UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HILTI AKTIENGESELLSCHAFT

Petitioner,

v.

SPECIFIED TECHNOLOGIES INC.,

Patent Owner.

Case No. IPR2024-00192

U.S. Patent No. 9,157,232

DECLARATION OF MILOSH PUCHOVSKY

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I, Milosh Puchovsky of Mendon, Massachusetts, declare that:

I. INTRODUCTION

1. My name is Milosh Puchovsky, and I have been retained by counsel for Petitioner Hilti Aktiengesellschaft ("Hilti" or "Petitioner") as an expert witness to provide assistance regarding U.S. Patent No. 9,157,232 ("the '232 patent"). Specifically, I have been asked to consider the patentability of claims 6-12 of the '232 patent (the "Challenged Claims") in view of prior art, and anticipation and obviousness considerations from the perspective of a person of ordinary skill in the art at the time of the invention ("POSITA") as it relates to the '232 patent.

2. I am being compensated for my time at my standard consulting rate. I am also being reimbursed for expenses that I incur during the course of this work. My compensation is not contingent upon the results of my study, the substance of my opinions, or the outcome of any proceeding involving the challenged claims. I have no financial interest in the outcome of this matter or in the pending litigation between Petitioner and Patent Owner.

3. My analysis here is based on my years of education, research, and experience, as well as my investigation and study of relevant materials, including those cited herein.

4. I may rely upon these materials, my knowledge and experience and/or additional materials to rebut arguments raised by Patent Owner. Further, I may also

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consider additional documents and information in forming any necessary opinions, including documents that may not yet have been provided to me.

5. My analysis of the materials produced in this proceeding is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

II. QUALIFICATIONS

6. I have thirty-five years of experience working in and around the fire protection industry. I received my Bachelor of Science degree in Mechanical Engineering from Worcester Polytechnic Institute in 1988. I then received my Master of Science degree in Fire Protection Engineering from Worcester Polytechnic Institute in 1991. I am a Registered Professional Engineer (Fire Protection) in the state of Massachusetts (License number 38530).

7. I am presently Professor of Practice, the Associate Department Head and Principal Industry Liaison for the Department of Fire Protection Engineering at Worcester Polytechnic Institute. At WPI, I teach Graduate Engineering Courses in Building Fire Safety, Fire Protection Systems, Advanced Fire Suppression, Detection, Alarm, and Smoke Control, Performance Based Design, and Business Practices in Fire Protection Engineering. I have presented numerous Industry

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Related Seminars for the National Fire Protection Association. In addition to my academic responsibilities at WPI, I frequently work as a consultant to the fire protection industry and entities in need of fire protection expertise. A copy of my curriculum vitae is attached to this declaration as Appendix A.

III. PERSON OF ORDINARY SKILL IN THE ART

8. In rendering the opinions set forth in this declaration, I was asked to consider the patent claims and the prior art through the eyes of a person of ordinary skill in the art (a "POSITA") at the time of the alleged invention, which I understand is asserted to be June 11, 2013 (the filing date of a provisional patent application to which the '232 patent claims priority). I understand that the factors considered in determining the ordinary level of skill in a field of art include the level of education and experience of persons working in the field; the types of problems encountered in the field; the teachings of the prior art; and the sophistication of the technology at the time of the alleged invention. I understand that a POSITA is not a specific real individual, but rather is a hypothetical individual having the qualities reflected by the factors above. I understand that a POSITA would also have knowledge concerning the subject matter discussed in the prior art cited below.

9. Taking these factors into consideration, on or before June 11, 2013, a POSITA relating to the technology of the '232 patent would have had at least a bachelor's degree in mechanical engineering, civil engineering, fire protection

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engineering, applied science or a related field, with three to five years' experience in building construction, fire safety, or the firestopping field. Additional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education.

10. Before June 11, 2013, my level of skill in the art was at least that of a POSITA. By that time, I had an undergraduate degree in mechanical engineering, a master's degree in fire protection engineering, and had worked at the National Fire Protection Association as a consultant and a professor in the fire safety field for many years. I am qualified to provide opinions concerning what a POSITA would have known and understood at that time, and my analysis and conclusions herein are from the perspective of a POSITA as of that date.

11. In reaching the opinions and conclusions in this declaration, I have relied on the documents and materials cited herein as well as those identified in this declaration, including the '232 patent, the prosecution history of the '232 patent, and prior art references cited herein. These materials comprise patents, related documents, and printed publications. Each of these materials is a type of document that experts in my field would have reasonably relied upon when forming their opinions.

12. I have also relied upon my education, training, research, knowledge, and personal and professional experience in the relevant technologies and systems

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that were already in use prior to, and within the timeframe of, the earliest priority date of the claimed subject matter in the '232 patent, which is June 11, 2013.

IV. LEGAL STANDARDS

13. I am not a lawyer and do not provide any legal opinions, but I have been advised that certain legal standards are to be applied by technical experts in forming opinions regarding the meaning and validity of patent claims. I have applied the legal standards described below, which were provided to me by counsel for the Petitioner.

14. It is my understanding that assessing the validity of a U.S. patent based on a prior art analysis involves two steps. First, one must assess what meaning one of ordinary skill in the art would have given the claim terms applied. Second, after assessing the meaning of the claim terms, one may then assess validity by comparing a patent claim to the "prior art." I understand that the teaching of the prior art is viewed through the eyes of a POSITA at the time the invention was made. My analysis as to what constitutes a relevant POSITA is set forth above.

A. Legal Standards for Prior Art

15. I understand that a patent or other publication must first qualify as prior art before it can be used to invalidate a patent claim. For purposes of this declaration, counsel for Petitioner has instructed me to assume that each prior art reference cited in the combinations described below (i.e., U.S. 2009/0049781 ("Pilz I"), U.S.

8,595,999 ("Pilz II"), and U.S. 6,783,345 ("Morgan")) qualify as prior art to the '232 patent.

B. Legal Standard for Priority Date

16. I understand that the "priority date" (or "earliest effective filing date" or "Critical Date") of a patent is the date on which it is filed, or the date on which an earlier application was filed if the patentee properly claims the benefit of the earlier application's filing date. For purposes of my analysis in this declaration, I have assumed that the '232 patent is entitled to a priority date of June 11, 2013.

17. My understanding is that a patent claim is invalid as obvious only if the subject matter of the claimed invention "as a whole" would have been obvious to a POSITA at the time the invention was made. To determine the differences between a prior art reference (or a proposed combination of prior art references) and the claims, the question of obviousness is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Also, obviousness grounds cannot be sustained by mere conclusory statements. Rather, it is necessary to provide some articulated reasoning with rational underpinning to support the legal conclusion of obviousness.

18. I understand that a patent claim that comprises several elements is not proved obvious by simply showing that each of its elements was independently known in the prior art. In my evaluation of whether any claim of the '232 patent

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would have been obvious, I considered whether the Petition, or any evidence submitted in this proceeding, presented an articulated reason with a rational basis that would have motivated a POSITA to combine the elements or concepts from the prior art in the same way as in the claimed invention.

19. It is my understanding that there is no single way to define the line between true inventiveness on the one hand—which is patentable—and the application of common sense and ordinary skill to solve a problem on the other hand—which is not patentable. For instance, factors such as market forces or other design incentives may be the source of what produced a change, rather than true inventiveness.

20. I understand that the decision-maker may consider whether the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness. And the decision-maker may also consider whether there is some teaching or suggestion in the prior art to make the modification or combination of elements at issue. Also, the decision-maker may consider whether the innovation applies known techniques that had been used to improve a similar device or method in a similar way. The decision-maker may also consider whether the claimed invention would have been obvious to try, meaning that the claimed innovation was one of a relatively small number of

possible approaches to the problem with a reasonable expectation of success by those skilled in the art.

21. I have been instructed by counsel that if any of these considerations are relied upon to reach a conclusion of obviousness, the law requires that the analysis of such a consideration must be made explicit. I understand that the decision-maker must be careful not to determine obviousness using the benefit of hindsight and that many true inventions might seem obvious after the fact. I understand that the decision-maker should consider obviousness from the perspective of a POSITA at the time the claimed invention was made, and that the decision-maker should not consider what is known today or what is learned from the teaching of the patent.

22. I understand that in order to determine whether a patent claim is obvious, one must make certain factual findings regarding the claimed invention and the prior art. Specifically, I understand that the following factors must be evaluated to determine whether a claim is obvious: the scope and content of the prior art; the difference or differences, if any, between the claim of the patent and the prior art; the level of ordinary skill in the art at the time the claimed invention was made; and, if available, objective evidence of non-obviousness, also known as "secondary considerations."

23. I understand that the secondary considerations include: commercial success of a product due to the merits of the claimed invention; a long felt need for

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the solution provided by the claimed invention; unsuccessful attempts by others to find the solution provided by the claimed invention; copying of the claimed invention by others; unexpected and superior results from the claimed invention; acceptance by others of the claimed invention as shown by praise from others in the field or from the licensing of the claimed invention; teaching away from the conventional wisdom in the art at the time of the invention; independent invention of the claimed invention by others before or at about the same time as the named inventor thought of it; and other evidence tending to show obviousness.

24. I understand that to establish a secondary consideration, the evidence must demonstrate a connection between that secondary consideration and the claimed invention.

V. OVERVIEW OF THE '232 PATENT

A. Subject Matter Overview

25. According to the '232 patent Abstract, the patent relates to a "construction for insulating the head-of-wall joint between a wall and a floor or roof thereabove which utilizes an insulating gasket construction positionable between the ceiling track and the building structure thereabove" referred to as an "insulating gasket." The "insulating gasket" of the '232 patent "effectively [forms a] seal between conventionally designed metal track sections and the immediately adjacent

roof or ceiling area for firestopping and/or acoustic insulating thereof[].” Ex. 1001 at 5:5-8.

26. The insulating gasket of the ’232 patent is “preferably L-shaped and when used in pairs on a given wall 11 will define an overall downwardly facing C-shaped construction similar to the overall shape of the ceiling track or runner 18.” Ex. 1001 at 7:10-14; *see also id.* at 7:12-21 (“In this manner these two similarly shaped L-shaped members will co-operate together to define a downwardly facing C-shaped configuration for the insulating material similar to the shape and orientation of ceiling track 18.”).[1] The ’232 patent further explains that the insulating gasket includes the “first L-shaped gasket section 70 and the second L-shaped gasket section 76.” Ex. 1001 at 7:22-23. The L-shaped gasket sections are highlighted in red below. The ceiling track is highlighted in blue.

[1] Those in the art also refer to C-shaped gaskets and tracks as U-shaped gaskets and tracks. Both refer to the same structure.

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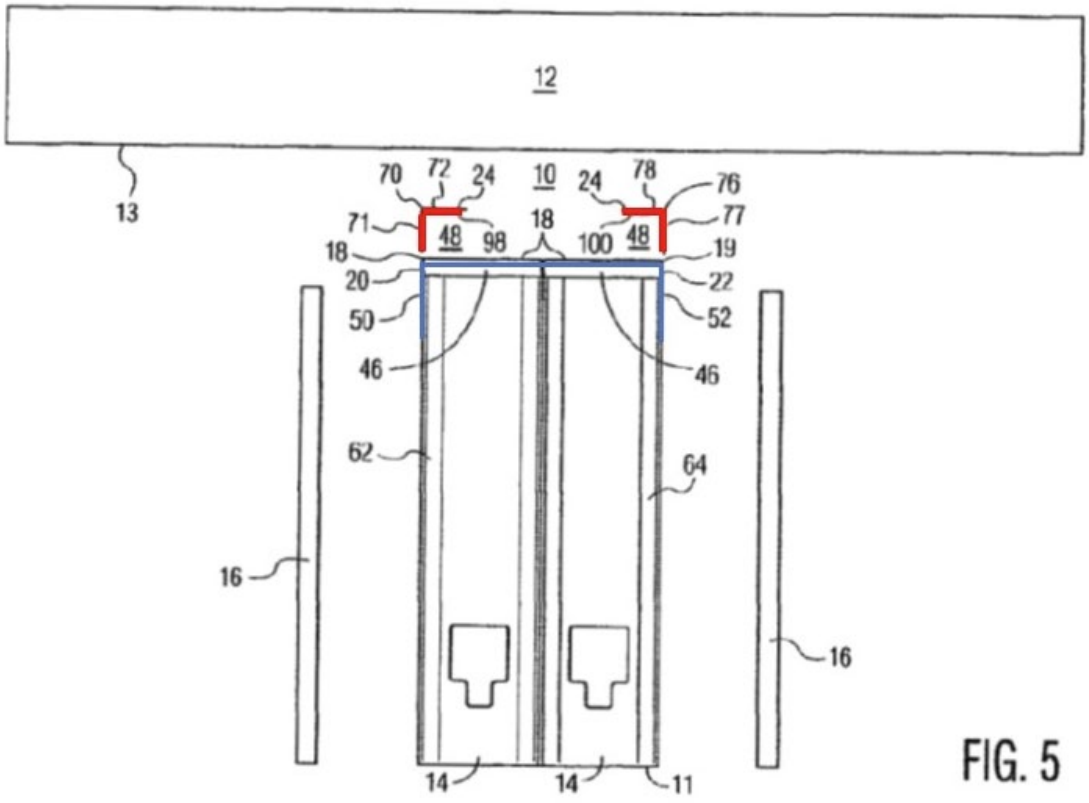

FIG. 5

Ex. 1001, Fig. 5 (annotated).

27. As discussed in the ’232 patent (see above) and as illustrated in Fig. 5, a ceiling track takes the shape of an upside down “C.” Quite commonsensically, the L-shaped gasket sections are shaped to mate with the upside-down C-shaped ceiling track. To that end, the ’232 patent discusses its first “L-shaped gasket section” with reference to a “first gasket upper panel 72 extending over one side of the main track section 19 of ceiling track 18” and “a first gasket side panel 71 attached to the first gasket upper panel 72 and extending outwardly over the first track side section 20 of ceiling track 18.” Ex. 1001 at 7:24-30. The ’232 patent includes corresponding disclosure concerning a second “L-shaped gasket section.” Ex. 1001 at 7:31-38.

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28. In the ’232 patent, the L-shaped gasket sections of the ’232 patent are positioned on top of a ceiling track with one or more connecting straps 82 (not shown in Fig. 5 above) attached to the L-shaped gasket. Ex. 1001 at 7:39-52. The ’232 patent also discloses that the upper panels of the L-shaped gasket sections are attached to the ceiling track by an adhesive means. Ex. 1001 at 8:52-63. Fig 3 (annotated below) discloses an embodiment of connecting straps 82 (colored green), which are used to connect the two L-shaped gasket sections of the ’232 patent’s insulating gasket when it is positioned on the ceiling track.

