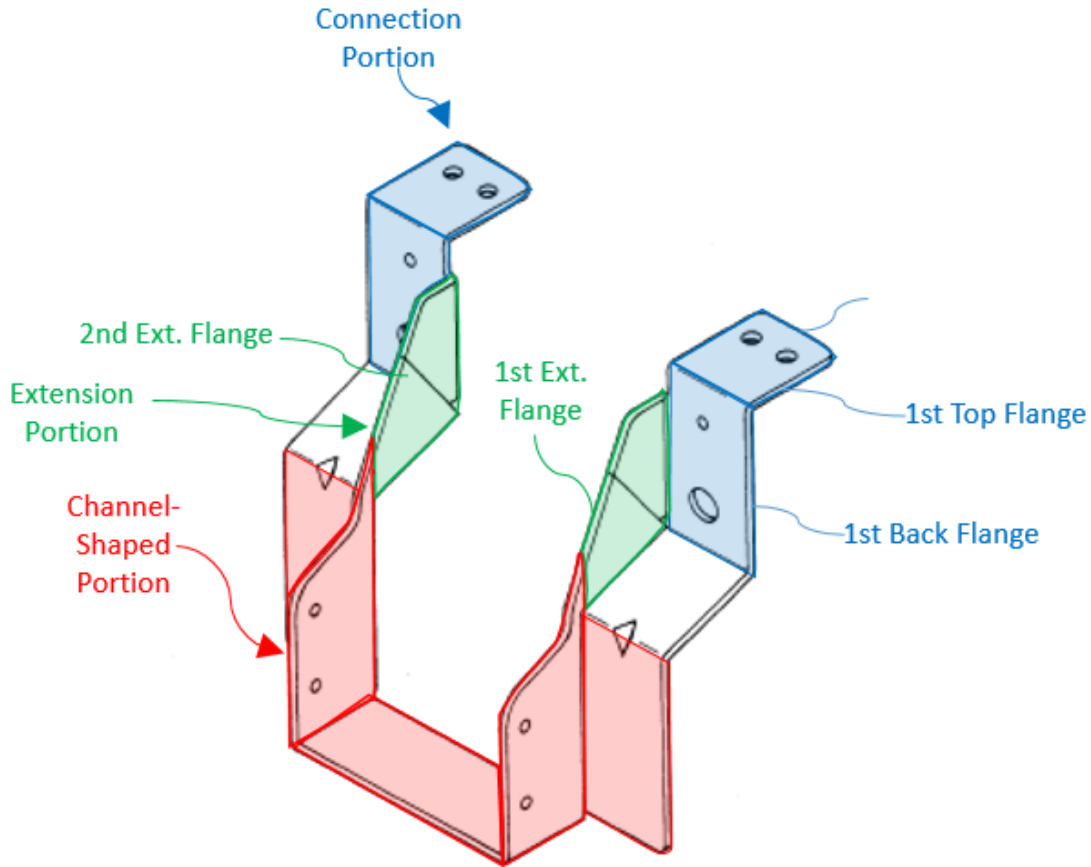
150. As discussed for claims 42 and 95, Yamaguchi discloses the channel-shaped portion (red) including first and second side panels (annotated below) extending upward (i.e., vertically) from the base (annotated below), wherein the first and second extension flanges (green—vertical) are parallel to each other and the first and second side panels (red—vertical) are parallel to each other. EX1041, 2–5.



EX1041, 2, Perspective View (annotated).

4) First Back and Top Flanges

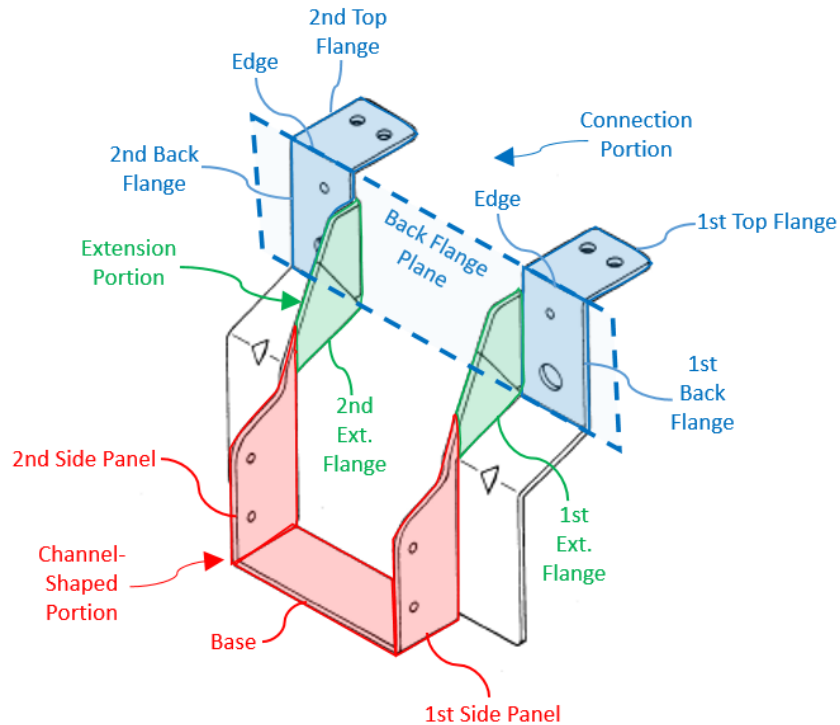
151. For the reasons discussed for claims 39 and 92, Yamaguchi discloses that the back flange (blue-vertical) is a first back flange (blue-right vertical) and the top flange (blue) is a first top flange (blue-right horizontal). EX1041, 2-5.



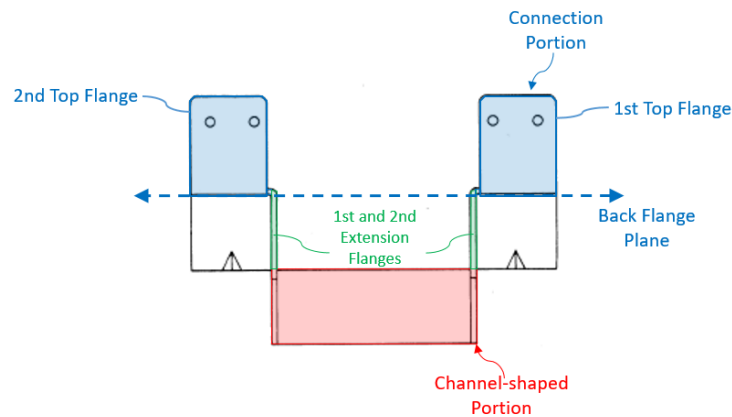
EX1041, Perspective View (annotated).

5) Second Back Flange and Second Top Flange

152. For the reasons discussed for claims 39 and 92, when mounted on a frame wall as taught by Bundy, Yamaguchi-Bundy discloses that 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 and 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. EX1041, 2–5.



EX1041, 2, Perspective View (annotated).

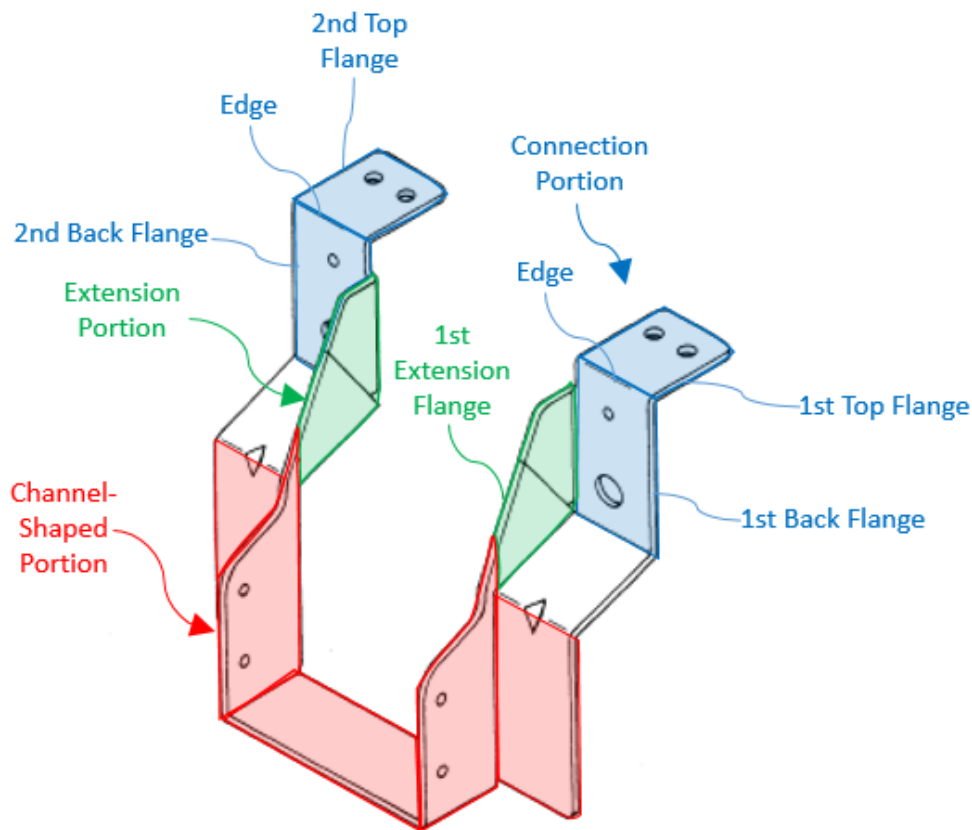


EX1041, 3, Plan View (annotated).

6) Extension Flanges Extending From Back Flanges to Channel-Shaped Portion

153. As discussed for claims 1.3.A, 39, 41, and 94, Yamaguchi discloses that the first extension flange (green–right vertical) extends from the first back

flange (blue–right vertical) to the channel-shaped portion (red) and that the second extension flange (green–left vertical) extends from the second back flange (blue–left horizontal) to the channel-shaped portion (red). EX1041, 2–5.



EX1041, 2, Perspective View (annotated).

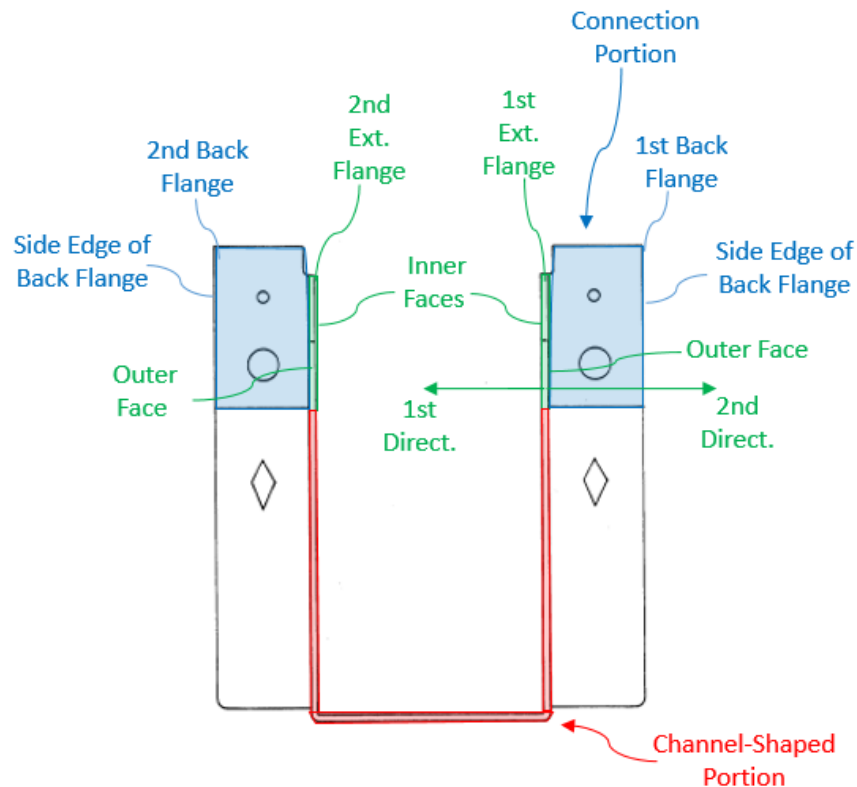
7) Inner and Outer Faces of Extension Flanges and Side Edge of Back Flanges

154. A POSITA would have understood that Yamaguchi's hanger is constructed of sheet metal, in view of Bundy. *See* EX1007, 4:46–49. Yamaguchi discloses that the first and second extension flanges (green–vertical) each have a

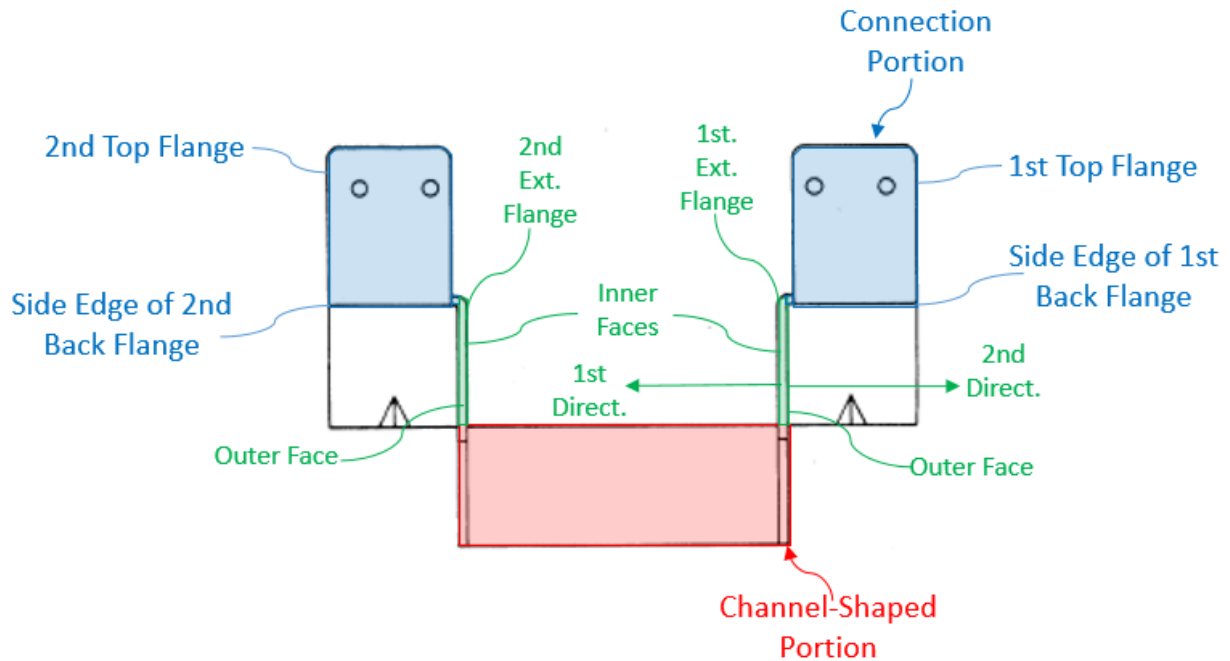
thickness and thus includes an inner face and an outer face (annotated below).

EX1041, 2–5. Yamaguchi discloses the inner faces of the first and second extension flanges face one another—the inner face of the first extension flange (right) facing in a first direction (annotated below) toward the inner face of the second extension flange (left), and the outer face of the first extension flange facing in a second direction (annotated below) that is opposite the first direction.

EX1041, 2–5.



EX1041, 2, Front View (annotated).



EX1041, 3, Plan View (annotated).

155. Yamaguchi further discloses the first back flange (blue–right vertical) having a side edge (annotated above) disposed outward, in the second direction, of the outer face of the first extension flange (green–right vertical), as shown above.

EX1041, 2–5. Yamaguchi further discloses the second back flange (blue–right vertical) having a side edge (annotated above) disposed outward, in the first direction, of the outer face of the second extension flange (green–left vertical).

EX1041, 2–5.

156. Accordingly, in my opinion, Yamaguchi in view of Bundy and Adams renders obvious claims 52 and 105.

XII. CLAIMS 1, 22–27, 39–45, 50–53, 74–79, 92–98, AND 103–105 WOULD HAVE BEEN OBVIOUS OVER CULLEN IN VIEW OF BUNDY.

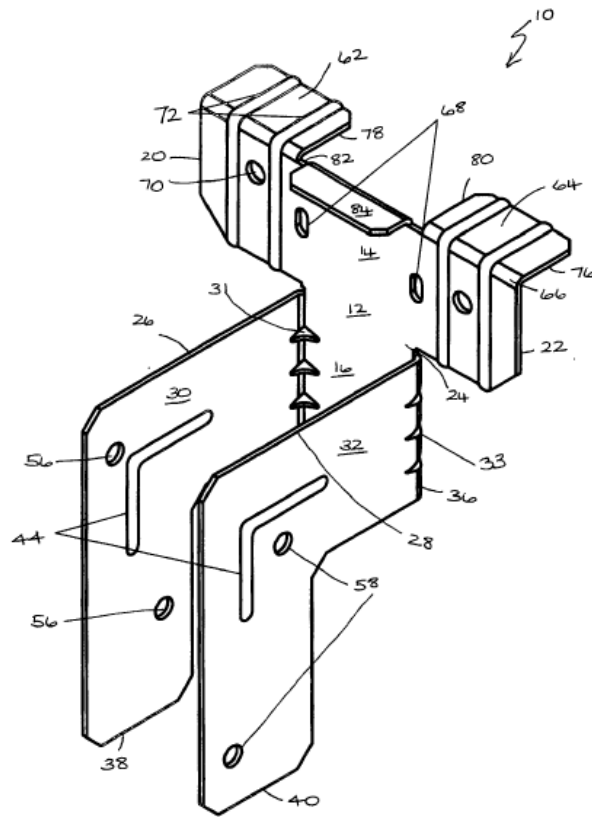
157. In my opinion, Cullen, as modified in view of Bundy, renders obvious claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105 for the following reasons.

158. Cullen discloses each and every structural element listed in independent claims 1 and 53 but does not explicitly disclose that the space defined between its channel-shaped portion and back plate is sized large enough to receive two layers of 5/8-inch-thick drywall therein. However, Bundy discloses an analogous firewall hanger that receives two layers of 5/8-inch-thick drywall between its channel-shaped portion and the wall frame. A POSITA would have sought to combine the teachings of Bundy with Cullen’s hanger to define a space large enough for receiving two layers of 5/8-inch-thick drywall with a reasonable expectation of success, as explained below.

A. Motivation to Modify Cullen Based on the Teachings of Bundy.

159. Cullen and Bundy are both directed to joist hangers. As shown below, Cullen’s hanger 10 includes a channel-shaped portion (which includes legs 38, 40 with an optional seat) that is separated from a connection portion (back plate 12) via an extension flange (side walls 30, 32). A POSITA would have understood that Cullen’s hanger 10 defines a space between its back plate 12 and channel-shaped portion (which includes legs 38, 40 and an optional seat) corresponding to the

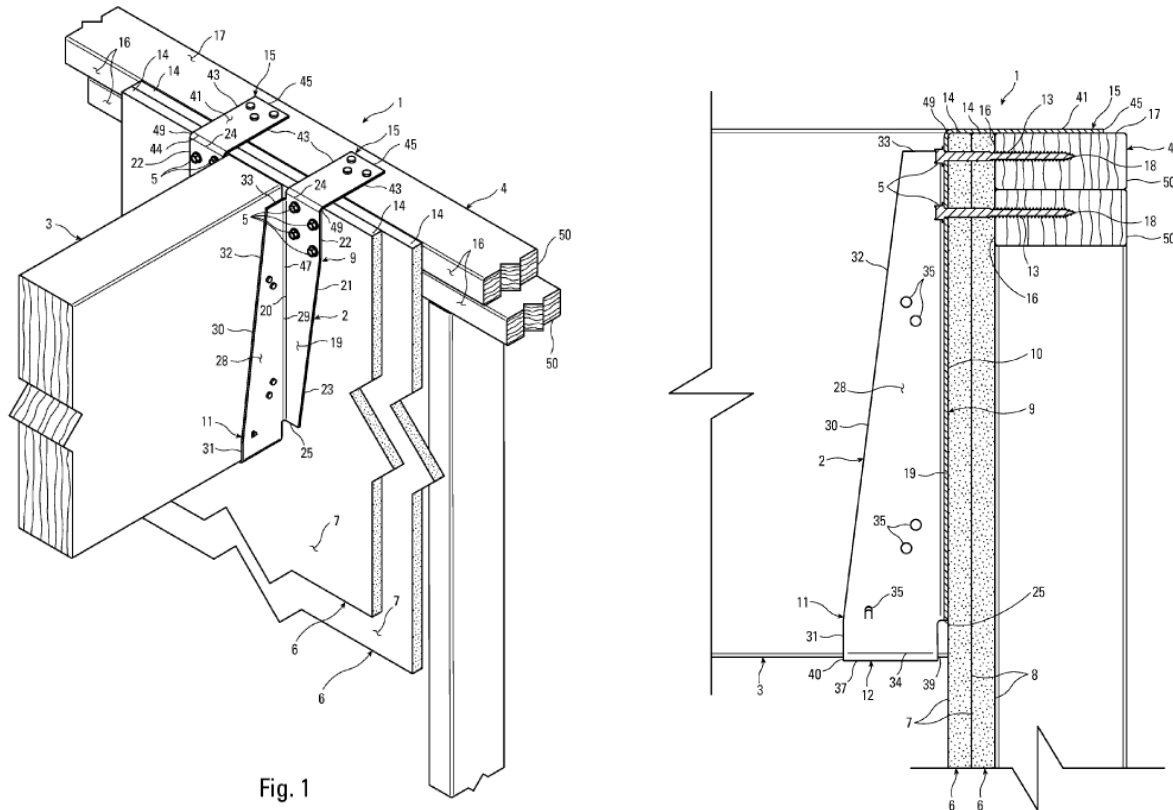
length of its extension portion (sidewalls 30, 32). Cullen does not explicitly disclose the extension portion spacing its legs 38, 40 from a plane defined by a surface of back plate 12 by a distance sized large enough to permit the two layers of 5/8-inch-thick drywall of the fire separation wall to be received between the channel-shaped portion and the back flange plane.



EX1039, FIG. 1.

160. As I explained above in §XI.A., Bundy discloses sizing an extension portion of an analogous hanger to receive two 5/8"-thick-layers of drywall between its channel-shaped portion (seat member 12) and the front face 6 of the wall's support member 4. EX1007, 5:16-18. In view of Bundy and the fact that two 5/8"

thick layers of drywall are commonly used for a fire separation wall, a POSITA would have understood that the extension portion of a joist hanger can be sized optimally to define a two 5/8"-thick-layer drywall space between the channel-shaped portion and a wall.



EX1007, FIGs. 1, 3.

161. While Cullen describes applying its hanger in a “decking” application, as one example, Cullen further describes that its hanger 10 is intended broadly for “timber building construction.” EX1039, 1:4, 5:7–8. Recognizing that Cullen’s hanger is used for “timber building construction,” a POSITA would have sought to use Cullen’s hanger 10 to secure a joist to a top plate of a wooden frame wall—a

common application for a joist hanger in timber building construction settings. Furthermore, there is often a space between the end of a joist and the wooden frame wall for receiving drywall, as evidenced by Bundy. EX1007, 2:10–24, 5:10–20. Bundy teaches receiving drywall between a hanger’s channel-shaped portion and the front surface of a top plate to shield a frame wall, and discloses advantages for accommodating two layers of 5/8” drywall between a wall frame and a structural member held by a hanger for fire resistance in a fire separation wall, as I discussed above in §XI.A. EX1007, 2:10–24, 5:10–20. Accordingly, a POSITA would have been motivated to receive drywall between Cullen’s back plate and legs when using Cullen’s hanger for “timber building construction,” to provide a shielded fire resistant wooden frame wall, while also enhancing the wall for other applications, such as sounding proofing or improved aesthetic appeal. *See* EX1007, 2:10–24, 5:10–20.

162. In combining the teachings of Bundy’s drywall space with Cullen, a POSITA would have optimized the size of the spacing between Cullen’s back plate and legs (i.e., the length of its sidewalls) to accommodate two layers of 5/8” thick drywall according to the size preference described by Bundy for optimal fire protection and wall integrity. EX1007, 5:10-22. This modification to Cullen would have been nothing more than applying a known technique (Bundy’s spacing a hanger seat from a wall frame by a distance sufficient to accommodate two 5/8”

drywall sheets for fire resistance) to a similar device (Cullen's hanger having sidewalls of indeterminate length) to obtain the predictable result of a firewall hanger having sidewalls long enough to space a channel-shaped portion from a wall frame for receiving fire-resistant drywall therebetween, thereby "protect[ing] the structural members of a building." EX1007, 5:18-20.

163. A POSITA would have had an expectation of success in modifying Cullen's hanger 10 to include a space large enough to receive two layers of 5/8"-thick drywall between its back plate 12 and legs 38, 40 because doing so would still allow Cullen's hanger to perform its intended function of securing a joist to a wall. EX1039, 5:7-8. Recognizing that Cullen's and Bundy's hangers are constructed from sheet metal blanks, a POSITA would have understood how to modify the size of Cullen's legs 38, 40 to accommodate two layers of 5/8" drywall while still allowing Cullen's hanger to secure a joist's end to a frame wall. EX1007, 4:47-53; EX1039, 3:1-11.

164. A POSITA would have also understood to adjust the length of Cullen's location tab 84 to extend across two layers of 5/8" drywall to ensure that the joist's top surface is "coplanar" with the top plate's upper surface. EX1039, 12:20-13:5. Specifically, a POSITA would have recognized that the length of location tab 84 would need to be longer than the drywall space defined by sidewalls 30, 32. Cullen describes forming the hanger from a metal sheet and

folding location tab 84 into position. *See* EX1039, 5:25–28. In applying this manufacturing process disclosed in Cullen, a POSITA would have understood to cut a longer extension from fold line 116 shown in Figure 4 to provide location tab 84 adequate length to extend across two layers of 5/8” drywall. Doing so would have been well within the level of ordinary skill in the art. Therefore, Cullen’s hanger will continue to have the same fundamental principle of operation and the combination with Bundy will not render Cullen unsatisfactory for its intended purpose.

165. Accordingly, in my opinion, a POSITA would have been motivated to combine the teachings of Bundy’s two 5/8” drywall space with Cullen with a reasonable expectation of success.

B. Independent Claim 1

[1.P] “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,”

166. For the reasons that I discussed above in § XI.B.[1.P], it is my understanding that the preamble recites an intended use of the claimed invention, and therefore, is satisfied by any prior art structure capable of performing the intended use.

167. To the extent that the preamble is limiting, employing the teachings of Bundy with Cullen renders obvious a hanger for connecting a structural component

to a wall adapted to have two layers of 5/8-inch-thick drywall mounted thereon to form a fire separation wall. Cullen explicitly discloses using hanger 10 for timber building construction, but not explicitly for a wall adapted to have two-layers of 5/8-inch-thick drywall mounted thereon. EX1039, 3:1–11. As discussed above in § XI.A., a POSITA would have understood that Cullen’s hanger would be applicable to a wall covered with two such layers of drywall for fire resistance, as taught by Bundy, and that Cullen’s sidewalls would be sized to accommodate two such layers of drywall between its back flanges and channel-shaped portion. EX1007, 2:37-41. A POSITA would have also understood that Cullen’s hanger is configured to secure to a top plate of a frame wall by connecting Cullen’s hanger directly to the top plate. Accordingly, it would have been obvious to a POSITA to use Cullen’s hanger, as modified by Bundy, to connect a structural component to a top plate of a frame wall adapted to have the requisite drywall mounted thereon.

168. This modification would have been simply applying a known technique (Bundy’s use of a hanger on a frame wall with two layers of 5/8” drywall to create a fire separation wall) to a known device (Cullen’s hanger having sidewalls of indeterminate length) to obtain the predictable result of optimizing the size of the hanger’s spacing to receive two layers of 5/8” thick drywall therein, thereby shielding wall structures from fire. *See* EX1007, 5:18-19.

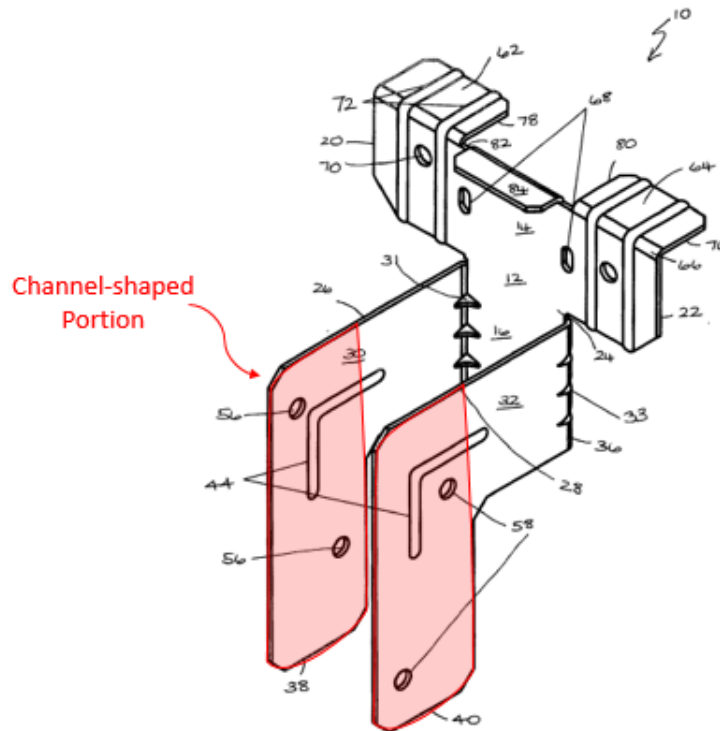
169. A POSITA would have had an expectation of success in using Cullen's hanger with a drywall-covered wall because Bundy's and Cullen's hangers serve similar purposes—supporting a floor joist/structural beam at a top end of a wall, as I explained in Section XI.A.

170. Accordingly, in my opinion, Cullen in view of Bundy renders obvious element [1.P].

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

171. Cullen discloses a channel shaped portion (which includes legs 38, 40 and an optional seat) configured to receive the structural component (joist).

EX1039, 10:29–11:1, 17:20–25. Cullen further discloses that “[t]he joist hanger may include a seat portion.” EX1039, 5:25-28, 7:20–22. A POSITA would have understood that legs 38, 40 of Cullen's hanger is configured to receive an end of a structural component because legs 38, 40 are parallel and spatially-separated from each other to define a space for receiving the joist's end, as shown below. EX1039, FIG. 1.



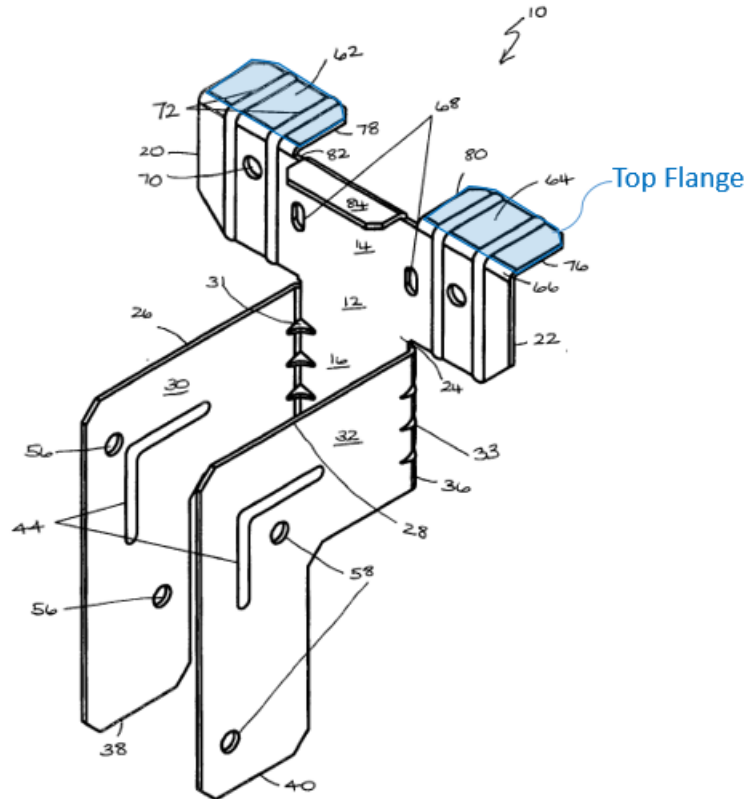
EX1039, FIG. 1 (annotated).

172. Accordingly, in my opinion, Cullen discloses claim element [1.1].

[1.2.A] “a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and,”

173. Cullen discloses a connection portion that includes a top flange (bearing plates 62, 64) arranged to engage a top surface of a top plate of the frame wall, as suggested by Bundy. EX1039, 3:2–11, 11:24–29. A POSITA would have understood that bearing plates 62, 64 of Cullen’s hanger are arranged to engage a top surface of a top plate of the frame wall because bearing plates 62, 64 extend from a top edge of a back flange (Cullen’s back plate 12) in a horizontal direction,

allowing bearing plates 62, 64 to rest on the top plate of the frame wall, as shown below. EX1039, FIG. 1.



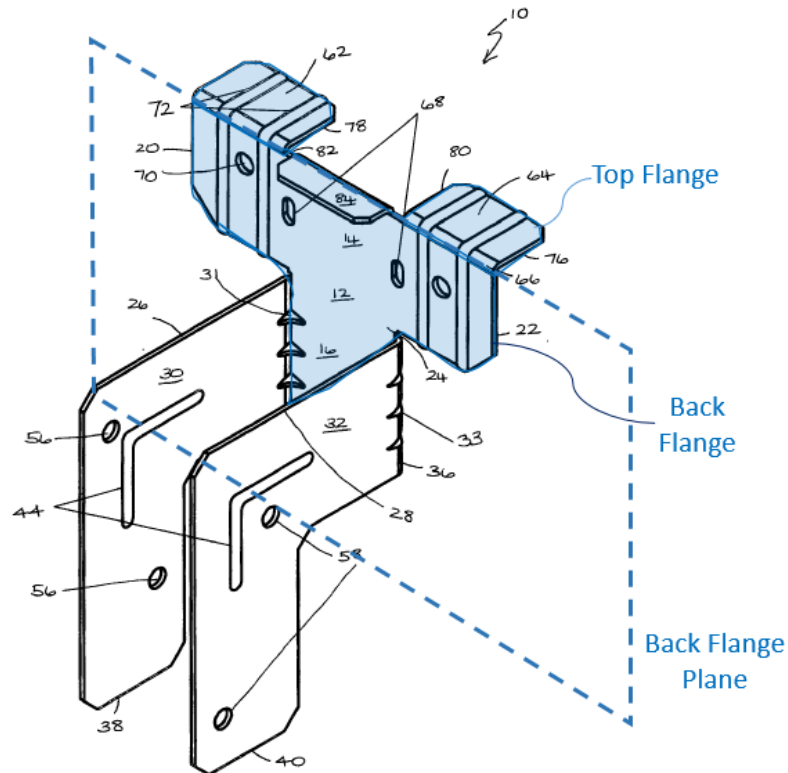
EX1039, FIG. 1 (annotated).

174. Accordingly, in my opinion, Cullen in view of Bundy discloses claim element [1.1A].

[1.2.B] “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,”

175. Cullen discloses a back flange (back plate 12), the back flange (back plate 12) extending from an edge of the top flange (bearing plates 62, 64) and

being 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. EX1039, 10:16–22.

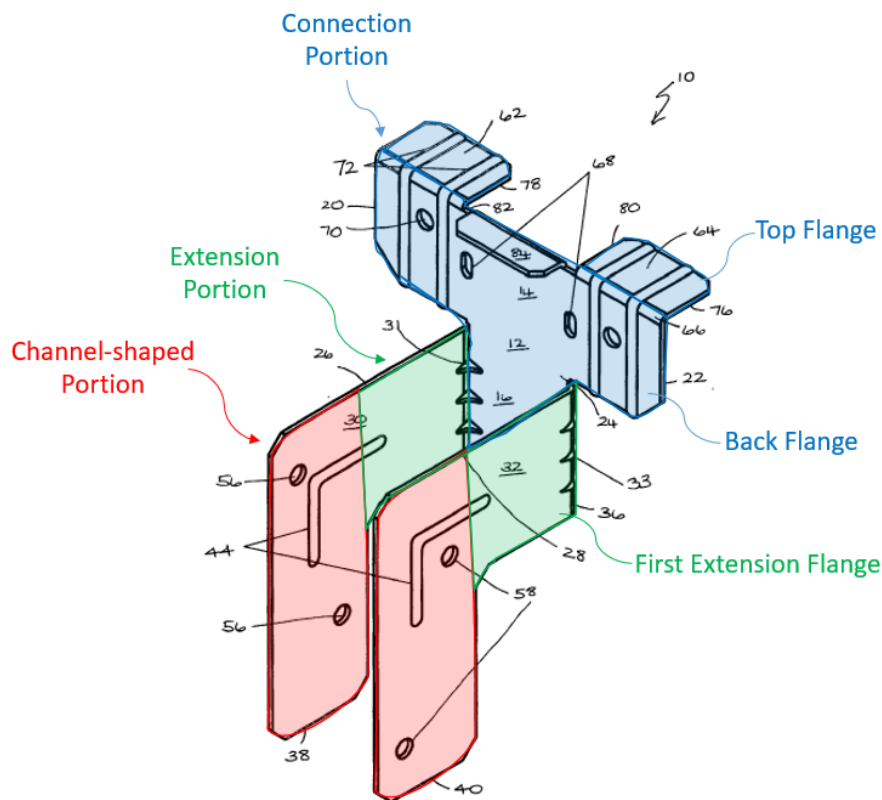


EX1039, FIG. 1 (annotated).

176. A POSITA would have understood that Cullen's back plate 12 is arranged to engage a vertical face of the top plate of the frame wall because back plate 12 extends in a vertical direction and is located rearward of the remaining portions of Cullen's hanger. Accordingly, in my opinion, Cullen in view of Bundy discloses claim element [1.2.B].

[1.3.A] “an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion;”

177. Cullen discloses an extension portion including a first extension flange (sidewall 32) extending from the back flange (back plate 12) to the channel-shaped portion (which includes legs 38, 40 and an optional seat). EX1039, 10:25–11:1. Specifically, a POSITA would have understood that Cullen’s extension portion (sidewalls 30, 32) begins at a fold line (fold lines 34, 36) defined along a vertical edge of its back plate 12 and ends at a rear edge of its channel-shaped portion (legs 38, 40), thereby extending from the back flange to the channel-shaped portion.



EX1039, FIG. 1 (annotated).

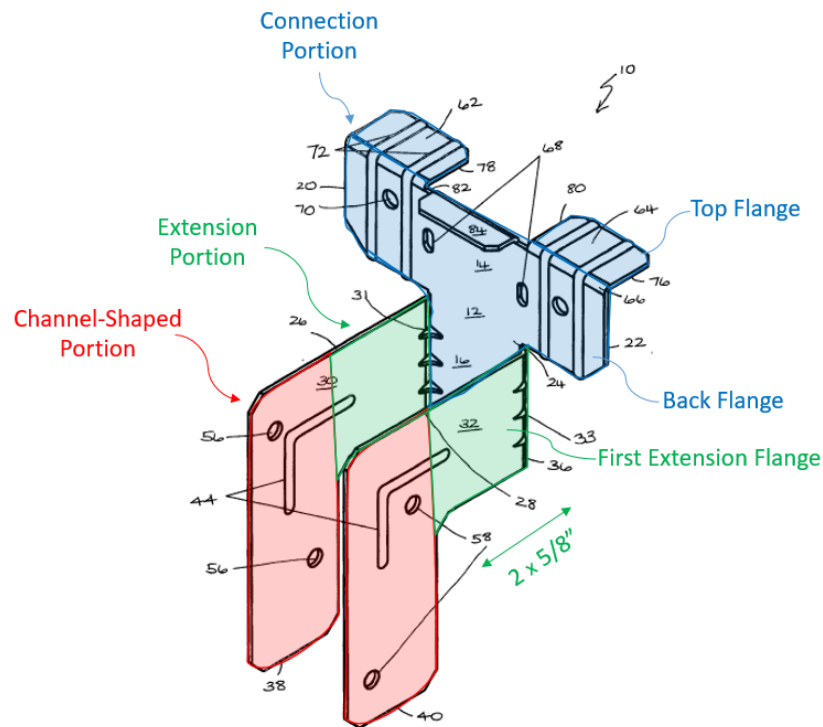
178. As Cullen's extension portion (sidewalls 30, 32) is formed from the same piece of sheet metal as the back flange of its connection portion with no intervening components therebetween, Cullen's extension portion extends from its connection portion to its channel-shaped portion. Accordingly, in my opinion, Cullen discloses claim element [1.3.A].

[1.3.B] “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”

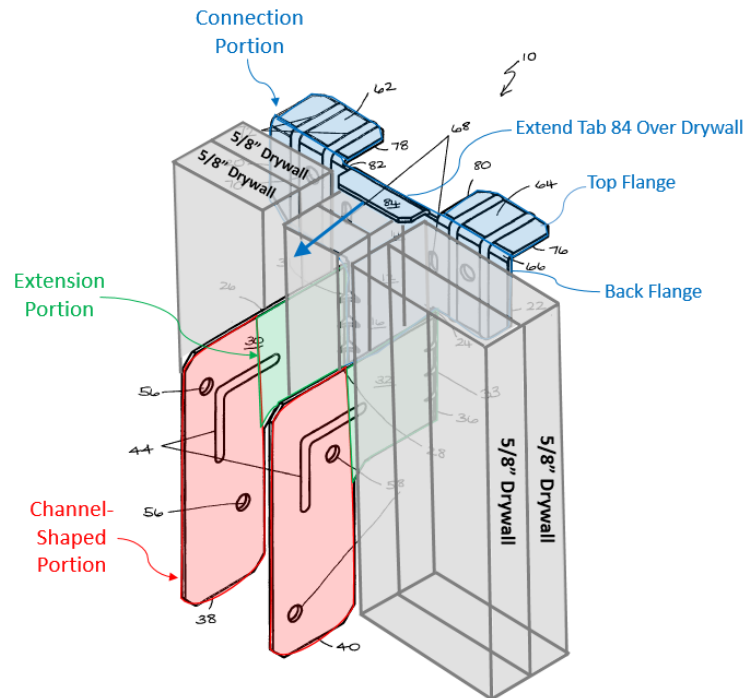
179. Cullen's sidewalls 30, 32 define a space that would permit drywall to be inserted between the surface of back plate 12 and legs 38, 40. Patent Owner may argue that Cullen does not explicitly disclose installing two layers of 5/8-inch-thick drywall between the surface of back plate 12 and legs 38, 40. In my opinion, a POSITA would have found it obvious to size the length of Cullen's sidewalls 30, 32 to define a space for receiving two layers of 5/8-inch-thick drywall therein based on Bundy. *See*, §XI.A above, Bundy teaches installing two layers of 5/8” drywall between a hanger's channel shaped portion (Bundy's side members 11) and wall frame. EX1007, 5:18-20.

180. A POSITA would have had an expectation of success in defining a specifically-sized drywall space between the surface of Cullen's back plate 12 and legs 38, 40, because Cullen's and Bundy's hangers are used for similar purposes

(e.g., hanging a joist to a wall) and Cullen's back plate 12 and legs 38, 40 already define a space therebetween. EX1007, 4:46-53; EX1039, 10:29–11:1. Furthermore, as the length of Cullen's location tab 84 is simply a design choice, a POSITA would have also understood to adjust the length of Cullen's location tab 84 accordingly to extend across two layers of 5/8" drywall to ensure that the joist's top surface is still "coplanar" with the top plate's upper surface. EX1039, 12:20–13:5. Cullen states that when the joist hanger includes a seat portion, "additionally, the joist hanger may include a location tab." EX1039, 5:25-26.



EX1039, FIG. 1 (annotated).



EX1039, FIG. 1 (annotated).

181. Accordingly, in my opinion, Cullen in view of Bundy renders obvious element [1.3.B].

[1.4] “wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another”

182. Cullen discloses that the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another in the form of a folded metal sheet. EX1039, 5:26-28, 8:12-19, 10:12-14 (“Bracket 10 is formed from a single sheet of metal, the thickness being chosen to provide sufficient strength while allowing the material to be folded at marked locations.”). A POSITA would have understood that the manufacturing process described in

Cullen would have resulted in all portions of Cullen's hanger 10 being connected such that they do not move freely with respect to each other. Accordingly, in my opinion, Cullen discloses element [1.4].

183. Therefore, in my opinion, Cullen in view of Bundy renders obvious all the recited limitations of claim 1.

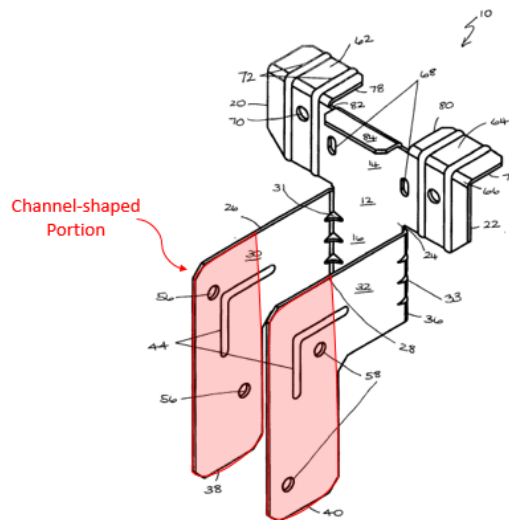
C. Independent Claim 53

[53.P] "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,"

184. As discussed above with respect to claim 1, element [1.P], Cullen in view of Bundy renders obvious this limitation.

[53.1] "a channel-shaped portion configured to receive the structural component,"

185. As discussed with respect to claim 1, element [1.1.A], Cullen discloses this limitation. EX1039, 10:29–11:1, 17:20–25, FIG. 1.



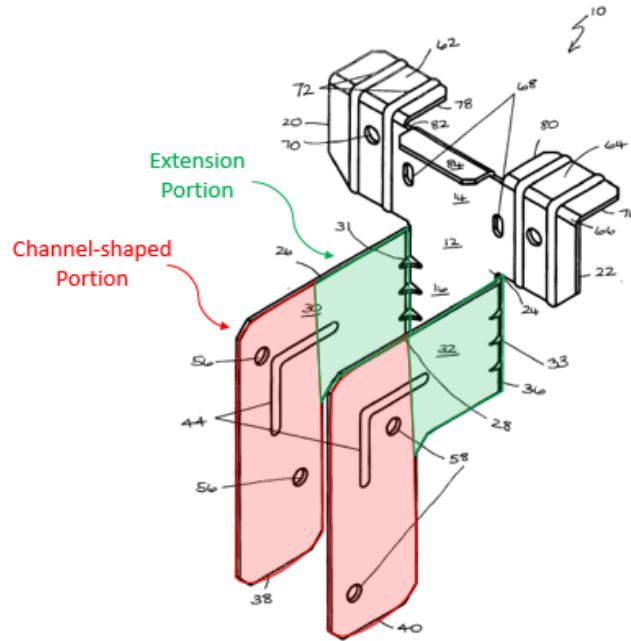
EX1039, FIG. 1 (annotated).

[53.2] “an extension portion extending from the channel-shaped portion and configured to extend through the two layers of 5/8-inch-thick drywall;”

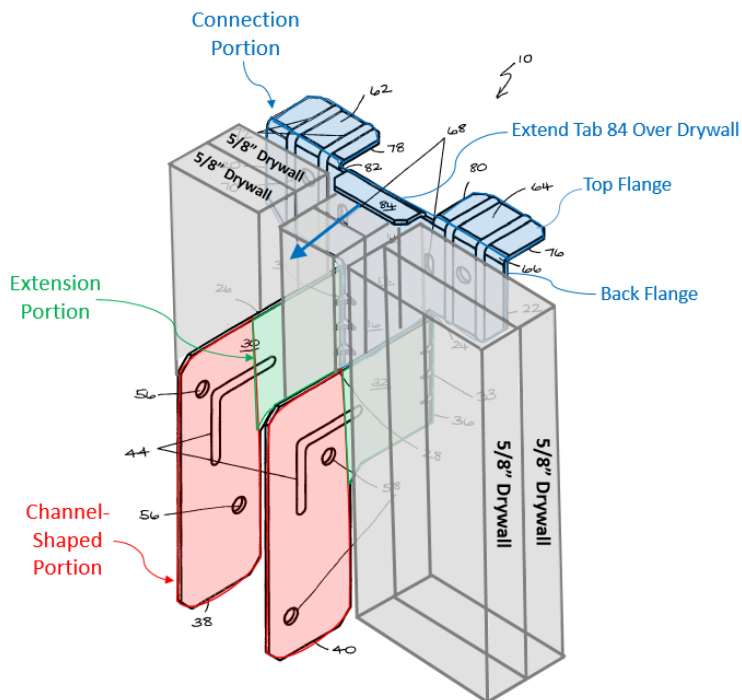
186. Cullen discloses an extension portion (side walls 30, 32) extending from the channel-shaped portion (legs 38, 40) to the back flange (plate 12).

EX1039, 10:29–11:1.

187. While Cullen does not explicitly disclose extending sidewalls 30, 32 through drywall, a POSITA would have been motivated to size Cullen’s sidewalls large enough to receive two layers of 5/8-inch-thick drywall between Cullen’s back plate 12 and legs 38, 40, as taught by Bundy. EX1007, 5:18-20. In doing so, a POSITA would have understood that Cullen’s sidewalls 30, 32, sized as taught by Bundy, are configured to extend into one side of such drywall and out of the other side of such drywall when such drywall is installed, because Cullen’s sidewalls 30, 32 are flat sheet metal extending continuously from back plate 12 to legs 38, 40, just like the extension flanges described in the ’626 patent. Thus, as modified by Bundy, Cullen’s sidewalls 30, 32 are configured to extend through two layers of 5/8-inch-thick drywall.



EX1039, FIG. 1 (annotated).



EX1039, FIG. 1 (annotated).

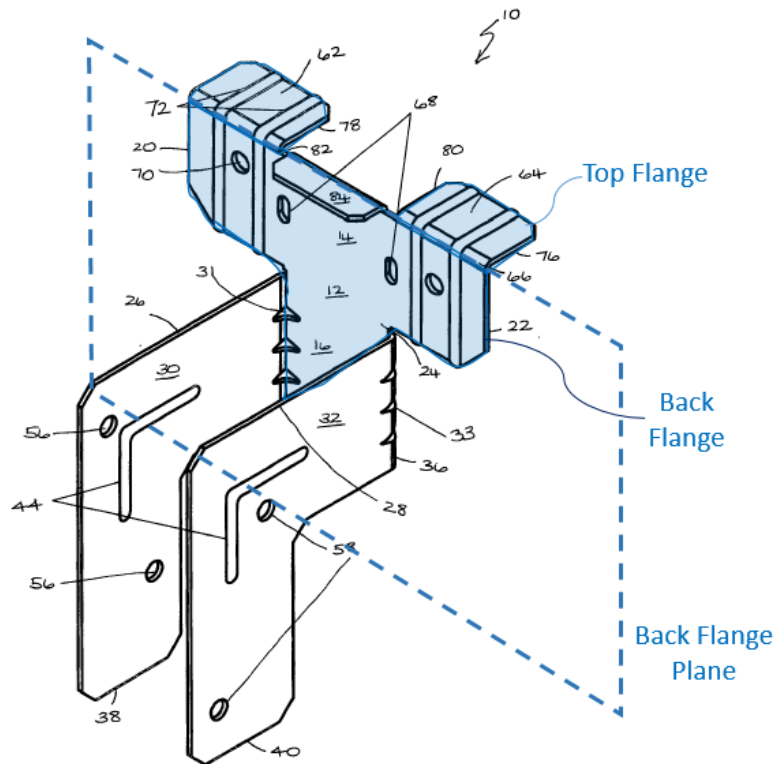
188. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claim [53.2].

[53.3.A] “a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and,”

189. As discussed above with respect to claim 1, element [1.2.A], Cullen in view of Bundy renders obvious this limitation. EX1039, 3:2–11, 11:24–29.

[53.3.B] “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,”

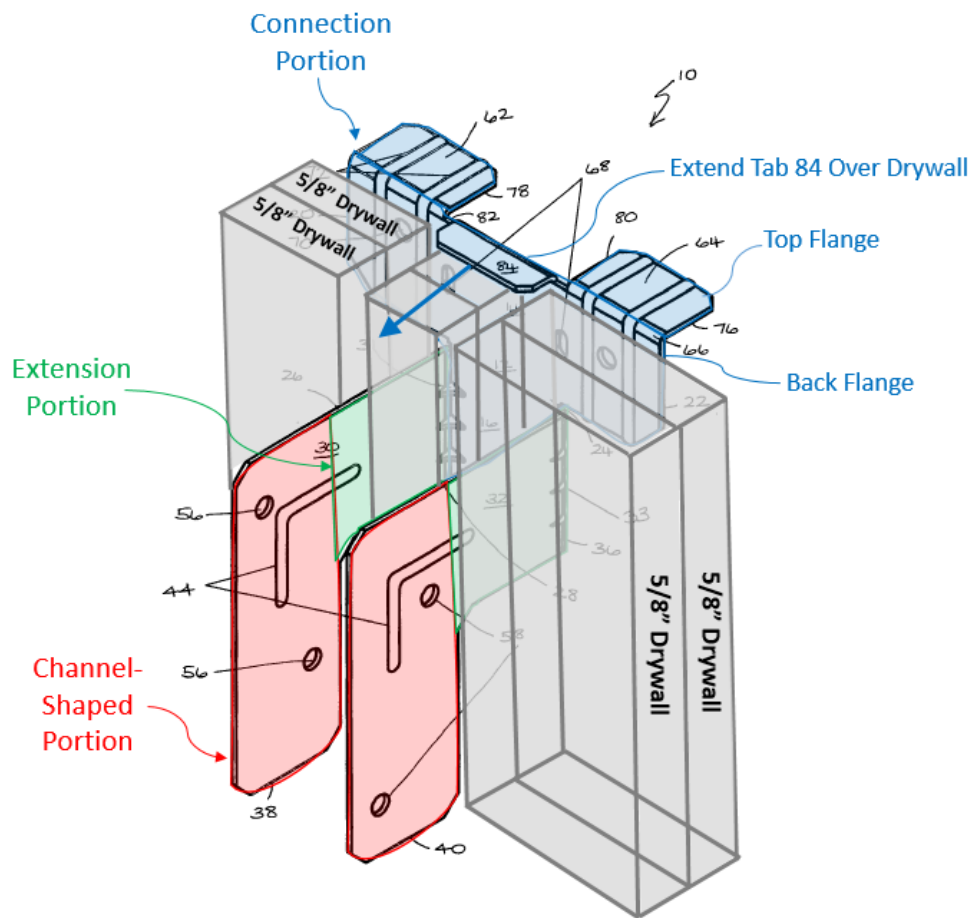
190. As discussed above with respect to claim 1, element [1.2.B], Cullen in view of Bundy renders obvious this limitation. EX1039, 10:16–22,



EX1039, FIG. 1 (annotated)

[53.4] “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”

191. As discussed above with respect to claim 1, element [1.3.B], Cullen–Bundy renders obvious this limitation. EX1007, 5:18–20; EX1039, FIG. 1.



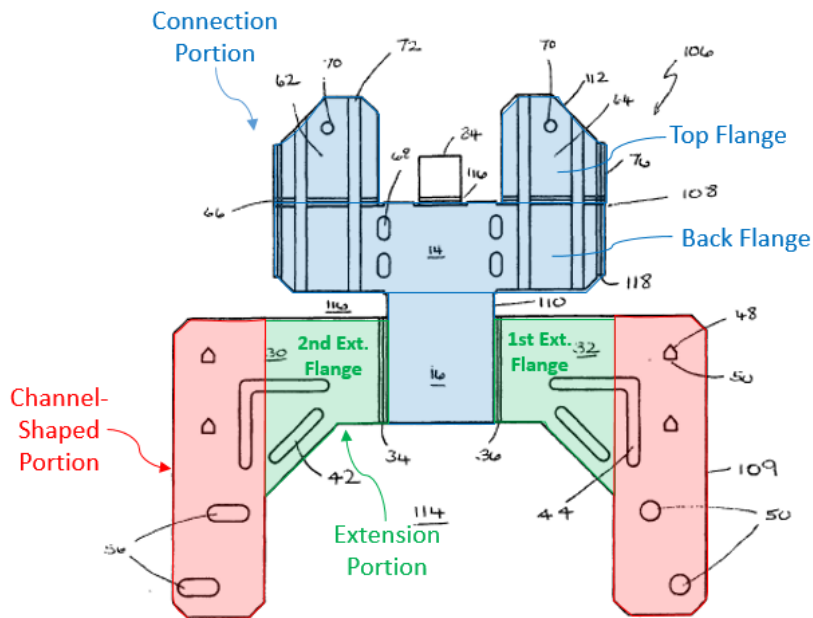
EX1039, FIG. 1 (annotated).

[53.5] “wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another”

192. As discussed above with respect to claim 1, element [1.4], Cullen discloses this limitation. EX1039, 8:12–19, 10:12–14.

D. Claims 22-24, 26-27, 74-76 and 78-79

193. Cullen discloses that its extension portion (sidewalls 30/32), including its first extension flange (sidewall 32), its channel-shaped portion (legs 38/40), and its connection portion (back plate 12, bearing plates 62/64) are all formed as one-piece of sheet metal (blank 106), thus disclosing all combinations of two or more of those elements, as recited in claims 22-24, 26-27, 74-76, and 78-79. EX1039, 10:12–14 (“Bracket 10 is formed from a single sheet of metal.”); 18:8–19:7.



EX1039, FIG. 4 (annotated).⁴

⁴ While the blank 106 shown in Figure 4 corresponds to hanger 100 shown in

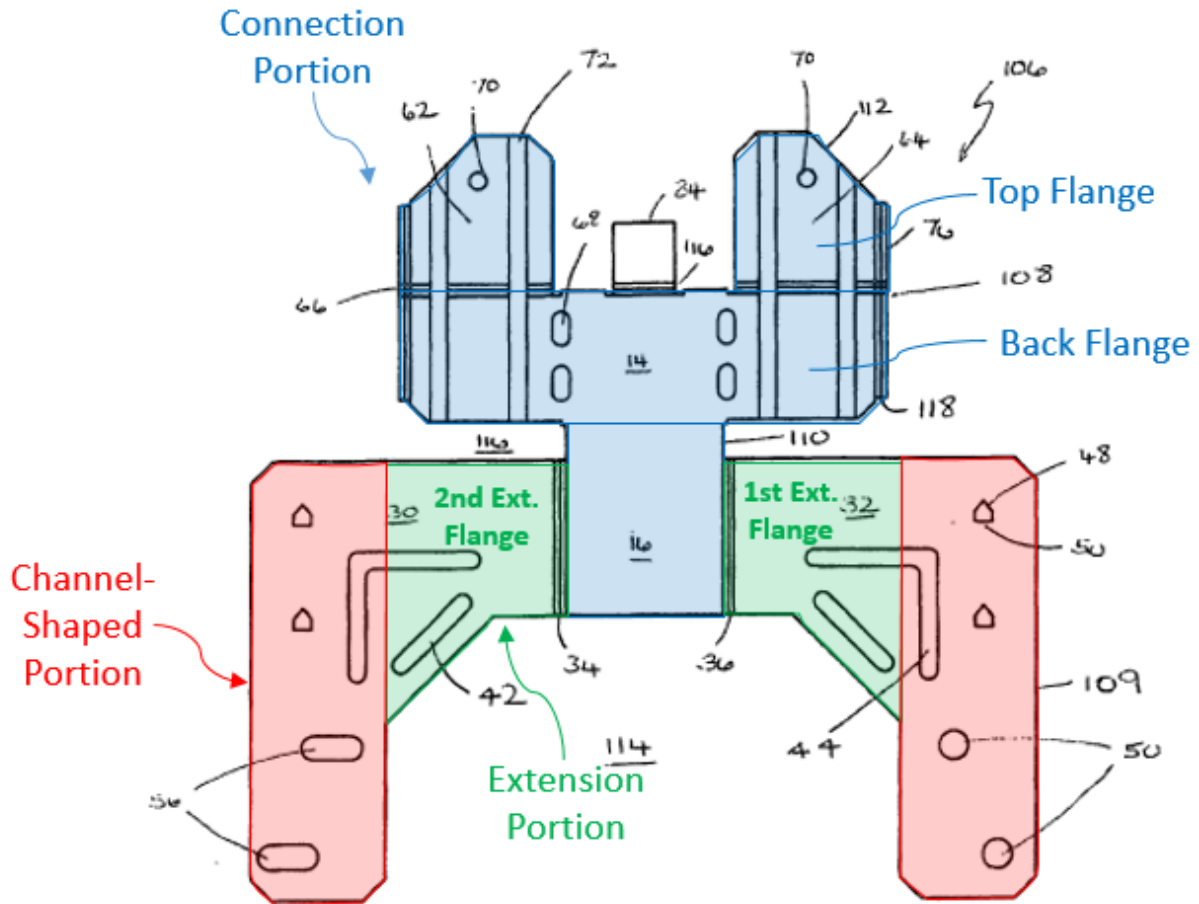
194. Specifically, as illustrated above, Cullen discloses: (1) the hanger's extension portion (sidewalls 30, 32), including its first extension flange, and channel-shaped portion (legs 38, 40) being formed as one-piece of sheet metal (claims 22/26/74/78); (2) the hanger's extension portion (sidewalls 30, 32), including its first extension flange, and connection portion (legs 38, 40) being formed as one-piece of sheet metal (claims 23/75); and (3) the hanger's channel-shaped portion (legs 38, 40), connection portion (back plate 12, bearing plates 62/64), and extension portion (sidewalls 30, 32), including its first extension flange, being formed as one-piece of sheet metal (claims 24/27/76/79).

195. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 22–24, 26–27, 74–76, and 78–79.

E. Claims 25 and 77

196. Cullen discloses that the channel-shaped portion (legs 38, 40) is made of sheet metal (blank 106) and that the extension portion (sidewalls 30, 32), including its first extension flange, is an extension of the sheet metal (blank 106) forming the channel-shaped portion (legs 38, 40). EX1039, 10:12–14; 18:8–19:7.

Figure 2, a POSITA would have understood that blank 106 is applicable to forming bracket 10 shown in Figure 1. EX1039, 10:12–14, 18:8–19:7.



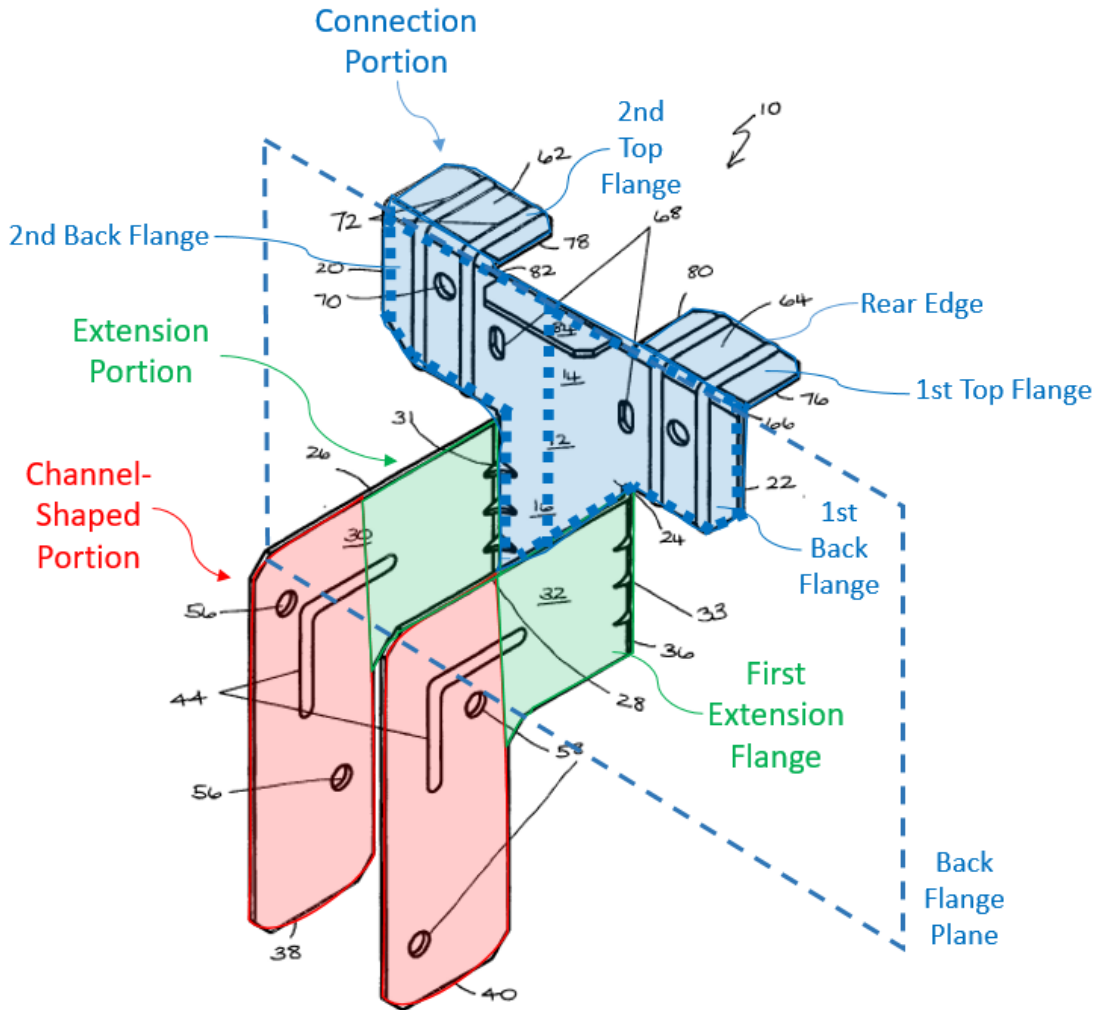
EX1039, FIG. 4 (annotated).

197. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 25 and 27.

F. Claims 39 and 92

198. A POSITA would have understood that Cullen's back flange (back plate 12) is a combination of two halves – a first half (the right-half of back plate 12 associated with sidewall 32) constituting a first back flange, and a second half (the left-half of back plate 12 associated with sidewall 30) constituting a second back flange, such that the two halves meet and join in the middle of Cullen's back

flange. Cullen thus discloses that the back flange is a first back flange and the top flange is a first top flange (bearing plate 64 located on right-half of back plate 12). EX1039, 10:16–22, 11:24–29. When mounted on a frame wall as taught by Bundy, Cullen-Bundy discloses that the connection portion includes a second top flange (bearing plate 62 located on left-half of back plate 12) arranged to engage the top surface of the top plate of the frame wall and a second back flange (left-half of back plate 12 associated with sidewall 30) extending from an edge (fold line 66) of the second top flange (bearing plate 62) and arranged to engage the vertical face of the top plate of the frame wall. Being constructed from flat sheet metal, Cullen's second back flange has a front surface lying in the back flange plane.



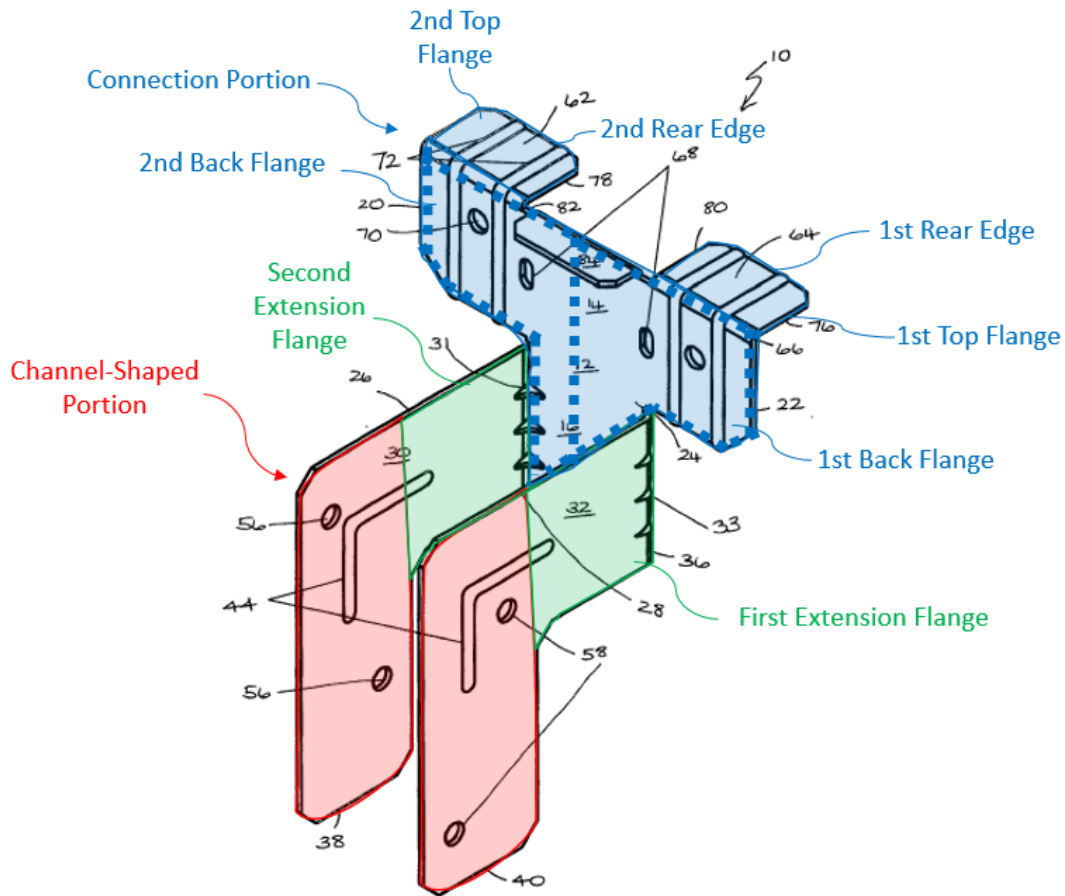
EX1039, FIG. 1 (annotated).

199. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 39 and 92.

G. Claims 40 and 93

200. Cullen discloses that the first top flange includes a first rear edge (annotated below) located rearwardly of the edge of the first top flange (bearing portion 64) from which the first back flange (right half of back plate 12) extends, and that the second top flange (bearing portion 62) includes a second rear edge

(annotated below) located rearwardly of the edge of the second top flange from which the second back flange (left half of back plate 12) extends. EX1039, 10:16–22, 11:24–29, FIG. 1. Cullen discloses the first rear edge (annotated below) being located rearwardly of the first back flange (right half of back plate 12) and the second rear edge (annotated below) being located rearwardly of the second back flange (left half of back plate 12). EX1039, 10:16–22, 11:24–29, FIG. 1.

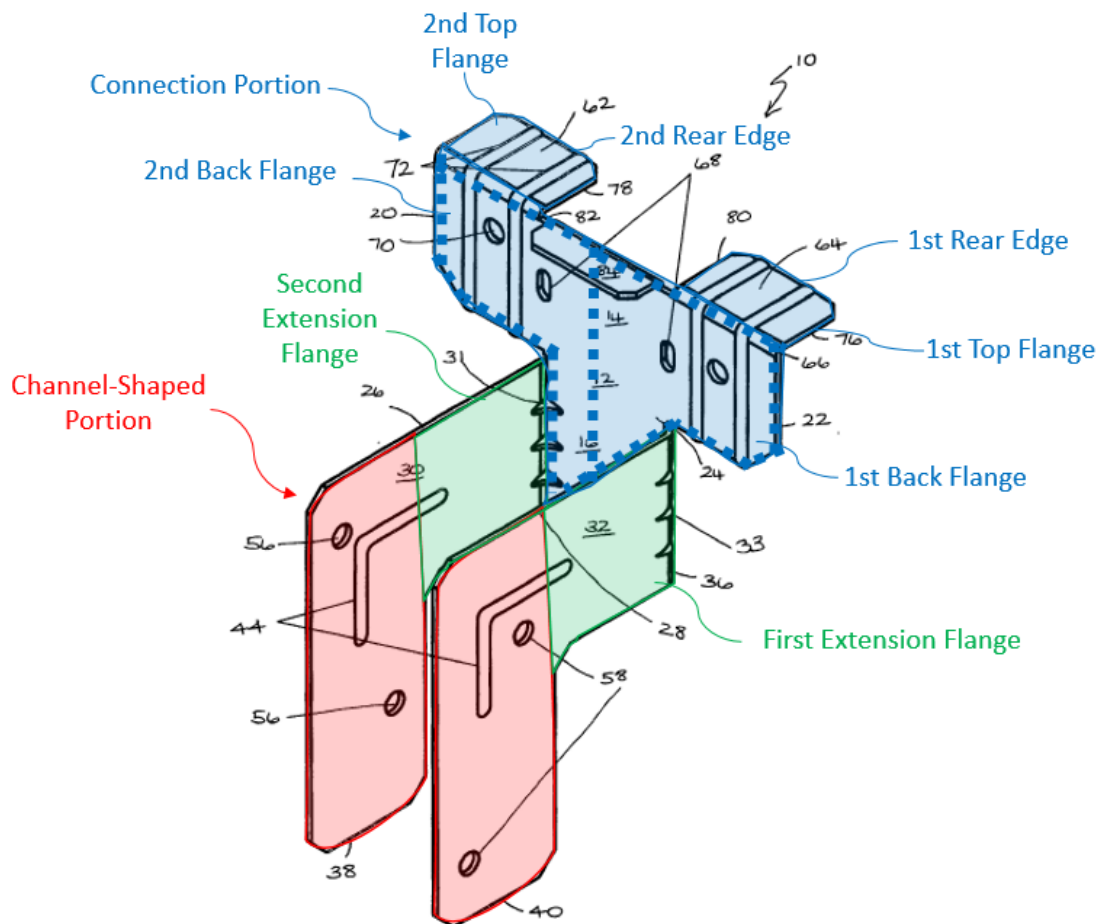


EX1039, FIG. 1 (annotated).

201. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 40 and 93.

H. Claims 41 and 94

202. For the reasons discussed for [1.3.A], and given that Cullen's sidewall 30 and leg 38 are symmetrical to sidewall 32 and leg 40, Cullen discloses that the extension portion includes a first extension flange (sidewall 32) extending from the channel-shaped portion to the first back flange (and vice-versa) and a second extension flange (sidewall 30) extending from the second back flange to the channel-shaped portion (and vice-versa). EX1039, 10:25–11:1, FIG. 1.



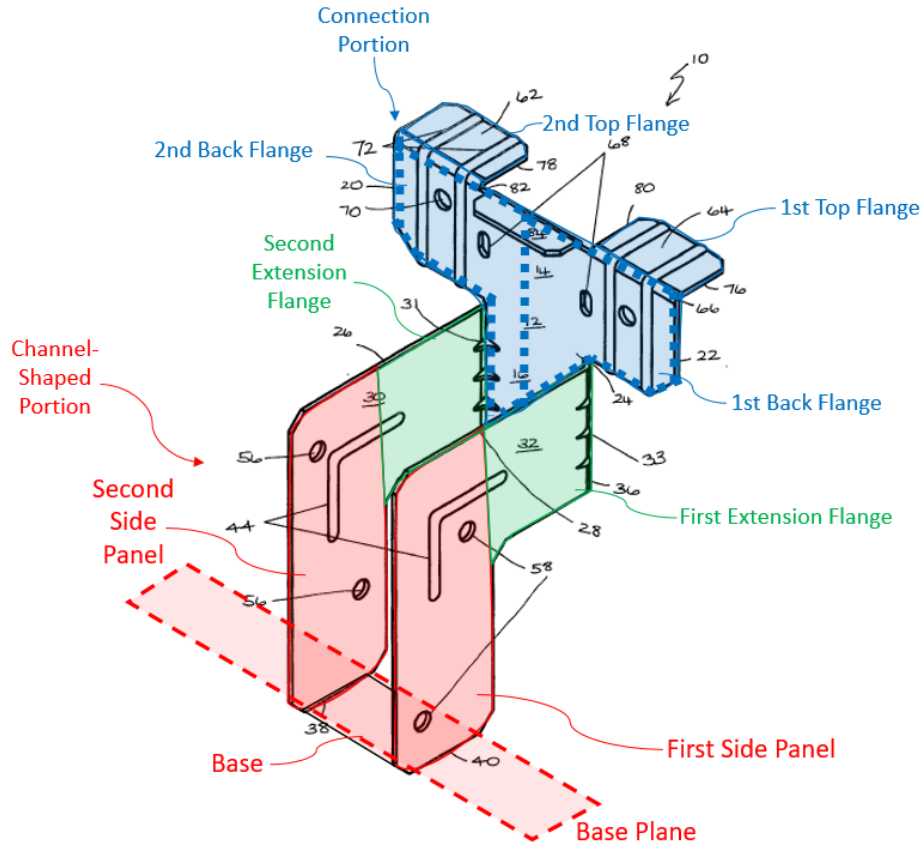
EX1039, FIG. 1 (annotated).

203. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 41 and 94.

I. Claims 42 and 95

204. Cullen discloses “a seat [] located on the legs 38, 40 of the side walls 30, 32 to cradle a joist. The seat is positioned so that the distance between the seat and surface 86 of tab 84 is the height of the joist being used.” EX1039, 17:20–25. A POSITA would have understood that Cullen’s seat corresponds to the recited “base.” It would have been obvious to modify Cullen’s hanger 10 shown in Figures 1–4 to include a base (the “seat”) receiving the joist’s end portion, and extend legs 38/40 upward from the base. “Where the joist hanger is formed from sheet metal the seat...can be folded into position also.” EX1039, 5:25-29; 13:16-26; 19:26-30. If the seat is formed by folding a metal shelf up from one of the legs 38/40, a POSITA would have understood that the seat would be welded or otherwise joined to the other leg for structural integrity, such that each leg is joined to and extends upward from the seat. A POSITA would have further understood that such a seat may instead be formed by bending a lower portion of one or both legs 38/40 inward to meet the other. *Id.*

205. This renders obvious the channel-shaped portion including a base configured to receive and support the structural component’s end portion, and first and second side panels (leg 40/38) extending upward from the base.

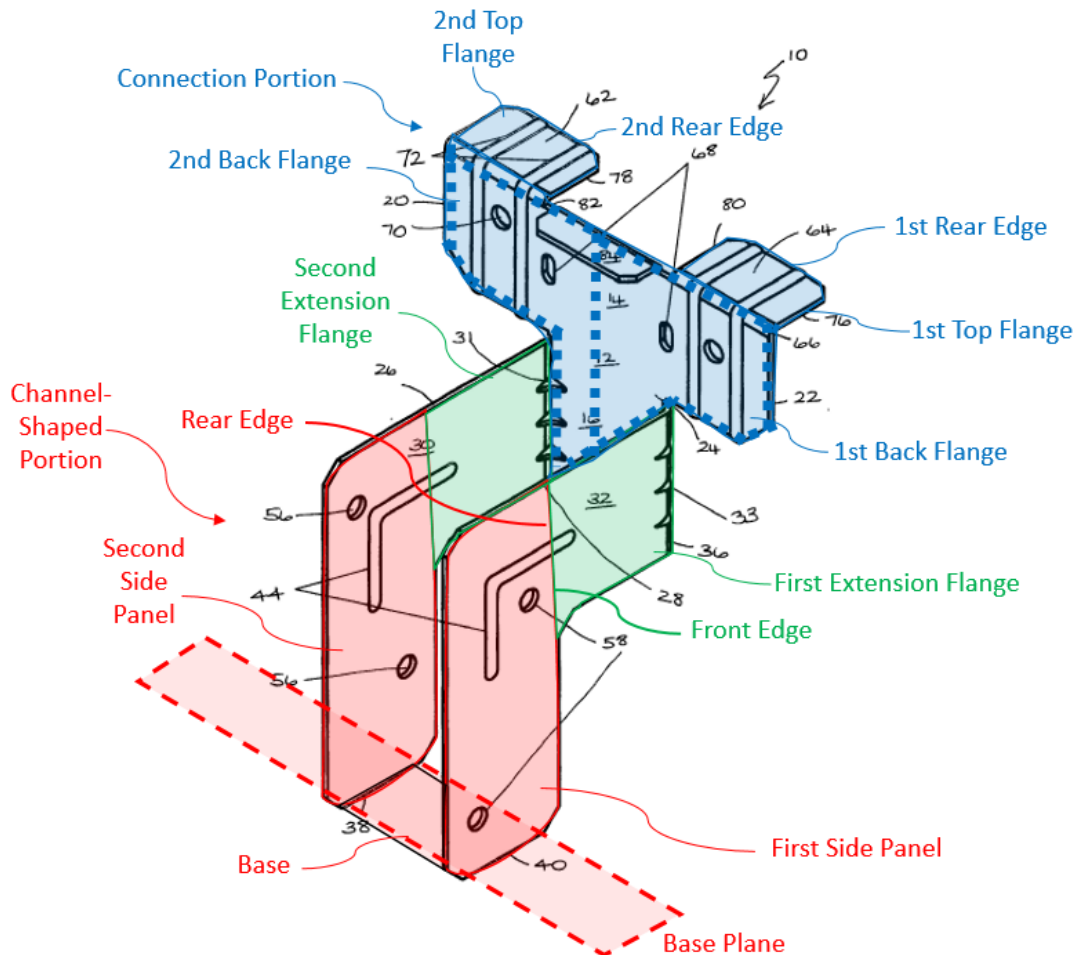


EX1039, FIG. 1 (annotated).