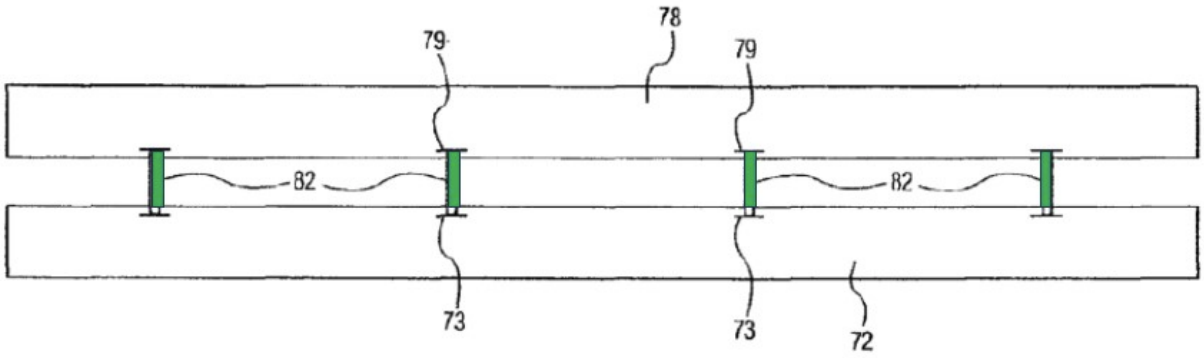

FIG. 3

29. The ’232 patent explains that, for purposes of fire protection, the insulating gasket preferably includes an “intumescent” component. See, e.g., Ex. 1001 at 9:12-25. An intumescent component foams in response to fire to limit the passage of smoke or fire. Thus, in the event of fire, the intumescent gasket sections would foam and delay the passage of fire through the openings sealed by the insulating gasket.

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B. File History of the ’232 patent

30. The Patent Owner filed a provisional patent application on June 11, 2013. Thereafter, Patent Owner filed a non-provisional patent application on April 14, 2014 claiming priority to the provisional patent application. Ex. 1002 at 325. On October 15, 2014, the Patent Office issued a non-final office action (the “NFOA”). *Id.* at 51-57. The NFOA rejected all application claims on the grounds of nonstatutory double patenting[2] in view of U.S. Patent No. 8,826,599 (Ex. 1007). *Id.* at 54. The Examiner found: “Although the claims at issue are not identical, they are not patentably distinct from each other. [The] ’599 [patent] teach[es] a C shaped gasket and the instant invention teach[es] two L shaped gaskets. Two L shapes are an obvious variation on a single C shape.” *Id*. at 54

31. The NFOA also rejected certain claims, including application claim 7, as obvious over U.S. Patent No. 7,950,198 to Pilz (the “’198 patent”) (Ex. 1008). Application claim 7 recited:

> An adjustable head-of-wall insulating construction for sealing a head of-wall area between a ceiling thereabove and a wall configuration therebelow which is wider than standard and which includes a ceiling track having a main track section which extends generally horizontally

[2] I am informed that a “nonstatutory double patenting rejection” finds that the claimed subject matter of a patent application is patentably indistinct from another patent owned by the same patent owner.

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and a first track side section extending downwardly therefrom and a second side track section extend downwardly therefrom at a position spatially disposed from the first track section wherein the main track section includes a first track side section defining a first lowermost edge thereof and a second side track section defining a second lowermost edge thereof, said insulating gasket construction comprising:

A. a first L-shaped gasket section including:

(1) a first gasket upper panel of insulating material positioned immediately above the main track section of the ceiling track and extending generally horizontally thereover; and

(2) a first gasket side panel of insulating material attached with respect to said first gasket upper panel and extending generally downwardly therefrom across the first track side section for insulating thereover, said first gasket side panel extending downwardly from said first gasket upper panel to define the generally L-shaped configuration of the first L-shaped gasket section, said first gasket upper panel and said first gasket side panel together defining a track receiving recess facing downwardly therebelow;

B. a second L-shaped gasket section including:

(1) a second gasket upper panel of insulating material positioned immediately above the main track section of the ceiling track and extending generally horizontally thereover at a position spatially disposed from said first gasket upper panel; and

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(2) a second gasket side panel of insulating material attached with respect to said second gasket upper panel and extending generally downwardly therefrom across the second track side section for insulating thereover, said second gasket side panel extending downwardly from said second gasket upper panel to define the generally L-shaped configuration of the second L-shaped gasket section, said second gasket upper panel and said second gasket side panel and said first gasket upper panel and said first gasket side panel together defining a track receiving recess facing downward therebelow for receiving a ceiling track positionable therewithin for facilitating insulating therearound;

C. a first panel adhesive means mounted on said first gasket upper panel at a position between said first gasket upper panel of said first L-shaped gasket section and the main track section of the ceiling track to facilitate engagement therebetween; and

D. a second panel adhesive means mounted on said second gasket upper panel at a position between said second gasket upper panel of said second L-shaped gasket section and the main track section of the ceiling track to facilitate engagement therebetween.

Id. at 298-301.

32. This claim language is identical to issued claim 6 of the ’232 patent with exception that issued claim 6 includes element 6E, which recites a “connecting strap.”

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33. In this same NFOA, the examiner found that the ’198 patent disclosed each of the above limitations of application claim 7 (which issued as claim 6). Id. at 55. As to the claimed “adhesive means,” the examiner found that the ’198 patent “discloses the use of adhesives with the gasket but not a particular configuration” and further that “it would have been an obvious design choice to use the adhesion configuration such as specified in these claims.” Ex. 1002 at 55.

34. The application also included dependent claim 8, which recites the same “connecting strap” as claimed in element (E) of issued claim 6 of the ’232 patent: “at least one connecting strap positioned above the main track section of the ceiling track and attached to said first L-shaped gasket section and to said second L-shaped gasket section to limit spatial separation therebetween .” Ex. 1002 at 301. In the NFOA, the examiner “objected” to application claim 8 as it was presented in the application as being dependent upon a rejected base claim (application claim 7) but found that the claim would be allowable if rewritten in independent form including all of the limitations of claim 7 from which it depended. *Id*. at 56.

35. Thus, the examiner found that all elements of issued claim 6 of the ’232 patent were present in the ’198 patent except the “connecting strap” limitation (element (E) of issued claim 6). The examiner apparently found that the prior art did not disclose the “connecting strap” limitation. In other words, the examiner’s

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allowance of issued claim 6 of the ’232 patent turned entirely on the inclusion of a “connecting strap” as claimed in element (E) of claim 6 of the ’232 patent.

36. In response to the Office Action, Patent Owner filed a “terminal disclaimer” to overcome the nonstatutory double patenting rejection. Ex. 1002 at 29. Patent Owner also cancelled application claim 8 and incorporated it into application claim 7. *Id*. Patent Owner did not dispute the examiner’s finding that all limitations of application claim 7 were disclosed in the ’198 patent. *Id*.

VI. OVERVIEW OF THE CITED PRIOR ART

A. Overview of Pilz I

37. I understand that U.S. 2009/0049781 (“Pilz I”) is a continuation-in-part of parent U.S. Application No. 12/013,361 of which the ’198 patent is a divisional application. Ex. 1004 (Related U.S. Application Data – Continuation-in-part of application no. 12/013,361, filed on Jan. 11, 2008”) Ex. 1008 (“Related U.S. Application Data – Division of application no. 12/013,361, filed on Jan. 11, 2008, now Pat. No. 7,617,643”). I am informed that a continuation in part application includes all of the disclosure of the parent application and adds additional subject matter not disclosed in the parent application. Accordingly, I understand that Pilz I includes all of the disclosure of the ’198 patent and adds material not included in the ’198 patent.

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38. Pilz I discloses "fire-rated wall construction components and wall systems" with embodiments that "can include tracks for holding studs which incorporate various geometries capable of receiving fire-retardant material" and "flat straps for use between tracks and fluted wall components." Ex. 1004, Abstract.

39. Pilz I also discloses first and second L-shaped gaskets 84 comprised of intumescent material, positioned above a main track section of a ceiling track 82 and extending over respective track side sections (colored red below). Ex. 1004, ¶0055. Pilz I discloses that intumescent material 50 (of the embodiment disclosed in Fig. 6B) may include "adhesive backing, which permits the intumescent material 50 to be secured to . . . wall component 56." *Id*., ¶0049. As shown in the figure below, the L-shaped gasket sections 84 of Pilz I form downward facing track receiving recesses.

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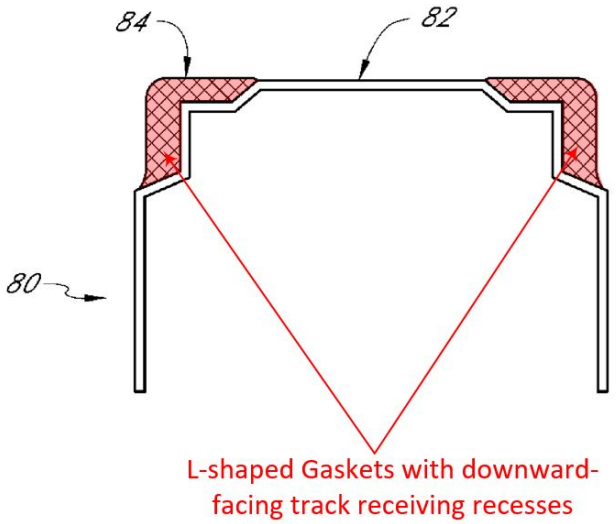
Pilz I FIG. 9 Excerpt



Ex. 1004, Fig. 9 (annotated).

40. During prosecution of the ’232 patent, the examiner relied on this same Fig. 9 and accompanying description to find that the ’198 patent disclosed each limitation of issued claim 6 of the ’232 patent with the exception of the claimed “connecting strap” in element (E). Ex. 1002 at 55.

41. Pilz I added Fig. 10A (annotated below), which (along with the strap 116) was not included in the ’198 patent. FIG. 10A shows a ceiling track 114 with two L-shaped gaskets sections 120 (red) and a “strap 116” (colored green, which is called both “flat strap 116”[3] and “fire strap 116” in Pilz I) positioned above the main

[3] The ’198 patent discloses a different “flat strap,” which performs a different function. Ex. 1008 at 4:45-61.

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track section of the ceiling track and connected to the L-shaped gasket sections (colored red).[4] Ex. 1004, ¶¶0056-0058. While Fig. 10A is disclosed with reference to a fluted ceiling track, Pilz I explains that "the first wall component 112 can comprise a floor, ceiling, overhang, or any other type of wall component." Ex. 1004, ¶0056.

42. Pilz I explains that L-shaped gasket sections 120 (colored red) can be adhered to ceiling track 114[5] (Ex. 1004, ¶¶0057-0058) such that when the ceiling track 114 "is attached to, pressed, and/or placed against the fire strap 116, the gasket or gaskets 120 can form a sound and/or air seal, inhibiting sound and/or air from moving from one side of the" ceiling track to the other. Ex. 1004, ¶0058. As such, the fire strap 116 is attached to the two L-shaped gaskets 120, which are adhered to the ceiling track.

[4] For clarity, flat strap 116 extends beyond the portion highlighted green.

[5] Pilz I explains that "[i]n at least some embodiments the second wall component 114 can comprise a track, or header track, such as the one illustrated in FIG. 10A, for retaining wall studs." Ex. 1004, ¶0057.

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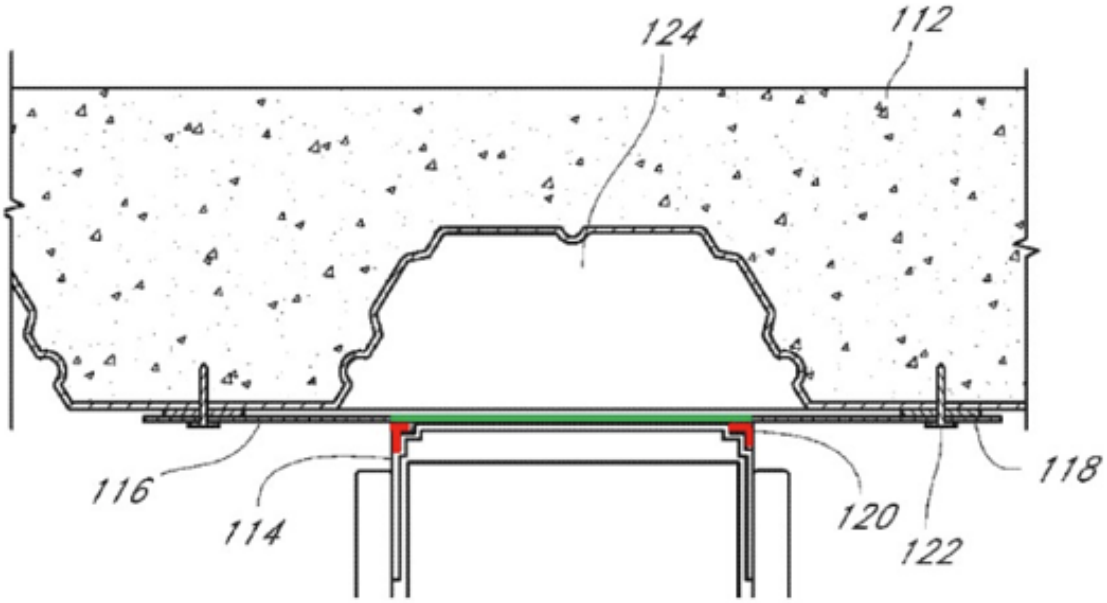

Ex. 1004, FIG. 10A (annotated).[6]

43. The result of the above-described construction is an insulating gasket comprising two L-shaped gasket sections adhered to the ceiling track and connected by a connecting strap that is positioned above the ceiling track. Pilz I also discloses that "[t]he gasket 120 can itself comprise a strip of fire-retardant material, including but not limited to intumescent material." Ex. 1004, ¶0058. Thus, a POSITA understands that the gasket of Pilz I includes intumescent properties to prevent the spread of fire.

[6] Fig. 10B shows a zoomed in view of the L-shaped gasket section 120. Notably, the vertical portion of L-shaped gasket section 120 is not flush against ridged portion of the ceiling track, which suggests that the vertical portion need not be adhered to the side track section.

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44. Pilz I discloses another embodiment in which a C-shaped gasket is formed of intumescent material to mate with the C-shape of the ceiling track. Pilz I discloses this with reference to Fig. 8. Pilz I explains that Fig. 8 discloses track 72 (colored blue) for holding a wall stud 20 beneath a ceiling 18. Ex. 1004, ¶0054. Intumescent material 74 (colored red) is attached to ceiling track 72 as shown in the below figure. *Id*.

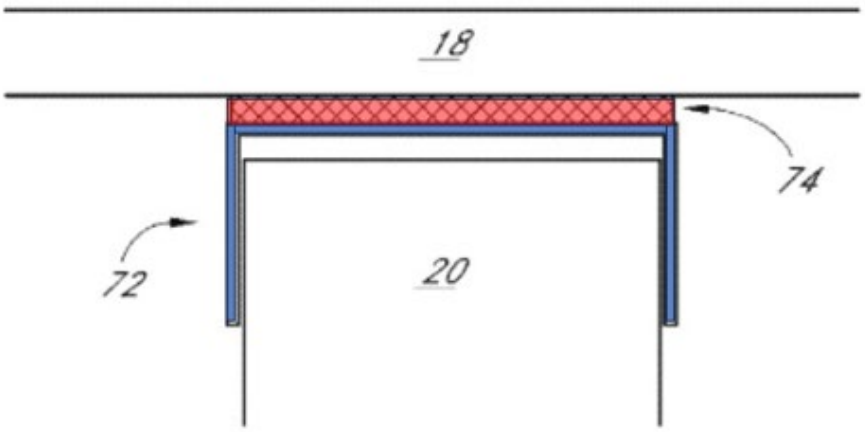

FIG. 8

Ex. 1004, Fig. 8 (annotated)

45. Pilz I further describes additional embodiments where "the intumescent material may extend down one or both sides of the wall component 72." Ex. 1004, ¶0054. The modified figure below illustrates the structure of this embodiment (which is described but not depicted in Pilz I) in which a single piece of intumescent

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material extends across the horizontal track side and down the side track sections to form a C-shaped gasket.

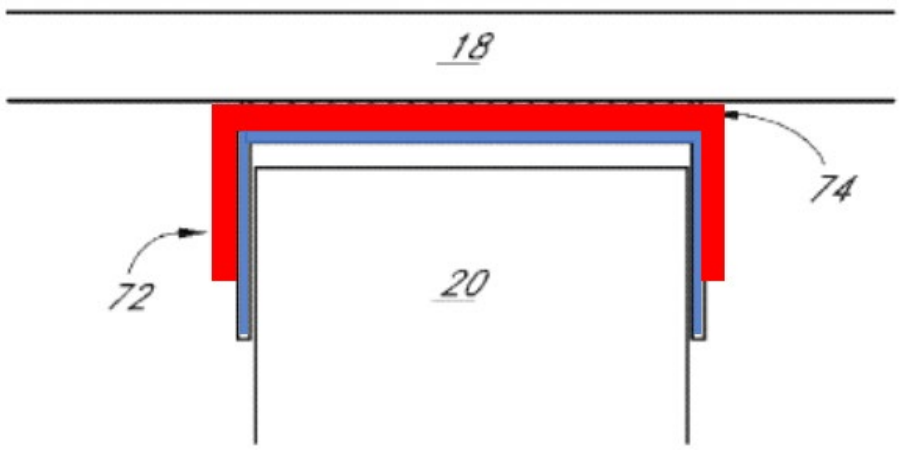


FIG. 8

Ex. 1004, Fig. 8 (annotated).

46. This C-shaped construction of Pilz I includes two L-shaped gasket sections and a connecting strap to limit the spatial separation between the two, as shown in the annotated figure below.[7]

[7] This single piece of intumescent material embodiment of Fig. 8 is consistent with the embodiment of Figs. 6A and 6B, which include "an intumescent material 50, [which] can be a single piece of material." Ex. 1004 at ¶¶0048-0049.

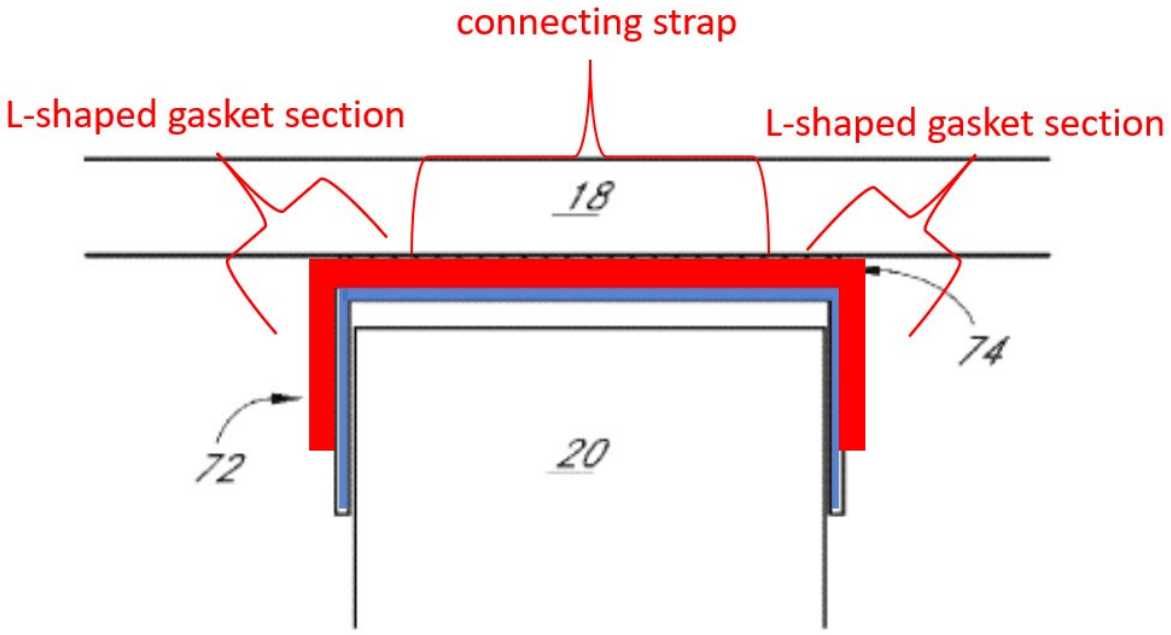


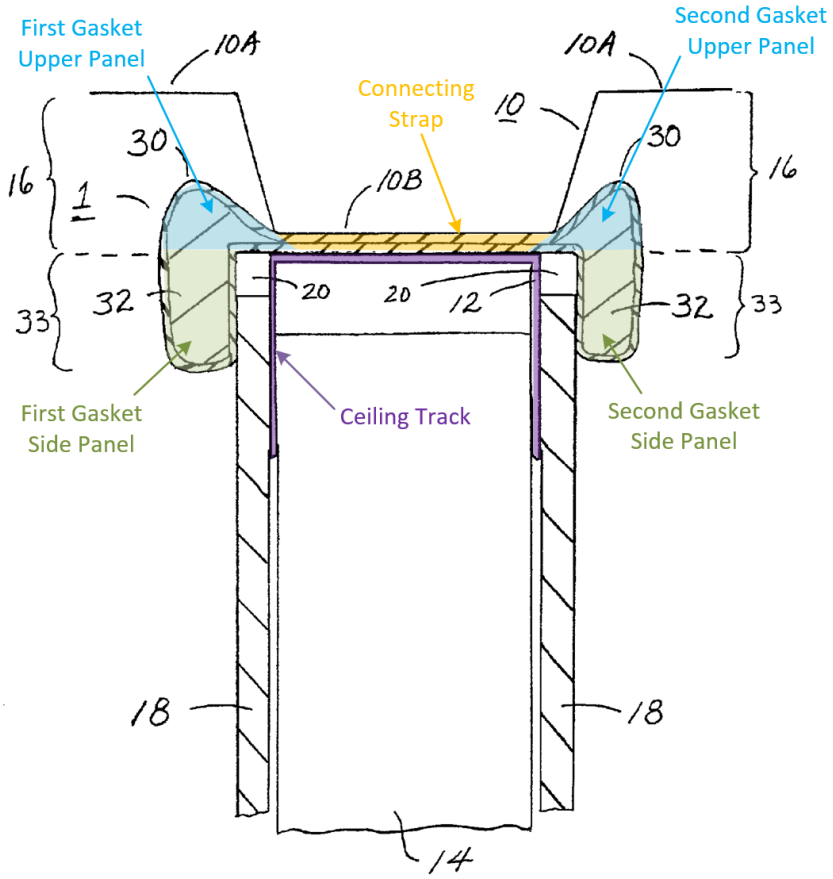
FIG. 8

B. Overview of Morgan

47. Morgan discloses "methods, systems, and devices for installing barriers in openings or gaps in or between structures such as walls, ceilings, and floors [using a] barrier molding bag [] positioned in the hole or gap and [filled with] a flowable firestop material." Ex. 1005, Abstract. Morgan explains that "[o]ne objective of the present invention is to provide a more convenient and cost-effective method for installing a thermal barrier in intricately shaped openings and joint gaps such as are found in 'head-of-wall' joints, 'perimeter' joints, and other variously sized and/or

intricately shaped gaps or openings such as penetrations through walls." Ex. 1005 at 2:5-10.

48. Morgan discloses various embodiments of the disclosed invention, including with reference to annotated Fig. 4 below.



Ex. 1005, Fig. 4 (annotated).

49. As to Fig. 4, Morgan explains:

> As shown in FIG. 4, another exemplary thermal barrier 1 of the invention can be made when the fluted metal ceiling 10 is oriented in the same direction as the metal stud wall 14. In this case, a barrier molding bag 30 is positioned between the horizontal track member 12

> and ceiling surface 10B, with longitudinal edges of the bag (33) extending outwards on either side of the joint between the wall and ceiling, before the horizontal track member 12 is attached to (or otherwise disposed against) the ceiling surface 10B….a flowable firestop material 32 is introduced into the molding bag 30, such that a thermal firestop barrier is molded along the joint over the corner gaps 20 at the top of the gypsum boards 18.

Ex. 1005 at 5:5-25.

50. Morgan further explains that an advantage of the disclosed invention is that the bags can be adjusted to fill joints of varying sizes:

> Exemplary molding bags 30 of the invention, as previously mentioned, should be sufficiently flexible to provide for convenience in positioning the bag, when empty, into opening or gaps of various sizes and shapes, and to provide for expandability in size, upon introduction of the hydratable cementitious material, whereby the molding bag conforms to at least a portion, or the entirety, of the joint gap or opening. Preferably, the bag may be shipped in roll form such that it can be unrolled into place conveniently during installation.
>
> The molding bag material should be strong enough to permit filling by a cementitious slurry under pressure and to retain the slurry until it hardens. Since it is the function of the cementitious material, when hardened, to provide a barrier against heat and fire, it is not necessary for the molding bag material itself to be fire-retardant, and it would be expected for the bag material to be burned or even consumed when exposed to fire.

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Ex. 1005 at 10:40-57.

51. Morgan discloses that its "molding bag 30 can be attached, using adhesives or fasteners, to the horizontal track 12 as a one-piece assembly." Ex. 1005 at 11:46-48. Morgan further explains: "For example, the bottom side 30B of the bag 30 shown in FIG. 5 can be supplied with a two-sided tape, covered by a releasable sheet, to permit the bag device 30 to be adhered to the horizontal track 12 before it is fastened to or disposed against the ceiling, as illustrated in FIGS. 3 and 4." Ex. 1005 at 14:14-19. Accordingly, a POSITA understands that Morgan discloses that it was known to place an adhesive on the portion of an L-shaped gasket section that is directly above the horizontal section of a ceiling track.

C. Overview of Pilz II

52. U.S. 8,595,999 ("Pilz II") is from a different patent family as compared to Pilz I. Pilz II discloses fire-rated angles to which L-shaped gasket sections (colored red) are attached. This can be seen with reference to annotated Fig. 2 below.

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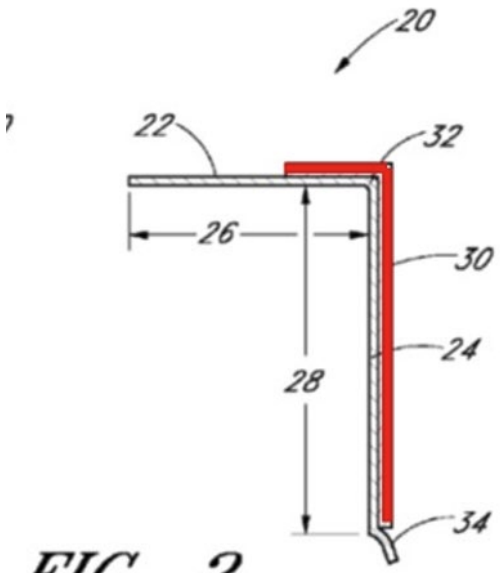

FIG. 2

Ex. 1006, Fig. 2 (annotated).

53. The angle profiles 20 are positioned between a ceiling track and wallboards as shown with reference to Fig. 12 below.

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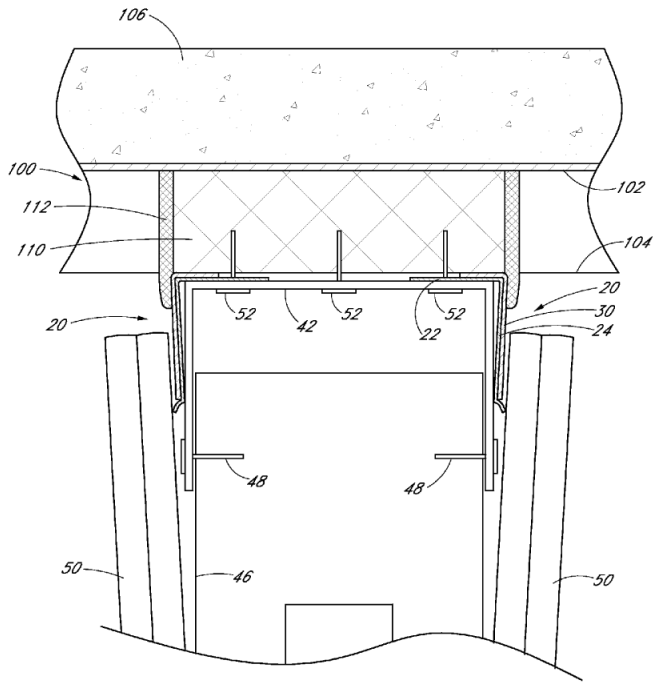

FIG. 12

Ex. 1006, Fig. 12.

54. Pilz II discloses that it was known to construct head of wall sealing systems used in connection with "wider than standard" wall assemblies:

> The dimensions of the width of the horizontal leg 22 preferably are selected such that two angles 20 can be employed in a head-of-wall assembly (illustrated in FIG. 3) with one angle 20 on each side of the wall. Preferably, the width of the horizontal leg 22 is selected such that the legs 22 of the two angles 20 do not overlap one another when assembled into the head-of-wall assembly. Accordingly, if the angle 20 is configured for use with a wall assembly that is wider than standard width, the width of the horizontal leg 22 can be increased to, for example, about 1 ½ incudes to about 3 inches, or more.

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Ex. 1006 at 6:63-7:6; *see also id* at 23:31-41.