206. Cullen's sidewall 30 and leg 38 are co-planar, as they share the same vertical orientation. Cullen's sidewall 30 and leg 38 are symmetrical to sidewall 32 and leg 40. Cullen thus discloses the first and second extension flanges parallel to each other and the first and second side panels parallel to each other, as shown above. EX1039, FIG. 1. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 42 and 95.

J. Claims 43 and 96

207. Cullen discloses that a front edge (annotated below) of the first extension flange (sidewall 32) abuts a rear edge (annotated below) of the first side panel (leg 40), as they join with no intervening structures. EX1039, FIG. 1.

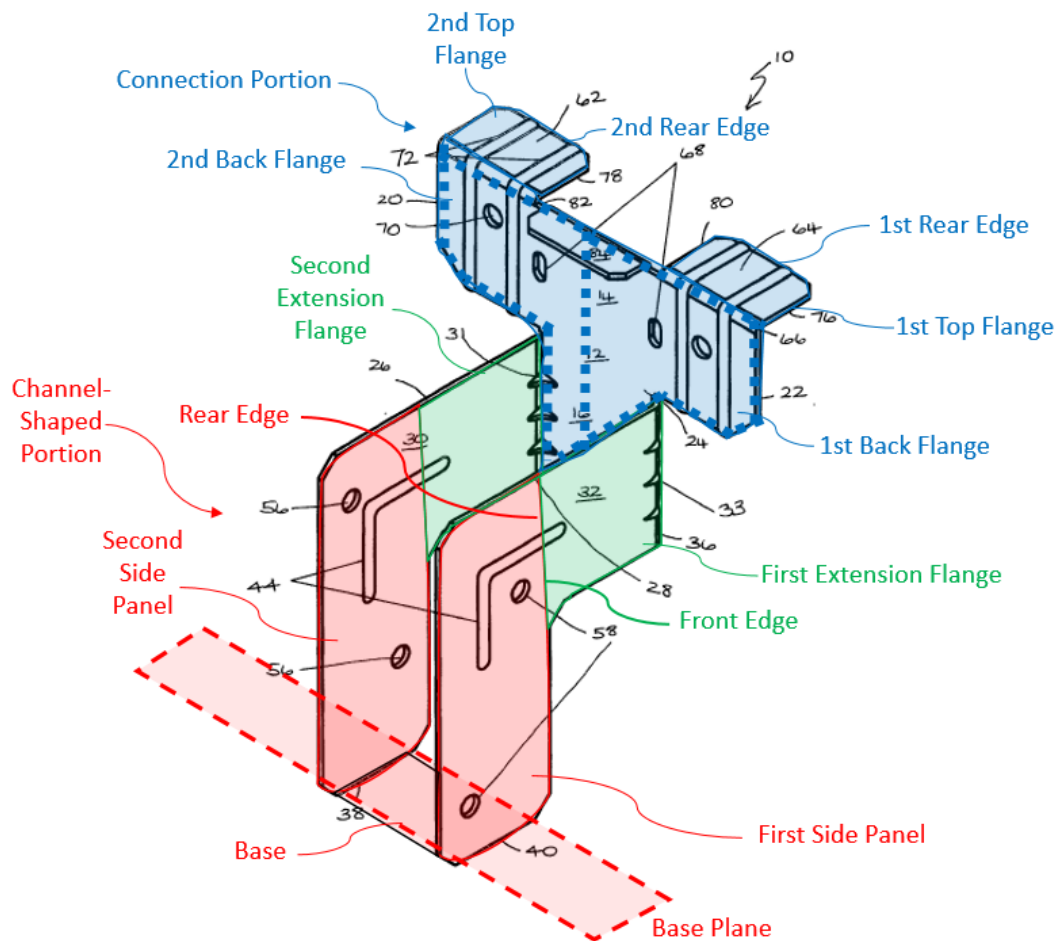


EX1039, FIG. 1 (annotated).

208. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 43 and 96.

K. Claims 44 and 97

209. Cullen's first extension flange (sidewall 32) and first back flange (right half of back plate 12) are directly attached to each other by a first bend (fold line 36); the first back flange (right half of back plate 12) and the first top flange (bearing portion 64) are directly attached to each other by a second bend (fold line 66). EX1039, 10:22–26, 11:24–27.

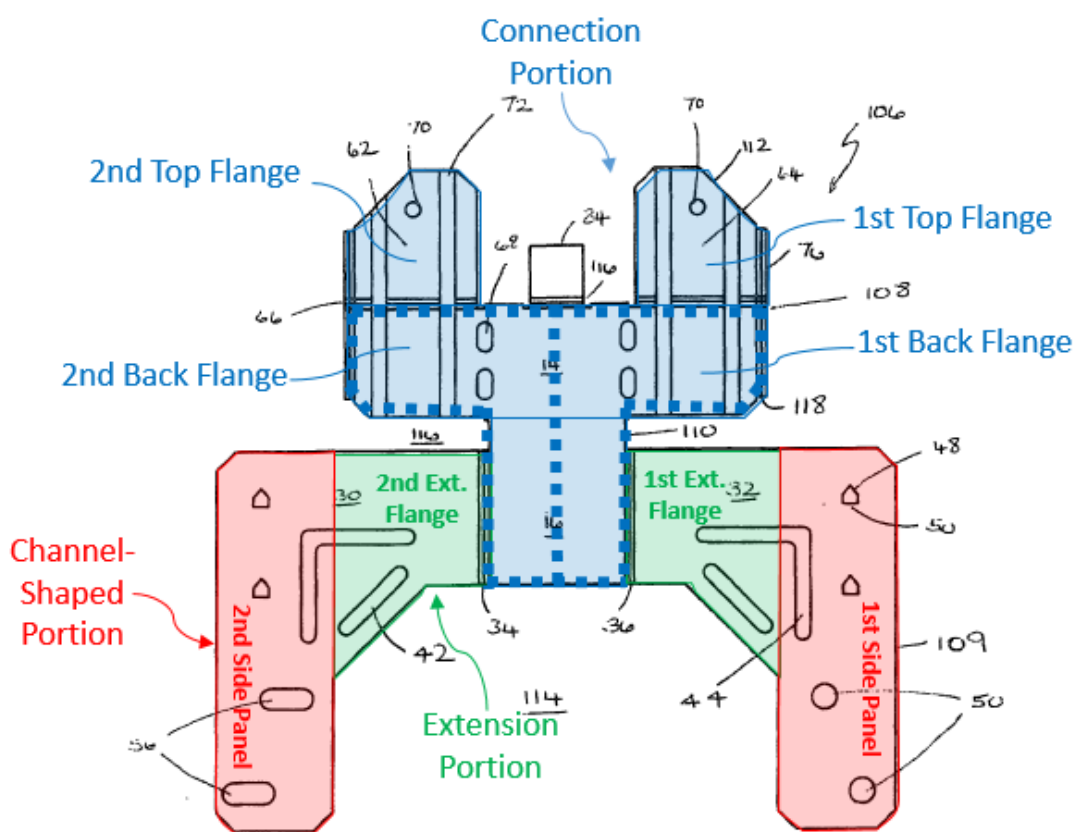


EX1039, FIG. 1 (annotated).

210. Cullen's second extension flange (sidewall 30) and second back flange (bearing portion 62) are directly attached to each other by a third bend (fold line 34); the second back flange (left half of back plate 12) and the second top flange (bearing portion 62) are directly attached to each other by a fourth bend (fold line 66 as it extends across the top of back plate 12). EX1039, 10:22–26, 11:24–27. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 44 and 97.

L. Claims 45 and 98

211. As discussed for claims 24, 27, 76, and 79, Cullen discloses the channel-shaped portion (legs 38, 40), the connection portion (back plate 12/bearing portions 62/64), and the extension portion (sidewalls 30/32) formed as one-piece of sheet metal. EX1039, 10:12–14; 18:8–19:7.



EX1039, FIG. 4 (annotated).

212. As discussed for claims 42 and 95, in employing the teachings of Cullen's seat with hanger 10, a POSITA would have found it obvious to include a base with legs 38/40 as a one-piece design by bending a lower portion of one or both legs 38/40 inward from lateral edges of the base. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 45 and 98.

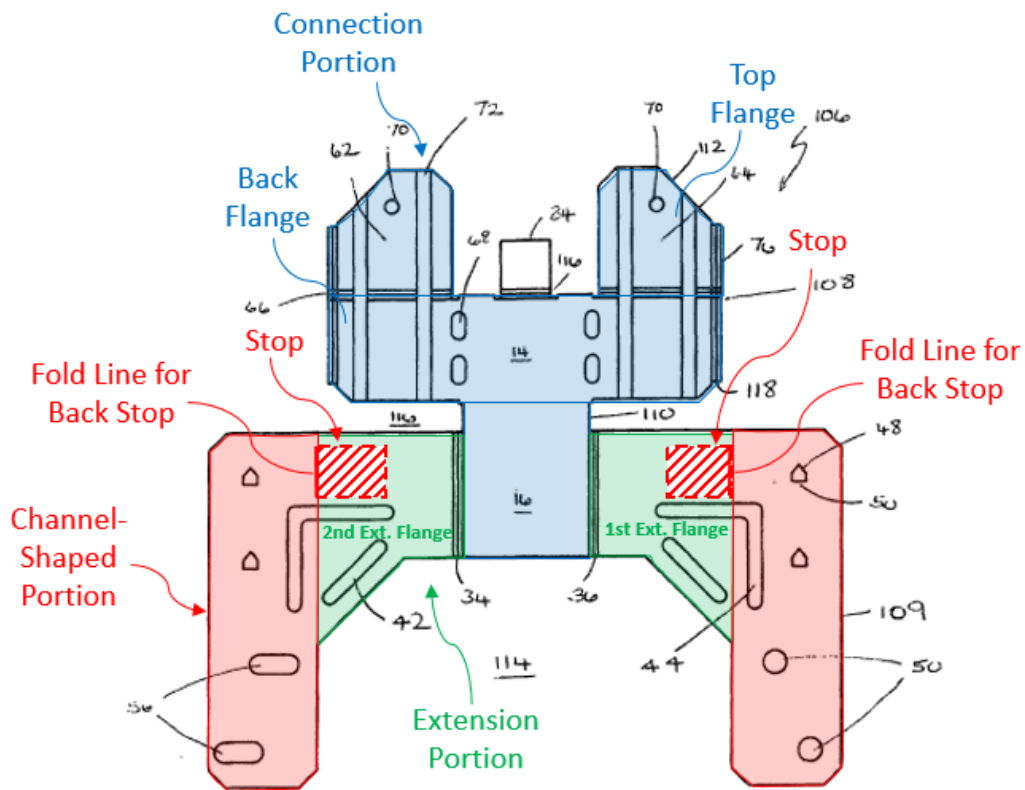
M. Claims 50 and 103

1) Stop Arranged To Engage an End of the Structural Component

213. Cullen does not explicitly disclose a stop configured 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 5/8-inch-thick drywall to be received therebetween. However, as discussed in §XIII.A, Bundy teaches an analogous hanger. Bundy discloses a stop (e.g., back plate members 9) engaging the end of the structural component and spacing it at the requisite distance by bending back plate members 9 inward from its side members 11. EX1007, 4:39-46. Bending back plate members 9 inward prevents a structural component installed thereon from extending past the back plate members, thereby acting as a stop.

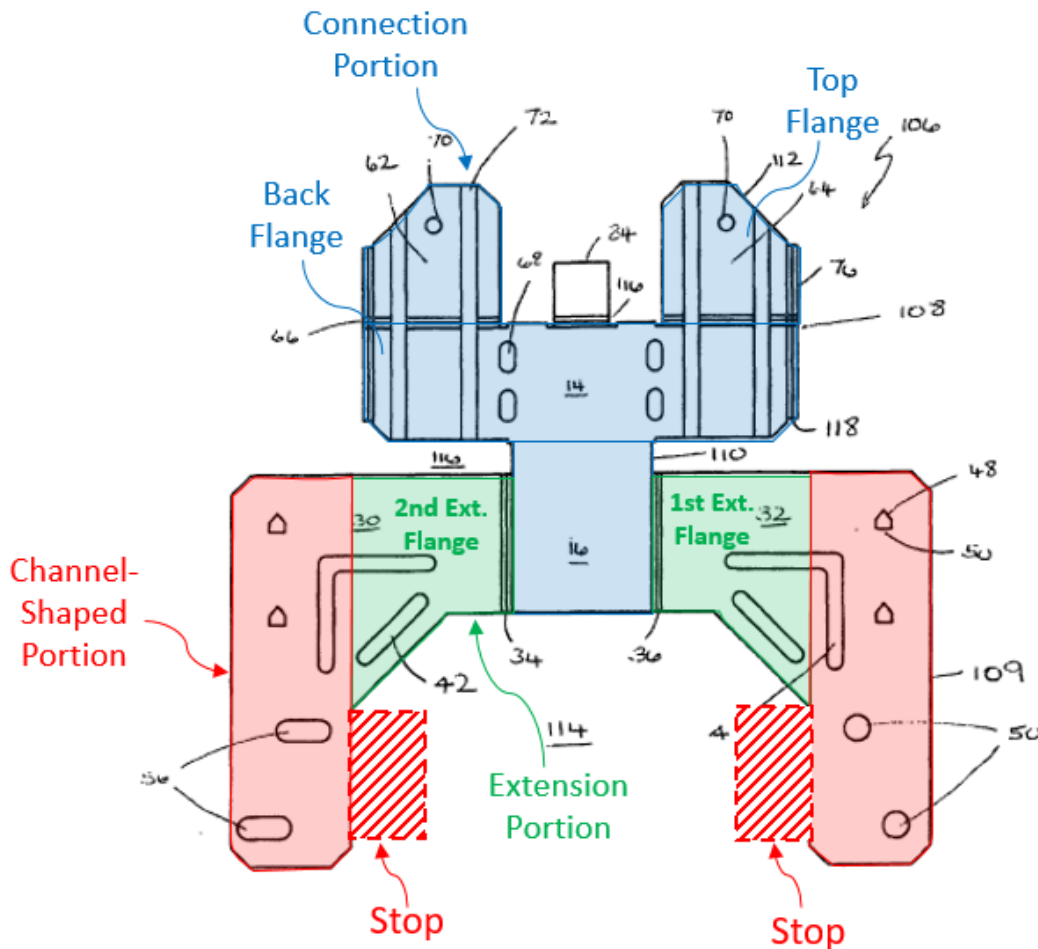
214. In employing the teachings of Bundy's drywall space with Cullen, a POSITA would have been motivated to provide Cullen's hanger 10 with a stop to engage the joist's end at the noted distance, as taught by Bundy, so it does not impair drywall installed into the drywall space defined between Cullen-Bundy's back plate and legs. This provides an obvious benefit of providing another support surface for Cullen's hanger and protecting any material that may be located beneath the hanger. Such a modification would have simply been applying a substitution of one known element (the sides of Bundy's channel-shaped portion having stops bent inwards to face each other) for another (the sides of Cullen's

channel-shaped portion) to obtain the predictable result of providing a stop at the joist's end. A POSITA would have had a reasonable expectation of success in providing Cullen's hanger with a stop to engage the joist's end because doing so was well within the level of ordinary skill in the art, as evidenced by Bundy. EX1007, 4:39-46; EX1008, ¶40. For example, shown below, a POSITA would have understood to cut a section of each sidewall 30/32, and bend the cutout inward at the boundary between the channel-shaped portion and the extension portion to form a stop consisting of back panels.



EX1039, FIG. 4 (annotated).

215. A POSITA would have understood that another option for achieving the stop taught by Bundy would be to configure Cullen's metal blank to include an auxiliary section extending from each leg 38/40 such that the auxiliary section is bent perpendicular to legs 38/40 to form a stop consisting of back panels.

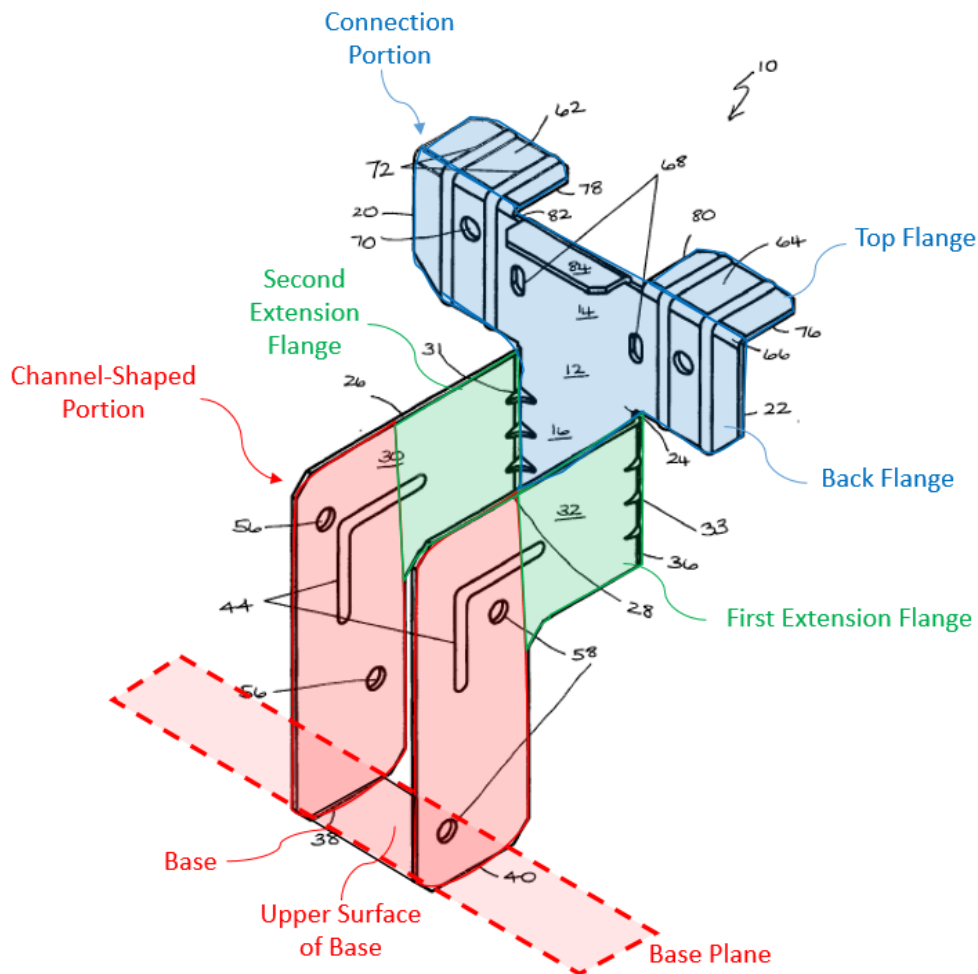


EX1039, FIG. 4 (annotated).

2) Base to receive End Portion of Structural Component

216. As discussed above for claims 42 and 95, Cullen renders obvious the channel-shaped portion (legs 38/40) including a base (seat) configured to receive

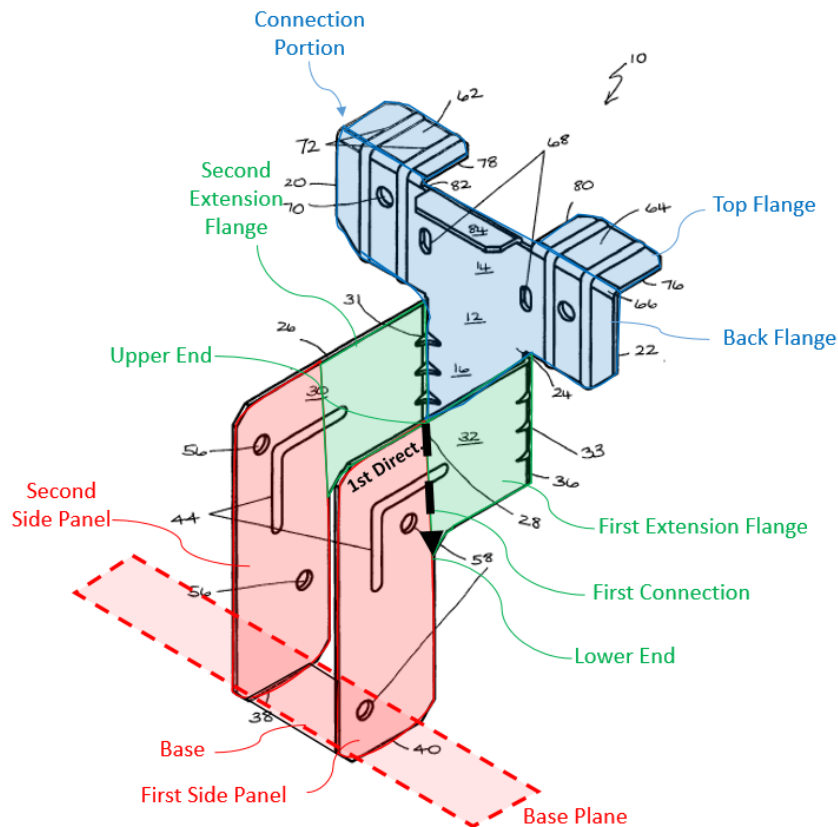
and support a structural component's end portion. EX1039, 5:25-29 (“Where the joist hanger is formed from sheet metal the seat...can be folded into position also.”); 13:16-26; 19:26-30. The base is made out of sheet metal (EX1039, 5:25-29), and thus has an upper surface defining (thus lying in) a horizontal base plane. EX1039, FIG. 1, 5:25-29; 13:16-26; 19:26-30. The upper surface is arranged to engage the structural component by receiving the end portion thereof. *Id.*



EX1039, FIG. 1 (annotated).

3) First Extension Flange Directly Attached to Channel-Shaped Portion

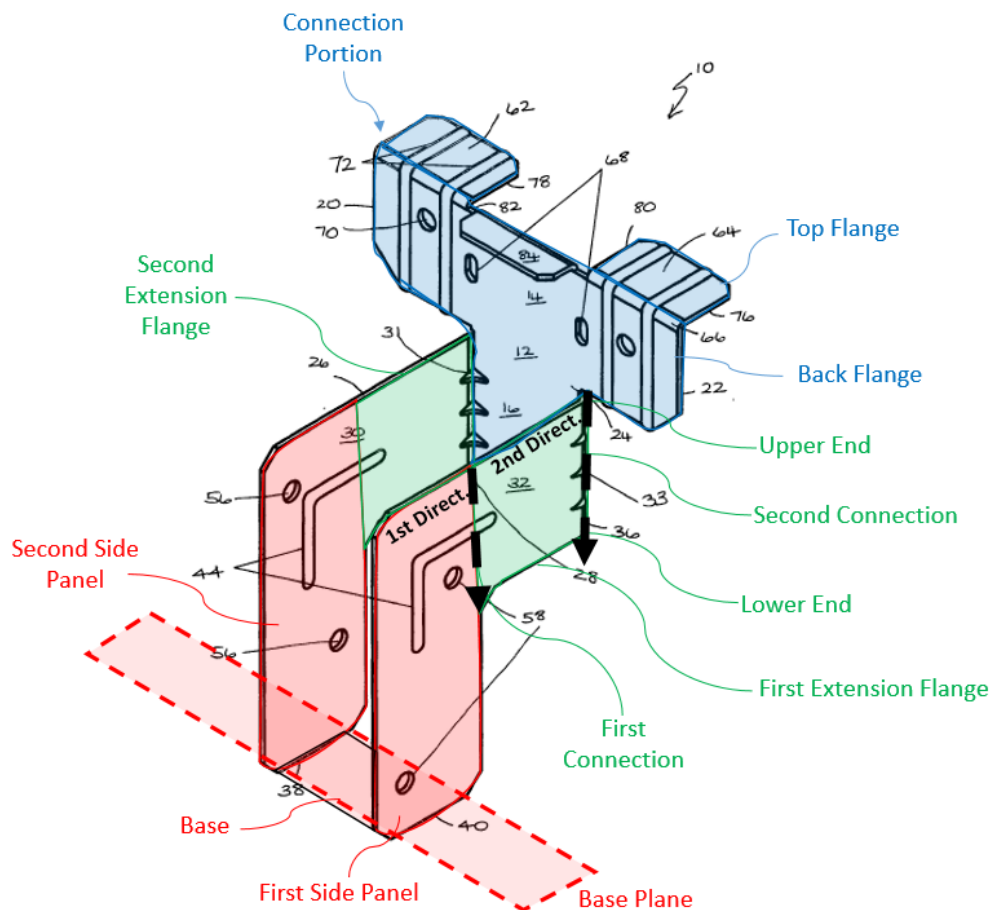
217. As discussed regarding claim 1, Cullen also discloses that the extension portion includes a first extension flange (sidewall 32). Cullen further discloses that the first extension flange (sidewall 32) is directly attached to the channel-shaped portion (leg 40) by a first connection, as shown by the black dashed line between the green and red portions below. EX1039, FIG. 1. The first connection has an upper end and a lower end and extending from the upper end to the lower end in a first direction (i.e., vertically) that is perpendicular to the horizontal base plane, shown below. EX1039, FIG. 1.



EX1039, FIG. 1 (annotated)

4) First Extension Flange Directly Attached to Connection Portion

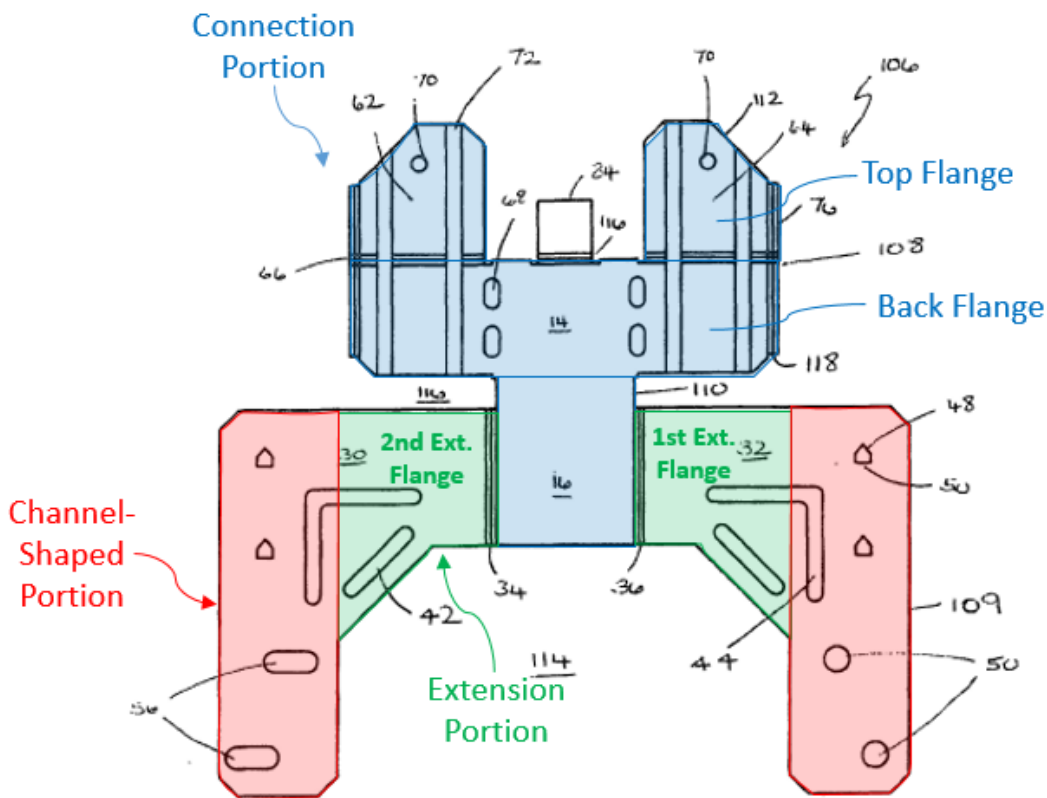
218. Cullen discloses that the first extension flange (sidewall 32) is directly attached to the connection portion (back plate 12) by a second connection, shown below, at bend 36 where sidewall 32 meets back plate 12. EX1039, FIG. 1, 10:22–26. The second connection (annotated below) has an upper end and a lower end and extends from the upper end to the lower end in a second direction that is parallel to the first direction (i.e., vertical) and perpendicular to the horizontal base plane, shown below. EX1039, FIG. 1.



EX1039, FIG. 1 (annotated).

5) First Extension Flange and Channel-Shaped Portion as One Piece

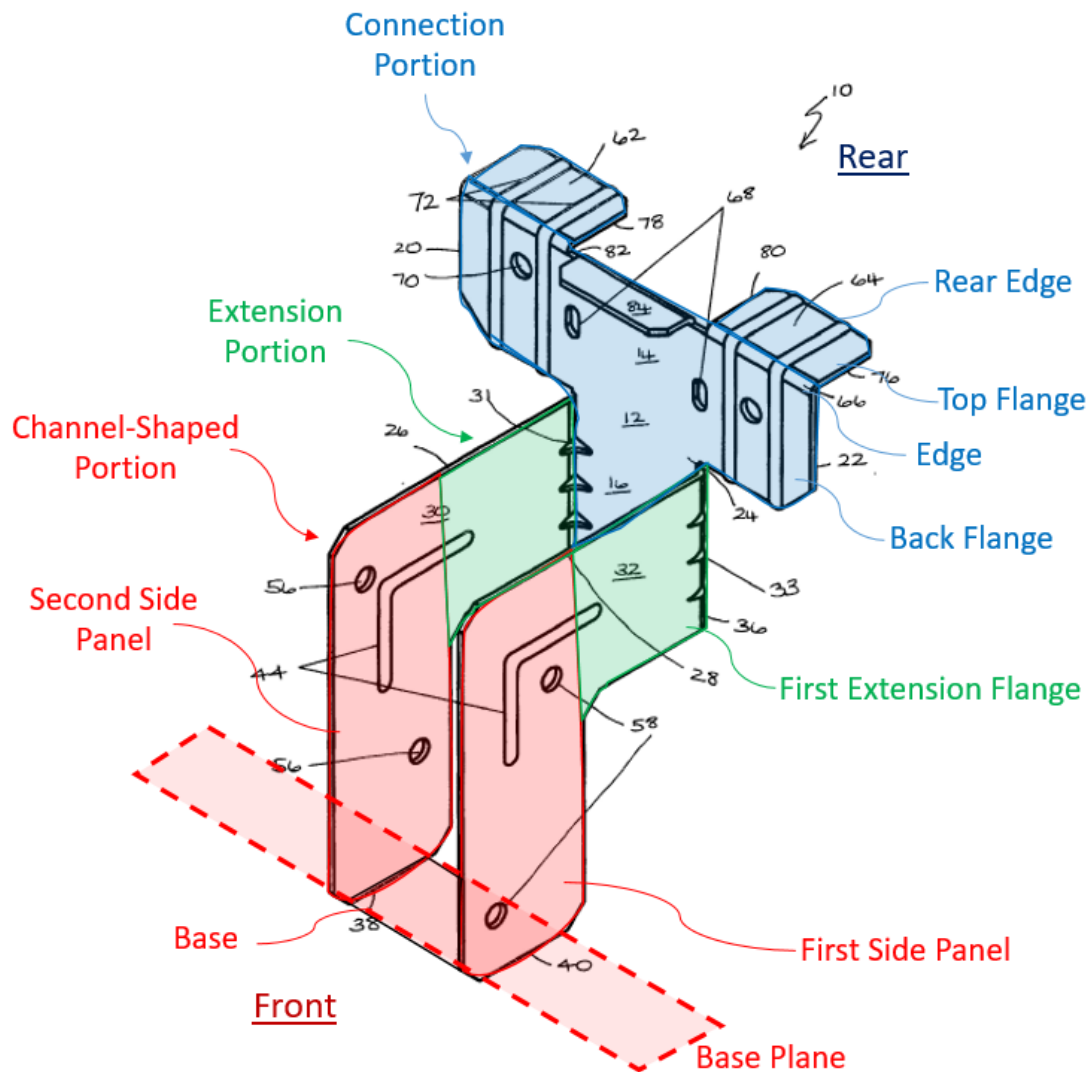
219. Cullen discloses that the first extension flange (sidewall 32) and the channel-shaped portion (legs 38/40) are formed as one-piece of sheet metal (blank 106). EX1039, 10:12–14; 18:8–19:7. And as discussed for claims 42 and 95, in employing the teachings of Cullen’s seat with hanger 10, a POSITA would have found it obvious to include a base with legs 38/40 as a one-piece design by bending a lower portion of one or both legs 38/40 inward to form a surface to receive the structural member.



EX1039, FIG. 4 (annotated).

6) Top Flange's Rear Edge

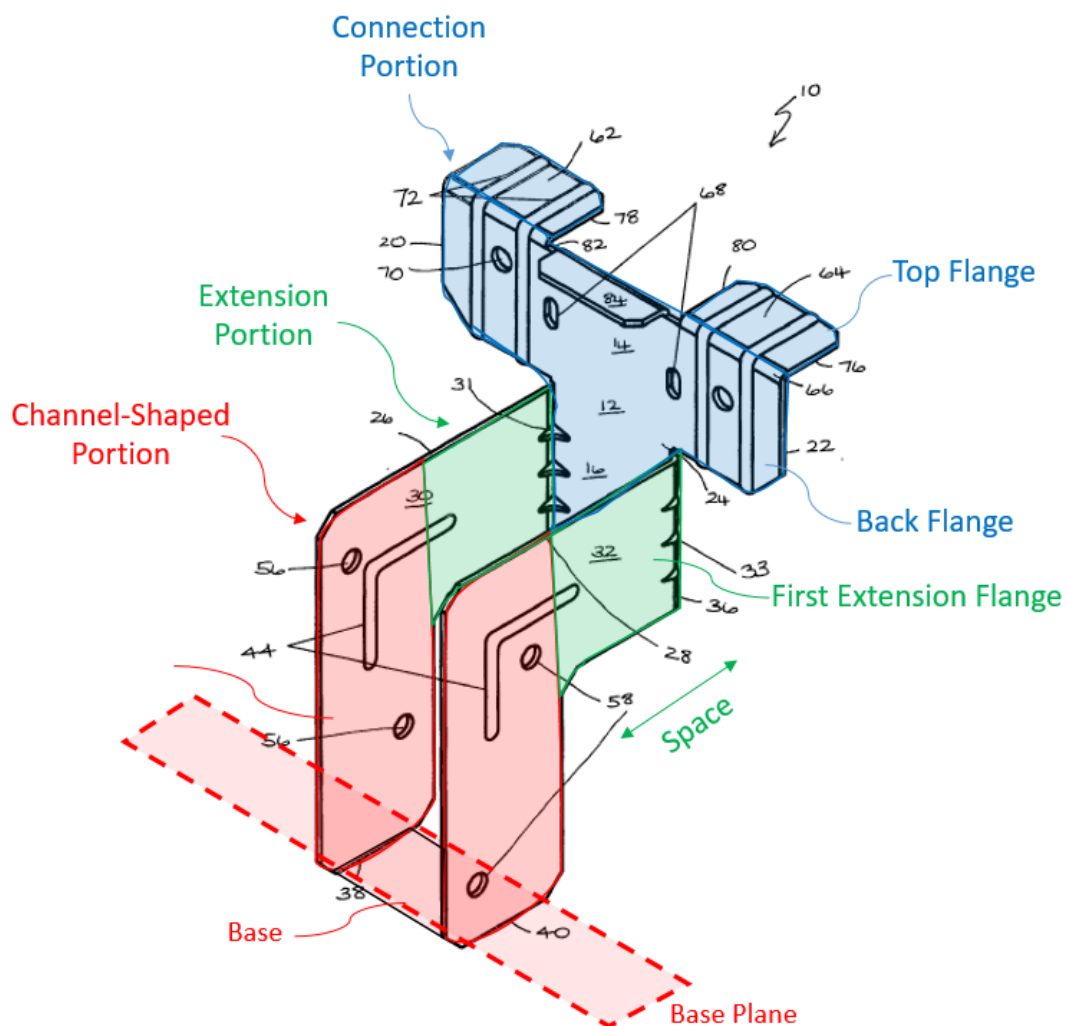
220. Cullen discloses that the top flange (bearing plate 64) includes a rear edge (annotated below) located rearwardly of the edge (fold line 66) of the top flange from which the back flange extends and that the rear edge is located rearwardly of the back flange, shown below. EX1039, FIG. 1.



EX1039, FIG. 1 (annotated).

7) Channel-shaped Portion Spaced Apart From Connection Portion

221. Cullen discloses the channel-shaped portion (legs 38/40) and the connection portion (back plate 12 and bearing plates 62/64) are spaced apart from one another by the distance defined by the extension portion extending therebetween—long enough to allow two layers of 5/8” drywall to be inserted, as taught by Bundy. EX1039, 10:29–30.



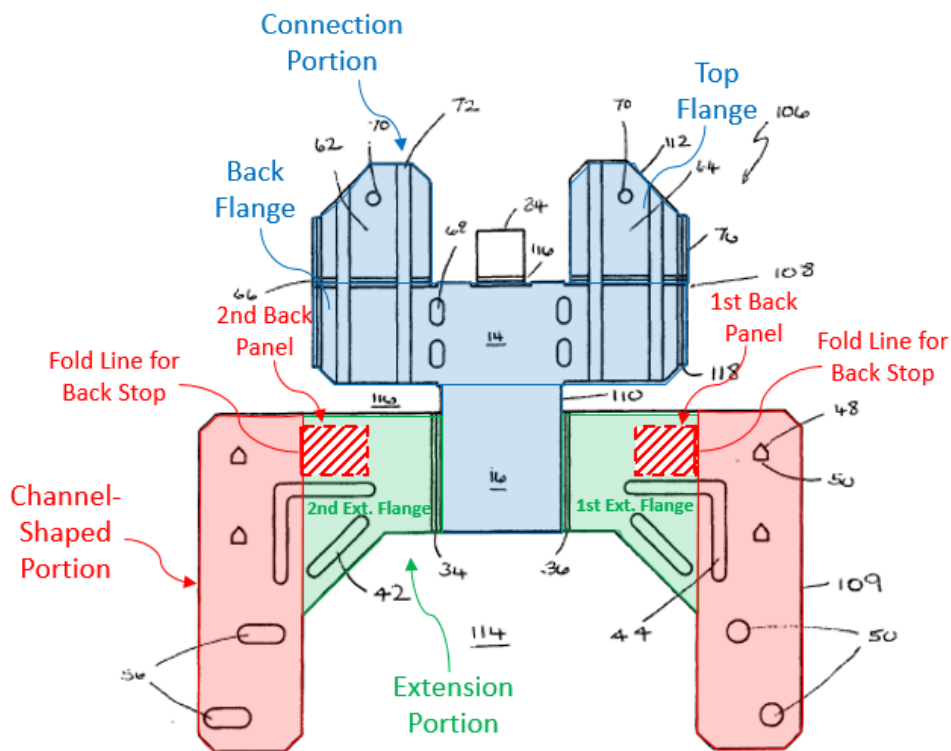
EX1039, FIG. 1 (annotated).

222. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 50 and 103.