55. Pilz II discloses a fluted deck pan 100, which includes voids 104 where the track 42 does not contact the deck 106, such as shown in the FIG. 12 cross-section. Ex. 1006 at 12:33-55. In such regions, Pilz II discloses a flexible connecting structure positioned above the main track section 42. Ex. 1006 at 12:33-55. Specifically, the voids are filled with a combination of compressed mineral wool 110 and an elastomeric fire spray 112 applied over the mineral wool. Ex. 1006 at 12:33-55. The fire spray laps the intumescent angles 20, thus attaching the angles, compressed mineral wool, and elastomeric coating into an assembly that allows wallboard 50 "to cycle unencumbered against intumescent angle 20 without stress cracks to the fire rated deflection joint." Ex. 1006 at 13:3-8. Pilz II also discloses the use of optional fasteners 52 driven through each of the left and right gasket upper panels and the mineral wool. Ex. 1006, FIG. 12. A POSITA would understand the combination of Pilz II's mineral wool and elastomeric spray to form a type of strap that connects the two L-shaped angle profiles with L-shaped intumescent gasket sections adhered to the profiles, as shown in the figure below (with reference to the blue section).

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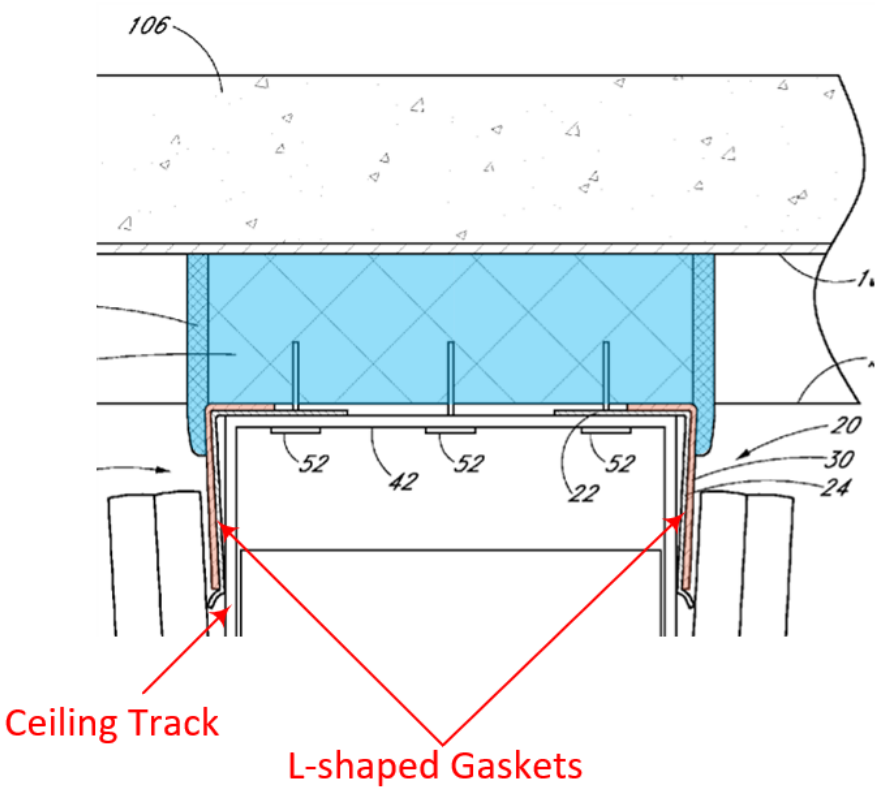

Ex. 1006, Fig. 12 (annotated).

VII. CLAIM CONSTRUCTION

56. I understand that the meaning of claim terms that appear in claims 6-12 of the '232 patent should be interpreted from the perspective of a POSITA as of June 11, 2013. I understand that unless the specification or file history clearly identifies a special meaning for a given claim term, the claim term should be given its plain and ordinary meaning as judged from the perspective of a POSITA. I have applied the plain and ordinary meaning of each claim term in forming my opinions set forth in this declaration. Where appropriate, I have addressed certain claim construction disputes raised by the parties in the District Court Litigation.

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57. I understand that in co-pending District Court litigation, Petitioner and Patent Owner dispute the meaning of certain terms in claims 6-12 of the '232 patent. Where appropriate, I have addressed those disputes below. That said, under either Patent Owner's or Petitioner's construction, it is my opinion that claims 6-12 are obvious as explained in this declaration.

VIII. GROUNDS 1A AND 1B RENDER OBVIOUS CLAIMS 6-12.

A. Ground 1A: Pilz I in view of Morgan and Pilz II

1. Overview of the Combination.

58. As explained in detail below, Pilz I discloses each element of claim 6, except that Pilz I does not expressly address the location of the adhesive used to adhere Pilz I's L-shaped gasket sections to the top of the ceiling track (*i.e.*, elements [6c] and [6d]). Pilz I also does not expressly state that its insulating gasket could be used on a "wider than standard" wall assembly as recited in the preamble.

59. A POSITA would have found it obvious to include an "adhesive means" on the upper gasket panels of Pilz I's L-shaped gasket sections to facilitate engagement between the main track section (the horizontal track section) and the L-shaped gasket sections.

60. Starting with Pilz I, the reference discloses that "intumescent material 50" of the embodiment disclosed in Fig. 6B may "include adhesive backing, which permits the intumescent material 50 to be secured to . . . wall component 56." Ex.

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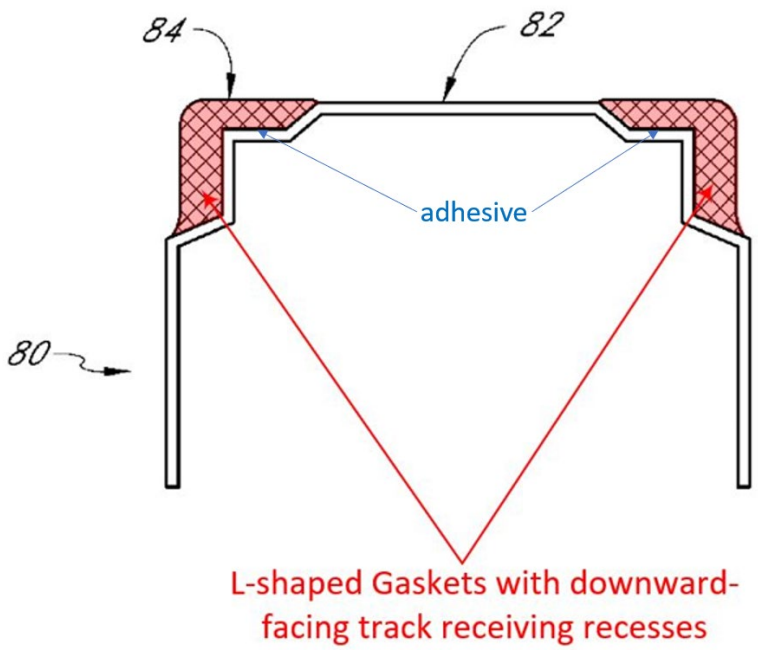
1004, ¶0049. Thus, Pilz I expressly discloses that it was known to place an "adhesive backing" on intumescent material, such as intumescent material 84 of the embodiment disclosed in Fig. 10A (as well as Fig. 9). While Pilz does not expressly disclose the location of the adhesive backing, a POSITA would have understood this to be an obvious design choice. This is consistent with the patent examiner's finding during prosecution that "it would have been an obvious design choice to use the adhesion configuration such as specified in these claims." Ex. 1002 at 55-56.

61. One such obvious design choice would be to place the adhesive backing on the upper panels of Pilz I's L-shaped gasket sections such that those panels could be adhesively connected to the horizontal portion of the ceiling track as shown in the figure below.



Ex. 1004, Fig. 9 (annotated).[8]

62. Morgan confirms it was known to include an adhesive means on the upper panel of an L-shaped insulating gasket section included in a head-of-wall assembly. Morgan discloses that the insulating gasket may include "a pressure sensitive adhesive layer, grommets, or other means for allowing the bag to be adhered or mechanically attached to a wall, ceiling, floor, or other building or vessel structure." Ex. 1005 at 14:10-19. Morgan continues: "For example, the bottom side 30B of the bag 30 shown in FIG. 5 can be supplied with a two-sided tape, covered by a releasable sheet, to permit the bag device 30 to be adhered to the horizontal track 12 before it is fastened to or disposed against the ceiling, as illustrated in FIGS. 3 and 4." Ex. 1005 at 14:14-19. Accordingly, Morgan discloses that it was known to place an adhesive on the portion of an L-shaped gasket section that is directly above the horizontal section of a ceiling track, confirming that this was an obvious and known design choice.

63. With respect to Pilz I's embodiment in Fig. 10A disclosing "fire strap 116," Pilz I states that L-shaped gasket sections 120 "can be adhered to a surface of the second wall component 114." Ex. 1004, ¶0058. As explained previously, Pilz I explains that "[i]n at least some embodiments the second wall component 114 can

[8] A POSITA understands that the L-shaped gasket sections of Pilz I may be applied on site or prior to delivery of the ceiling track.

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comprise a track, or header track, such as the one illustrated in FIG. 10A, for retaining wall studs." Ex. 1004, ¶0057. Thus, Pilz I discloses that the L-shaped gasket sections of Fig. 10A can be adhered to the ceiling track, again leaving a POSITA with a known and obvious design choice. As such, a POSITA would have been motivated to combine Morgan with Pilz I.

64. In fact, there are only a finite number of design choices available to a POSITA in deciding where to locate the panel adhesive means in the L-shaped gasket sections of Pilz I. Specifically, a POSITA would recognize just three options for where the adhesive means could be located: a) the portion of the L-shaped gasket section that extends over the horizontal portion of the ceiling track (*e.g.*, the upper panel); b) the portion of the L-shaped gasket section that extends downward across the vertical portion of the ceiling track (*e.g.*, the side panel); and c) an adhesive that spans the locations of both a) and b). Placing the adhesive on the upper panel of the L-shaped gasket sections also has the benefit of ensuring the upper panel does not shift when the ceiling track is affixed to the ceiling.

65. A POSITA would have been further motivated to place an adhesive means on the upper gasket panel of Pilz I's L-shaped gasket section because doing so would allow for free movement of the portion of the L-shaped gasket sections that extends across the vertical portions of the ceiling track. A POSITA would understand that the wall assembly including the L-shaped gasket sections and ceiling

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tracks will move vertically and horizontally due to normal forces exerted on a building (*e.g.*, human movement, wind, etc.). If a side gasket panel were affixed to the side of a standard ceiling track (such as wall component 72 in Fig. 8 of Pilz I), the building movement could place undue stress on the L-shaped gasket sections causing them to tear. A POSITA would be motivated to avoid such damage to the L-shaped gasket sections.

66. As another example, Morgan discloses that "in FIG. 2, gypsum wallboards 18 are affixed on either side of the studs 14 to complete the wall assembly (PRIOR ART), and gaps 20 are typically left between the tops of the gypsum wallboard 18 and horizontal track 12 to permit movement of the wallboards 18." Ex. 1005 at 4:42-47. Pilz II similarly acknowledges building and joint movement. Ex. 1006 at 1:27-23; 8:36-45. Thus, it was known to allow for vertical movement of wallboards. If the side gasket panel were adhered to the side track section, the vertical movement of the wall boards could cause friction against the L-shaped gasket side panels and risk destroying the L-shaped gasket sections. Adhering the upper panel to the ceiling track and leaving the side panel free to move will avoid such friction as the side panel is able to move laterally as the wallboards move vertically. This provides another reason a POSITA would place an adhesive means on the upper gasket panel. Combining Pilz I and Morgan merely involves combining

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prior art elements according to known methods to yield predictable results, and use of known techniques to improve similar devices in the same way.

67. A POSITA would understand that Pilz I's L-shaped gasket sections and fire strap 116 could be positioned on a wall assembly of any size, including "wider than standard" wall configurations. This would be accomplished by cutting the intumescent material of L-shaped gasket sections 120 to any appropriate length based on the size of the ceiling track. Indeed, Pilz I explains that the fire strap 116 is flexibly sized "to cover a portion or all of one more flutes 124 of fluted deck 112." Ex. 1004, ¶0059. Because the two L-shaped sections are separately placed, they can be placed as close or as far from each other laterally as needed to accommodate a ceiling track of any size. The L-shaped gasket sections would then be secured to the top horizontal portion of the ceiling track consistent with the obvious design choice discussed above and especially in view of Morgan. The size of the fire strap 116 will be selected based on the ceiling width with consideration to the width of the ceiling track. A fire strap 116 of any size can be cut to accommodate a wall assembly of any size. The fire strap 116 is then adhered to the ceiling. Ex. 1004, ¶0058. After that, the two L-shaped gasket sections are adhered to the fire strap 116 to form an insulating gasket to seal a head of wall area. *Id*. Alternatively, Pilz I explains that fire strap 116 can be attached directly to the ceiling track (i.e., the second wall component) rather than the ceiling (i.e., the first wall component). *Id*., ¶0059.

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68. To the extent a POSITA had any doubt as to whether Pilz I's insulating gasket could be used on a "wider than standard" wall configuration, Pilz II expressly discloses that it was known to vary the size of L-shaped gasket sections to seal "a wall assembly that is wider than standard width" as discussed above. Ex. 1006 at 6:55-7:15; *see also id*. at 18:30-38 ("Accordingly, if the angle 200 is configured for use with a wall assembly that is wider than standard width, the width of the horizontal leg 220 can be increased to, for example, about 11/2 inches to about 3 inches, or more."). A POSITA would be motivated to consider Pilz II's disclosure in this regard to obtain the benefit of flexibility in the width of a wall assembly that can be sealed. Indeed, Pilz II discloses: "The web of the header track can be any suitable width. For example, the web can have a width between about 2 ½ and 10 inches, with specific lengths of about 3.5 inches, 4 inches, 5.5 inches, 6 inches and 7.5 inches, among others." *Id*. at 15:66-16:2. The flexibility provided by the combined gasket of Pilz I in view of Morgan and Pilz II would be advantageous in the marketplace due to economic pressures in the marketplace for a flexible gasket that can accommodate various different sized wall assemblies. A POSITA understands that the width of a wall configuration will vary greatly in the marketplace and depend on a number of subjective factors, many of which must be assessed at the job site. For example, the size of the studs will impact the width of the ceiling track. As another example, some buildings may call for a double wall

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configuration with soundproofing insulation between two wall assemblies. The combined gasket of Pilz I in view of Morgan and Pilz II provides a POSITA will flexibility to address any marketplace condition that may arise.

69. A POSITA would reasonably expect to be successful in making the combination of Pilz I in view of Morgan and Pilz II. The technology at issue is mechanical in nature and predictable. The references disclose well known components that are combinable with ordinary skill. There is nothing unpredictable that would result from the combination. Moreover, the three references all disclose insulating gaskets with which a POSITA would be well familiar and would readily recognize as combinable with—at the very least—a reasonable expectation of success.

2. Analysis of the Challenged Claims

70. Based on my review of claims 6-12 of the ’232 patent and the above cited prior art, it is my opinion that claims 6-12 of the ’232 patent are obvious. A mapping of each claim element to the prior art follows.

> **[6pre]** An adjustable head-of-wall insulating construction for sealing a head-of-wall area between a ceiling thereabove and a wall configuration therebelow which is wider than standard and which includes a ceiling track having a main track section which extends generally horizontally and a first track side section extending downwardly therefrom and a second side track section extend downwardly therefrom at a position spatially disposed from the first

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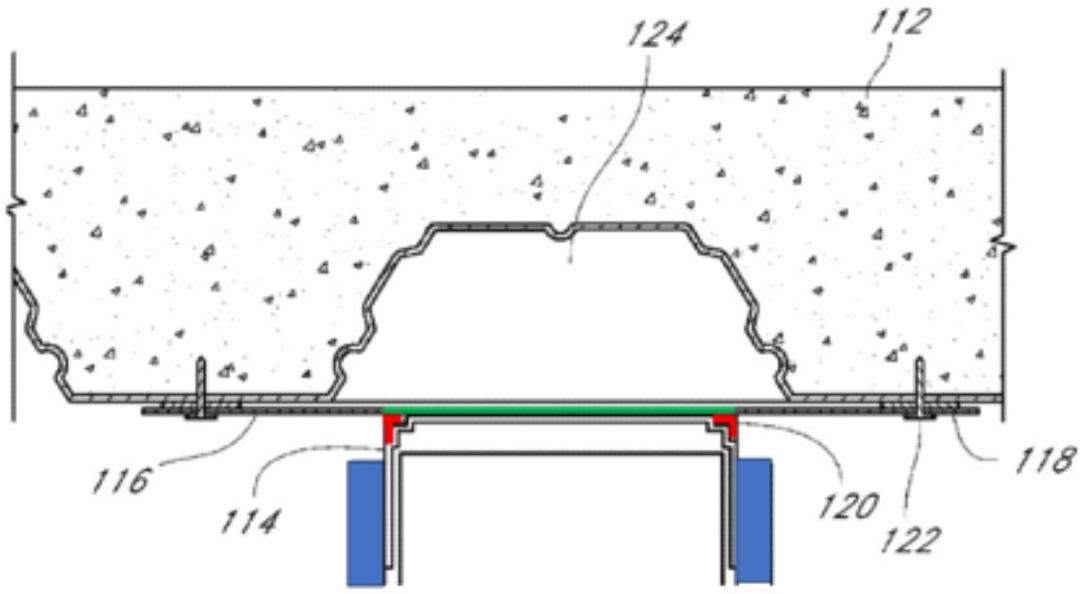
track section wherein the main track section includes a first track side section defining a first lowermost edge thereof and a second side track section defining a second lowermost edge thereof, said insulating gasket construction comprising:

71. To the extent the preamble is treated as a limitation, it is my opinion that Pilz I in view of Morgan and Pilz II discloses the preamble.

72. As Morgan explains, "a 'head-of-wall'" joint gap appears between the top of a vertical wall and ceiling.'" Ex. 1005 at 4:32-33. Pilz I discloses a "head of wall insulating construction" in, for example, Fig. 10B, which is annotated below.



Ex. 1004, Fig. 10B (annotated).

73. Pilz I explains that "first wall component 112 can comprise a floor, ceiling, overhang, or any other type of wall component." Ex. 1004, ¶0056. Wall boards (colored blue above) extend vertically on both sides of ceiling track 114 to form a wall. Pilz I's insulating gasket seals the area between the ceiling and the top of the walls. Thus, Pilz I discloses a "head-of-wall insulating construction for sealing a head-of-wall area between a ceiling thereabove." The insulating construction includes two L-shaped gasket sections 120 (colored red in the above figure) and a fire strap 116 (colored green), which seal the areas between the ceiling and the wall assembly. Pilz I explains that "the gasket 120 can be adhered to a surface of the second wall component 114 such that when the second wall component is attached to, pressed, and/or placed against the fire strap 116, the gasket or gaskets 120 can form a sound and/or air seal…" Ex. 1004, ¶0058. Pilz I explains that "the second wall component 114 can comprise a track, or header track, such as the one illustrated in FIG. 10A, for retaining wall studs." *Id*., ¶0057.

74. Pilz I discloses an "***adjustable*** head-of-wall insulating construction for sealing a head-of-wall area between a ceiling thereabove and a wall configuration therebelow which is ***wider than standard***" because a POSITA would understand that Pilz I's insulating gasket can be used in connection with a wall configuration of any size as discussed, *supra* (at ¶¶66-68).

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75. Pilz I's insulating gasket is "adjustable" because the L-shaped gasket sections 120 and fire strap 116 are positionable on the top horizontal track section of ***any*** size ceiling track to seal the area between the ceiling and the wall assembly. For example, the L-shaped gasket sections will be positioned on both corners of the ceiling track regardless of its size (e.g. 2 1/2 inches, 3 5/8 inches, 6 inches, etc.). The fire strap 116 can be cut to an appropriate size depending on the ceiling track as discussed *supra* at ¶¶66-68. In other words, Pilz I's gasket assembly is adjustably variable in lateral dimension to fit whatever sized ceiling track a POSITA would encounter.

76. Because Pilz I's insulating gasket can be used on any sized wall-configuration that a POSITA may encounter, it can be positioned on a "wider than standard" wall configuration. Pilz I itself teaches that "[v]arious geometries and designs may be used in the wall components to accommodate the use of fire-retardant material." Ex. 1004, ¶0077. As explained above (at ¶¶66-68), to the extent a POSITA had any doubt as to whether Pilz I's gasket could be used on a "wider than standard" wall assembly, a POSITA would be motivated to look to Pilz II, which expressly identifies the advantages to be gained from a gasket assembly that has the flexibility to seal wall assemblies of all sizes. Ex. 1006 at 7:2-4 ("Accordingly, if the angle 20 is configured for use with a wall assembly that is wider than standard width . . ."); *Id*. at 15:66-16:2 ("The web of the header track can

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be any suitable width. For example, the web can have a width between about 2½ and 10 inches, with specific lengths of about 3.5 inches, 4 inches, 5.5 inches, 6 inches and 7.5 inches, among others.").

77. Pilz I discloses a wall configuration as recited in the preamble, which includes "a ceiling track having a main track section which extends generally horizontally and a first track side section extending downwardly therefrom and a second side track section extend downwardly therefrom at a position spatially disposed from the first track section wherein the main track section includes a first track side section defining a first lowermost edge thereof and a second side track section defining a second lowermost edge thereof," as shown in the annotated figure below.

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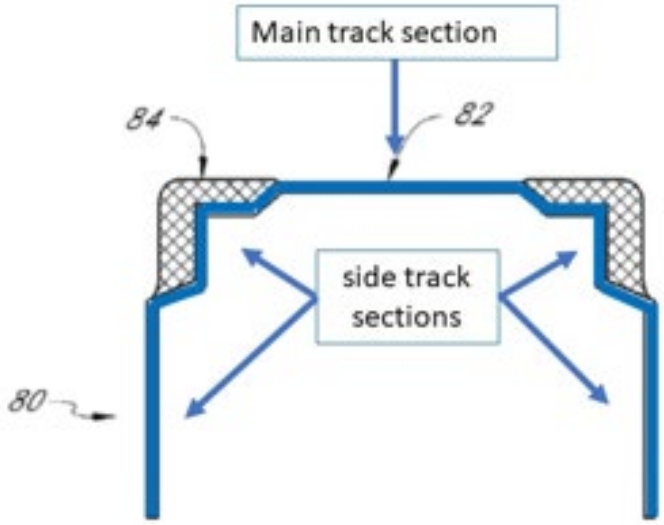


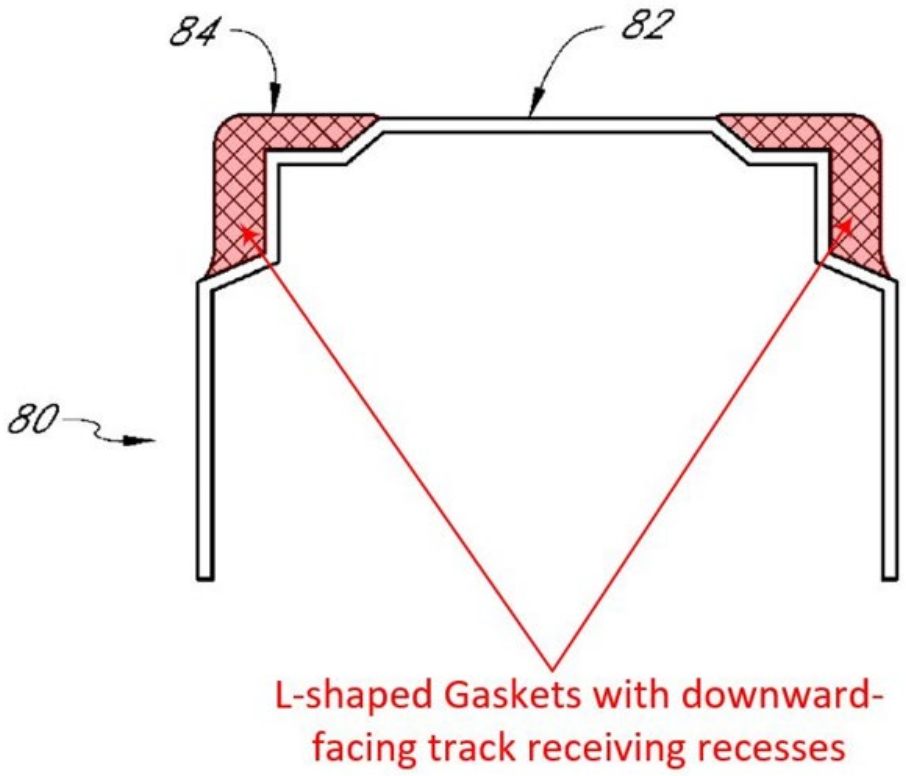
FIG. 9

Ex. 1004, Fig. 9 (annotated).

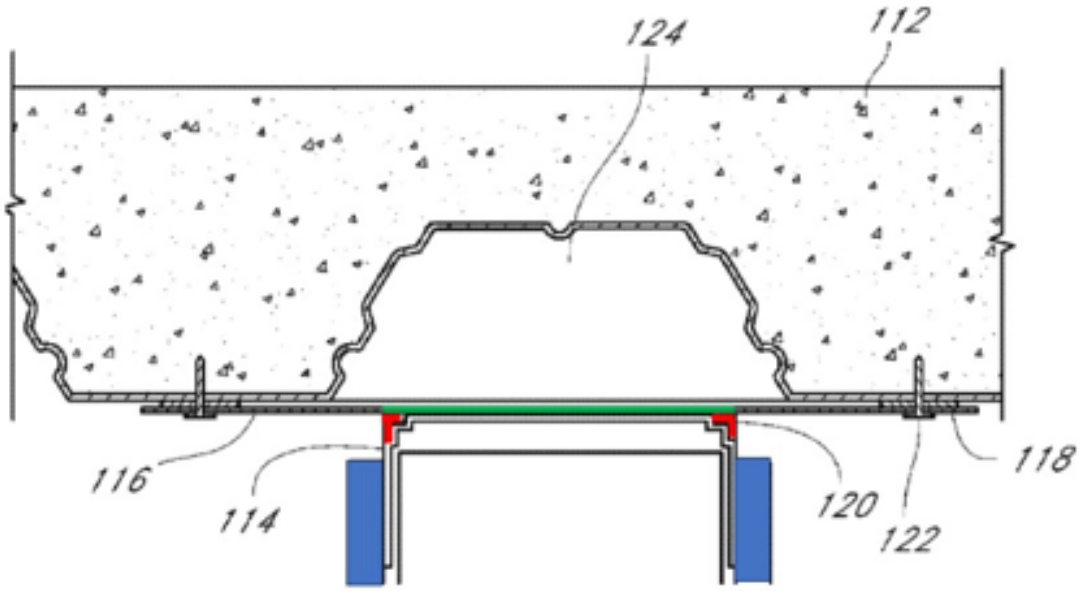
[6a] A. a first L-shaped gasket section including:

[6b] B. a second L-shaped gasket section including:

78. Pilz I discloses first and second L-shaped gasket sections (colored red) in multiple figures, including Figures 9 and 10B as shown below.



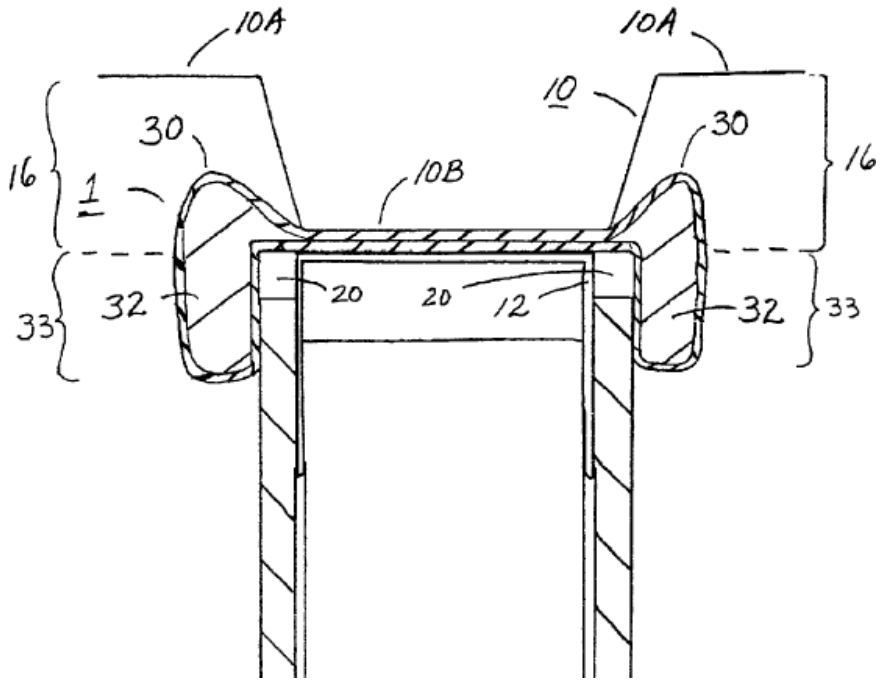
Ex. 1004, Fig. 9 (annotated)



Id., Fig. 10B (annotated).

79. A POSITA would understand that the ceiling track illustrated in Fig. 9 is substantially the same as the ceiling track shown in Fig. 10B. As such, for ease of illustration, I may refer to Fig. 9 as showing the structure of the L-shaped gasket sections and ceiling track of Fig. 10B.