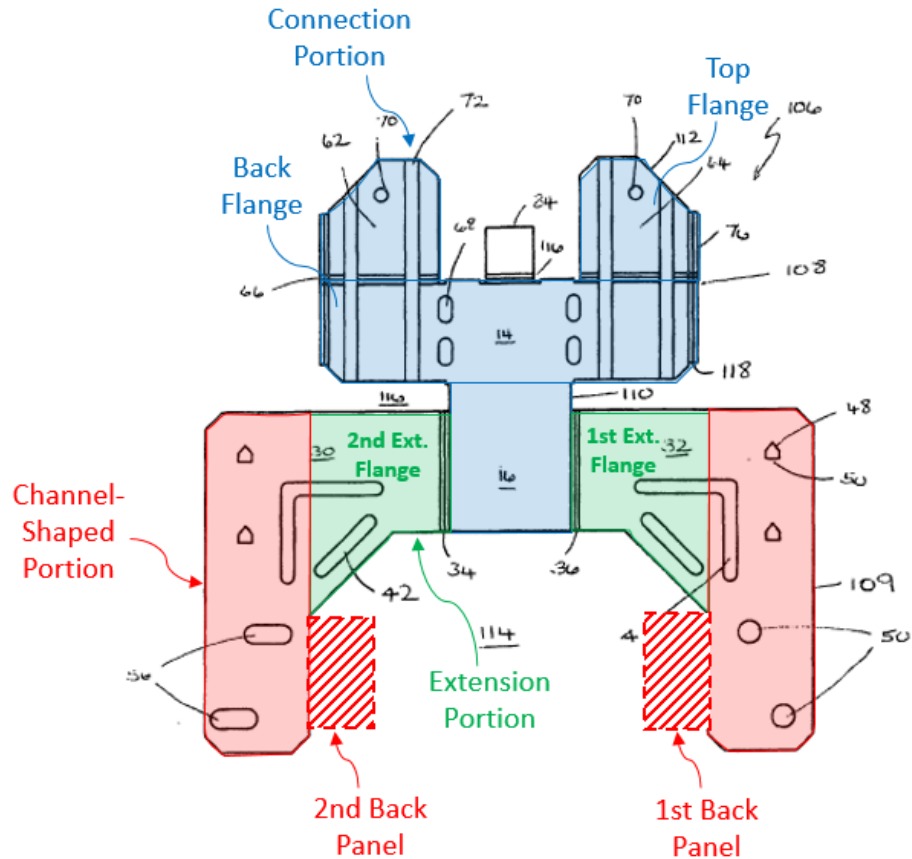
N. Claims 51 and 104

1) Stop Comprising First and Second Back Panels

223. As discussed for claims 50 and 103, modifying Cullen's hanger to include inward-bent back plate members as taught by Bundy would have resulted in first and second back panels extending toward each other. EX1007, 4:39-46 ("Although the back plate members 9 are shown as splayed outward in opposite direction, **they could both be bent inward to face each other between the first and second side members 11.**").



EX1039, FIG. 4 (annotated).



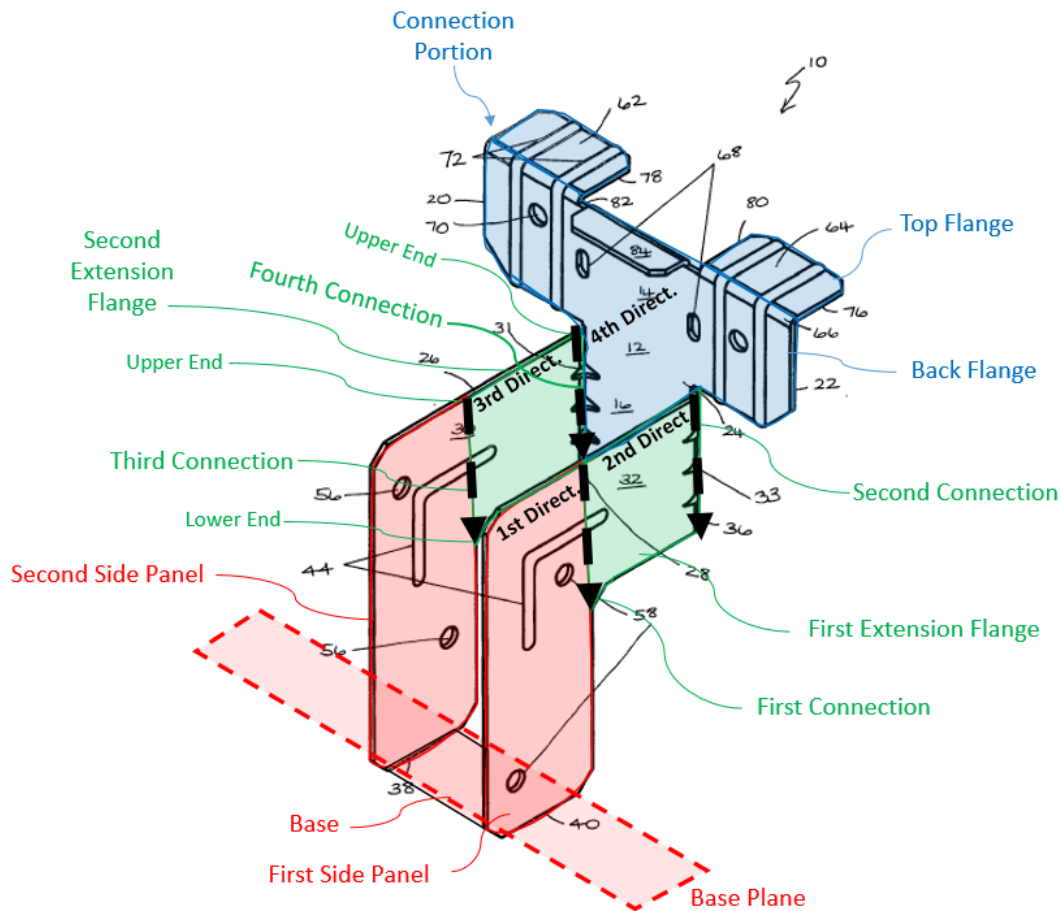
EX1039, FIG. 4 (annotated).

2) Second Extension Flange

224. As discussed for claims 41 and 94, Cullen discloses that the extension portion includes a second extension flange (sidewall 30) extending from the connection portion (back plate 12) to the channel-shaped portion (leg 38). The second extension flange (sidewall 30) is directly attached to the channel-shaped portion (leg 38) by a third connection (annotated below) and to the connection portion (back plate 12) by a fourth connection (bend 34), shown below. EX1039, 10:25–30, FIG. 1. The third and fourth connections (annotated below) each have an

upper end and a lower end and extends from the upper end to the lower end in a third direction and fourth direction, respectively, shown below. EX1039, FIG. 1.

Cullen discloses the third and fourth directions being parallel to the first and second directions (i.e., vertical) and being perpendicular to the horizontal base plane, shown below. EX1039, FIG. 1.

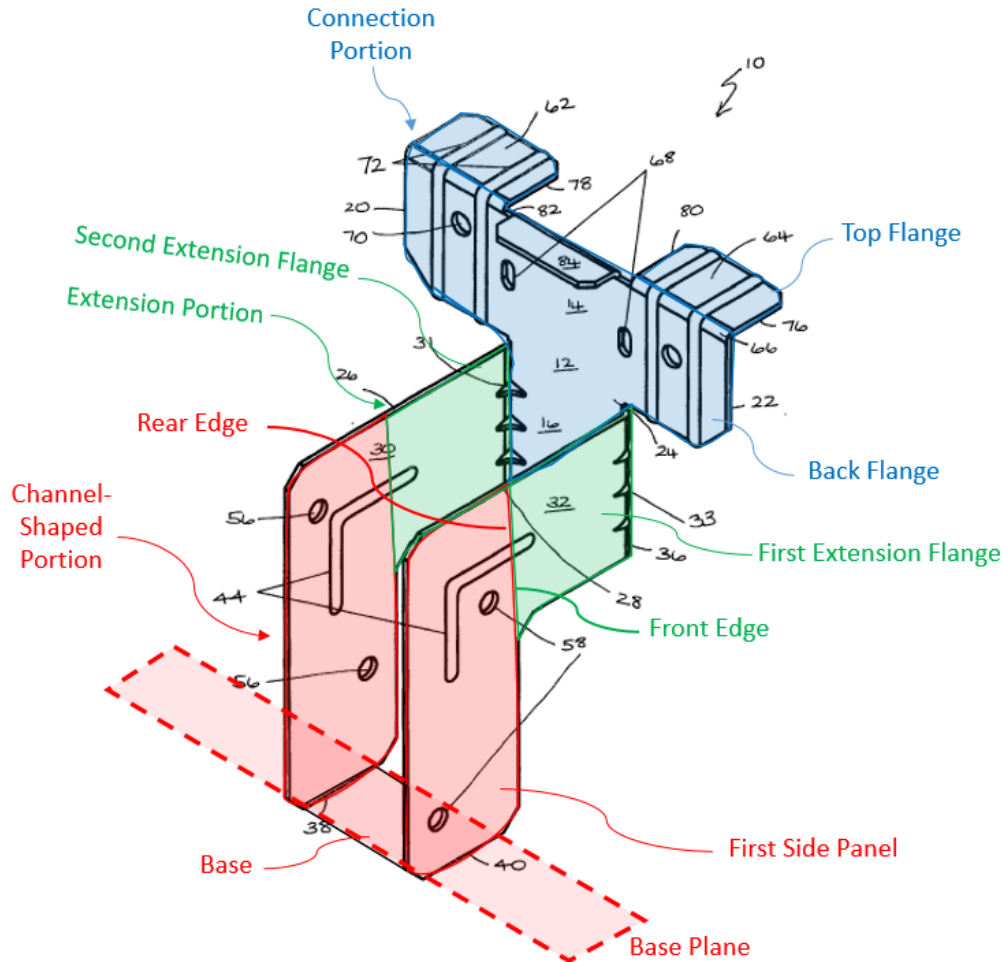


EX1039, FIG. 1.

3) First Side Panel

225. As discussed for claims 42 and 95, Cullen renders obvious a channel-shaped portion including a first side panel (leg 40) extending upward from the base

(seat). Cullen discloses a front edge of the first extension flange (sidewall 32) abutting a rear edge of the first side panel (leg 40), shown below. EX1039, FIG. 1.

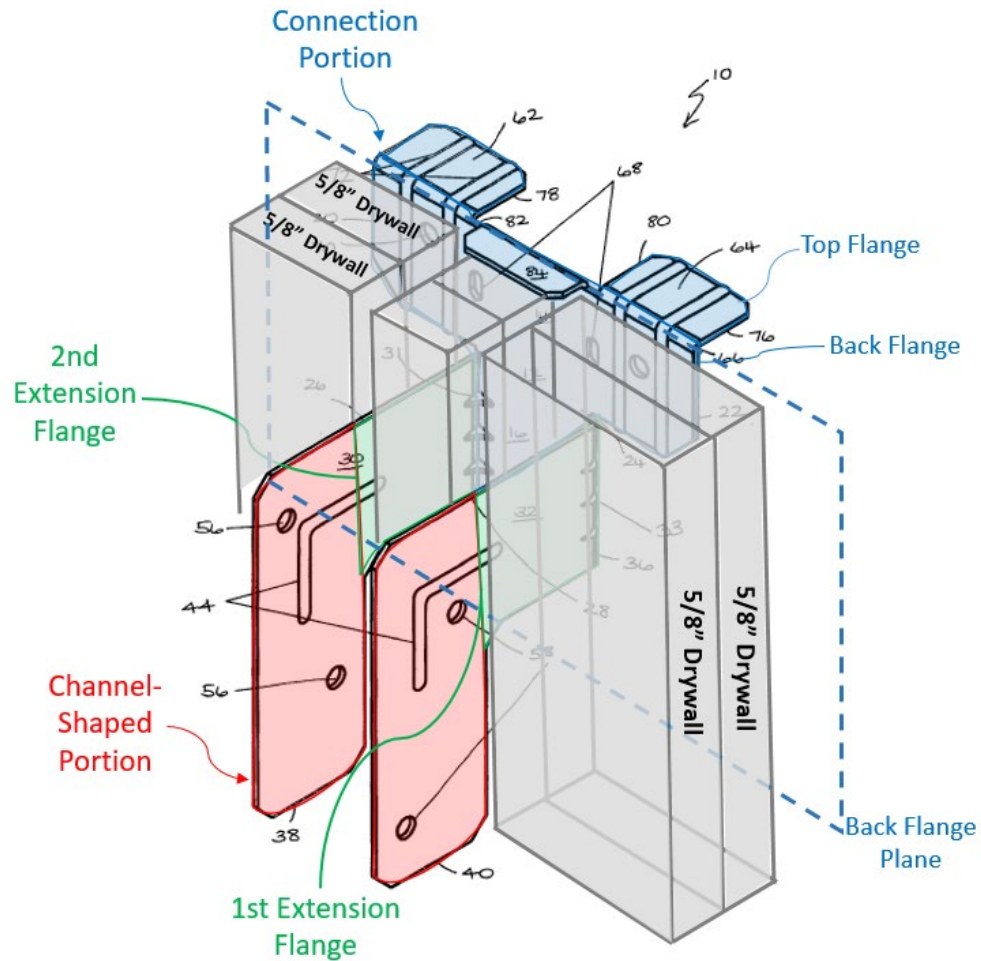


EX1039, FIG. 1 (annotated).

4) Drywall Space

226. As discussed in §XIII.A, employing the teachings of Bundy's drywall space with Cullen's hanger renders obvious a drywall space sized and shaped to receive the two layers of 5/8-inch-thick drywall therein. EX1007, 5:10–22. As the channel-shaped portion, first and second extension flanges, and back flange (whose

front surface defines the back flange plane) define the drywall space's size and shape, they bound the drywall space. EX1039, FIG. 1; EX1007, 5:10-22.



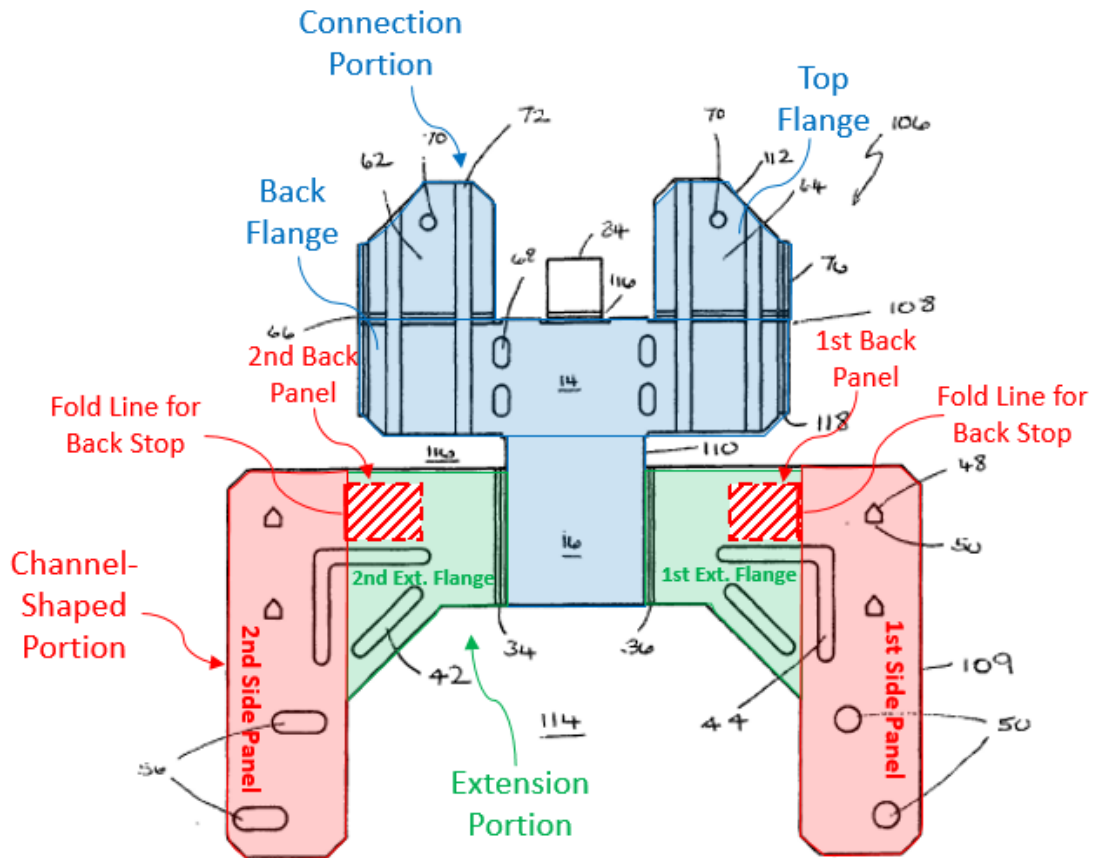
EX1039, FIG. 1 (annotated).

227. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 51 and 104.

O. Claims 52 and 105

1) First and Second Back Panels Directly Attached to First and Second Extension Flanges

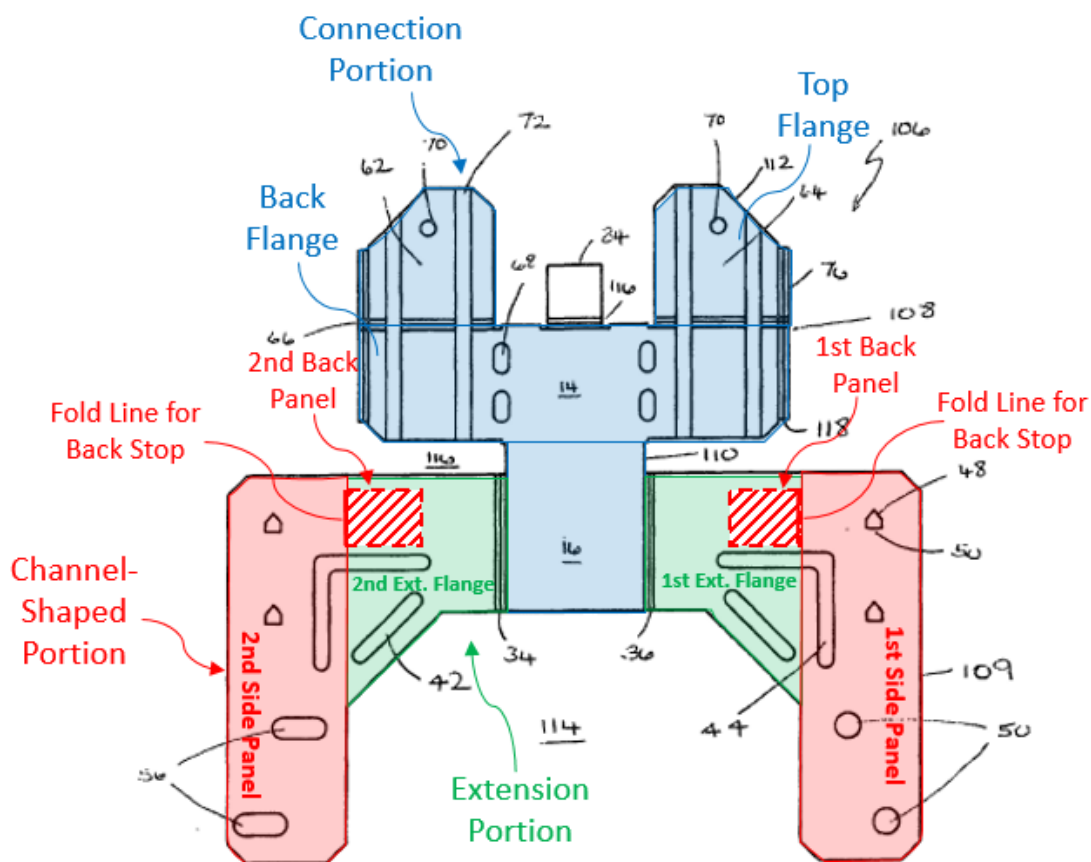
228. Given the teachings of Bundy's inward-bent back plate members 9, a POSITA would have been motivated to directly attach, via bending, one of Bundy's inward-bent back panels to Cullen's first extension flange (sidewall 32) and the other of Bundy's inward-bent back panels to Cullen's second extension flange (sidewall 30). Bundy teaches bending in back plate members 9 at the rear edge of its channel-shaped portion. EX1007, 4:41–46. A POSITA would have understood that punching out and bending a section of Cullen's sidewalls 30/32 inward at the rear edge of legs 38/40, as taught by Bundy, would provide the benefits of the back panels using the least amount of sheet metal. When such bending of the sidewalls is implemented in Cullen at a location that would be in front of any inserted drywall, as taught by Bundy, such bends would also directly attach to the extension flanges at the top and bottom corners of the respective bent sections, given the location of Cullen's sidewalls vis-à-vis its extension flanges. Thus, Cullen in view of Bundy renders obvious the first back panel directly attached to the first extension flange and the second back panel directly attached to the second extension flange.



EX1039, FIG. 4 (annotated).

2) One-Piece of Sheet Metal

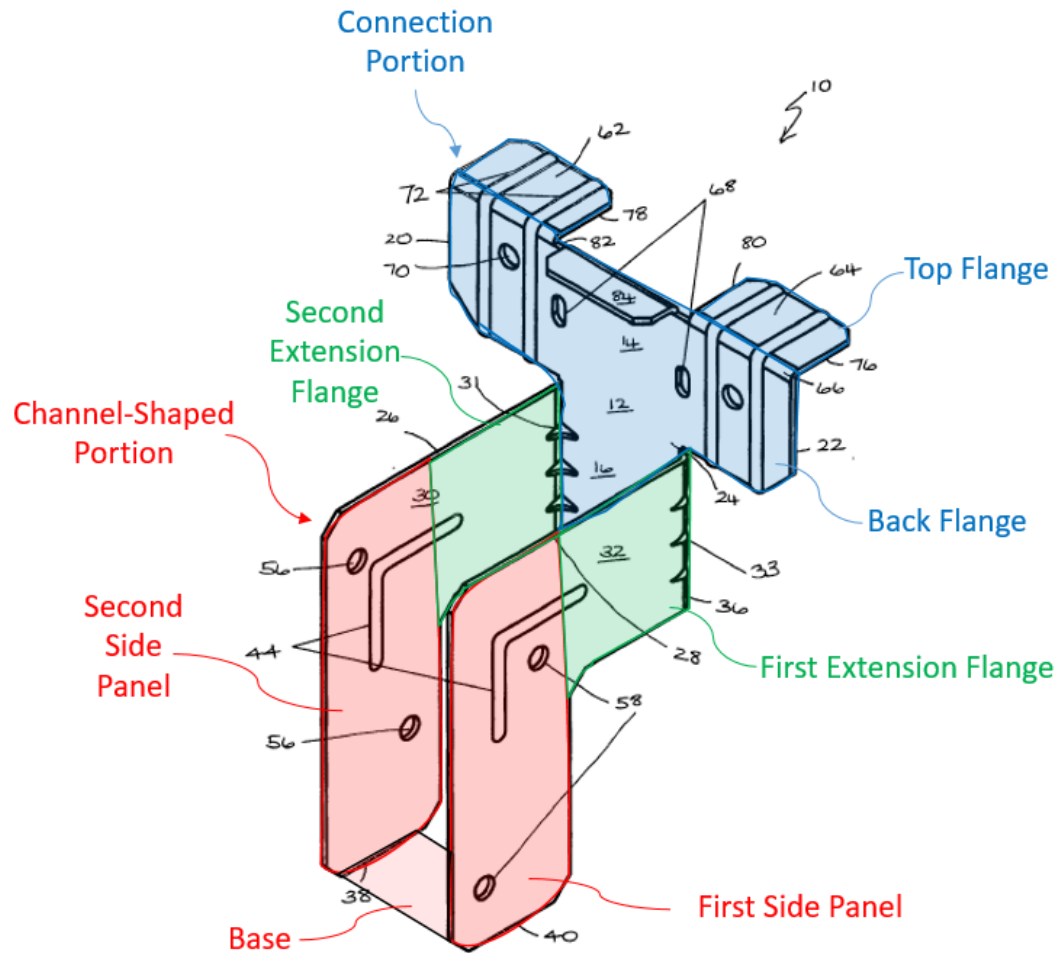
229. As discussed for claims 45 and 98, Cullen discloses the channel-shaped portion (legs 38/40 and seat), the connection portion (back plate 12, bearing plates 62/64), and the extension portion (sidewalls 30/32) being formed as one-piece of sheet metal. EX1039, 10:12–14; 18:8–19:7.



EX1039, FIG. 4 (annotated).

3) Second Side Panel

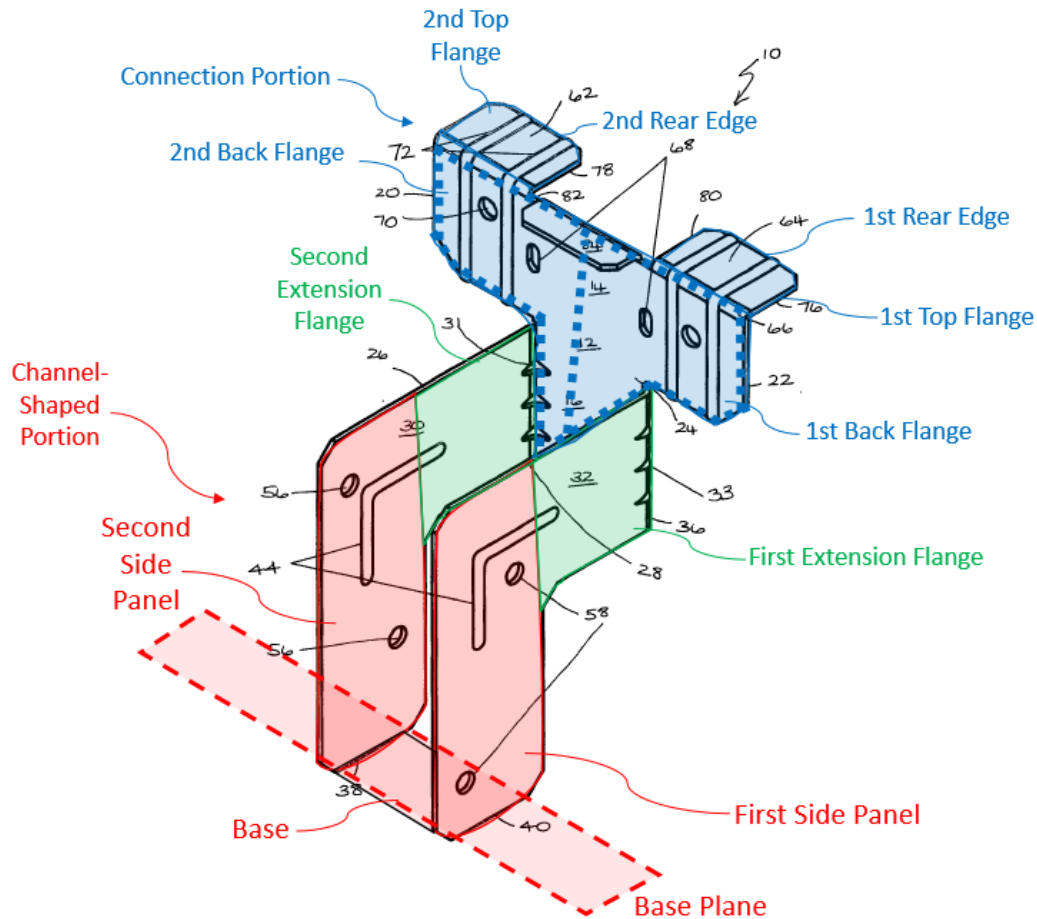
230. As discussed for claims 42 and 95, Cullen-Bundy discloses a second side panel (leg 38) extending upward from the base (seat), wherein the first and second extension flanges (sidewalls 30/32) are parallel to each other and the first and second side panels (legs 38/40) are parallel to each other.



EX1039, FIG. 1 (annotated).

4) First Back and Top Flanges

231. For the reasons discussed for claims 39 and 92, Cullen discloses the back flange being a first back flange (right half of back plate 12), and the top flange being a first top flange (bearing plate 64). EX1039, 10:16–22, 11:24–29.

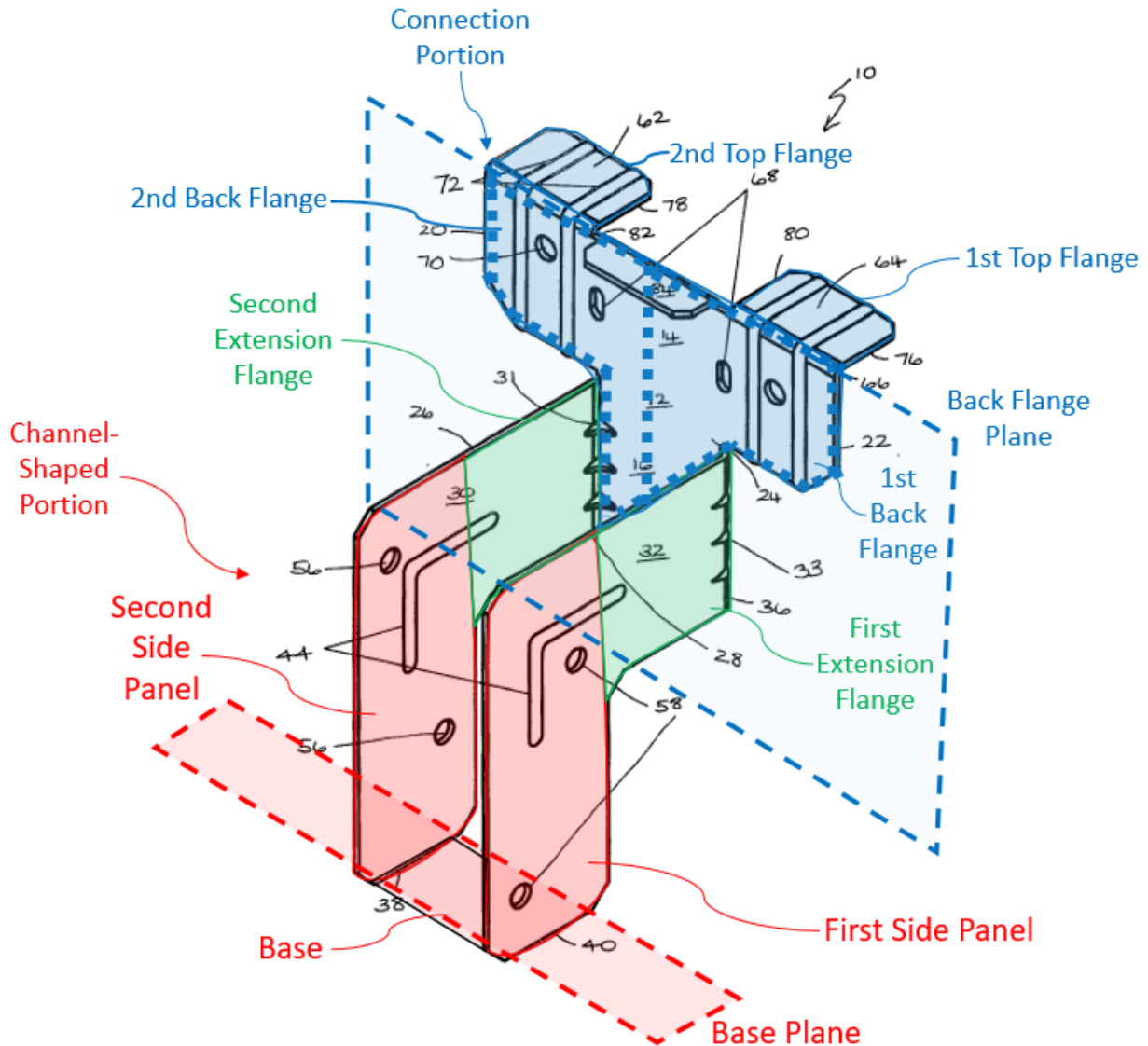


EX1039, FIG. 1 (annotated).

5) Second Back Flange and Second Top Flange

232. For the reasons discussed for claims 39 and 92, when mounted on a frame wall as taught in Cullen-Bundy, Cullen discloses that the connection portion includes a second top flange (bearing plate 62) arranged to engage the top surface of the top plate of the frame wall and a second back flange (left half of back plate 12) extending from an edge of the second top flange (bearing plate 62) and arranged to engage the vertical face of the top plate of the frame wall, the second

back flange (left half of back plate 12) having a front surface lying in the back flange plane.

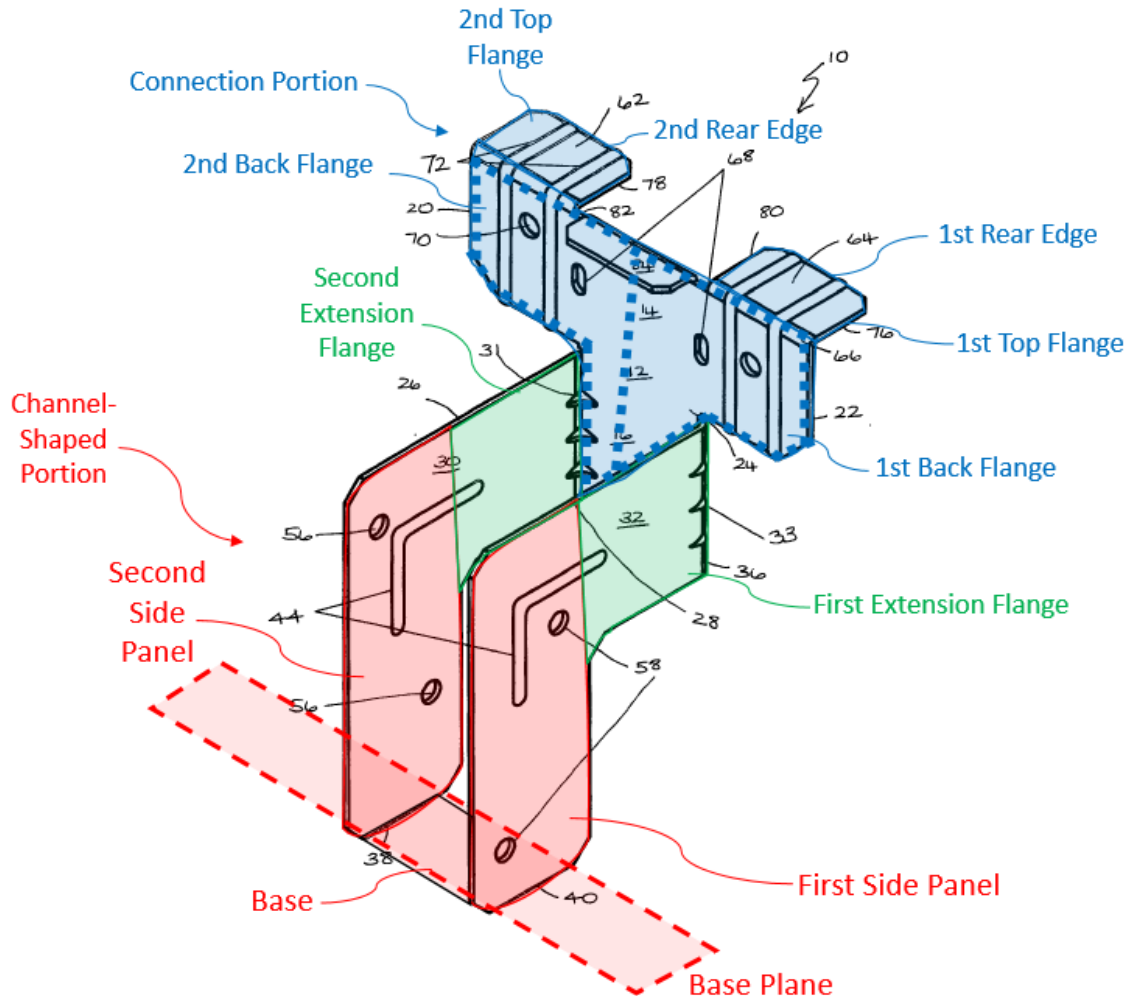


EX1039, FIG. 1 (annotated).

6) Extension Flanges Extending From Back Flanges to Channel-Shaped Portion

233. As discussed for claims 1.3.A, 39, 41, and 94, Cullen discloses that the first extension flange (sidewall 32) extends from the first back flange (back

plate 12) to the channel-shaped portion (leg 40) and that the second extension flange (sidewall 30) extends from the second back flange (left half of back plate 12) to the channel-shaped portion (leg 38). EX1039, 10:22–30.



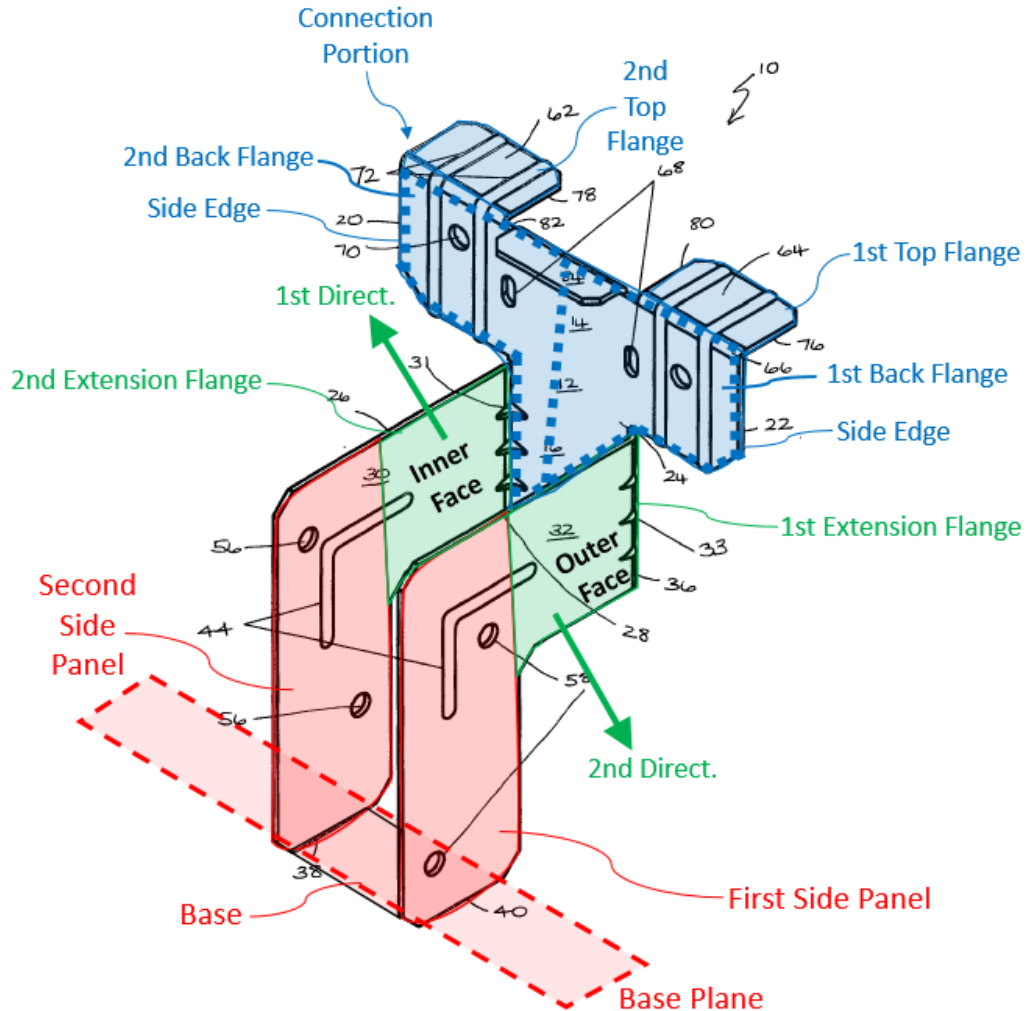
EX1039, FIG. 1 (annotated).

7) Inner and Outer Faces of Extension Flanges and Side Edge of Back Flanges

234. Cullen discloses that the first and second extension flanges (sidewalls 30/32) each include an inner face and an outer face (annotated below) because they

are made of sheet metal with a thickness. EX1039, 10:29–30. Because sidewalls 30/32 are parallel to each other, Cullen discloses that the inner faces of the first and second extension flanges face one another—the inner face of the first extension flange (sidewall 32) facing in a first direction toward the inner face of the second extension flange (sidewall 30), and the outer face of the first extension flange facing in a second direction that is opposite the first direction, shown below.

EX1039, FIG. 1, 10:25-26.



EX1039, FIG. 1 (annotated).

235. Cullen further discloses the first back flange (right-half of back plate 12) having a side edge disposed outward, in the second direction, of the outer face of the first extension flange (sidewall 32), as shown above. EX1039, FIG. 1.

Cullen further discloses the second back flange (left-half of back plate 12) having a side edge disposed outward, in the first direction, of the outer face of the second extension flange (sidewall 30). EX1039, FIG. 1.

236. Accordingly, in my opinion, Cullen in view of Bundy renders obvious claims 52 and 105.

XIII. CLAIMS 1, 22–27, 39–45, 50–53, 74–79, 92–98, AND 103–105 WOULD HAVE BEEN OBVIOUS OVER ADAMS IN VIEW OF BUNDY.

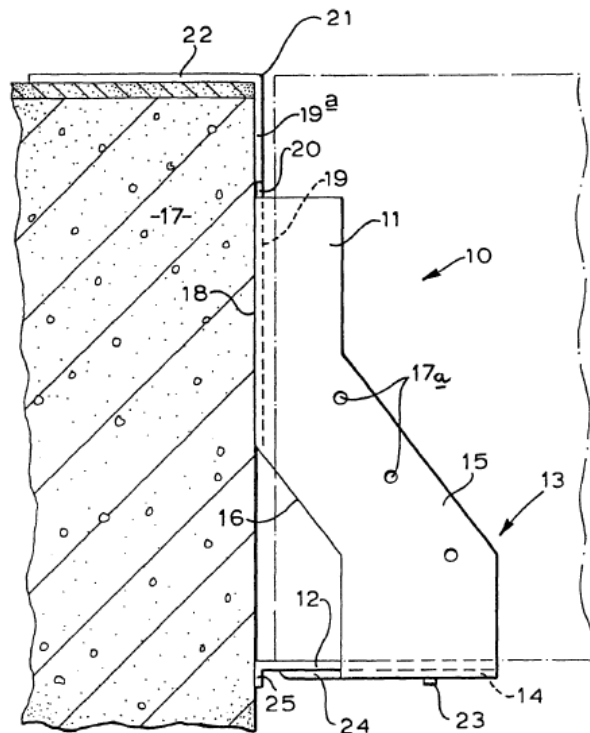
237. In my opinion, Adams, as modified in view of Bundy, renders obvious claims 1, 22–27, 39–45, 50–53, 74–79, 92–98, and 103–105 for the following reasons.

238. Adams discloses each and every structural element listed in independent claims 1 and 53, but does not explicitly disclose that the space defined between its channel-shaped portion and back flange is sized large enough to receive two layers of 5/8-inch-thick drywall therein. However, Bundy discloses an analogous firewall hanger that receives two layers of 5/8-inch-thick drywall between its channel-shaped portion and the wall frame. A POSITA would have sought to modify Adams's hanger based on the teachings of Bundy to define a

space large enough for receiving two layers of 5/8-inch-thick drywall with a reasonable expectation of success, as explained below.

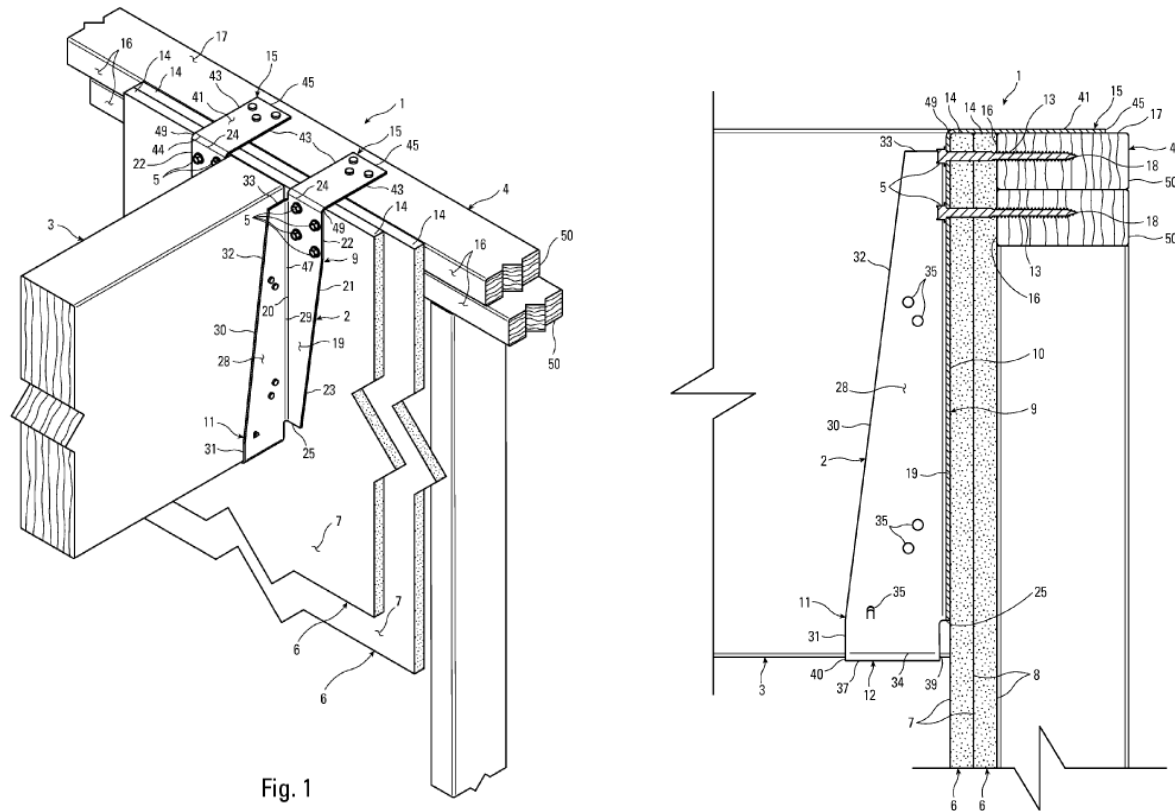
A. Motivation to Modify Adams Based on the Teachings of Bundy.

239. Adams and Bundy are both directed to joist hangers. As shown below, Adams's hanger includes a channel-shaped portion (base 14 and portion of sidewall 15 thereabove) that is separated from a connection portion (abutment portion 19) via an extension flange (portion of sidewall 15 above edge 16). A POSITA would have understood that Adams's hanger 10 defines a space between its back flange (abutment portion 19) and channel-shaped portion (base 14 and portions of sidewall 15 thereabove) corresponding to the length defined by edge 16 of its sidewall 15, such that a space exists between the wall and the end of the joist.



EX1040, FIG. 2

240. A POSITA would also have understood that Adams discloses separating the end of a joist from a wall frame, as shown above. Specifically, Adams describes that “[i]n use, the base 14 is positioned away from the supporting element 17.” EX1040, 4:11-21. A POSITA would have understood that supporting element 17 can be a timber wall. Adams further describes that “the positioning of the joist within the hanger can clearly be seen and the end of the joist can be ventilated through the opening behind the inclined edge 16 of the side walls.” EX1040, 4:11-21. While Adams explicitly describes spatially separating the joist’s end away from its back flange (abutment portion 19), Adams is silent about the size of that space. But in my opinion, it would have been obvious to a POSITA to adjust the sizing of the space defined between Adams’s abutment portion 19 and the edge of base 14 to a size sufficient to accommodate two layers of 5/8” drywall for fire resistance, as taught by Bundy.



EX1007, FIGs. 1 and 3.

241. As I explained above in § XI.A., Bundy discloses sizing an extension portion of an analogous hanger to receive two 5/8"-thick-layers of drywall between its channel-shaped portion and the front face 6 of the wall's support member 4. EX1007, 5:16-18. In view of Bundy and the fact that two 5/8" thick layers of drywall are commonly used for a fire separation wall, a POSITA would have understood that the extension portion of a joist hanger can be sized optimally to define a two 5/8"-thick-layer drywall space between the channel-shaped portion and a wall.

242. Given that Adams's hanger is intended for securing its base 14 "away from the supporting element 17" of a "timber" wall, a POSITA would have been motivated to receive drywall in the space between Adams's base 14 and abutment portion 19. Bundy teaches receiving drywall between a hanger's channel-shaped portion and the front surface of a top plate to shield a frame wall, and advantages for accommodating two layers of 5/8" drywall between a wall frame and a structural member held by a hanger for fire resistance in a fire separation wall. EX1007, 2:10–24. In view of Bundy's teachings, a POSITA would have optimized the size of the spacing between Adams's base 14 and abutment portion 19 (i.e., the spacing provided by the inclined portions of sidewalls 15) to accommodate two layers of 5/8"-thick drywall according to the size preference described by Bundy for optimal fire protection and wall integrity. EX1007, 5:10-22. This modification to Adams would have been nothing more than applying a known technique (Bundy's spacing a hanger seat from a wall frame by a distance sufficient to accommodate two 5/8"-thick drywall sheets for fire resistance) to a similar device (Adams's hanger having a spacing of indeterminate length) to obtain the predictable result of a firewall hanger having a space between Adams's base 14 and abutment portion 19 large enough for receiving the fire-resistant drywall therebetween, thereby "protect[ing] the structural members of a building." EX1007, 5:18-20.

243. A POSITA would have had an expectation of success in modifying Adams's hanger 10 to include a space large enough to receive two layers of 5/8" thick drywall between its base 14 and abutment portion 19, because doing so would still allow Adams's hanger to perform its intended function of securing a joist to a wall. EX1040, 4:13–19. Recognizing that Adams's and Bundy's hangers are constructed from sheet metal blanks, a POSITA would have understood how to modify the size of Adams's sidewalls 15 to accommodate two layers of 5/8" drywall while still allowing Adams's hanger to secure a joist's end to a frame wall. EX1007, 4:46-53; EX1040, 3:55–4:1. Doing so would have been well within the level of ordinary skill in the art at the time of invention.

B. Independent Claim 1

[1.P] “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,”

244. For the reasons that I discussed above in § XI.B.[1.P], it is my understanding that the preamble recites an intended use of the claimed invention, and therefore, is satisfied by any prior art structure capable of performing the intended use.

245. To the extent that the preamble is limiting, employing the teachings of Bundy with Adams renders obvious a hanger for connecting a structural component to a frame wall adapted to having two layers of 5/8"-thick drywall.

Adams explicitly discloses using hanger 10 for timber building construction, but not explicitly for a wall adapted to have two-layers of 5/8-inch-thick drywall mounted thereon. EX1040, 1:1-8. As discussed above in § XIV.A., a POSITA would have understood that Adams's hanger would be applicable to a wall covered with two such layers of drywall for fire resistance, as taught by Bundy, and that Adams's sidewalls would be sized to accommodate two such layers of drywall between its back flanges and channel-shaped portion. EX1007, 2:37-44. A POSITA would have also understood that Adams's hanger is configured to secure to a top plate of a frame wall by connecting Adams's hanger directly to the top plate when supporting element 17 is a timber wall. Accordingly, it would have been obvious to a POSITA to use Adams's hanger as modified by Bundy to connect a structural component to a top plate of a frame wall adapted to have the requisite drywall mounted thereon.

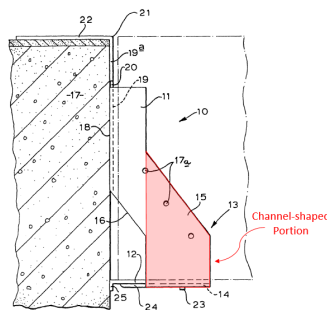
246. This modification would have been simply applying a known technique (Bundy's use of a hanger on a frame wall with two layers of 5/8" drywall to create a fire separation wall) to a known device (Adams's hanger having a space of unknown dimension between its base 14 and abutment portion 19) to obtain the predictable result of optimizing the size of the hanger's spacing to receive two 5/8"-thick layers of drywall therein, thereby shielding wall structures from fire. *See* EX1007, 5:18-20.

247. A POSITA would have had an expectation of success in using Adams's hanger with a drywall-covered wall because Bundy's and Adams's hangers serve similar purposes—supporting a floor joist/structural beam at a top end of a wall.

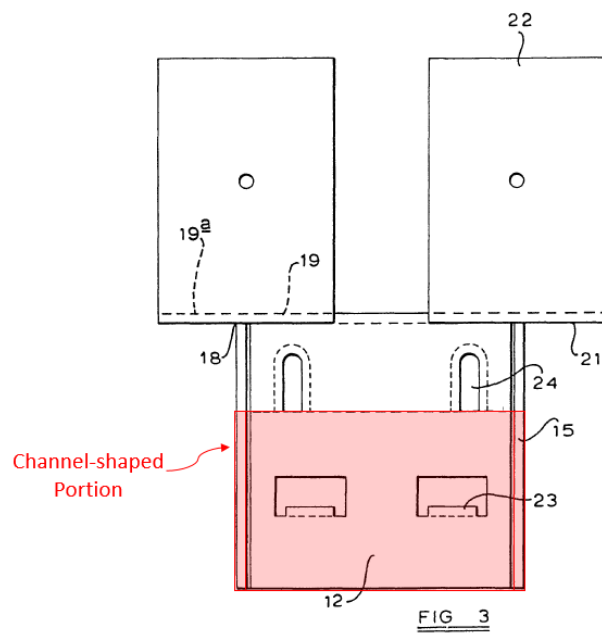
248. Accordingly, in my opinion, Adams in view of Bundy renders obvious element [1.P].

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

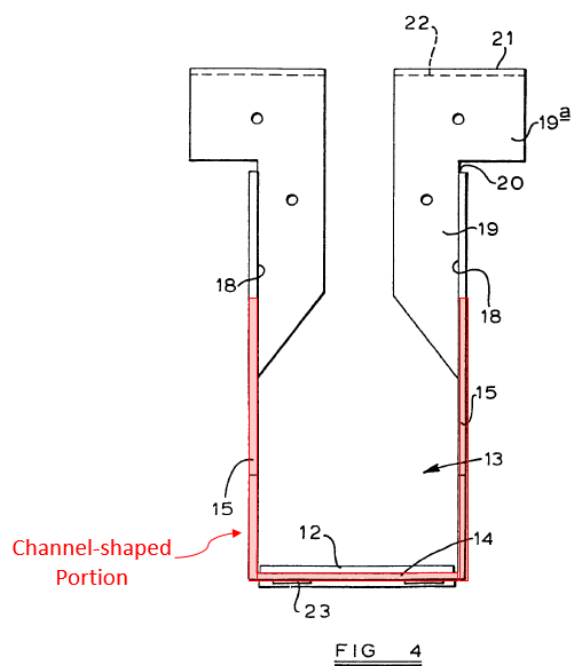
249. Adams discloses a channel shaped portion (e.g., base 14 and portions of sidewalls 15 thereabove) configured to receive the structural component (e.g., structural beam). EX1040, 4:2-5, FIGs. 2-4. A POSITA would have understood that the channel-shaped portion (base 14 and portions of sidewalls 15 thereabove) of Adams's hanger is configured to receive an end of a structural component because the portions of sidewalls 15 above base 14 are parallel and spatially-separated from each other to define a space for receiving the joist's end, as shown below. EX1040, FIGs. 2–4.



EX1040, FIG. 2 (annotated).



EX1040, FIG. 3 (annotated).

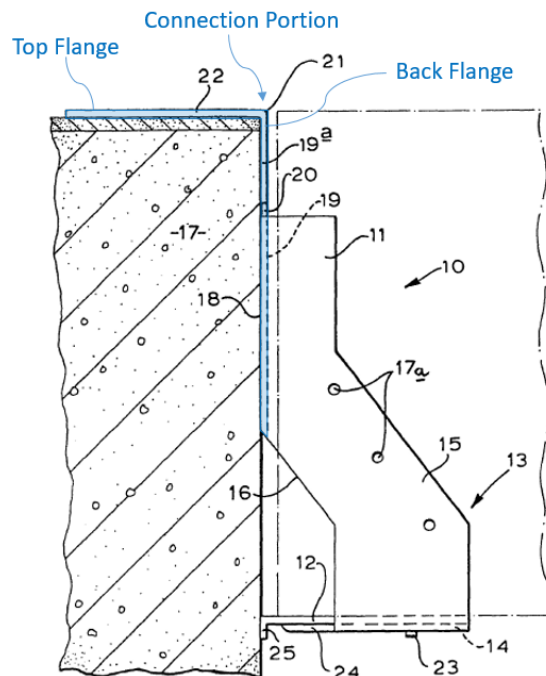


EX1040, FIG. 4 (annotated).

250. Accordingly, in my opinion, Adams discloses claim element [1.1].

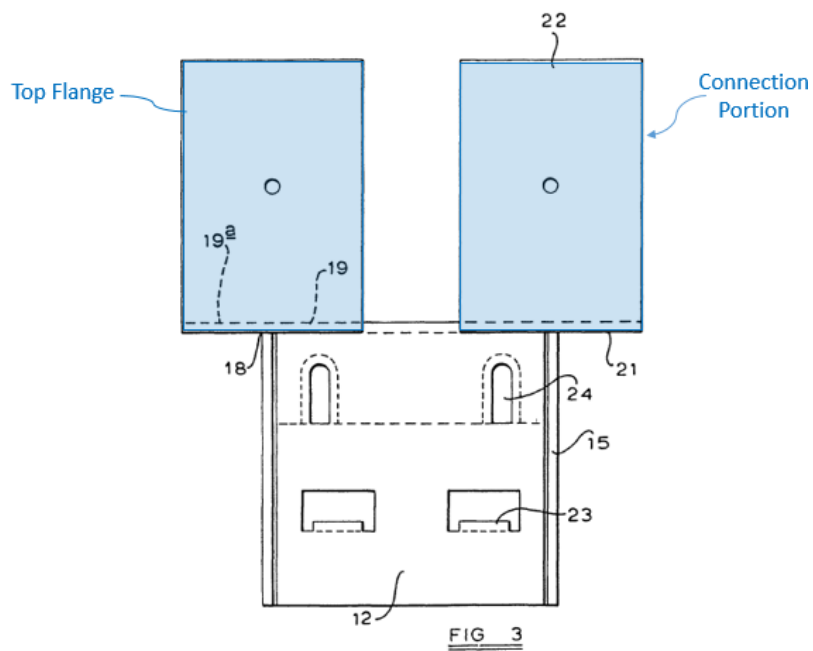
[1.2.A] “a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and,”

251. Adams discloses a connection portion that includes a top flange (bearing portion 22) arranged to engage a top surface of a top plate of the frame (timber) wall (support element 17), as taught by Bundy. EX1040, 4:34-41, FIGs. 2-4. A POSITA would have understood that the bearing portion 22 of Adams’s hanger is arranged to engage a top surface of a top plate of the frame wall because bearing portion 22 extends from a top edge (bend 21) of a back flange (abutment portion 19) in a horizontal direction, allowing bearing portion 22 to rest on the top plate of the frame wall, as shown below. EX1040, FIG. 2.

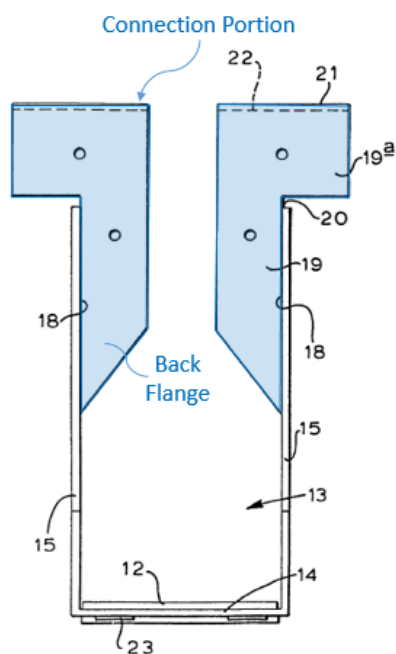


EX1040, FIG. 2 (annotated).

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EX1040, FIG. 3 (annotated).



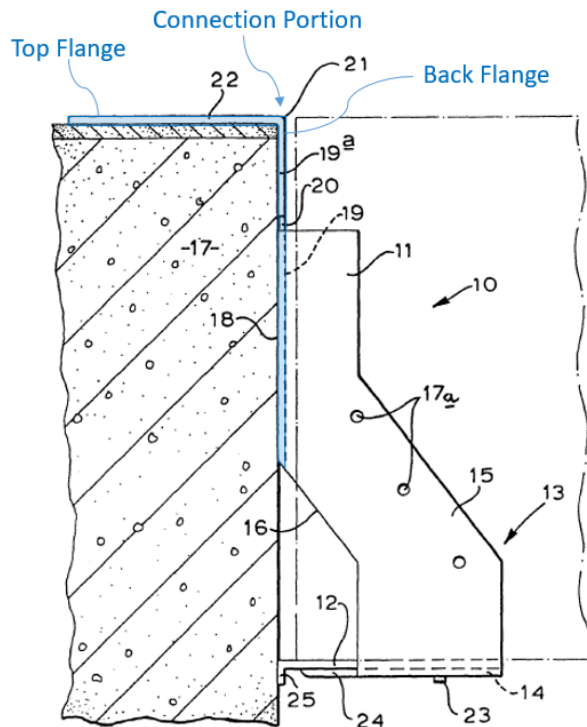
EX1040, FIG. 4 (annotated).

252. Accordingly, in my opinion, Adams in view of Bundy discloses claim element [1.2.A].

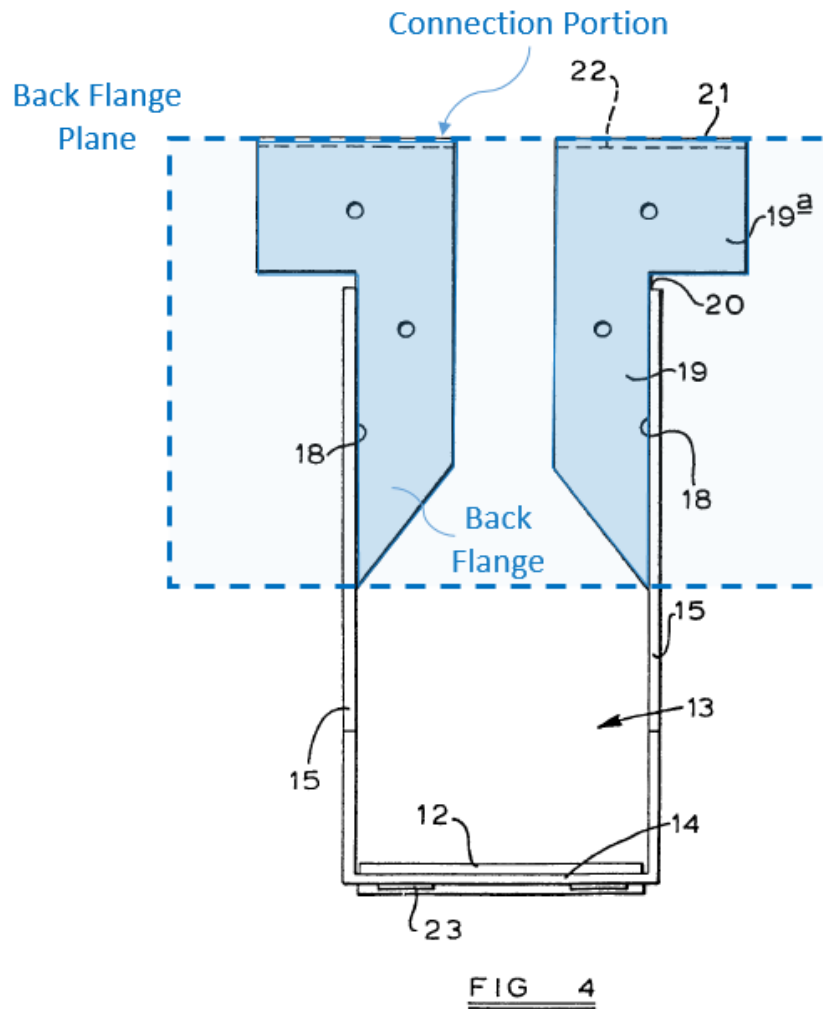
[1.2.B] “a back flange extending from an edge of the top flange, the back flange arranged to engage a vertical face of the top plate of the frame wall, the back flange having a front surface lying in a back flange plane,”

253. Adams discloses a back flange (abutment portion 19) extending from an edge (fold line 21) of the top flange (bearing portion 22) and arranged to engage a vertical face of the top plate of the frame wall (“lies against the forward face of the supporting element 17”). EX1040, 4:22-36, FIGs. 2-3. Adams’s abutment portion 19 has a front surface lying in a back flange plane, as shown below.

EX1040, FIGs. 2-3.



EX1040, FIG. 2 (annotated).

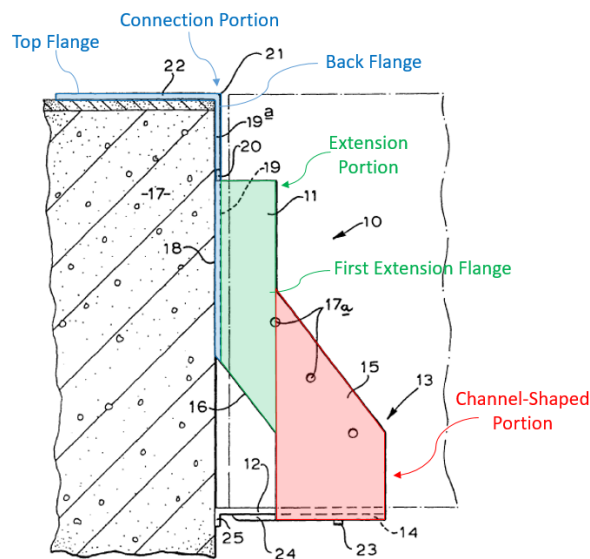


EX1040, FIG. 4 (annotated).

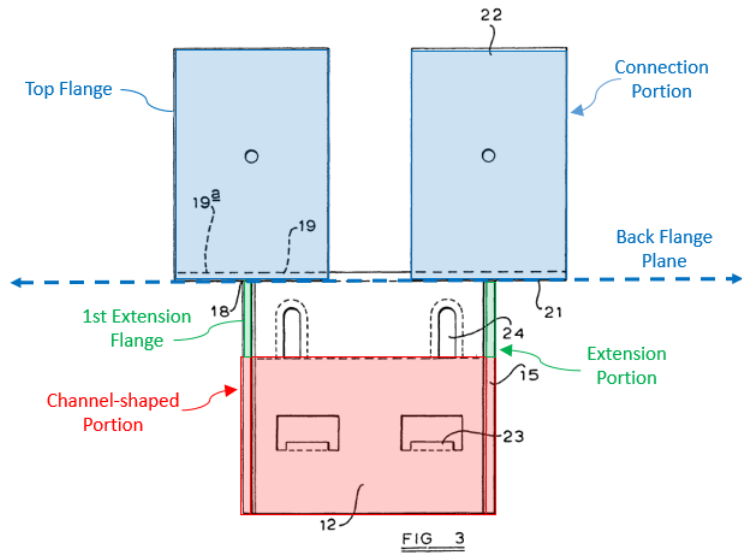
254. A POSITA would have understood that abutment portion 19 of Adams's hanger is arranged to engage a vertical face of the top plate of the frame wall because abutment portion 19 extends in a vertical direction and is located rearward of the remaining portions of Adams's hanger. Accordingly, in my opinion, Adams in view of Bundy discloses claim element [1.2.B].

[1.3.A] “an extension portion including a first extension flange extending from the back flange of the connection portion to the channel-shaped portion;”

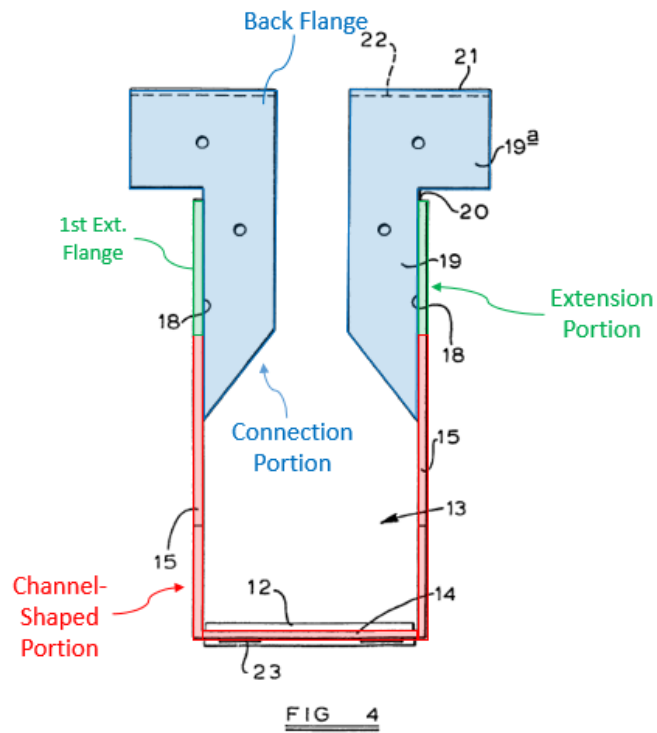
255. Adams discloses an extension portion (section of sidewalls 15 above edge 16) including a first extension flange (first sidewall 15 above edge 16) extending from the back flange (abutment portion 19) of the connection portion to the channel-shaped portion (base 14 and portions of sidewall 15 thereabove), as shown in green below. EX1040, 4:11-25, FIGs. 2-3. Specifically, a POSITA would have understood that Adams’s extension portion begins at a fold line (fold line 18) defined along a vertical edge of its back flange (abutment portion 19) and ends at a rear edge of its channel-shaped portion (portion of sidewall 15 above base 14), thereby extending from the back flange to the channel-shaped portion.



EX1040, FIG. 2 (annotated).



EX1040, FIG. 3 (annotated).

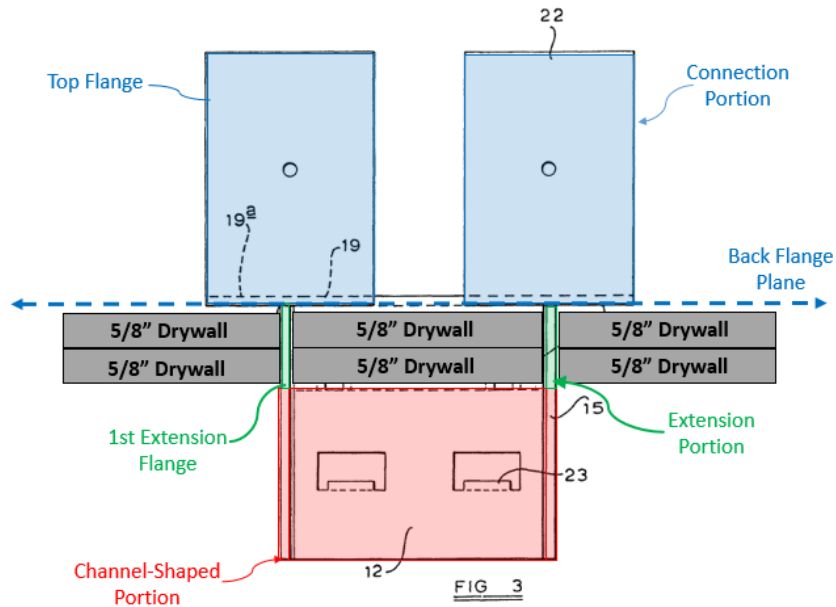


EX1040, FIG. 4 (annotated).

256. As Adams's extension portion is formed from the same piece of sheet metal as the back flange of its connection portion with no intervening components therebetween, Adams's extension portion extends from its connection portion to its channel-shaped portion. Accordingly, in my opinion, Adams discloses claim element [1.3.A].

[1.3.B] “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”

257. Adams's sidewalls 15 define a space that would permit drywall to be inserted between the surface of abutment portion 19 and base 14. Patent Owner may argue that Adams does not explicitly disclose installing two layers of 5/8-inch-thick drywall between the surface of abutment portion 19 and base 14. In my opinion, a POSITA would have found it obvious to size the length of Adams's sidewalls 15 to define a space for receiving two layers of 5/8-inch-thick drywall therein based on Bundy. *See supra* § XIV.A. Bundy teaches installing two layers of 5/8" sheathing between a hanger's channel shaped portion (Bundy's side members 11) and a wall frame. EX1007, 5:18-20.



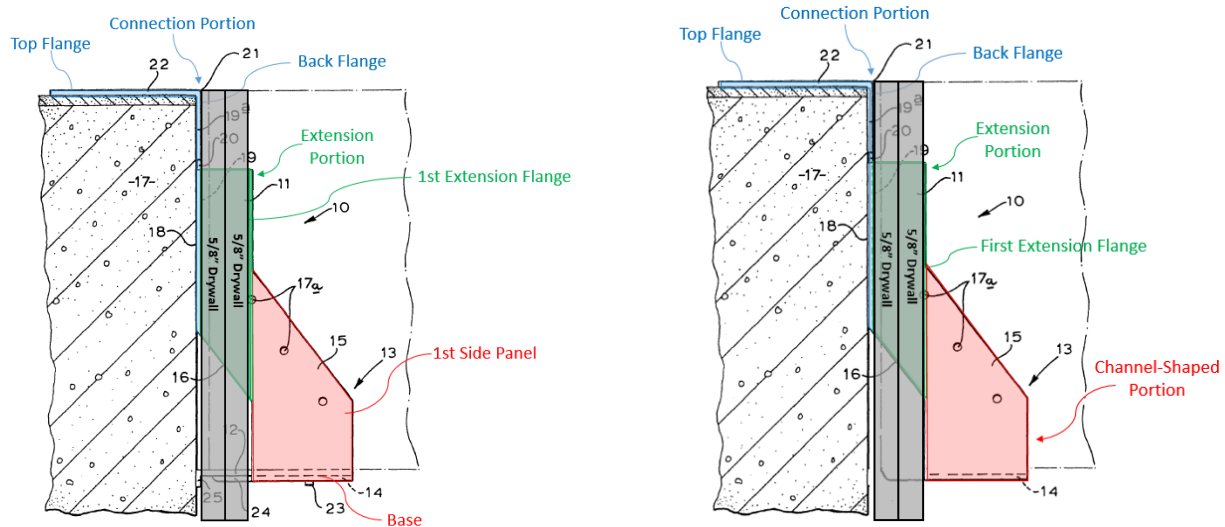
EX1040, FIG. 3 (annotated).

258. A POSITA would have had an expectation of success in defining a specifically-sized space between Adams's surface of abutment portion 19 and base 14 large enough to accommodate two layers of 5/8" drywall, because Adams's and Bundy's hangers are used for similar purposes (e.g., hanging a joist to a wall) and Adams's abutment portion 19 and base 14 already define a space therebetween. EX1007, 4:46-53; EX1040, 4:2-25. Adams describes that hanger 10 may be used with an "optional shoe plate 12" extending from base 14 to the front surface of supporting element 17. EX1040, 3:55-4:1, 4:46-5:3, 5:45-46. One option for a POSITA would be to use Adams's hanger with its optional shoe plate such that fire-resistant material (e.g., drywall, wool, etc.) is received in the gap between sidewalls 15 and abutment portion 19. For example, a POSITA would have

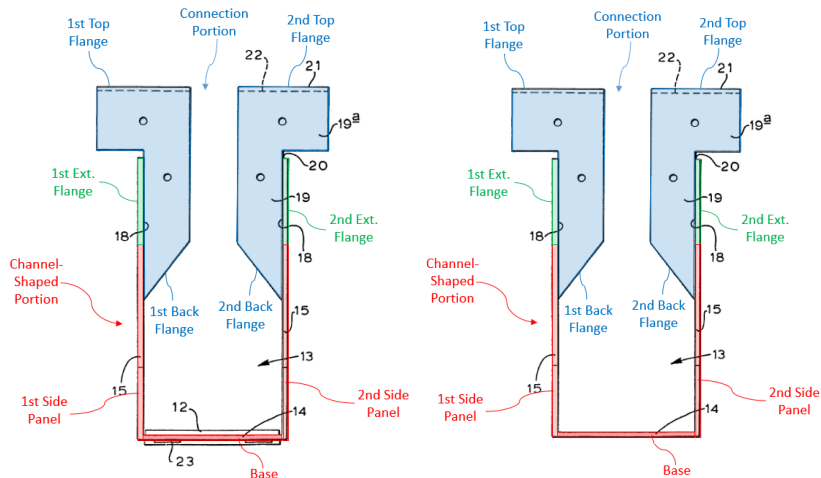
understood to add two layers of 5/8" drywall to the Adams-Bundy hanger under shoe plate 12 and around sidewalls 15, along with an insert of two layers of 5/8" drywall above shoe plate 12 and between sidewalls 15. Positioning drywall flush against a bottom surface of shoe plate 12 would result in drywall located along a plane defined by base 14 of Adams's hanger 10. Therefore, even with the presence of a shoe, a POSITA would have recognized that drywall can still be located between Adams's base 14 and the back flange plane defined by abutment portion 19.

259. Alternatively, given that shoe plate 12 is "optional," a POSITA would have been motivated to remove shoe plate 12 to provide a single-piece hanger. EX1040, 3:55–4:1. In doing so, a POSITA would have understood to construct Adams's hanger from a sufficiently-sized metal sheet to counter any moment forces. It is well known that increasing the thickness of the metal blank provides a more robust hanger. A POSITA would have also understood that receiving drywall between base 14 and supporting element 17, as taught by Bundy, would allow the base's rear edge to abut drywall, rather than hang without any support, thereby allowing Adams's hanger to counter any moment forces by the received joist. Because Adams's hanger 10 is already supported by its bearing portion 22 resting on the top surface of a wall frame member, the counter moment force applied by base 14 to drywall would be minimized, not damaging the drywall. Accordingly a

POSITA would have had a reasonable expectation of success in removing shoe plate 12 from hanger 10, while still keeping the base's rear edge separated from supporting element 17 to receive drywall therebetween.



EX1040, FIG. 2 (annotated, rendering without shoe plate)

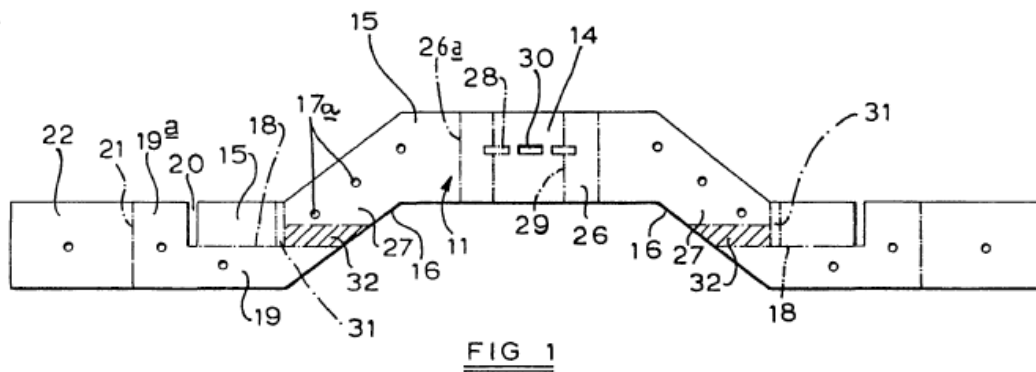


EX1040, FIG. 4 (annotated, rendering without shoe plate).

260. Accordingly in my opinion, Adams in view of Bundy renders obvious claim element [1.3.B].

[1.4] “wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another”

261. Adams discloses the channel-shaped portion (base 14 and portions of sidewall 15 thereabove), the extension portion (portions of sidewall 15 above edge 16) and the connection portion (abutment and bearing portions 19, 22) are formed from a single sheet metal blank, and thus are rigidly fixed with respect to one another once bent into shape. EX1040, 3:55-4:1 (“[A] joist hanger generally indicated at 10 comprises a main part formed from a single sheet metal blank 11.”); 5:39-44. A POSITA would have understood that the manufacturing process described in Adams would have resulted in all portions of Adams’s hanger 10 being connected such that they do not move freely with respect to each other.



EX1040, FIG. 1.