80. Consistent with Pilz I's disclosure, insulating gaskets, which included L-shaped sections, were well-known in the firestopping industry prior to the effective filing date of the '232 patent. For example, Morgan discloses an insulating gasket with two L-shaped sections.



Ex. 1005, Fig. 4. In fact, given the C-shape of the ceiling tracks on which insulating gaskets are positioned, the use of two L-shaped gasket sections is all but a necessity to seal the ceiling track.

> **[6a1]** a first gasket upper panel of insulating material positioned immediately above the main track section of the ceiling track and extending generally horizontally thereover
>
> **[6b1]** a second gasket upper panel of insulating material positioned immediately above the main track section of the ceiling track and extending generally horizontally thereover at a position spatially disposed from said first gasket upper panel; and

81. Pilz I discloses that the two L-shaped gasket sections each include gasket upper panels of insulating material (*e.g.*, intumescent material) positioned

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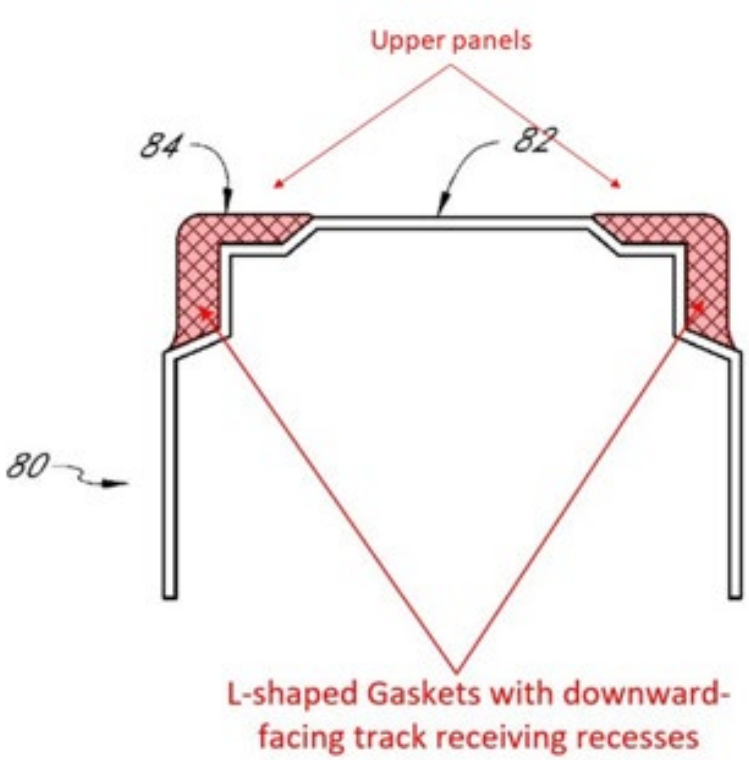
immediately above a main track section and extending horizontally thereover. Ex. 1004, FIGs. 9, 10A, [0054] ("here the intumescent material 84 extends both along a portion of the top and side surfaces of the wall component 80"). The figure below illustrates the gasket upper panels claimed in claim 6.



Ex. 1004, Fig. 9 (annotated).

[6a2] a first gasket side panel of insulating material attached with respect to said first gasket upper panel and extending generally downwardly therefrom across the first track side section for insulating thereover, said first gasket side panel extending downwardly from said first gasket upper panel to define the generally L-shaped configuration of the first L-shaped gasket section, said first gasket upper panel and said first gasket side panel together defining a track receiving recess

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facing downwardly therebelow

[6b2] a second gasket side panel of insulating material attached with respect to said second gasket upper panel and extending generally downwardly therefrom across the second track side section for insulating thereover, said second gasket side panel extending downwardly from said second gasket upper panel to define the generally L-shaped configuration of the second L-shaped gasket section, said second gasket upper panel and said second gasket side panel and said first gasket upper panel and said first gasket side panel together defining a track receiving recess facing downward therebelow for receiving a ceiling track positionable therewithin for facilitating insulating therearound

82. Pilz I discloses first and second gasket side panels of insulating material (*e.g.*, intumescent material) as claimed in claim 6. Ex. 1004, FIGs. 9, 10A, [0054] ("here the intumescent material 84 extends both along a portion of the top *and side surfaces of the wall component 80*"). This can be seen with reference to annotated Fig. 9 below.

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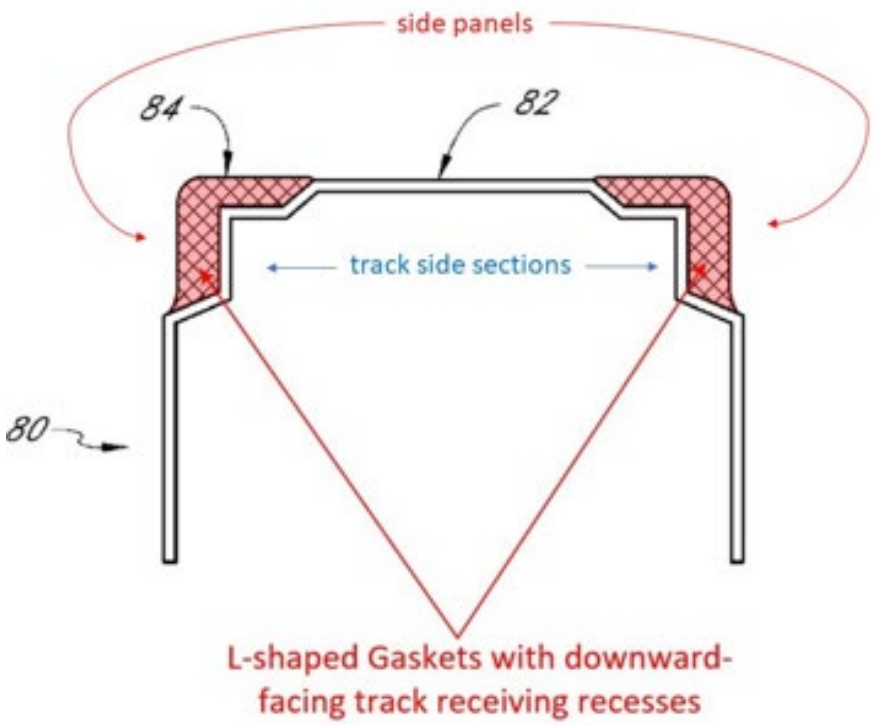

Ex. 1004, Fig. 9 (annotated).

83. As shown in the figure, the side panels are attached with respect to the upper panels and extend generally downwardly from the upper panels and across the track side sections of the ceiling track. This has the effect of insulating the side track sections. The extension of the side panels from the upper panels defines the generally L-shaped configuration of the L-shaped gasket section. The gasket upper panels and side panels together define a track receiving recess facing downwardly therebelow.

[6c] a first panel adhesive means mounted on said first gasket upper panel at a position between said first gasket upper panel of said first L-shaped gasket section and the main track section of the ceiling track to

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facilitate engagement therebetween

6[d] a second panel adhesive means mounted on said second gasket upper panel at a position between said second gasket upper panel of said second L-shaped gasket section and the main track section of the ceiling track to facilitate engagement therebetween

84. In the combined gasket of Pilz I in view of Morgan and Pilz II, the L-shaped gasket sections are adhesively mounted to the main (horizontal) track section of the respective ceiling track to facilitate engagement between the ceiling track and the L-shaped gasket sections. Ex. 1004, [0058] ("the gasket 120 can be *adhered to a surface of the second wall component 114* such that when the second wall component is attached to, pressed, and/or placed against the fire strap 116, the gasket or gaskets 120 can form a sound and/or air seal…").

85. As I explained previously, while Pilz I discloses the use of an adhesive layer, Pilz I does not expressly say where the adhesive should be placed. Ex. 1004, ¶¶0048, 0058. It would be an obvious design choice, especially in view of Morgan's disclosure, to place the adhesive means on the upper panels of Pilz I's L-shaped gasket sections to facilitate engagement between the upper panels and the ceiling track. *See* ¶¶58-66. The figure below illustrates this.

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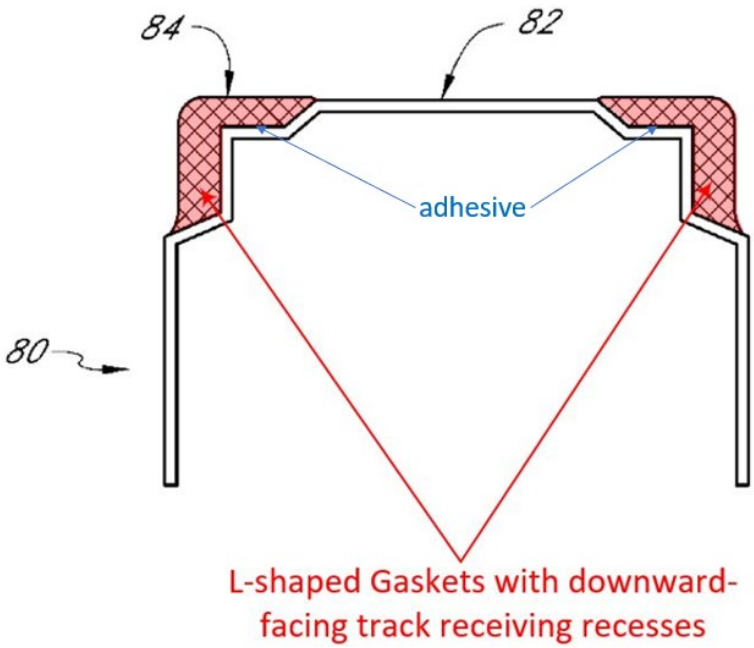

[6e] at least one connecting strap positioned above the main track section of the ceiling track and attached to said first L-shaped gasket section and to said second L-shaped gasket section to limit spatial separation therebetween.[9]

[9] This limitation requires only that the connecting strap be "***positioned***" above the main track section and attached to the L-shaped gasket sections. It does not limit when the strap must be positioned and attached to the L-shape gasket sections. Accordingly, a POSITA would understand that claim 6 covers both gaskets that are preformed and then installed as a well as gaskets that are formed as their components are installed. A POSITA would understand that the claim requires the gasket to be actually "positioned," not just positionable.

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86. Pilz I discloses this limitation. Specifically, "fire strap 116" is a "connecting strap positioned above the main track section and attached to said first L-shaped gasket section and to said second L-shaped gasket section to limit spatial separation therebetween" as claimed in claim 6.

87. Pilz I explains that L-shaped gasket sections 120 can be adhered to ceiling track 114 (Ex. 1004, ¶0057) such that when the ceiling track 114 is attached to, pressed, and/or placed against the fire strap 116, the gasket or gaskets 120 can "form a sound and/or air seal, inhibiting sound and/or air from moving from one side of the ceiling track to the other." Ex. 1004, ¶0058. Alternatively, Pilz I discloses that fire strap 116 can be attached directly to the ceiling track. *Id*., ¶0059. As such, the fire strap (also referred to as a flat strap) is attached to the two L-shaped gaskets 120, which are adhered to the ceiling track. The result is a gasket comprising L-shaped gasket sections connected by a connecting strap that is positioned above the ceiling track. This can be seen with reference to the annotated figure below (the L-shaped gasket sections are colored red, and the connecting strap is colored green).[10]

[10] I understand that in the District Court Litigation, Patent Owner argues that the "connecting strap" term takes its plain and ordinary meaning. Ex. 1009 at 10-11. Petitioner argues that "connecting strap" should be construed according to its plain meaning to require that the "connecting strap" be attached to the first and second L-shaped gasket sections to limit spatial separation therebetween when the gasket is ***positioned*** on the track. Patent Owner advocates for a broader construction that does

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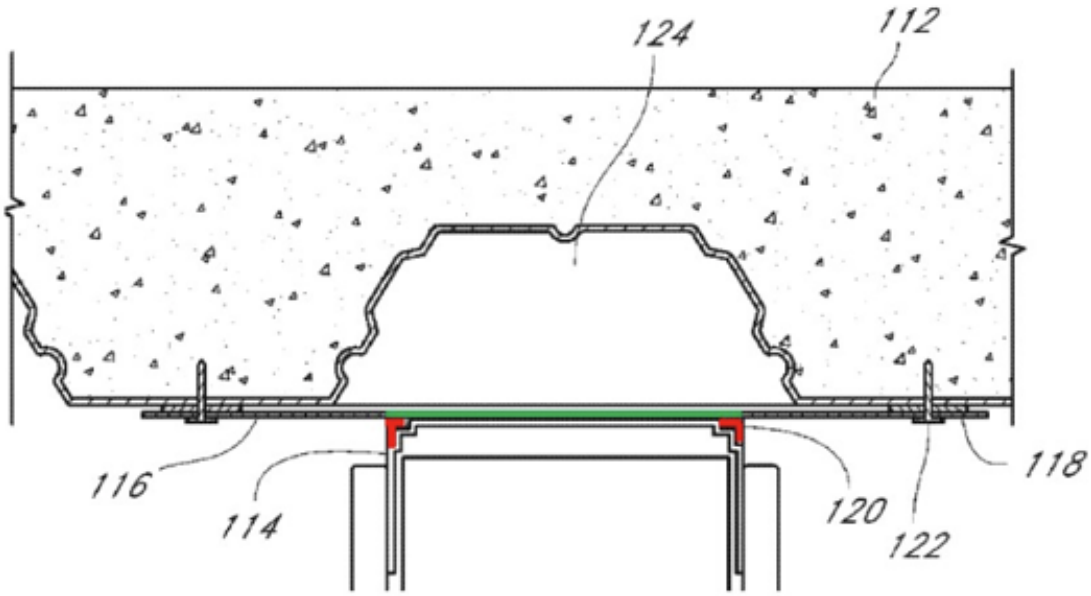

88. When fire strap 116 is attached to the two L-shaped gasket sections as shown in the figure above, it will limit the spatial separation between the L-shaped gasket sections. In fact, most any strap that connects two objects will limit spatial separation between those two objects (i.e., the space between the two objects is limited by the strap connecting those two objects).[11]

---

not require the connecting strap to be present when the gasket is positioned on the track. Under either construction, Pilz I discloses this element because the connecting strap is positioned on the track when the gasket is installed on the track.

[11] The fact that other objects (e.g., adhesive) may contribute to the limiting of spatial separation between the two L-shaped gasket sections is of no importance because claim 6 does not require the connecting strap to be the ***only*** component that may limit spatial separation between the two L-shaped gasket sections.