262. Accordingly, in my opinion, Adams discloses claim element [1.4].

263. Therefore, in my opinion, Adams in view of Bundy renders obvious all the recited limitations of claim 1.

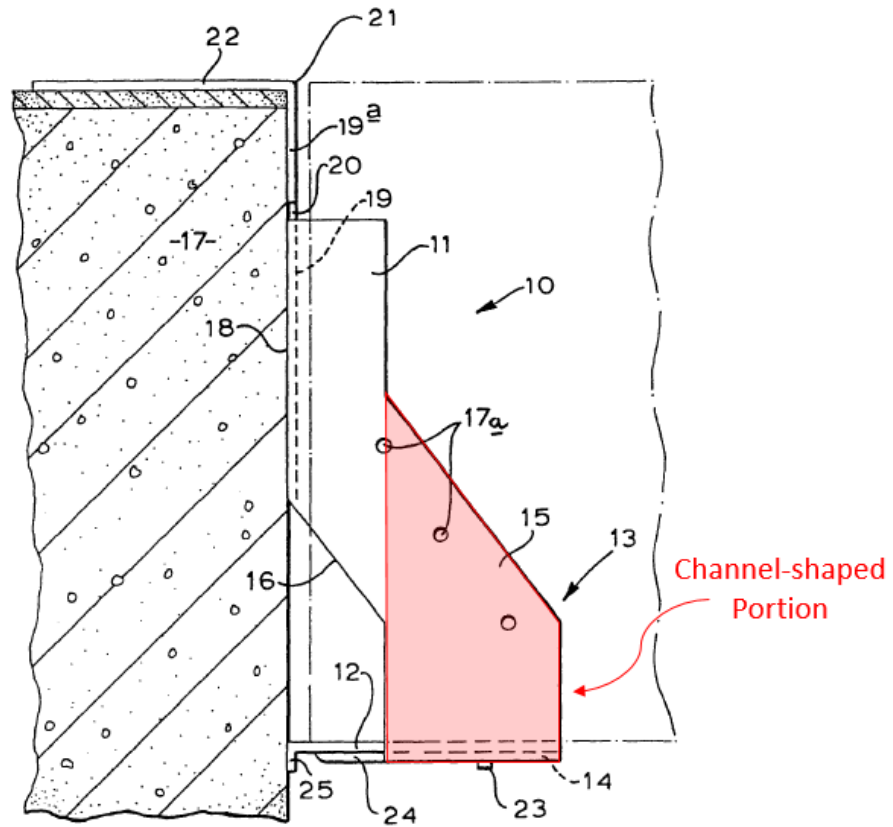
C. Independent Claim 53

[53.P] “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,”

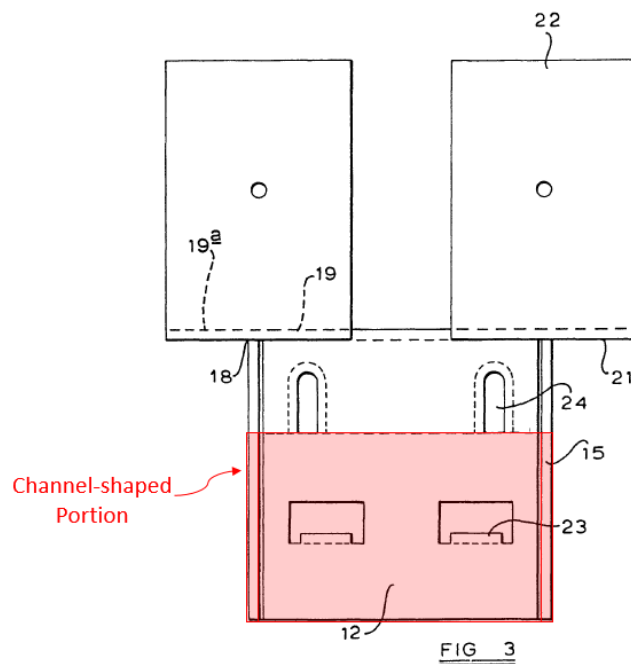
264. As discussed above with respect to claim 1, element [1.P], the Adams–Bundy combination renders obvious this limitation.

[53.1] “a channel-shaped portion configured to receive the structural component,”

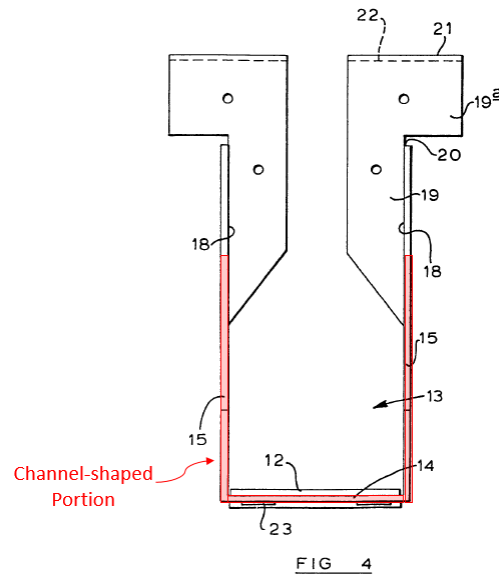
265. As discussed with respect to claim 1, element [1.1.A], Adams discloses this limitation. EX1035, 3:23-55, FIGs. 5-7.



EX1040, FIG. 2 (annotated).



EX1040, FIG. 3 (annotated).



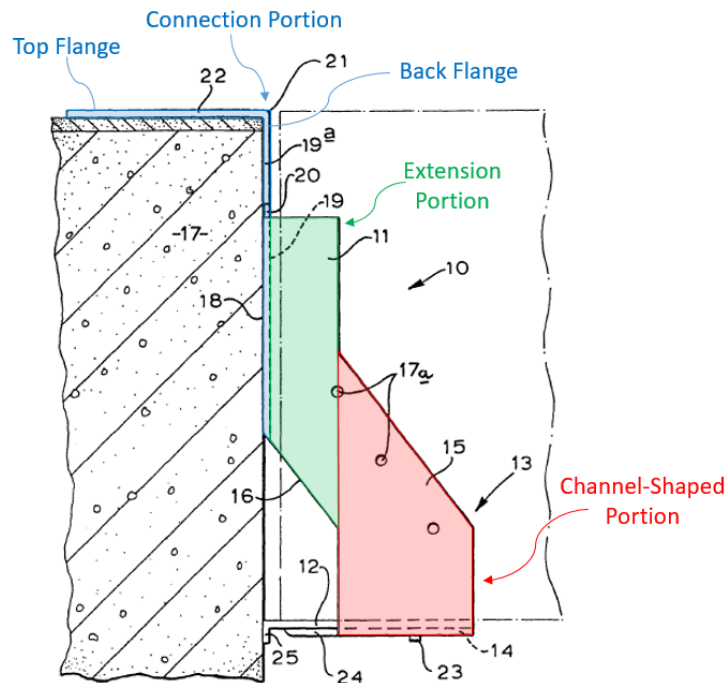
EX1040, FIG. 4 (annotated).

[53.2] “an extension portion extending from the channel-shaped portion and configured to extend through the two layers of 5/8-inch-thick drywall;”

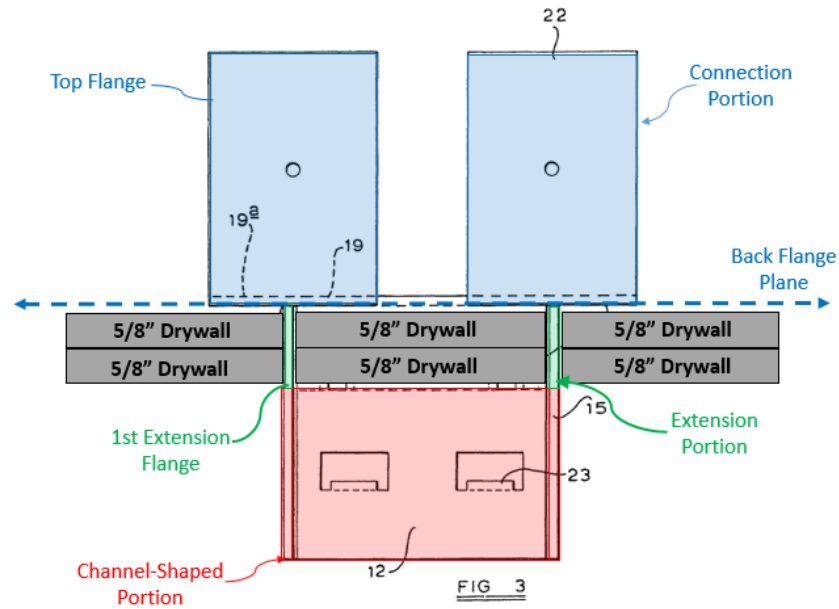
266. As Adams’s extension portion (section of sidewalls 15 above edge 16) is formed from the same piece of sheet metal as the channel-shaped portion (base 14 and portions of sidewall 15 thereabove) with no intervening components therebetween, Adams’s extension portion extends from its channel-shaped portion. EX1040, 4:11-25.

267. While Adams does not explicitly disclose extending sidewalls 15 through drywall, a POSITA would have been motivated to size Adams’s sidewalls so as to receive two layers of 5/8-inch-thick drywall between abutment portion 19

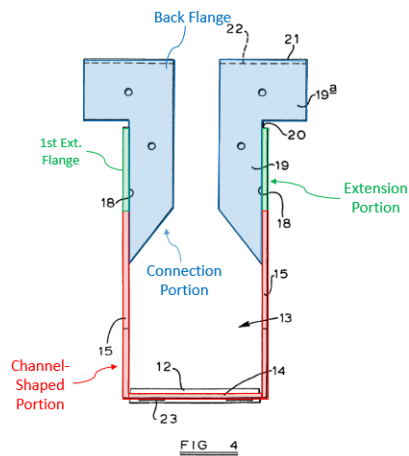
and base 14, as taught by Bundy and discussed above in § XIV.A. EX1007, 5:18-20. When modified as such, a POSITA would have understood that sidewalls 15 of the Adams-Bundy combination are configured to extend into one side and out the other side of drywall because the sidewalls 15 are flat sheet metal extending continuously from base 14 to abutment portion 19 when drywall is installed therebetween, just like the extension flanges described in the '626 patent. Accordingly Adams's sidewalls 15, sized as taught by Bundy, are configured to extend through the two layers of 5/8-inch-thick drywall.



EX1040, FIG. 2 (annotated).



EX1040, FIG. 3 (annotated).

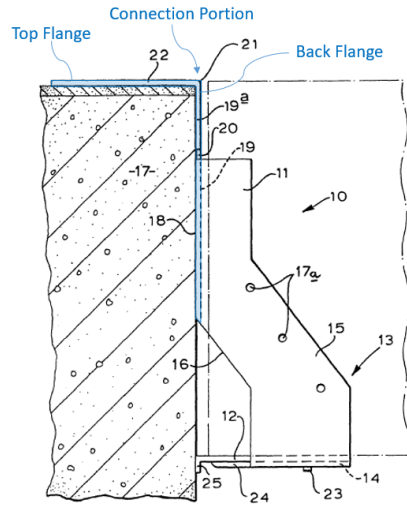


EX1040, FIG. 4 (annotated).

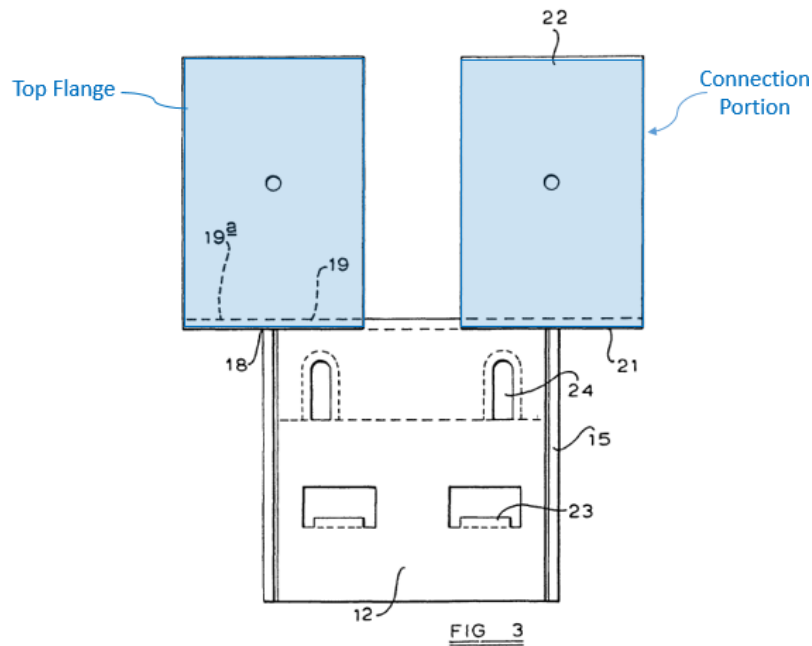
268. Accordingly in my opinion, Adams in view of Bundy renders obvious claim element [52.2].

[53.3.A] “a connection portion including a top flange arranged to engage a top surface of a top plate of the frame wall and,”

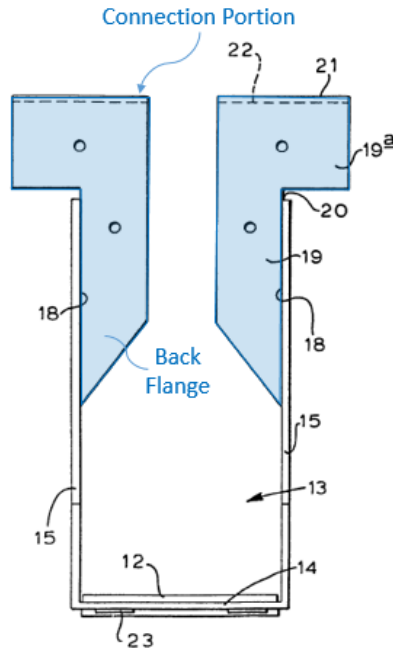
269. As discussed above with respect to claim 1, element [1.2.A], Adams in view of Bundy renders obvious this limitation. EX1035, 3:23-55, FIGs. 5-7.



EX1040, FIG. 2 (annotated).



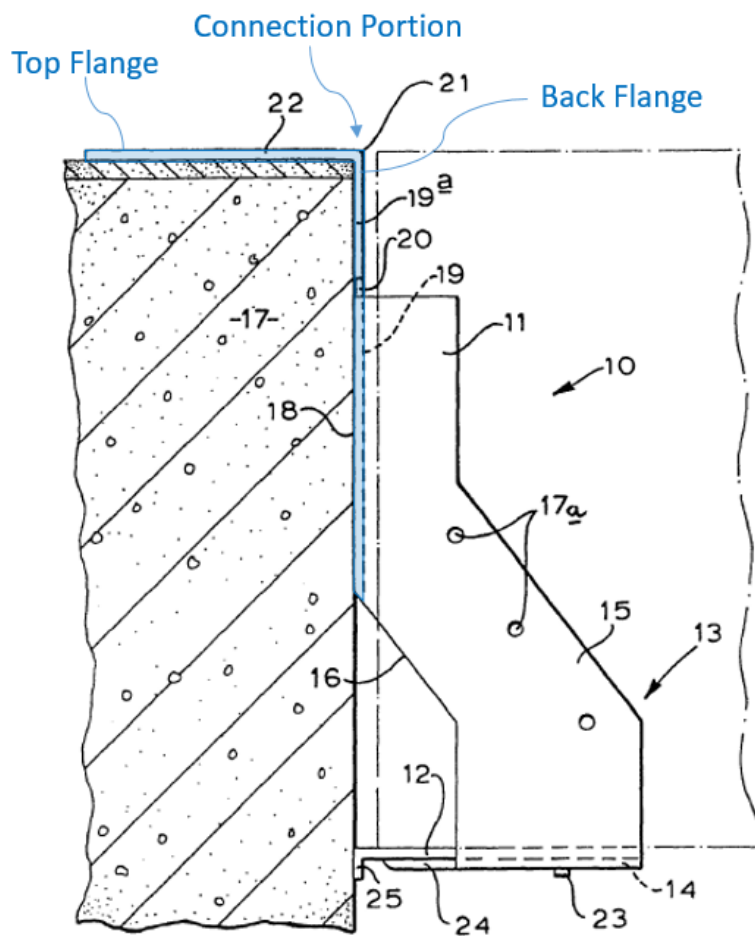
EX1040, FIG. 3 (annotated).



EX1040, FIG. 4 (annotated).

[53.3.B] “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,”

270. As discussed above with respect to claim 1, element [1.2.B], Adams in view of Bundy renders obvious this limitation.



EX1040, FIG. 2 (annotated).

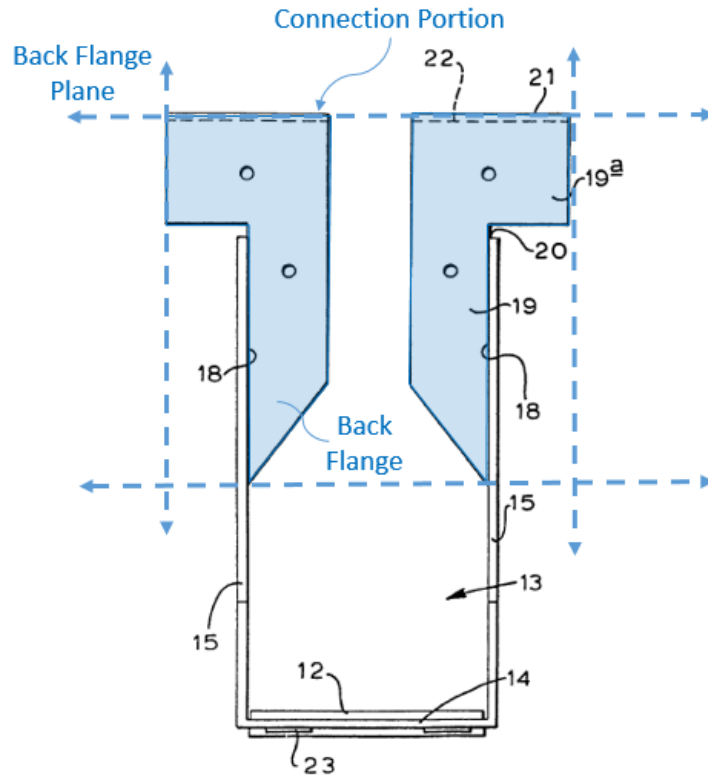
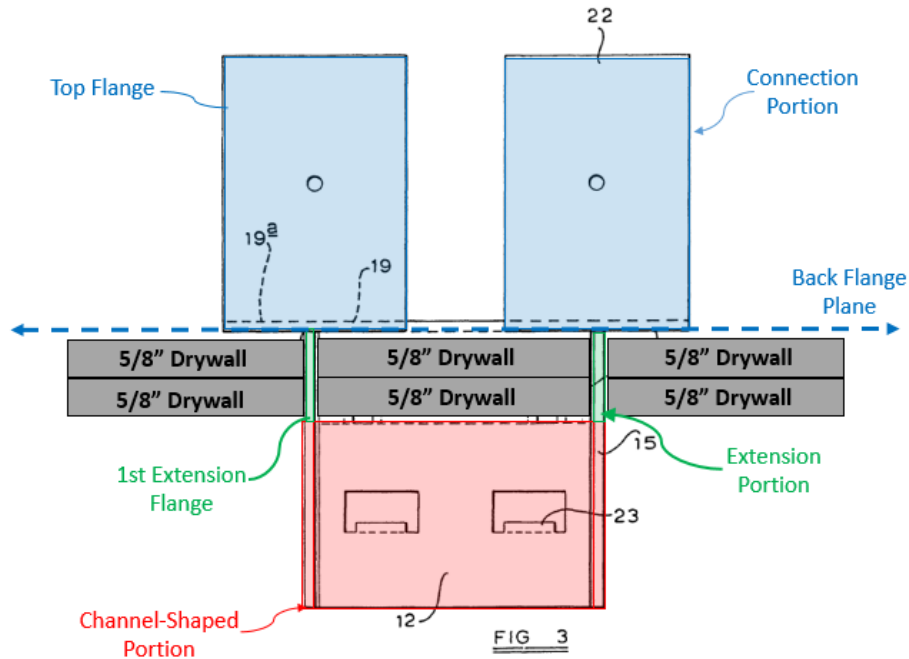


FIG 4

EX1040, FIG. 4 (annotated).

[53.4] “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”

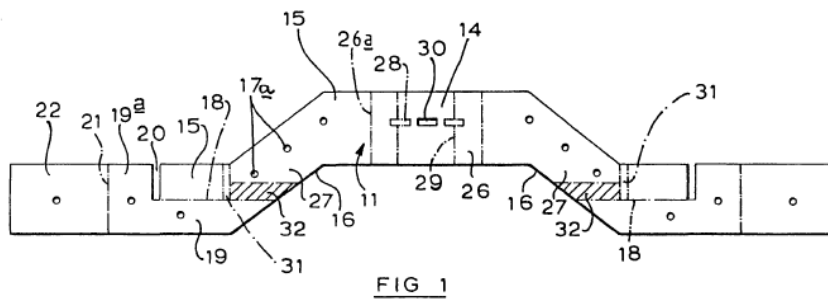
271. As discussed above with respect to claim 1, element [1.3.B], the Adams-Bundy combination renders obvious this limitation. EX1035, 3:23-55, FIGs. 5-7.



EX1040, FIG. 3 (annotated).

[53.5] “wherein the channel-shaped portion, the extension portion and the connection portion are rigidly fixed with respect to one another”

272. As discussed above with respect to claim 1, element [1.4], Adams discloses this limitation.

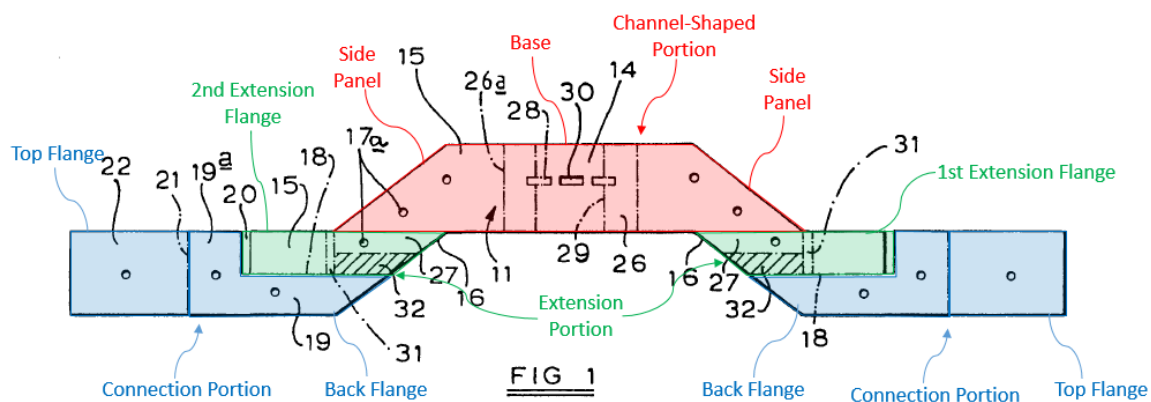


EX1040, FIG. 1.

D. Claims 22-27 and 74-79

273. Adams discloses forming a joist hanger's extension portion (sidewalls 15 above edge 16), including its first extension flange (first sidewall 15 above edge 16), its channel-shaped portion (base 14 and portions of sidewalls 15 thereabove), and its connection portion (abutment and bearing portions 19, 22) all as one-piece of sheet metal (blank 11). EX1040, 3:55–57, 4:2–6, 4:22–23, 4:34–36, 6:3–22.

Adams-Bundy thus renders obvious (1) the hanger's extension portion, including its first extension flange, and the channel-shaped portion being formed as one-piece of sheet metal (claims 22/26/74/78); (2) the extension portion, including its first extension flange, and the connection portion are formed as one-piece of sheet metal (claims 23/75); and (3) the channel-shaped portion, the connection portion, and the extension portion are formed as one-piece of sheet metal (claims 24/27/76/79).



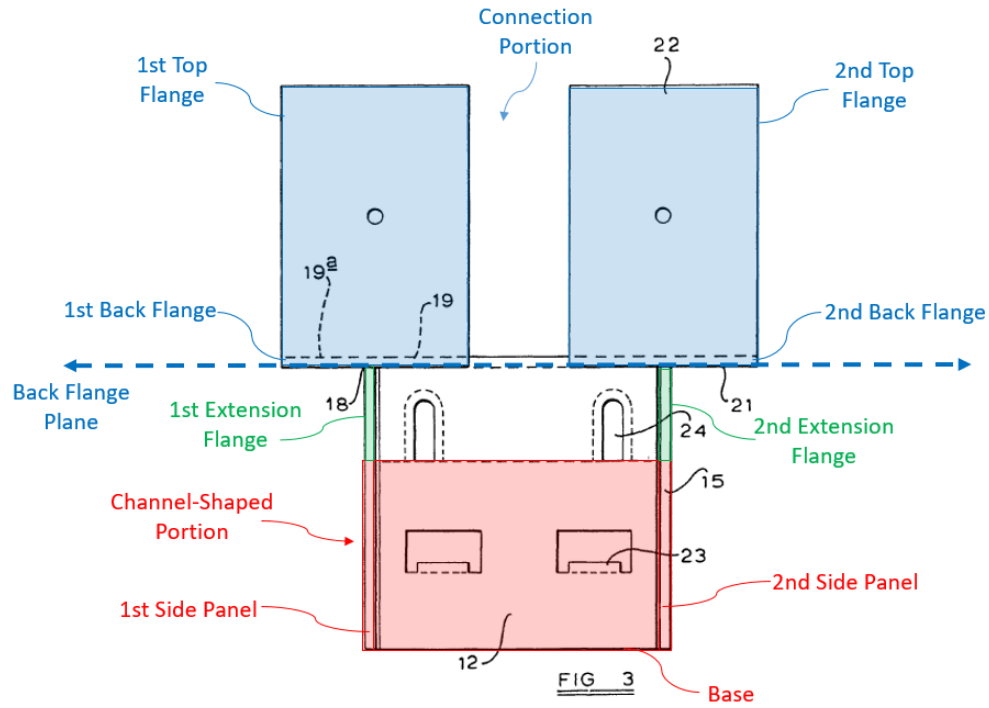
EX1040, FIG. 1 (annotated).

274. For the same reasons, Adams-Bundy renders obvious the hanger's channel-shaped portion (base 14 and portions of sidewalls 15 thereabove) being made of sheet metal, and the extension portion (portions of sidewall 15 above edge 16), including its first extension flange, being an extension of the sheet metal forming the channel-shaped portion (claims 25/77).

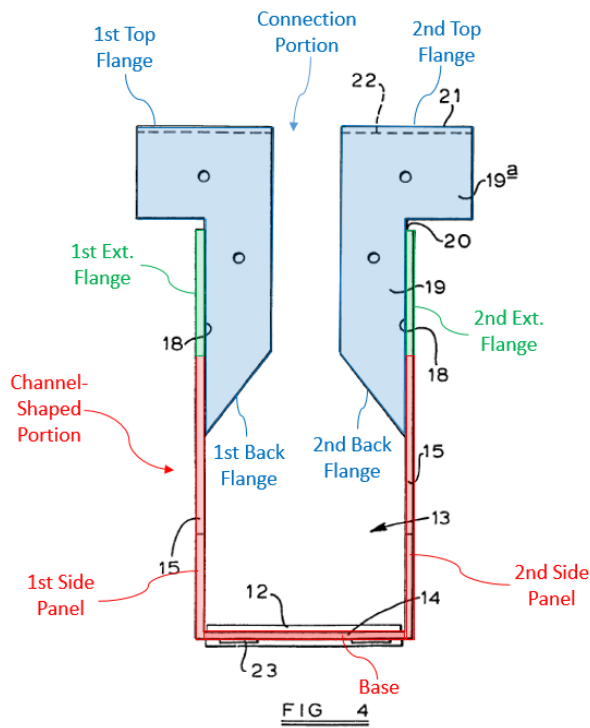
275. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 22–27 and 74–79.

E. Claims 39 and 92

276. Adams's connection portion includes a first back flange (first abutment portion 19) and a first top flange (first bearing portion 22). EX1040, 4:22–36. Adams's connection portion includes a second top flange (second bearing portion 22) arranged to engage the top surface of the top plate of the frame wall (supporting element 17) and a second back flange (second abutment portion 19) extending from an edge (fold line 21) of the second top flange and arranged to engage the vertical face of the top plate of the frame wall. Being constructed from sheet metal, Adams's second back flange has a front surface lying in the back flange plane. EX1040, 3:56–58.



EX1040, FIG. 3 (annotated).

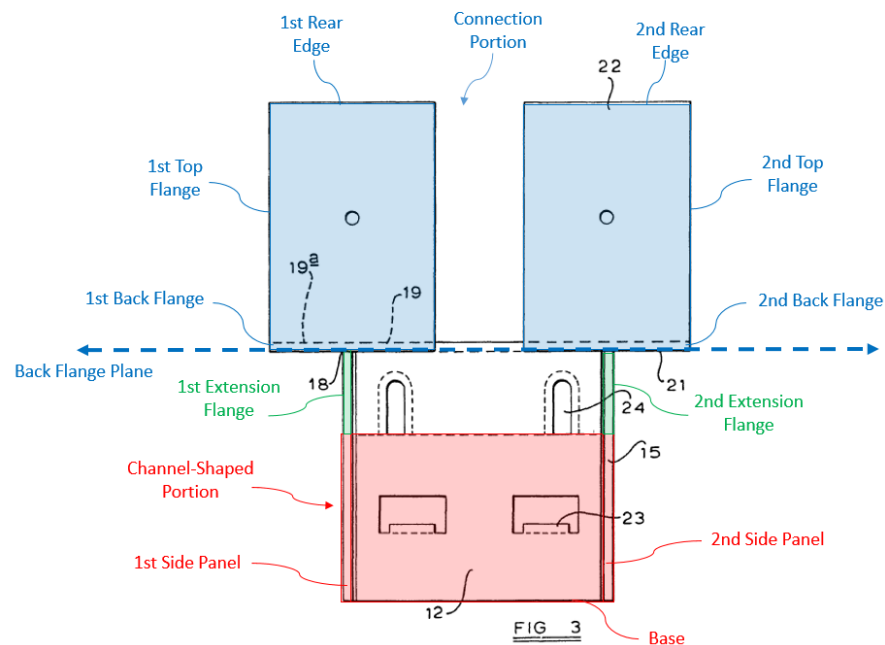


EX1040, FIG. 4 (annotated).

277. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 39 and 92.

F. Claims 40 and 93

278. Adams discloses that the first top flange includes a first rear edge (annotated below) located rearwardly of the edge (fold line 21) of the first top flange from which the first back flange extends and that the second top flange includes a second rear edge (annotated below) located rearwardly of the edge (fold line 21) of the second top flange from which the second back flange extends. EX1040, 4:22–37. Adams discloses the first rear edge (annotated below) being located rearwardly of the first back flange and the second rear edge (annotated below) being located rearwardly of the second back flange. EX1040, FIGs. 2–4.

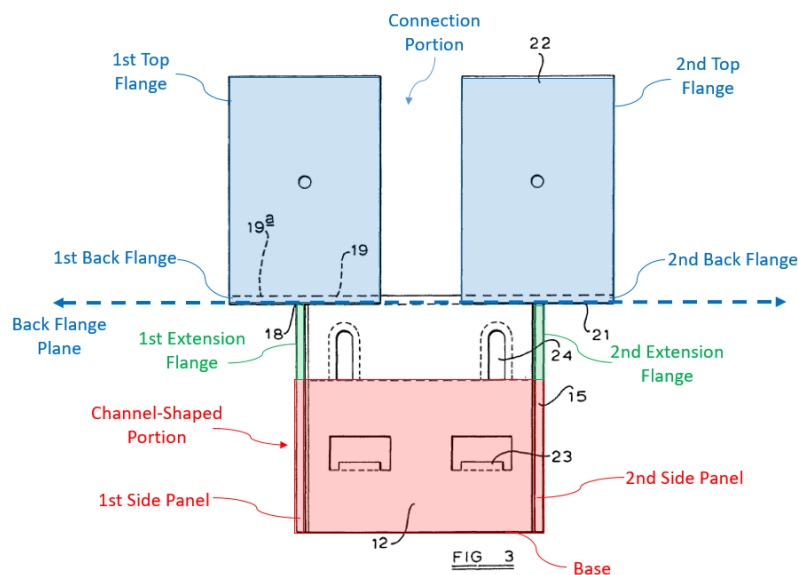


EX1040, FIG. 3 (annotated).

279. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 40 and 93.

G. Claims 41 and 94

280. For the reasons discussed for [1.3.A], and given that Adams's sidewalls 15 are symmetrical, Adams discloses that the extension portion includes a first extension flange (first sidewall 15 above edge 16) extending from the channel-shaped portion (base 14 and portion of sidewalls 15 thereabove) to the first back flange of the connection portion (first abutment portion 19) (and vice-versa) and a second extension flange (second sidewall 15 above edge 16) extending from the second back flange (second abutment portion 19) to the channel-shaped portion (base 14 and portion of sidewalls 15 thereabove) (and vice-versa). EX1040, 4:2–26,

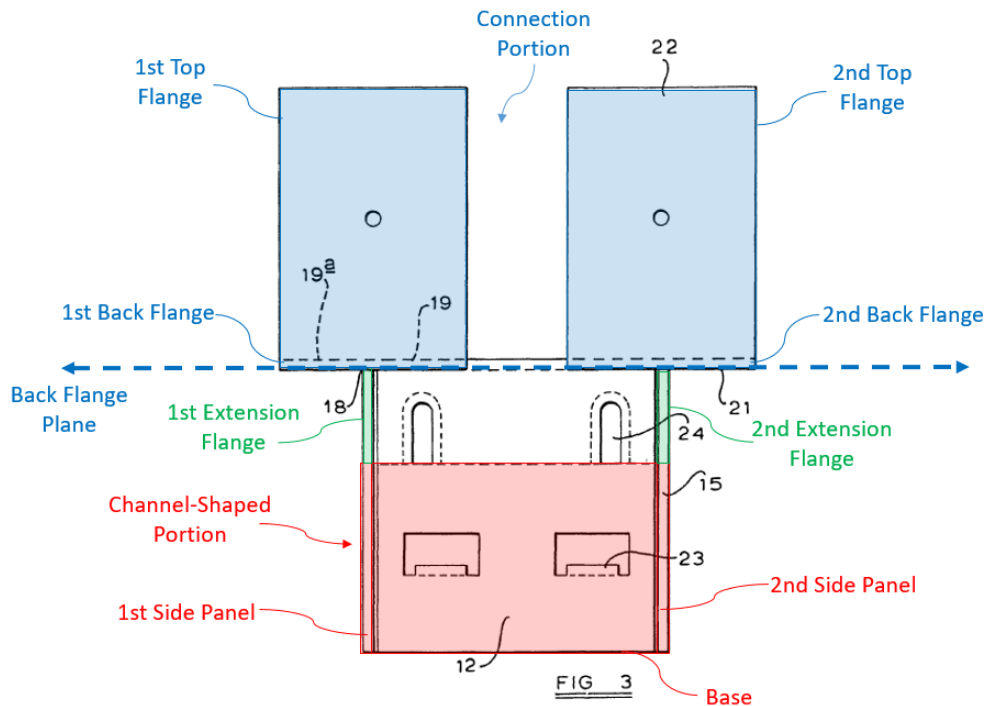


EX1040, FIG. 3 (annotated).

281. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 41 and 94.

H. Claims 42 and 95

282. Adams discloses the channel-shaped portion including a base (base 14) configured to receive and support the structural component's end portion and a channel-shaped portion including first and second side panels (section of sidewalls 15 defined above base 14). EX1040, 4:2-5. Adams further discloses the first and second extension flanges parallel to each other and the first and second side panels parallel to each other, as they are all vertical and extending in the same direction, as shown above. EX1040, FIGs. 2-4.

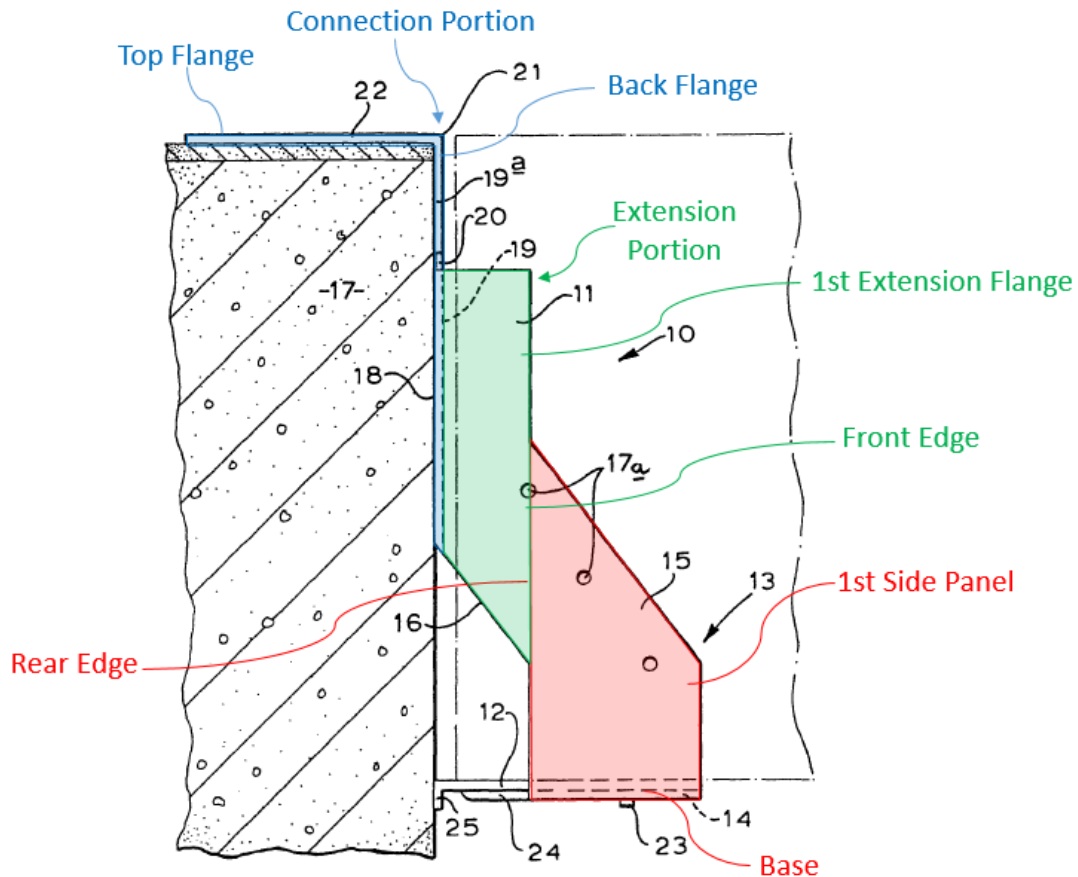


EX1040, FIG. 3 (annotated).

283. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 42 and 95.

I. Claims 43 and 96

284. Adams discloses that a front edge of the first extension flange (sidewall 15 above edge 16) abuts a rear edge of the (first side panel sidewall 15 above base 14), as they join with no intervening structures therebetween, shown below. EX1040, FIG. 2.



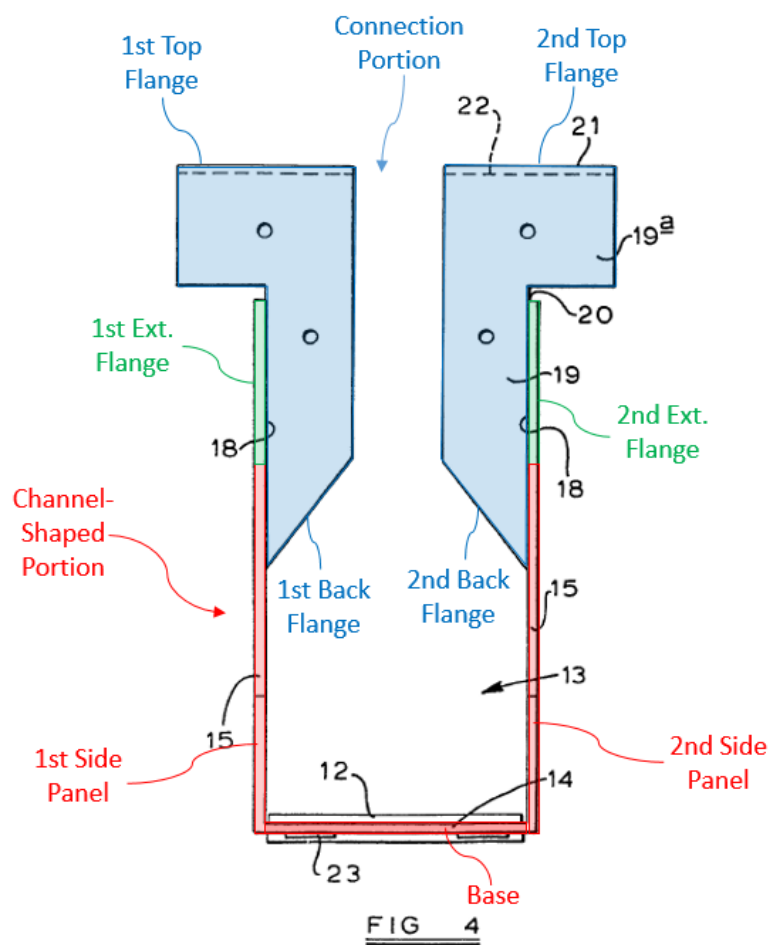
EX1040, FIG. 2 (annotated).

285. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 43 and 96.

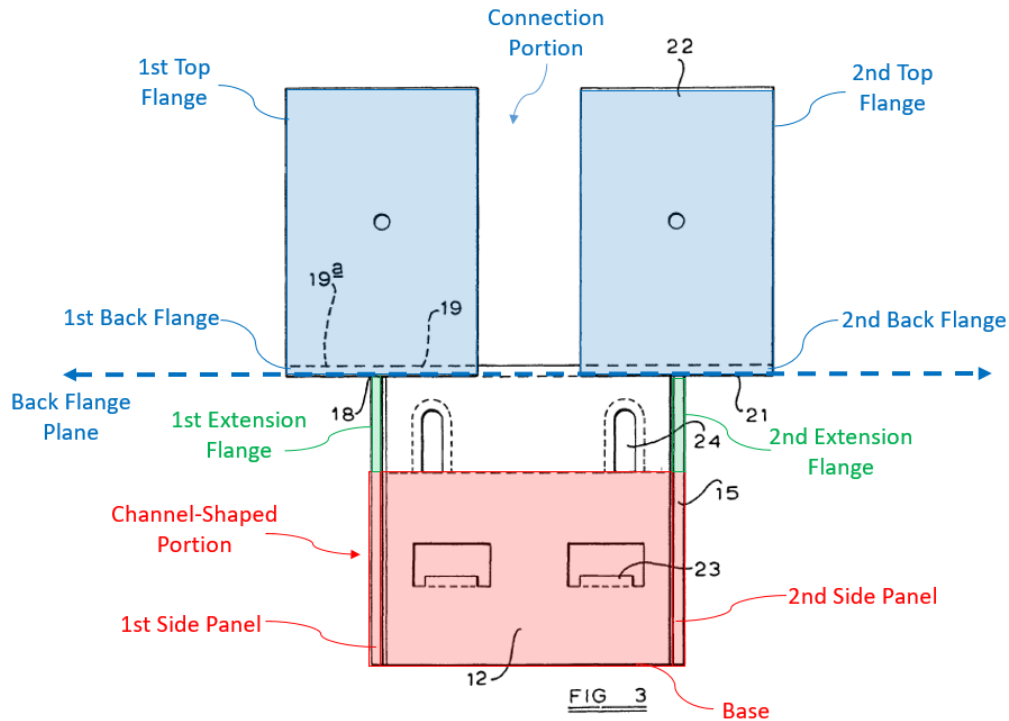
J. Claims 44 and 97

286. Adams discloses that the first extension flange (first sidewall 15 above edge 16) and the first back flange (first abutment portion 19) are directly attached to each other by a first bend (first fold line 18) and that the first back flange (first abutment portion 19) and the first top flange (first bearing portion 22) are directly attached to each other by a second bend (first fold line 21). EX1040, 4:22–36.

Adams discloses that the second extension flange and the second back flange are directly attached to each other by a third bend (second fold line 18) and that the second back flange and the second top flange are directly attached to each other by a fourth bend (second fold line 21). EX1040, 4:22-36.



EX1040, FIG. 4 (annotated).

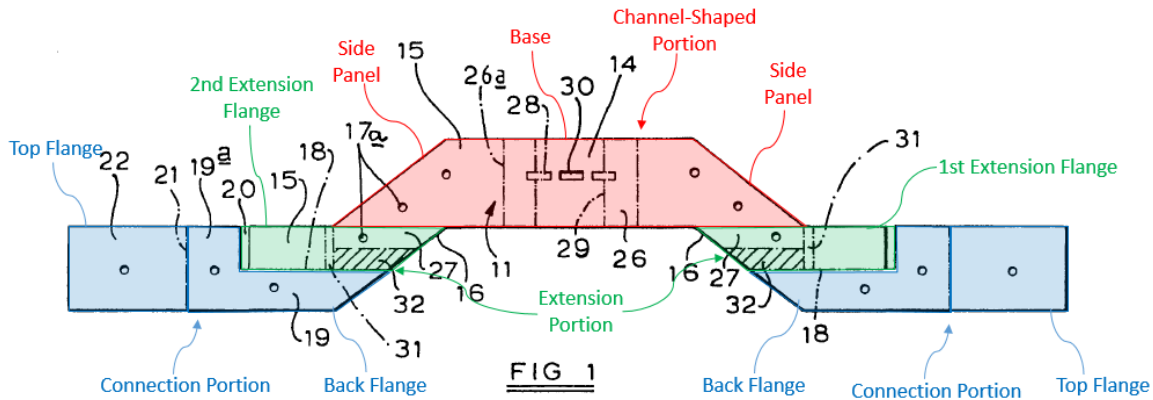


EX1040, FIG. 3 (annotated).

287. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 44 and 97.

K. Claims 45 and 98

288. As discussed for claims 24, 27, 76, and 79, Adams discloses that the channel-shaped portion (base 14 and portions of sidewall 15 thereabove), the connection portion (abutment portion 19, bearing portion 22), and the extension portion (sidewalls 15 above edge 16) are formed as one-piece of sheet metal.



EX1040, FIG. 1 (annotated).

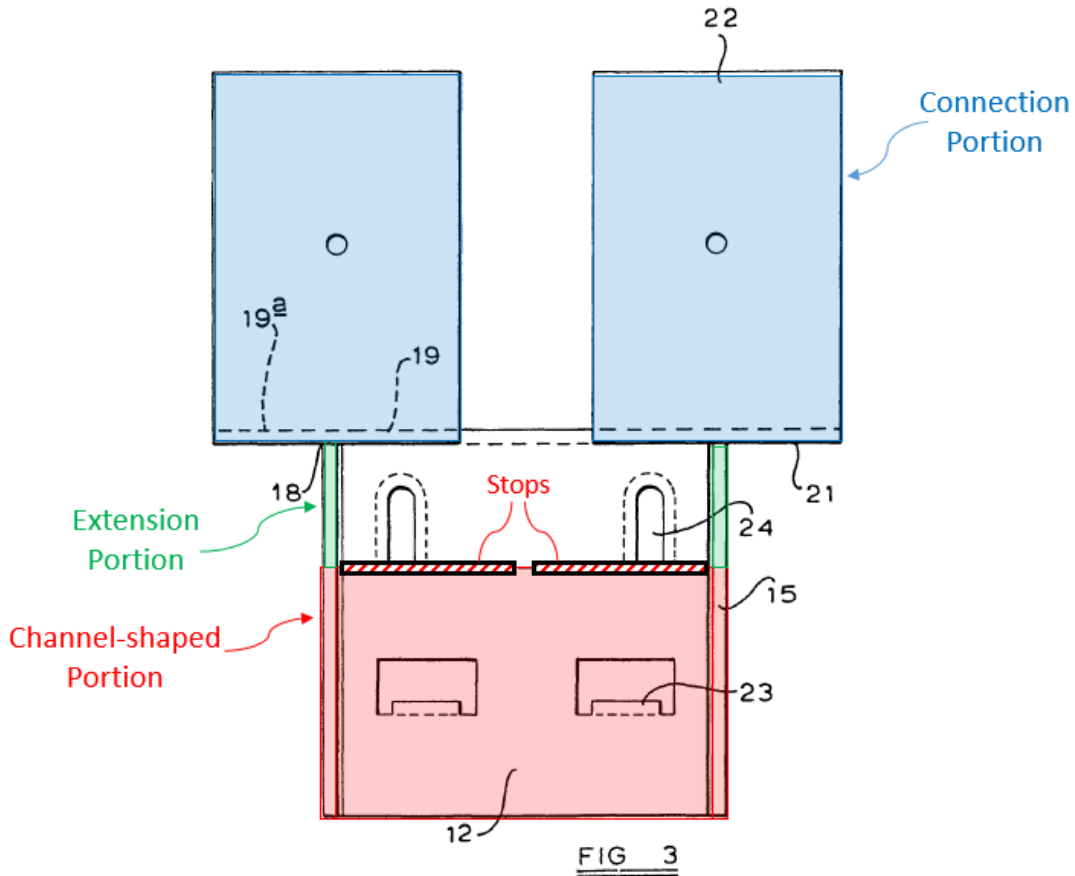
L. Claims 50 and 103

1) Stop Arranged To Engage an End of the Structural Component

289. Adams does not explicitly disclose a stop configured 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 5/8-inch-thick drywall to be received therebetween. However, as discussed in §XIV.A, Bundy teaches an analogous hanger. Bundy discloses forming a stop at the requisite distance by bending back plate members 9 inward from its side members 11. EX1007, 4:39-46.

290. In employing the teachings of Bundy's drywall space with Adams, a POSITA would have been motivated to provide Adams's hanger 10 with a stop to engage the joist's end at the noted distance, as taught by Bundy, so it does not impair drywall installed into the drywall space defined between Adams-Bundy's base and abutment portion. Such a modification would have been applying a simple substitution of one known element (the sides of Bundy's channel-shaped

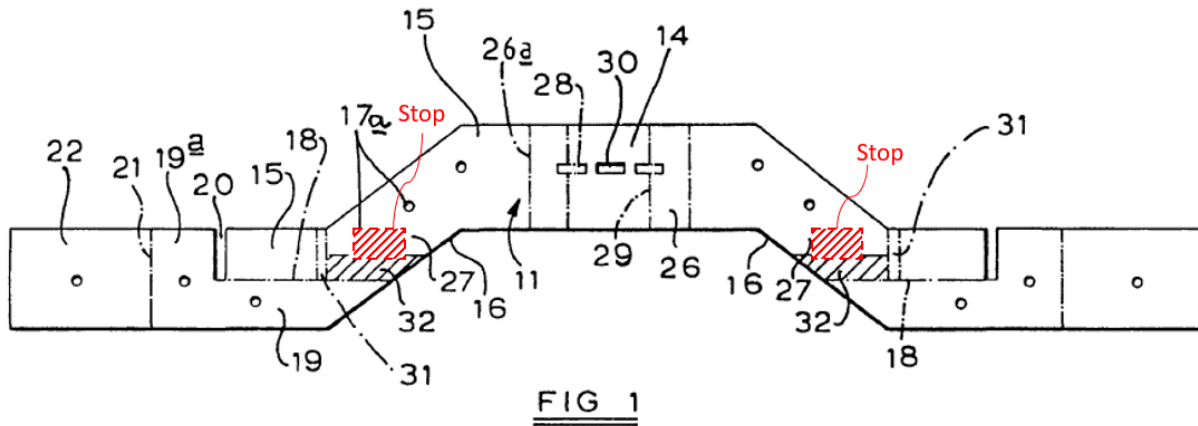
portion having stops bent inwards to face each other) to another (the sides of Adams's channel-shaped portion) to obtain the predictable result of providing a stop at the joist's end.



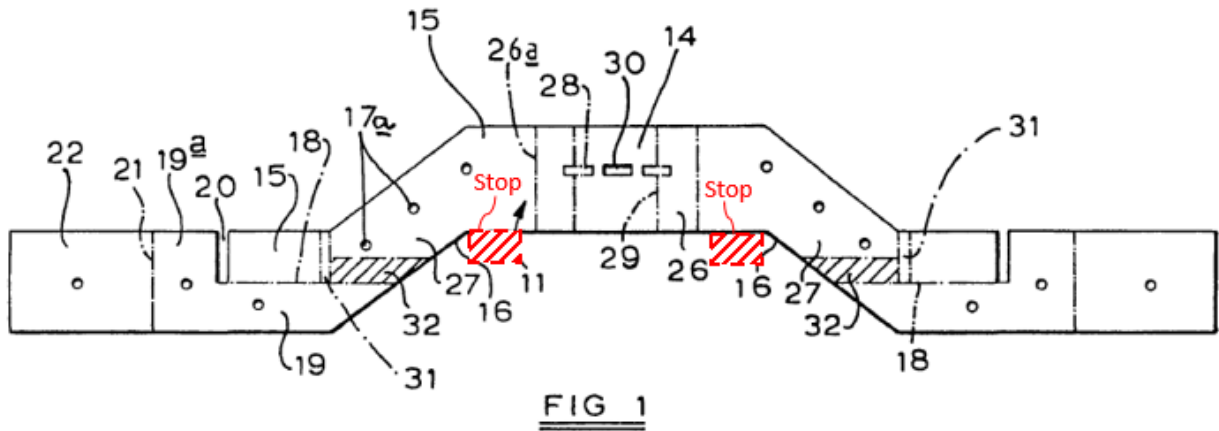
EX1040, FIG. 3 (annotated).

291. A POSITA would have had a reasonable expectation of success in providing Adams's hanger with a stop to engage and space the joist's end from its back plate 12 by the distance taught by Bundy, because doing so was well within the level of ordinary skill in the art. EX1007, 4:39-46; EX1008, ¶40. For example, as shown below, a POSITA would have understood to cut a section of Adams's

sidewalls 15 above the front of edge 16, and bend the cutout inward at the boundary between the channel-shaped portion and the extension portion to form a stop.



292. A POSITA would have understood that another option for achieving the stop taught by Bundy would be to configure Adams's metal blank to include an auxiliary section extending from each vertical back edge of the channel-shaped portion, between the base and the front end of edge 16, such that the auxiliary sections are bent inward, perpendicular to the channel-shaped portion, to form a stop.

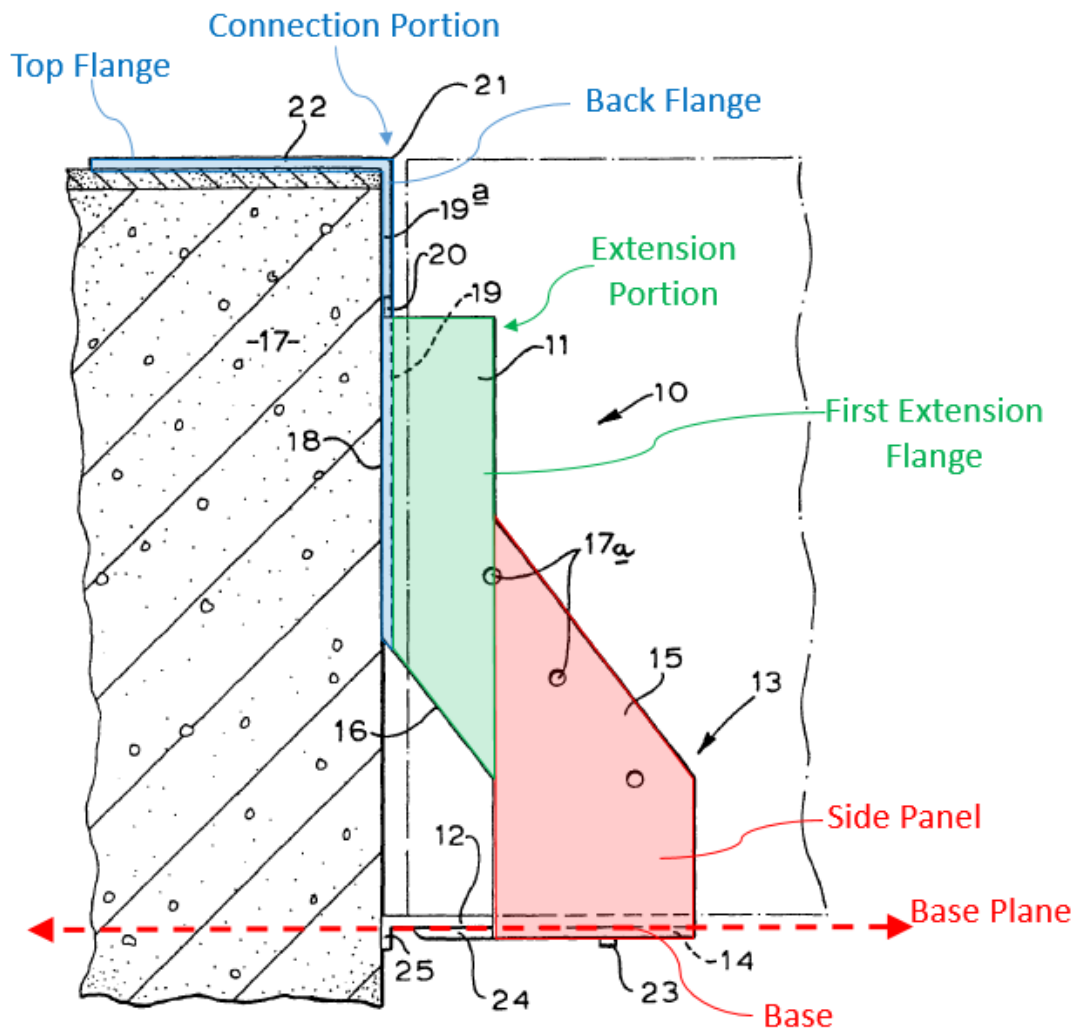


EX1040, FIG. 1 (annotated versions).

2) Base to Receive End Portion of Structural Component

293. As discussed above for claims 42 and 95, Adams discloses the channel-shaped portion including a base (base 14) configured to receive and support the structural component's end portion. EX1040, 4:2-5. Constructed from sheet metal, Adams's base (base 14) includes an upper surface lying in a horizontal base plane. EX1040, 4:2-5. A POSITA would have understood, as the term "engage" is used in the '626 patent (EX1001, Abstract), that Adams's base 14 is arranged to engage the structural component because Adams's base 14 "form[s] a seating for a joist" and supports a joist thereon. EX1040, 4:2-5. If Patent Owner contends that "engage" requires some measure of direct contact, which Petitioner does not concede, a POSITA would have understood that Adams's shoe plate 12 is "optional" and would have been motivated to remove shoe plate 12 to provide hanger 10 as a single part, thereby using base 14 to directly contact the joist's

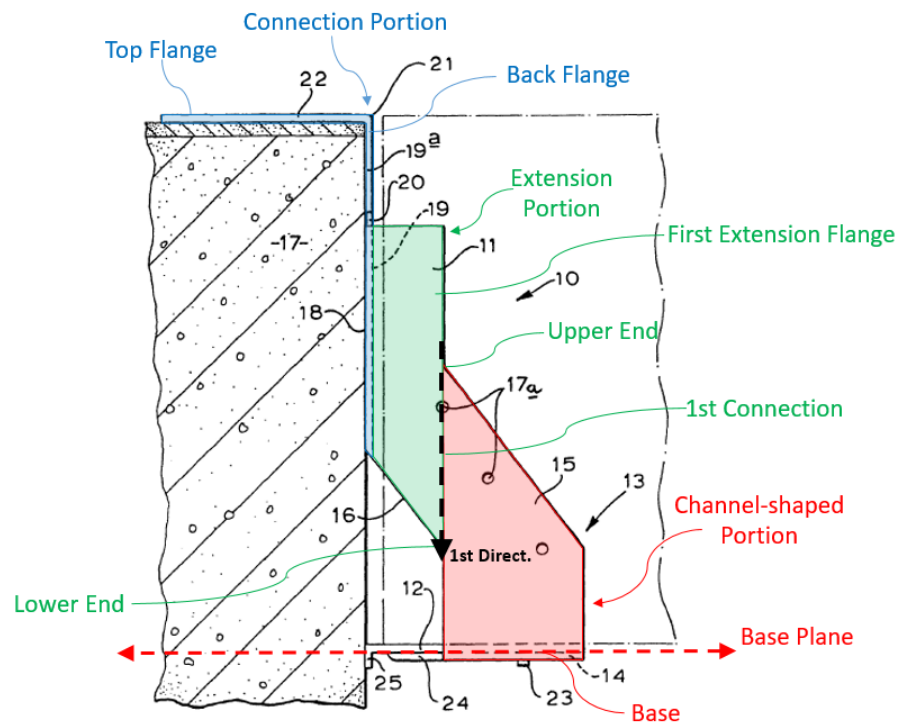
bottom surface. EX1040, 4:1–5. A POSITA would have understood that the shoe plate's function of bracing the hanger against the wall would in such cases be provided by other features, such as stronger sheet metal such that additional support is not required, posts on the back edge of base 14 for contacting the wall through which drywall may be inserted, drywall received between base 14 and the wall forming a barrier to counteract moment forces, and the like.



EX1040, FIG. 2 (annotated).

3) First Extension Flange Directly Attached to Channel-Shaped Portion

294. As discussed regarding claim 1, Adams also discloses that the extension portion includes a first extension flange (first sidewall 15 above edge 16). Adams further discloses that the first extension flange (first sidewall 15 above edge 16) is directly attached to the channel-shaped portion (portion of sidewall 15 above base 14) by a first connection, as shown by the black dashed line between the green and red portions below. EX1040, FIG. 2. The first connection has an upper end and a lower end and extends from the upper end to the lower end in a first direction (i.e., vertically) that is perpendicular to the horizontal base plane, shown below. EX1040, FIG. 2.

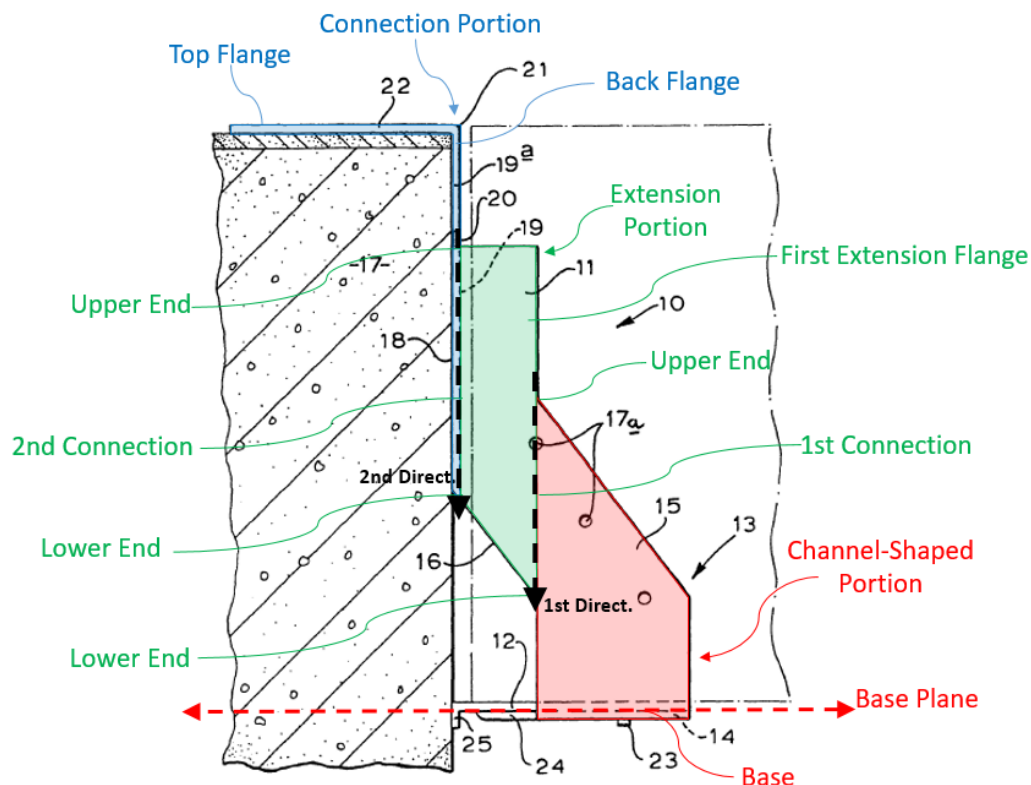


EX1040, FIG. 2 (annotated)

4) First Extension Flange Directly Attached to Connection Portion

295. Adams discloses that the first extension flange (first sidewall 15 above edge 16) is directly attached to the connection portion (first abutment portion 19) by a second connection (fold line 18), shown below. EX1040, 4:22–25, FIGs. 1–2. The second connection has an upper end and a lower end and extends from the upper end to the lower end in a second direction that is parallel to the first direction (i.e., vertical) and perpendicular to the horizontal base plane, shown below.

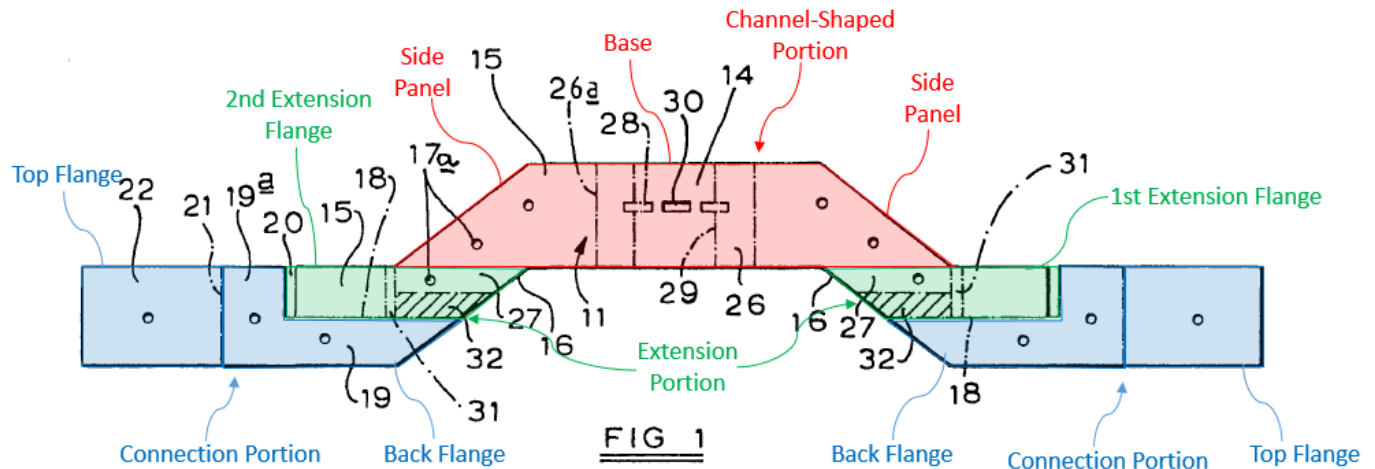
EX1040, FIG. 2.



EX1040, FIG. 2 (annotated)

5) First Extension Flange and Channel-Shaped Portion as One Piece

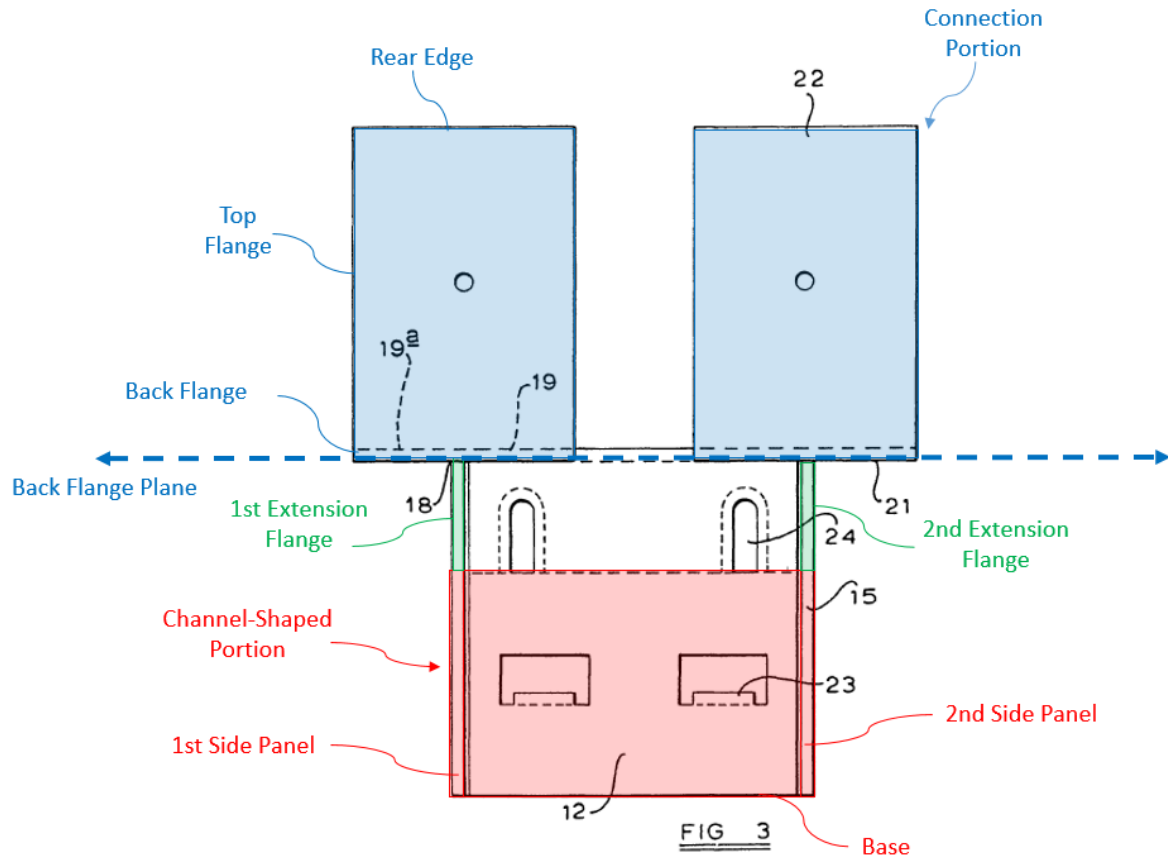
296. Adams discloses that the first extension flange (first sidewall 15 above edge 16) and the channel-shaped portion (portion of sidewall 15 above base 14) are formed as one-piece of sheet metal (blank 11). EX1040, 3:55–57, 4:2–6.



EX1040, FIG. 1 (annotated).

6) Top Flange's Rear Edge

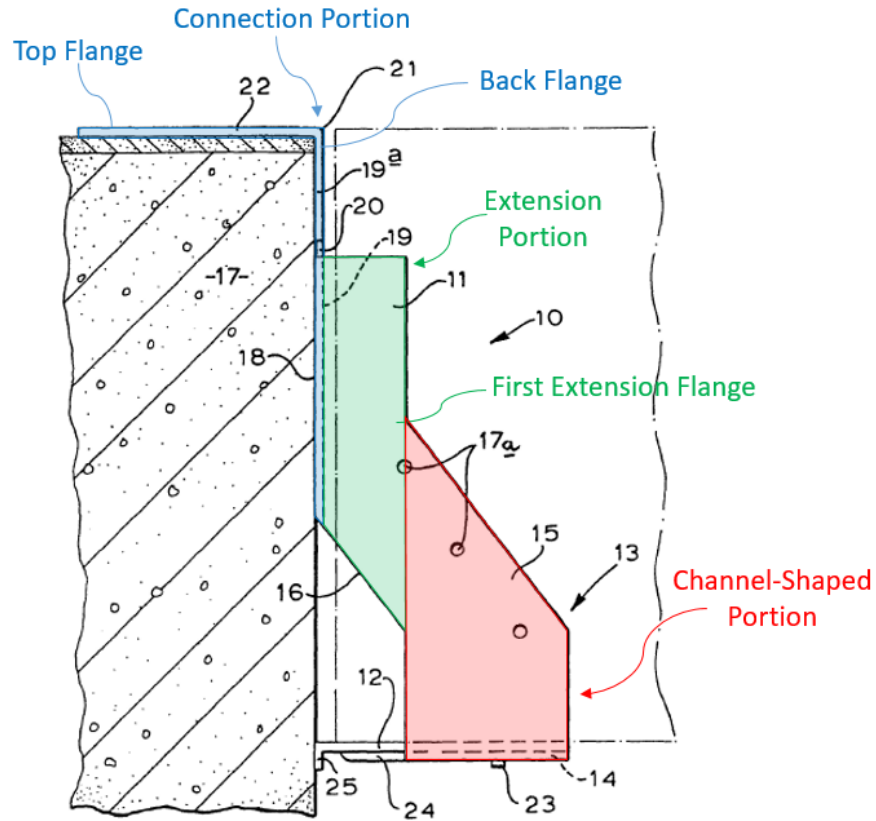
297. Adams discloses that the top flange includes a rear edge (annotated below) located rearwardly of the edge (fold line 21) of the top flange from which the back flange extends, and that the rear edge is located rearwardly of the back flange, shown below. EX1040, FIG. 3.



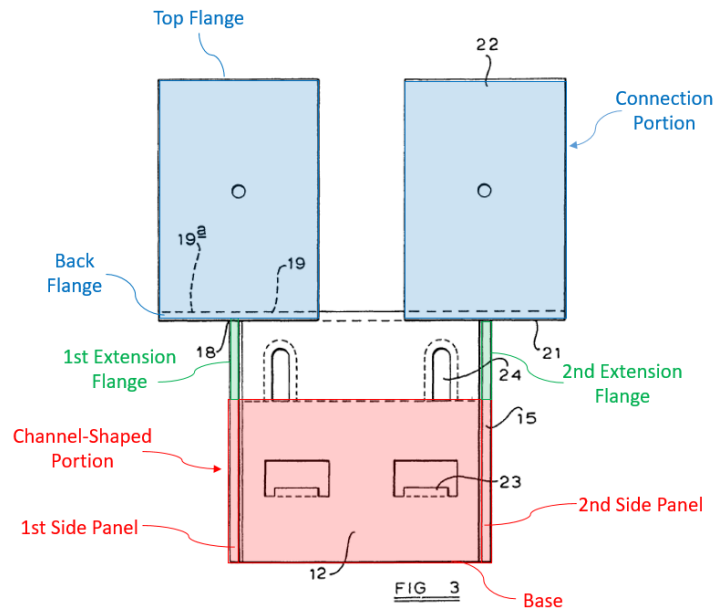
EX10040, FIG. 3 (annotated).

7) Channel-Shaped Portion Spaced Apart From Connection Portion

298. Adams discloses the channel-shaped portion (base 14 and portion of sidewall above base 14) and the connection portion (abutment portion 19 and bearing portion 22) are spaced apart from one another by the distance defined by the length of the extension portion (sidewalls 15 above edge 16) extending therebetween – long enough to allow two layers of 5/8” drywall to be inserted, as taught by Bundy. EX1040, 4:11–25.



EX1040, FIG. 2 (annotated).



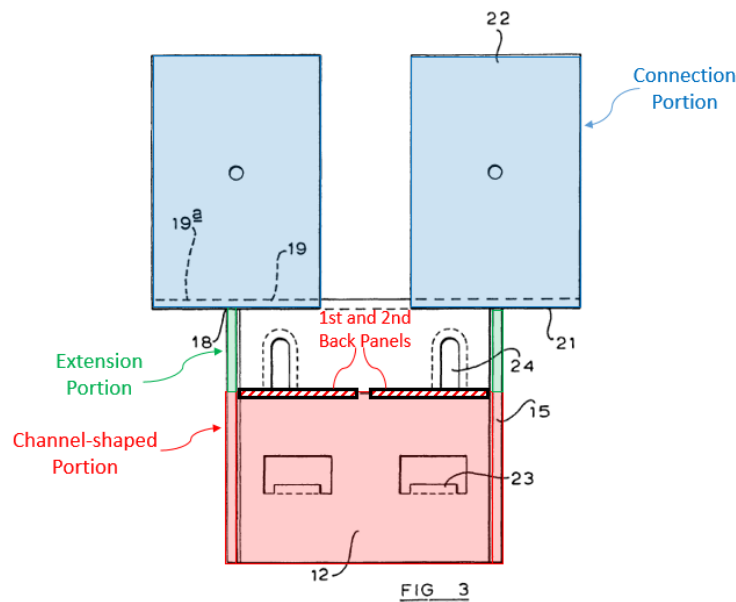
EX1040, FIG. 3 (annotated).

299. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 50 and 103.

M. Claims 51 and 104

1) Stop Comprising First and Second Back Panels

300. As discussed for claims 50 and 103, Adams's hanger includes inward-bent back plate members as taught by Bundy that would have resulted in first and second back panels extending toward each other. EX1007, 4:39-46.

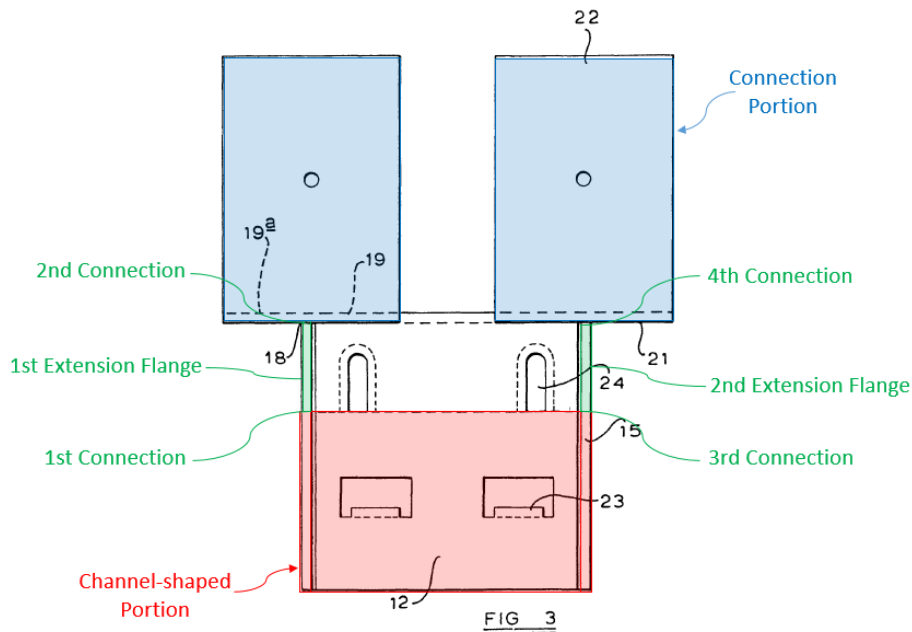


EX1040, FIG. 3 (annotated).

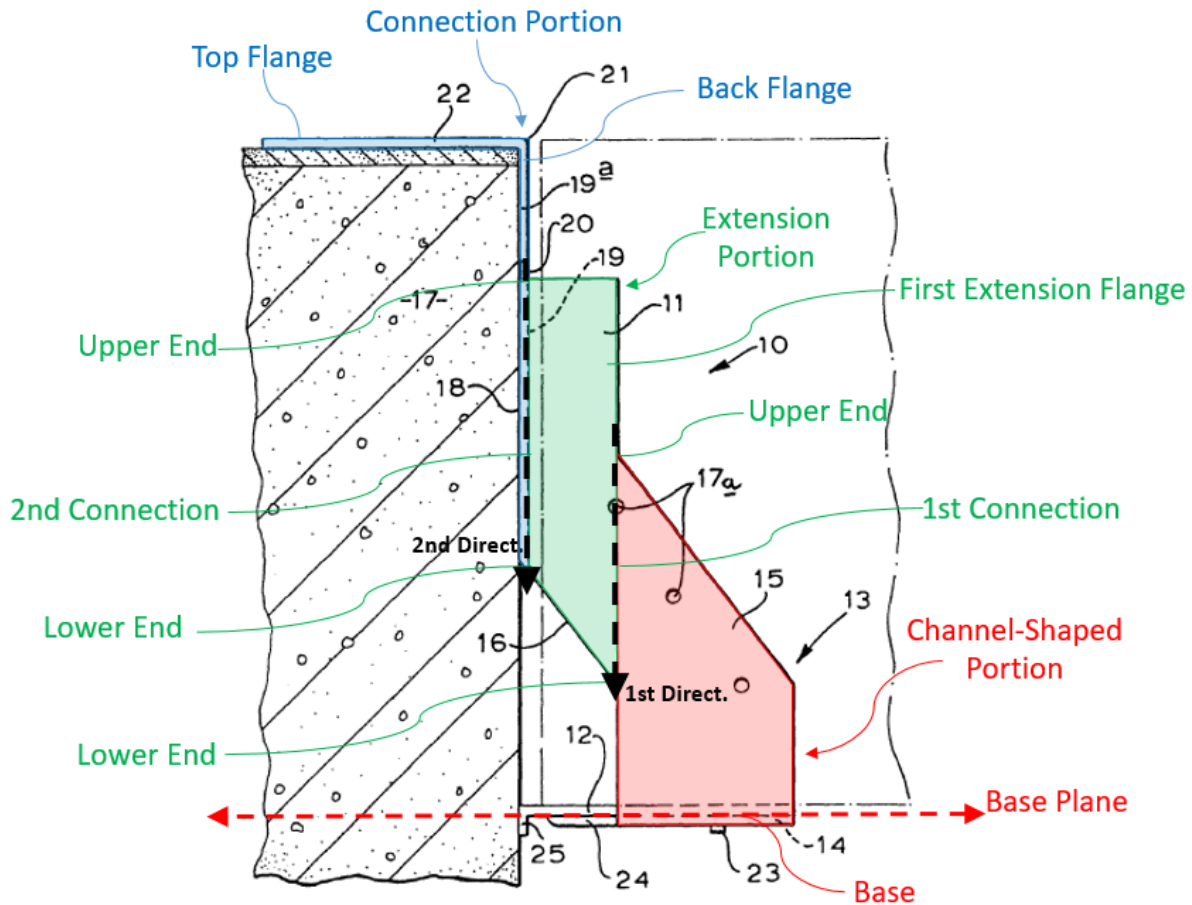
2) Second Extension Flange

301. Adam's two sidewalls 15 are symmetrical. Thus, for the same reasons provided for claims 41, 50, 94 and 103, Adams discloses that the extension portion includes a second extension flange (second sidewall 15 above second edge 16) extending from the connection portion to the channel-shaped portion (second

sidewall 15 above base 14) and being directly attached to the channel-shaped portion by a third connection (front end of edge 16 and upward, shown in yellow below) and directly attached to the connection portion by a fourth connection (fold line 18), shown below. EX1040, 4:22–25, FIGs. 1–2. The third and fourth connections each have an upper end and a lower end and extend from the upper end to the lower end in a third direction and fourth direction, respectively, shown below. EX1040, 4:22–25, FIGs. 1–2. Adams discloses the third and fourth directions being parallel to the first and second directions (i.e., vertical) and being perpendicular to the horizontal base plane, shown below. EX1040, 4:22–25, FIGs. 1–2.