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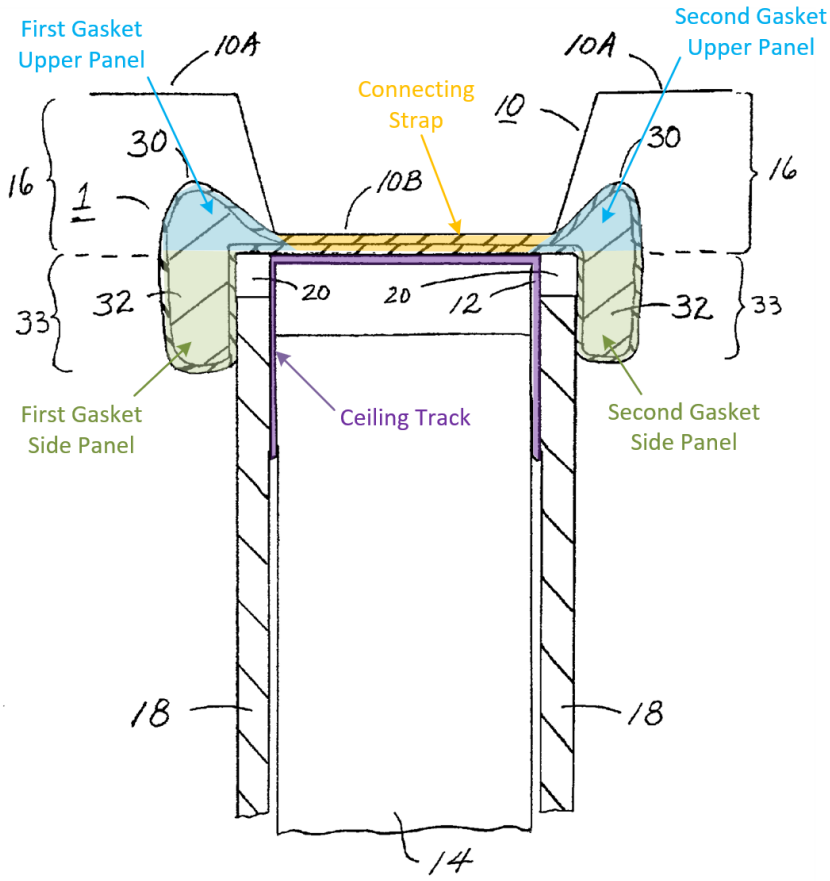
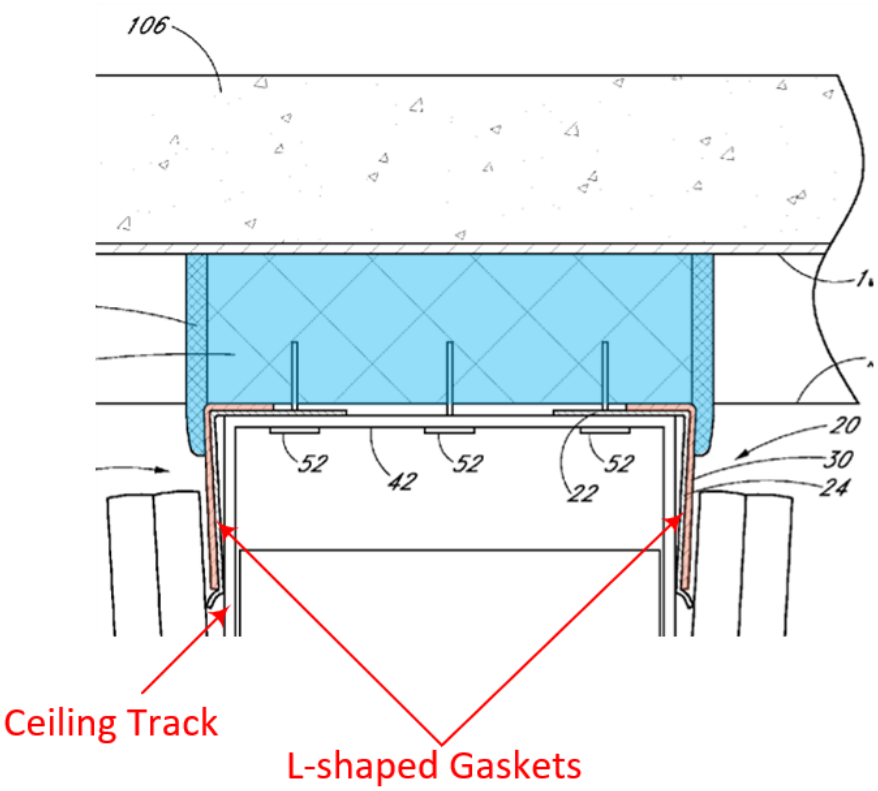
89. Prior to the '232 patent's effective filing date, the prior art disclosed that it was known to limit spatial separation between two objects through a strap like material. For example, the annotated figure below from Morgan discloses this.



90. Similarly, Pilz II discloses the use of material to form a type of strap (the combination of spray and mineral wool colored blue in the figure below) to connect two L-shaped components.



91. While the structures from Morgan and Pilz II shown above do not exactly meet the "connecting strap" limitation as recited in claim 6 of the '232 patent, they confirm a POSITA's understanding of Pilz I's fire strap 116 as a connecting strap positioned above the main ceiling track section and attached to L-shaped gasket sections to limit the spatial separation therebetween.

> **[7]** An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 6 wherein said at least one connecting strap is attached with respect to said first gasket upper panel of said first L-shaped gasket section and is also attached with respect to said second gasket upper panel of said second L-shaped gasket section

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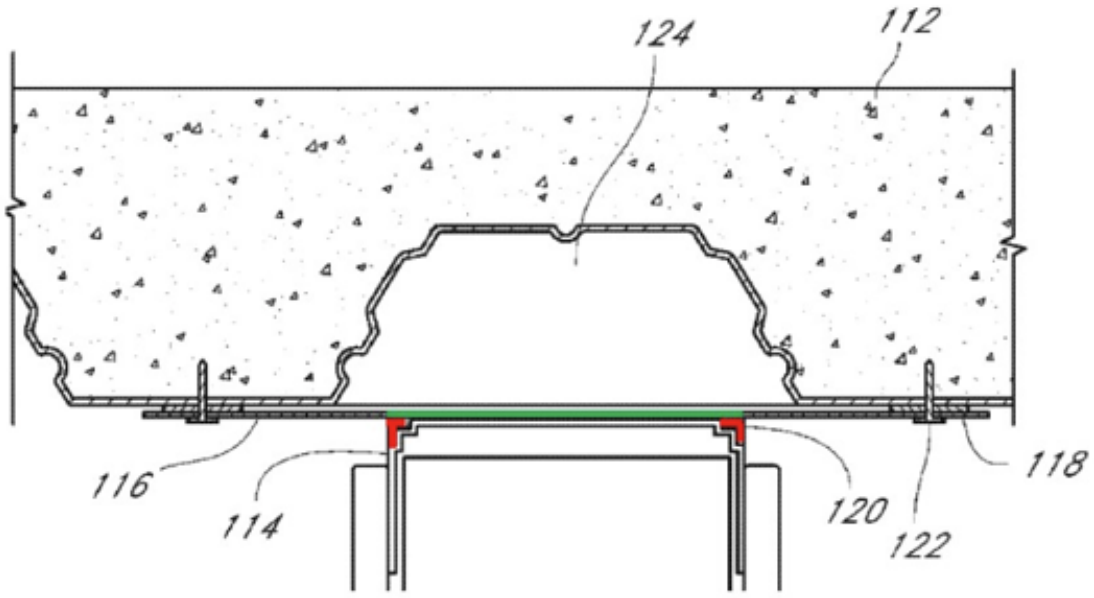
92. Pilz I is attached to the first gasket upper panel of said first L-shaped gasket section and is also attached with respect to the second gasket upper panel of said second L-shaped gasket section as discussed *supra* (at ¶¶86-88) when the L-shaped gasket sections are adhered to the fire strap 116. This can be seen with reference to the annotated figure below.



Ex. 1004, Fig. 10B (annotated).

93. Pilz I explains that L-shaped gasket sections 120 (colored red) can be adhered to ceiling track 114 (Ex. 1004, ¶¶0057-0058) such that when the ceiling track 114 "is attached to, pressed, and/or placed against the fire strap 116, the gasket or gaskets 120 can form a sound and/or air seal, inhibiting sound and/or air from moving from one side of the" ceiling track to the other. Ex. 1004, ¶0058. Alternatively, Pilz I explains that fire strap 116 can be attached directly to the ceiling

track (i.e., the second wall component) rather than the ceiling (i.e., the first wall component). *Id*., ¶0059.

> **[8]** An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 6 wherein said first gasket side panel is spatially disposed from the first track side section to be moveable with respect thereto responsive to relative movement between the wall configuration and the upper building structure thereabove and wherein said second gasket side panel is spatially disposed from the second track side section to be moveable with respect thereto responsive to relative movement between the wall configuration and the upper building structure thereabove.

94. Pilz I in view of Morgan and Pilz II disclose this element. Specifically, in the combined gasket, the upper panels of Pilz I's L-shaped gasket section are adhesively joined to the ceiling track while the side panels of the L-shaped gasket sections are free to move. *See* ¶¶58-66. In other words, there would be no adhesive on the side panels. A POSITA would thus understand that the gasket side panel is spatially disposed from the track side sections to be moveable relative to the side track sections and such movement would be responsive to movement between the wall configuration and the upper building structure above it (*e.g.*, the ceiling).

> **[9]** An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 6 wherein said first gasket upper panel and said first gasket side panel are made from an insulating

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material which includes a firestopping insulating component therewithin.

95. Pilz I's "gasket upper panel" and "gasket side panels" of the two L-shaped gasket sections are both made from an insulating material that includes a firestopping insulating component in the form of an intumescent material. In Pilz I FIG. 9, the L-shaped gaskets are described as "intumescent material 74," which Pilz I describes as "work[ing] well for [the] purpose" of "substantially block[ing] the path of the fire, heat, and smoke for at least some period of time." Ex. 1004, ¶¶0005, 0055. Furthermore, gasket 120 "can itself comprise a strip of fire-retardant material, including but not limited to intumescent material." Ex. 1004, ¶0058.

[10] An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 9 wherein the firestopping insulating component is intumescent.

96. Pilz I discloses that the L-shaped gasket sections (including the side and upper panels) comprise an "intumescent material." Ex. 1004, ¶0058.

[11] An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 6 wherein said first gasket upper panel and said first gasket side panel are made from an insulating material which includes an acoustical insulating component therewithin

97. With respect to Fig. 10B, Pilz I explains that when the ceiling track to which L-shaped gasket sections are adhered is attached to fire strap 116, "the gasket

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or gaskets 120 can form a ***sound*** and/or air seal, inhibiting ***sound*** and/or air from moving from one side of the second wall component 114 to the other." Ex. 1004, ¶0058. Because the insulating gasket inhibits the transfer of sound, a POSITA would understand that the insulating material of Pilz I would include an acoustical insulating component therewithin.

> **[12]** An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 6 wherein said first gasket upper panel is integrally formed with respect to said first gasket side panel and wherein said second gasket upper panel is integrally formed with respect to said second gasket side panel.

98. In Fig. 10B of Pilz I, the upper and side panels of the L-shaped gasket sections are formed from a single piece of intumescent material. Ex. 1004, Fig. 10B, ¶0058. A POSITA would thus understand that the upper panels are integrally formed with respect to the side panels of Pilz I's L-shaped gasket sections.

B. Ground 1B: Pilz I in view of Morgan and Pilz II

1. Overview of the Combination.

99. In addition to the embodiment of Fig. 10B, Pilz I discloses another insulating gasket embodiment disclosing two L-shaped gasket sections attached to a connecting strap, which gasket is positioned above, and on the sides of, a ceiling track.

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100. Specifically, Pilz I discloses a C-shaped gasket embodiment discussed with reference to Fig. 8. Pilz I explains that Fig. 8 discloses track 72 (colored blue) for holding a wall stud 20 beneath a ceiling 18. Ex. 1004, ¶0054. Intumescent material 74 (colored red) is "attached to the top surface of" track 72 as shown in the below figure. *Id*.

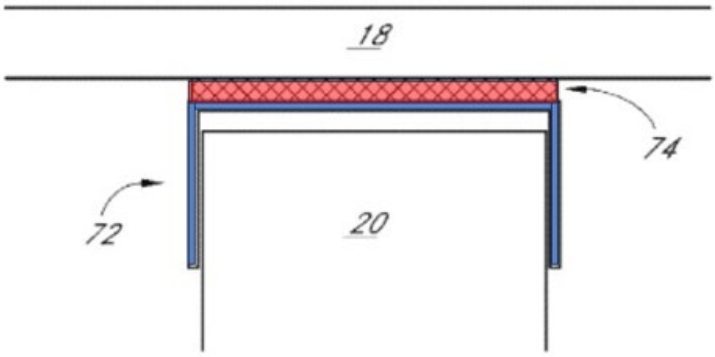

FIG. 8

Ex. 1004, Fig. 8 (annotated).

101. From Pilz I's disclosure, a POSITA would understand that intumescent material 74 can be "attached to the top surface of" track 72 by means of an "adhesive backing" as described with reference to the embodiments of Figs. 6A and 6B.

102. Pilz I further explains that "in some embodiments the intumescent material may extend down one or both sides of the wall component 72." Ex. 1004, ¶0054. The figure below illustrates the structure of this embodiment (which is described but not depicted in Pilz I).

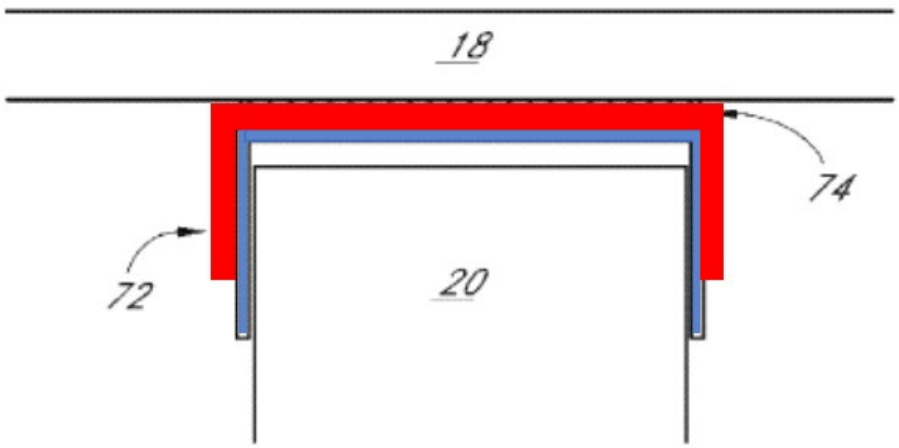

FIG. 8

Ex. 1004, Fig. 8 (annotated).

103. This C-shaped construction of Pilz I includes two L-shaped gasket sections attached to a connecting strap, which strap limits spatial separation between the L-shaped gasket sections as shown in the annotated figure below.