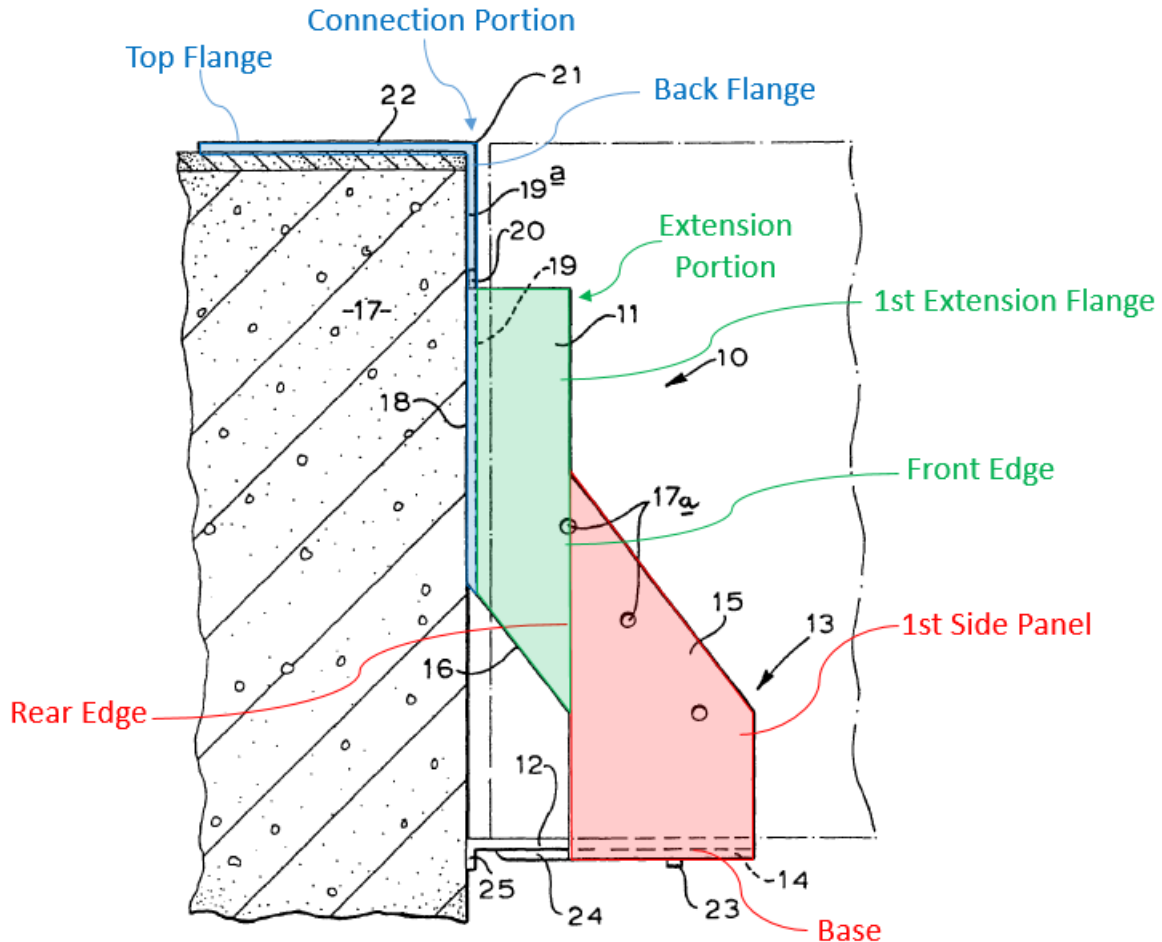
EX1040, FIG. 3 (annotated).



EX1040, FIG. 2 (annotated).

3) First Side Panel

302. As discussed for claims 42 and 95, Adams discloses a channel-shaped portion including a first side panel (first sidewall 15 above base 14) extending upward from the base. EX1040, 4:2-5. Adams discloses a front edge of the first extension flange (sidewall 15 above edge 16) abutting a rear edge of the first side panel (sidewall 15 above base 14). EX1040, FIG. 2.

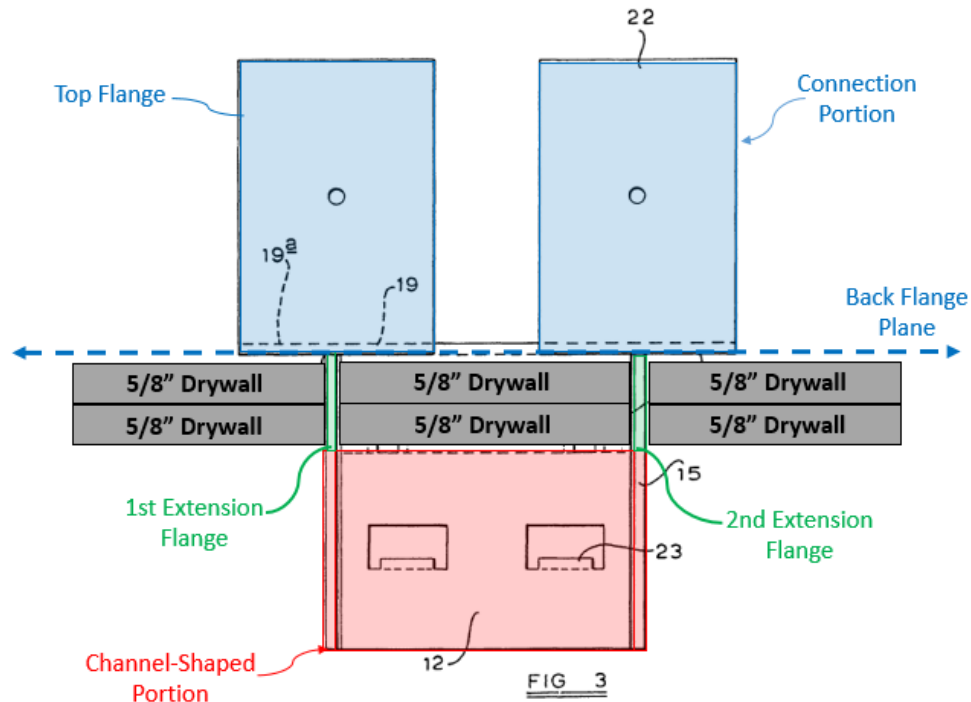


EX1040, FIG. 2 (annotated).

4) Drywall Space

303. As discussed in §XIV.A, Adams in view of Bundy renders obvious a drywall space sized and shaped to receive the two layers of 5/8-inch-thick drywall therein. EX1007, 5:10–22. For the reasons discussed for claims 1 and 53 and as illustrated below, a POSITA would have sought to modify the length of Adams’s sidewalls 15 to a size sufficient to receive such drywall between Adams’s base 14 and abutment portion 19 as taught by Bundy. Adams-Bundy’s channel-shaped

portion, first and second extension flanges, and back flange (whose front surface defines the back flange plane) define the drywall space's size and shape, and thus bound the drywall space. EX1040, FIGs. 1, 3; EX1007, 5:10-22.



EX1040, FIG. 3 (annotated).

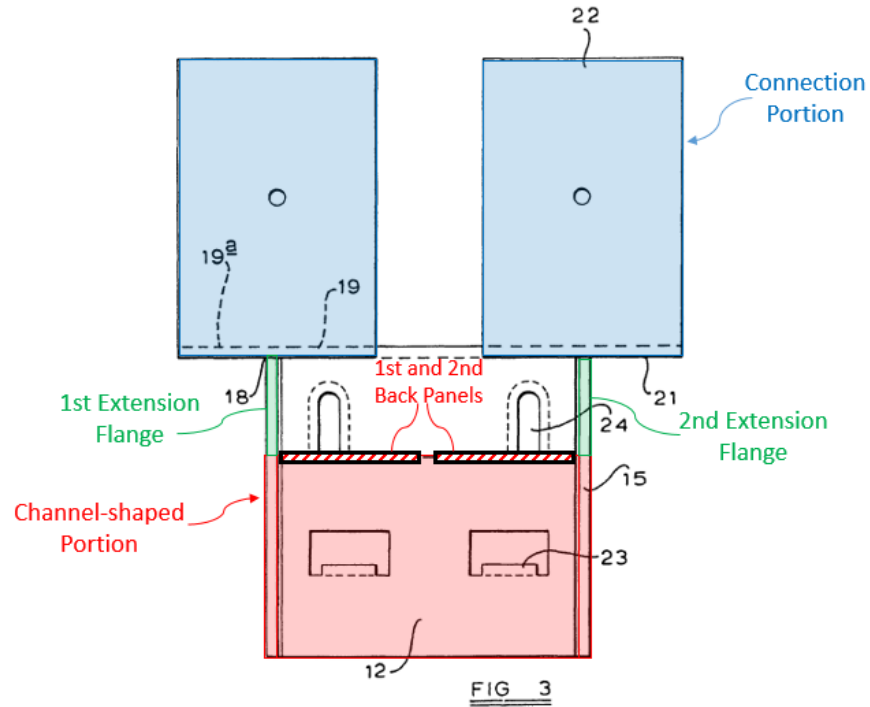
304. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 51 and 104.

N. Claims 52 and 105

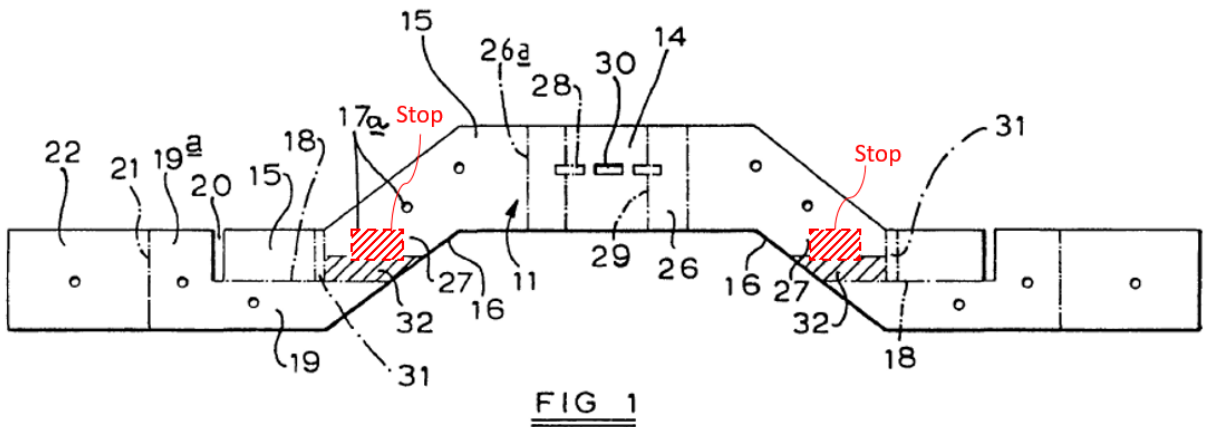
1) First and Second Back Panels Directly Attached to First and Second Extension Flanges

305. Given the teachings of Bundy's inward-bent back plate members 9 with Adams's hanger, a POSITA would have been motivated to directly attach, via bending, one of Bundy's inward-bent back panels to Adams's first extension

flange (first sidewall 15) and the other of Bundy's inward-bent back panels to Adams's second extension flange (second sidewall 15). Bundy teaches bending back plate members 9 at the rear edge of its channel-shaped portion. EX1007, 4:42–44. A POSITA would have understood that punching out and bending a section of Adams's sidewalls 15 above the front end of edge 16 would provide the benefits of the back panels using the least amount of sheet metal. When such a bending of the sidewalls is implemented in Adams at a location that would be in front of any inserted drywall, as taught by Bundy, such bends would also directly attach to the extension flanges at the top and bottom corners of the respective bent sections, given the location of Adams's sidewalls vis-à-vis its extension flanges. Thus, Adams-Bundy renders obvious the first back panel directly attached to the first extension flange and the second back panel directly attached to the second extension flange.



EX1040, FIG. 3 (annotated).



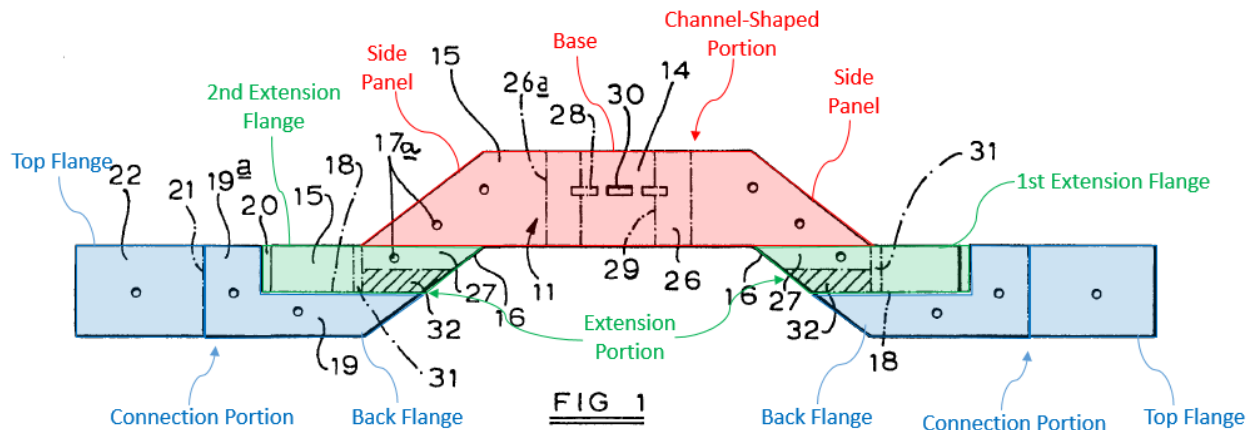
EX1040, FIG. 1 (annotated).

2) One-piece of Sheet Metal

306. As discussed for claims 45 and 98, Adams discloses the channel-shaped portion (base 14 and portion of sidewall 15 above base 14), the connection

portion (abutment portion 19 and bearing portion 22), and the extension portion (portion of sidewall 15 above edge 16) being formed as one-piece of sheet metal.

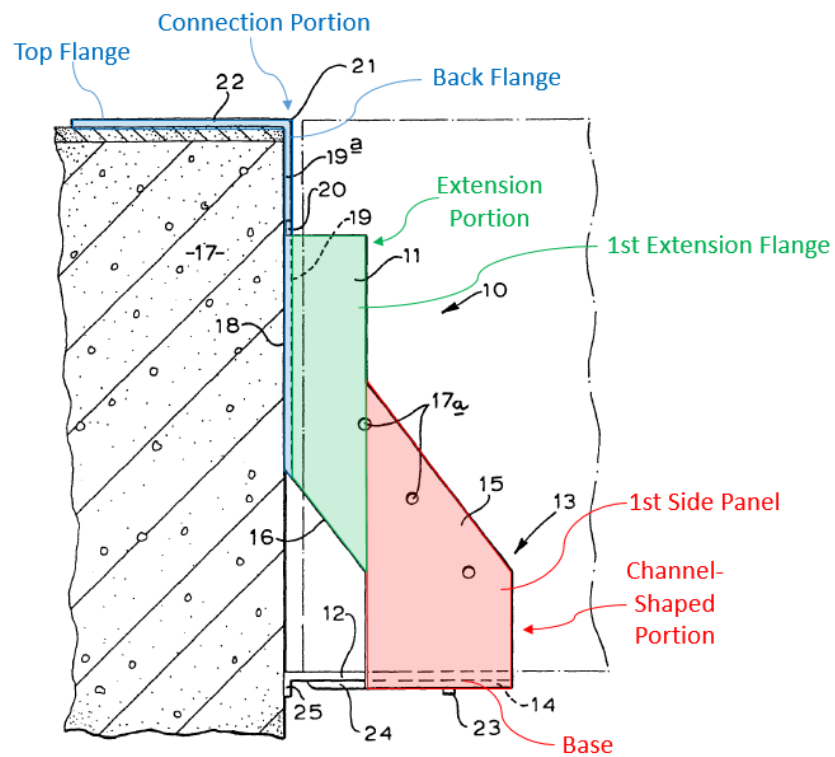
EX1040, 3:55–57, 4:2–6, 4:22–23, 4:34–36.



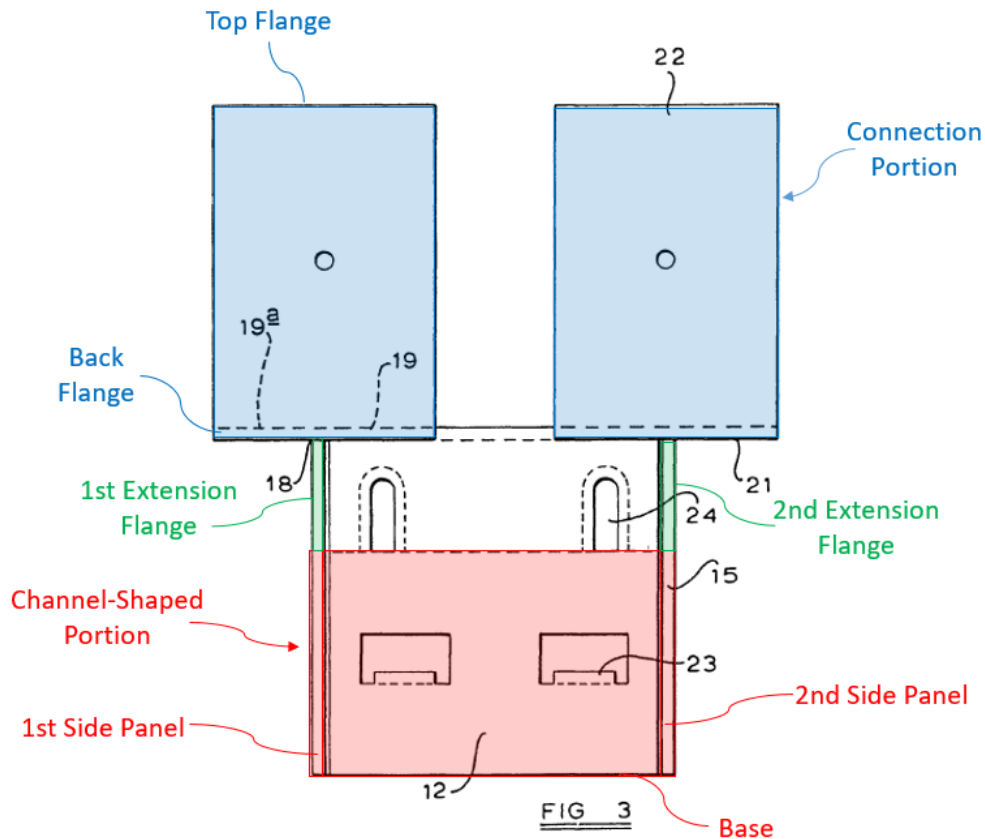
EX1040, FIG. 1 (annotated).

3) Second Side Panel

307. As discussed for claims 42 and 95, Adams-Bundy discloses a second side panel (second portion of sidewall 15 above base 14) extending upward from the base (base 14), wherein the first and second extension flanges (sidewalls 15 above edge 16) are parallel to each other and the first and second side panels (sidewalls 15 above base 14) are parallel to each other.



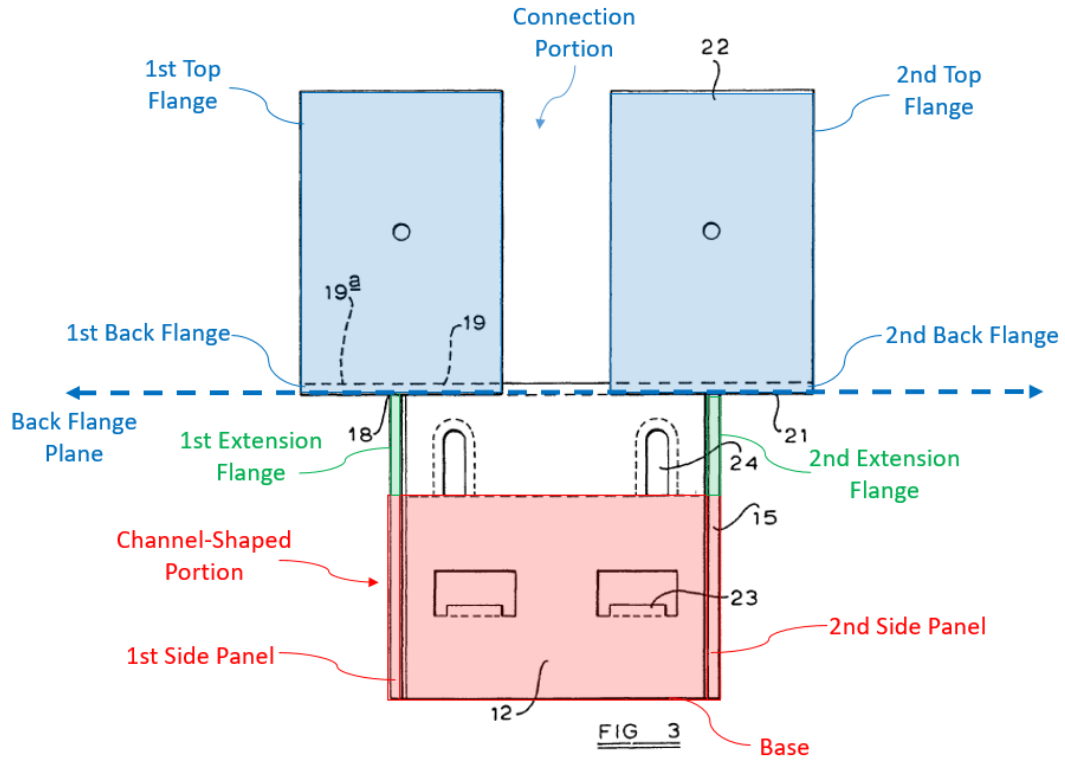
EX1040, FIG. 2 (annotated).



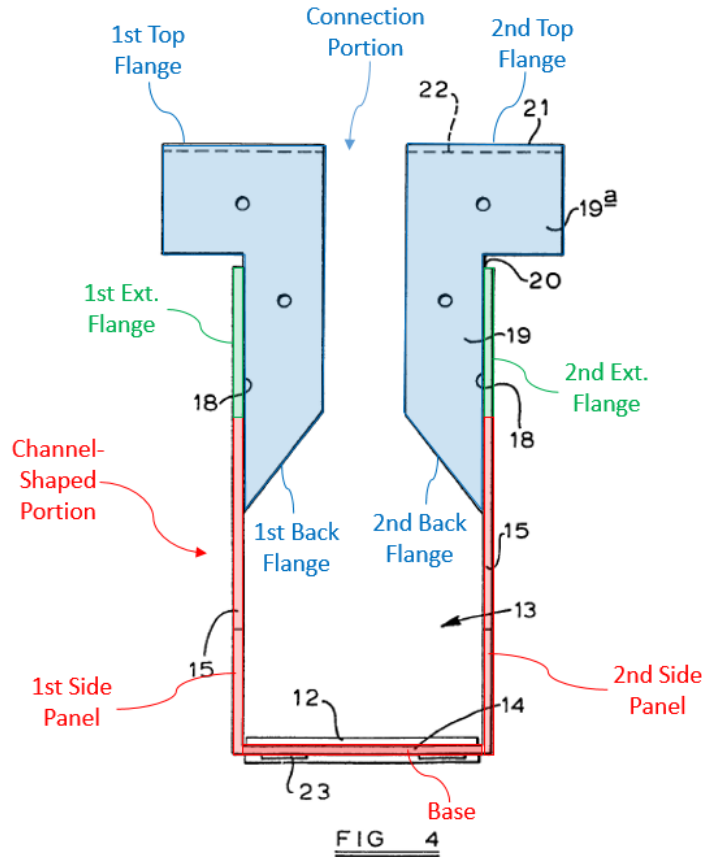
EX1040, FIG. 3 (annotated).

4) First Back and Top Flanges

308. For the reasons discussed for claims 39 and 92, Adams discloses that the back flange is a first back flange (first abutment portion 19) and the top flange is a first top flange (first bearing portion 22). EX1040, 4:22–36.



EX1040, FIG. 3 (annotated).

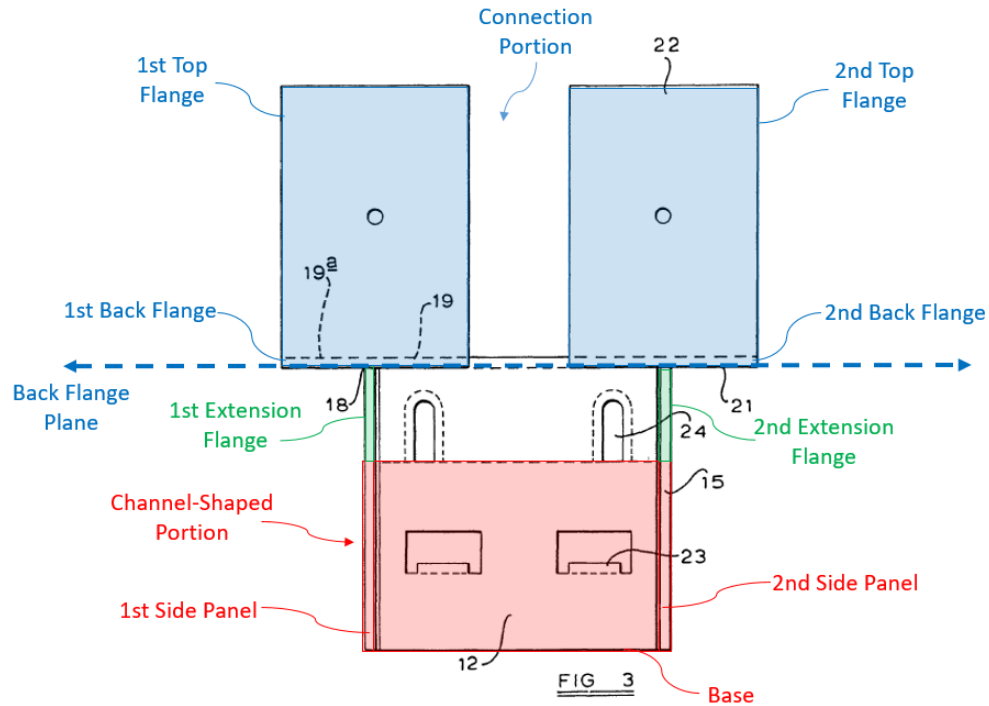


EX1040, FIG. 4 (annotated).

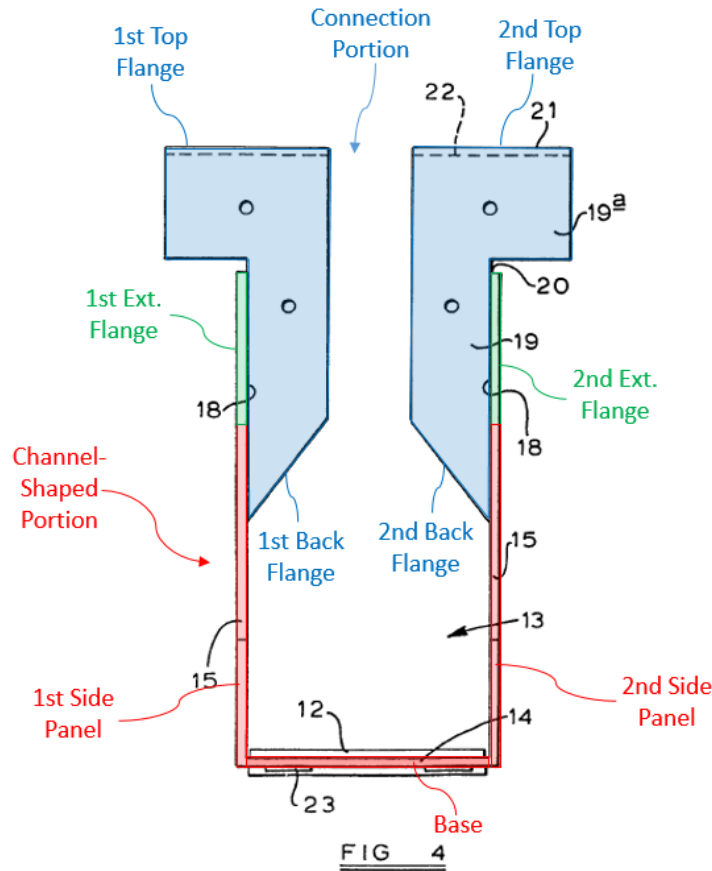
5) Second Back Flange and Second Top Flange

309. For the reasons discussed in claims 39 and 92, Adams-Bundy discloses that the connection portion includes a second top flange (second bearing portion 22) arranged to engage the top surface of the top plate of the frame wall and a second back flange (second abutment portion 19) extending from an edge (fold line 21) of the second top flange (second bearing portion 22) and arranged to engage the vertical face of the top plate of the frame wall. EX1040, 4:22–36. Being

constructed from sheet metal, Adams's second back flange (second abutment portion 19) has a front surface lying in the back flange plane. EX1040, 3:56–58.



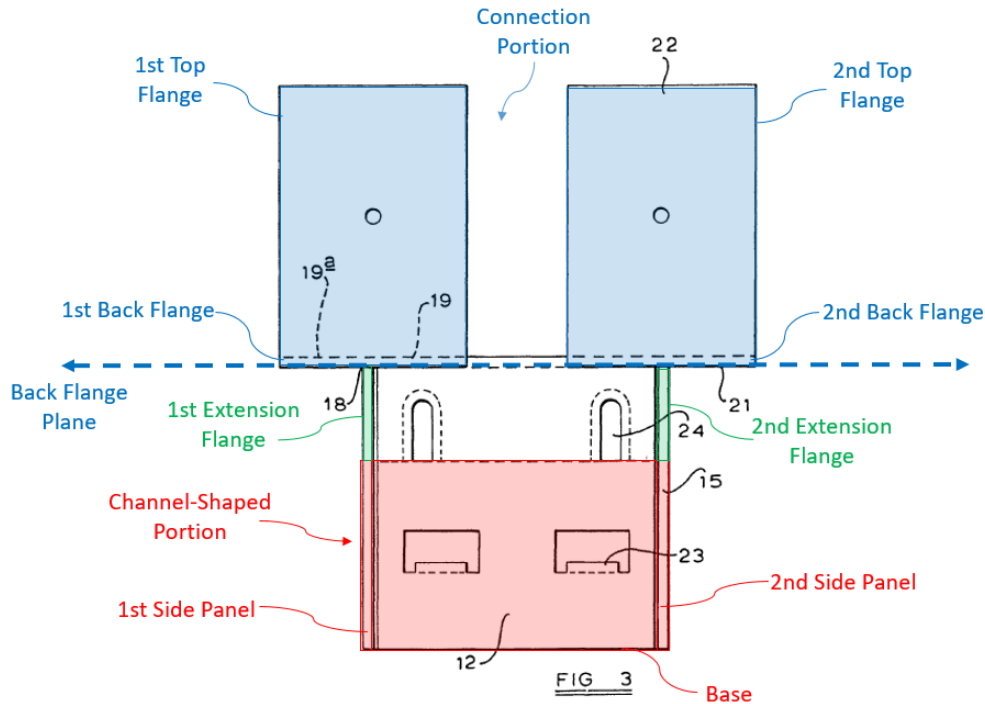
EX1040, FIG. 3 (annotated).



EX1040, FIG. 4 (annotated).

6) Extension Flanges Extending From Back Flanges to Channel-Shaped Portion

310. As discussed for claims 1.3.A, 39, 41, and 94, Adams discloses that the first extension flange (first portion of sidewall 15 above edge 16) extends from the first back flange (first abutment portion 19) to the channel-shaped portion (first portion of sidewall 15 above base 14) and that the second extension flange (second portion of sidewall 15 above edge 16) extends from the second back flange (second abutment portion 19) to the channel-shaped portion (second portion of sidewall 15 above base 14). EX1040, 4:11–26.



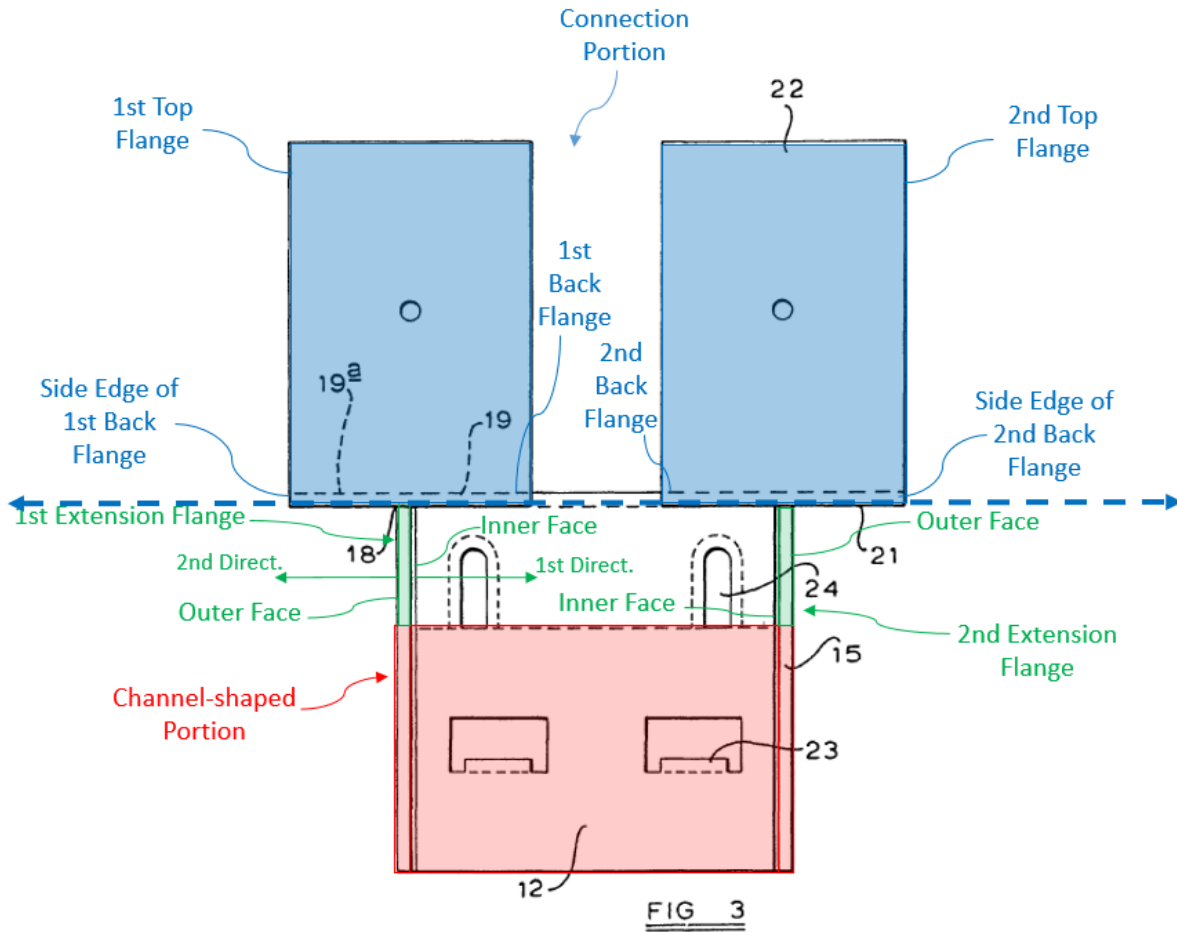
EX1040, FIG. 3 (annotated).

7) Inner and Outer Faces of Extension Flanges and Side Edge of Back Flanges

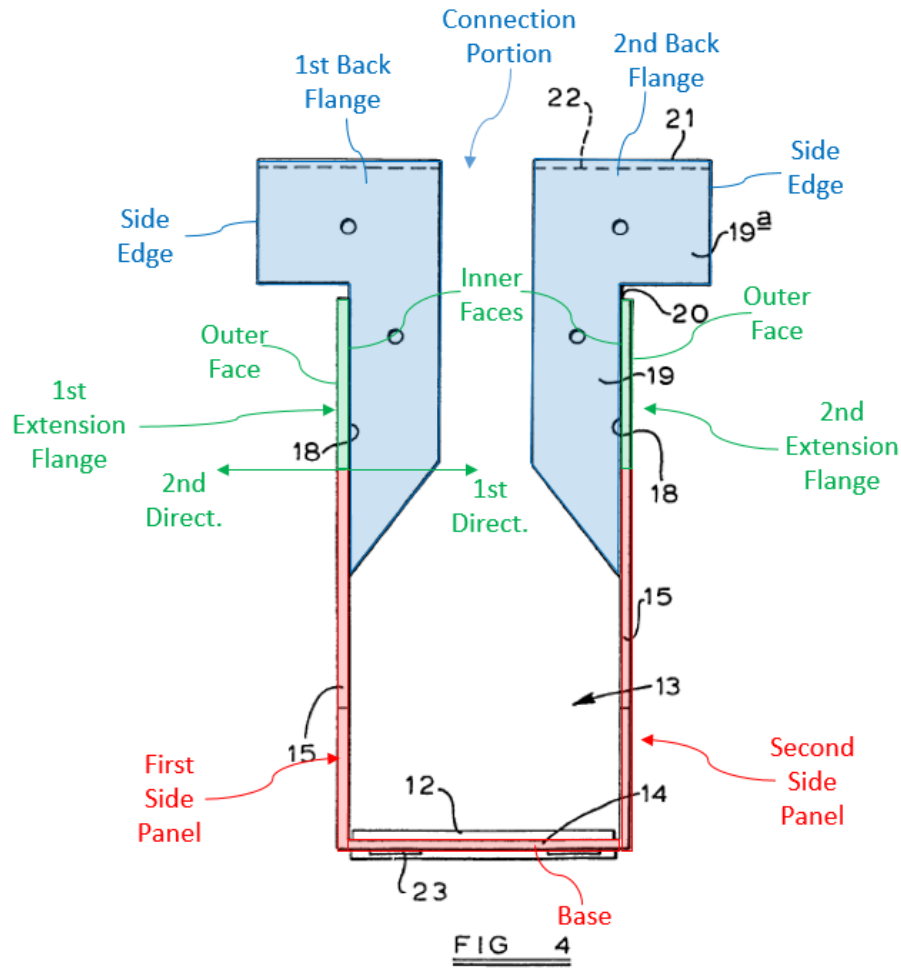
311. Adams discloses that the first and second extension flanges (sidewalls 15 above edge 16) each include an inner face and an outer face (annotated below) because they are made of sheet metal with a thickness. EX1040, 3:56–58. Because sidewalls 15 are parallel to each other, Adams discloses that the inner faces of the first and second extension flanges face one another—the inner face of the first extension flange (first sidewall 15 above edge 16) facing in a first direction toward the inner face of the second extension flange (second sidewall 15 above edge 16), and the outer face of the first extension flange (first sidewall 15 above edge 16)

facing in a second direction that is opposite the first direction, shown below.

EX1040, FIG. 3.



EX1040, FIG. 3 (annotated).



EX1040, FIG. 4 (annotated).

312. Adams further discloses the first back flange (first abutment portion 19) having a side edge (annotated above) disposed outward, in the second direction, of the outer face of the first extension flange (first sidewall 15 above edge 16), shown above. EX1040, FIG. 4. Adams further discloses the second back flange (second abutment portion 19) having a side edge (annotated above) disposed outward, in the first direction, of the outer face of the second extension flange (second sidewall 15 above edge 16). EX1040, FIGs. 3–4.

313. Accordingly, in my opinion, Adams in view of Bundy renders obvious claims 52 and 105.

XV. CONCLUSION

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

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

Executed on this 17th day of August, 2023, at Port Douglas, Australia,

/ W. Andrew Fennell /

W. ANDREW FENNELL

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