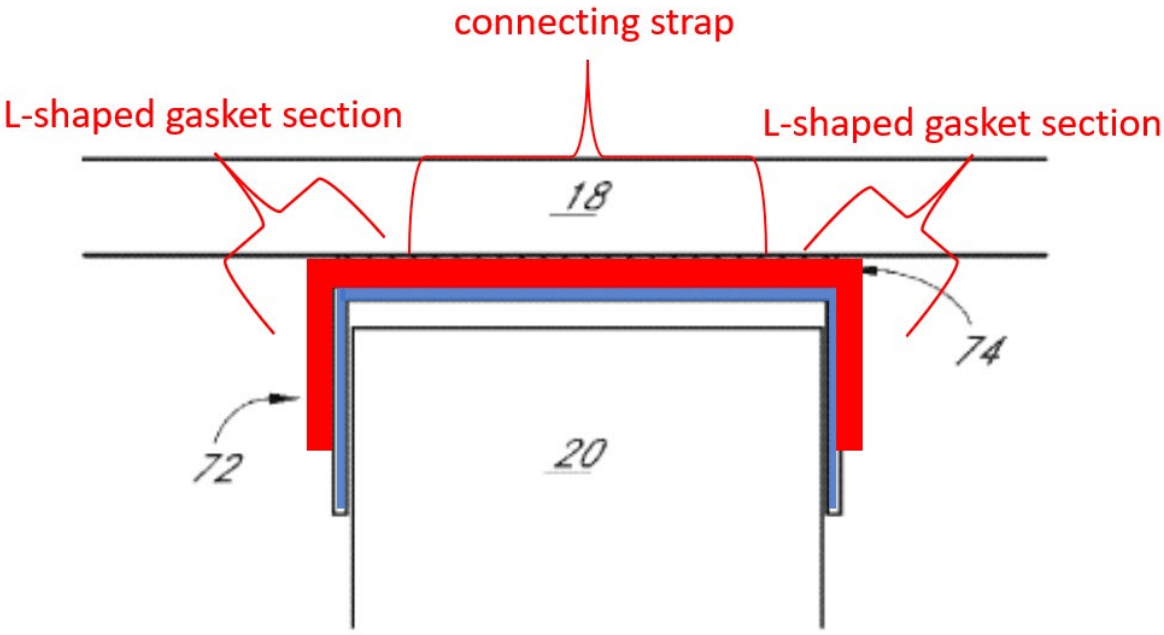

FIG. 8

Ex. 1004, Fig. 8 (annotated).

104. As explained above (at ¶¶84-88), a POSITA would understand that the section of Pilz I's insulating gasket spanning the horizontal portion of the ceiling track may be "attached to the top surface" of ceiling track 72 with an adhesive backing. To the extent this is not expressly disclosed in Pilz I, it would be obvious in view of Morgan: "For example, the bottom side 30B of the bag 30 shown in FIG. 5 can be supplied with a two-sided tape, covered by a releasable sheet, to permit the bag device 30 to be adhered to the horizontal track 12 before it is fastened to or disposed against the ceiling, as illustrated in FIGS. 3 and 4." Ex. 1005 at 14:14-19.

Accordingly, Morgan discloses that it was known to place an adhesive on the portion of an L-shaped gasket section that is directly above the horizontal section of a ceiling track, confirming that this was an obvious and known design choice. All of the reasons set forth above at paragraphs 60-66 in connection with Ground 1A that would motivate a POSITA to locate the adhesive means on the upper panel apply to this Ground 1B as well.

105. Like the Pilz I embodiment discussed *supra* (at ¶¶66-68) with respect to Ground 1A, a POSITA would understand that the gasket disclosed in the embodiment of Fig. 8 could be used to seal a wall configuration of any size, including a wall configuration that is "wider than standard." For example, the intumescent material 74, which extends across the main ceiling track section and down the side track sections can be cut to any size to seal a wall configuration of any size. To the extent a POSITA has any doubt as to this, a POSITA would look to Pilz II and its express disclosure of a gasket for sealing a wall configuration that is "wider than standard" as discussed *supra* with respect to Ground 1A. *See* ¶¶68-69.

106. A POSITA would reasonably expect to be successful in making the combination of Pilz I in view of Morgan and Pilz II. The technology at issue is mechanical in nature and predictable. The references disclose well known components that are combinable with ordinary skill. There is nothing unpredictable

that would result from the combination. Moreover, the three references all disclose insulating gaskets with which a POSITA would be well familiar and would readily recognize as combinable with—at the very least—a reasonable expectation of success.

> **[6pre]** An adjustable head-of-wall insulating construction for sealing a head-of-wall area between a ceiling thereabove and a wall configuration therebelow which is wider than standard and which includes a ceiling track having a main track section which extends generally horizontally and a first track side section extending downwardly therefrom and a second side track section extend downwardly therefrom at a position spatially disposed from the first track section wherein the main track section includes a first track side section defining a first lowermost edge thereof and a second side track section defining a second lowermost edge thereof, said insulating gasket construction comprising:

107. To the extent that the preamble is limiting, it is my opinion that Pilz I in view of Morgan and Pilz II discloses the preamble.

108. As Morgan explains, "a 'head-of-wall'" joint gap appears between the top of a vertical wall and ceiling.'" Ex. 1005 at 4:32-33. Pilz I discloses a "head of wall insulating construction" in, for example, Fig. 8, which is annotated below.

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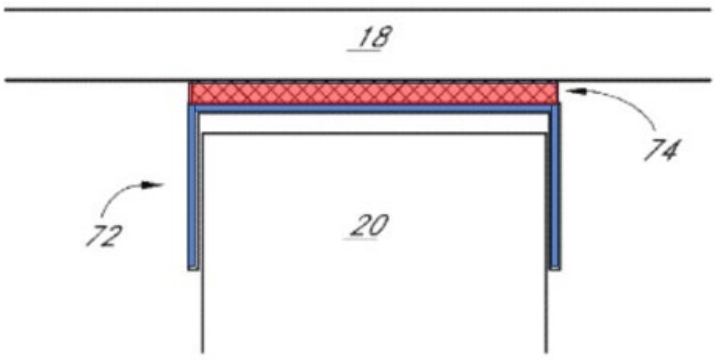

FIG. 8

Ex. 1004, Fig. 8 (annotated).

109. Pilz I identifies component 18 as a ceiling. Ex. 1004, ¶0054. Thus, Pilz I's gasket seals the head-of-wall joint between the wall configuration and the ceiling. The insulating construction includes two L-shaped gasket sections and a connecting strap as shown below.

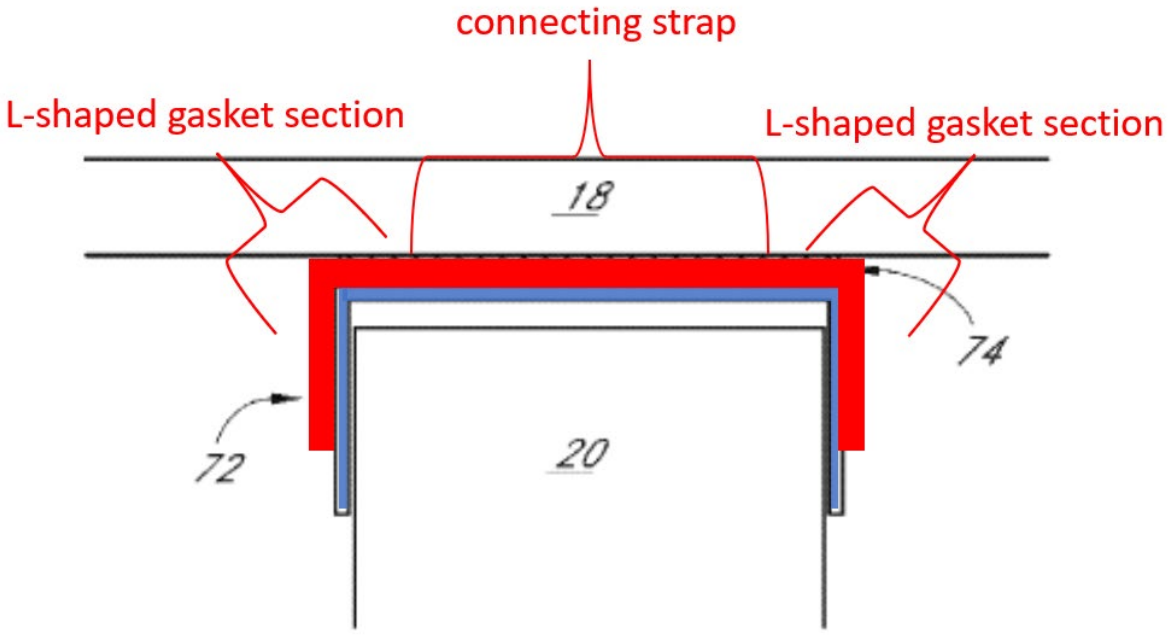

FIG. 8

Ex. 1004, Fig. 8 (annotated).

110. Pilz I discloses an "***adjustable*** head-of-wall insulating construction for sealing a head-of-wall area between a ceiling thereabove and a wall configuration therebelow which is ***wider than standard***" because a POSITA would understand that Pilz I's insulating gasket can be used in connection with a wall configuration of any size as discussed, *supra* (at ¶¶66-68).

111. Pilz I's insulating gasket is "adjustable" because the C-shaped insulating gasket can be positioned on any size ceiling track to seal the area between the ceiling and the wall assembly. Indeed, Pilz I teaches that "[v]arious geometries

and designs may be used in the wall components to accommodate the use of fire-retardant material." Ex. 1004, ¶0077. Relatedly, Pilz I explains that the fire strap 116 is flexibly sized "to cover a portion or all of one more flutes 124 of fluted deck 112." Ex. 1004, ¶0059. In other words, Pilz I's gasket assembly is adjustably variable in lateral dimension to fit whatever sized ceiling track a POSITA would encounter.

112. Because Pilz I's insulating gasket can be used on any sized wall-configuration that a POSITA may encounter, it can be positioned on a "wider than standard" wall configuration. Pilz I itself teaches that "[v]arious geometries and designs may be used in the wall components to accommodate the use of fire-retardant material." Ex. 1004, ¶0077. As explained above (*see* paragraphs 68 and 69), to the extent a POSITA had any doubt as to whether Pilz I's gasket could be used on a "wider than standard" wall assembly, a POSITA would be motivated to look to Pilz II, which expressly identifies the advantages to be gained from a gasket assembly that has the flexibility to seal wall assemblies of all sizes. Ex. 1006 at 7:2-4 ("Accordingly, if the angle 20 is configured for use with a wall assembly that is wider than standard width . . ."); *Id*. at 15:66-16:2 ("The web of the header track can be any suitable width. For example, the web can have a width between about 2½ and 10 inches, with specific lengths of about 3.5 inches, 4 inches, 5.5 inches, 6 inches and 7.5 inches, among others.").

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113. Pilz I discloses a wall configuration as recited in the preamble, which includes "a ceiling track having a main track section which extends generally horizontally and a first track side section extending downwardly therefrom and a second side track section extend downwardly therefrom at a position spatially disposed from the first track section wherein the main track section includes a first track side section defining a first lowermost edge thereof and a second side track section defining a second lowermost edge thereof," as shown in the annotated figure below.

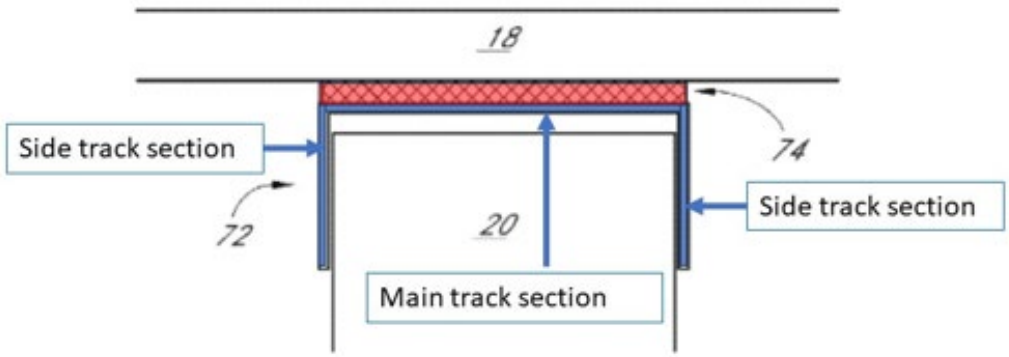

FIG. 8

Ex. 1004, Fig. 8 (annotated).

[6a] A. a first L-shaped gasket section including:

[6b] B. a second L-shaped gasket section including:

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114. Pilz I discloses first and second L-shaped gasket sections in the C-shaped embodiment described by Pilz I (¶0054) as shown below.

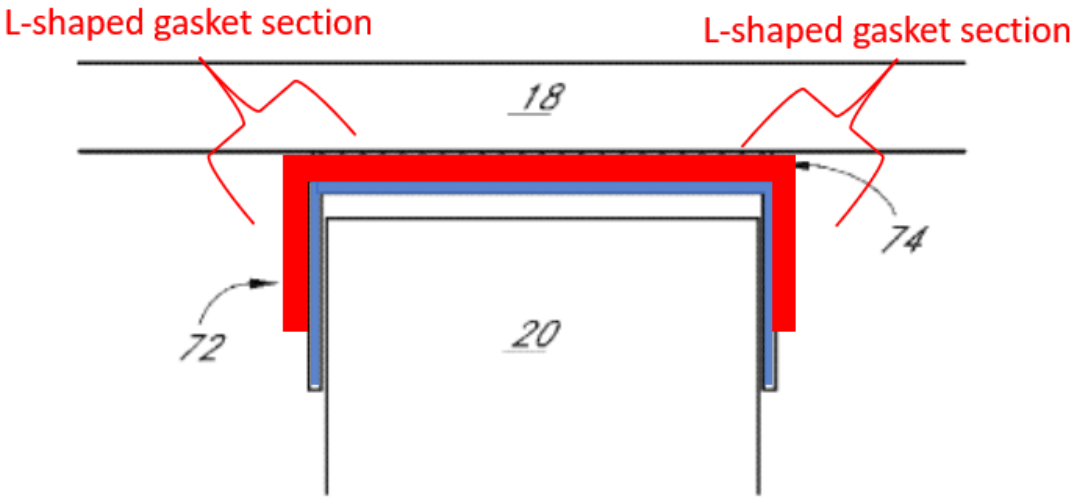

FIG. 8

Ex. 1004, Fig. 8 (annotated).

115. A POSITA's understanding of Fig. 8 as disclosing two L-shaped gasket sections in a C-shaped gasket embodiment is consistent with positions I understand Patent Owner has taken in the District Court Litigation and on its website. For example, I understand that Patent Owner "marked" its Track Top Gasket products as practicing the '232 patent. Ex. 1010 at 1. I further understand that, in the District Court Litigation, Patent Owner specifically contended that its Track Top Gasket

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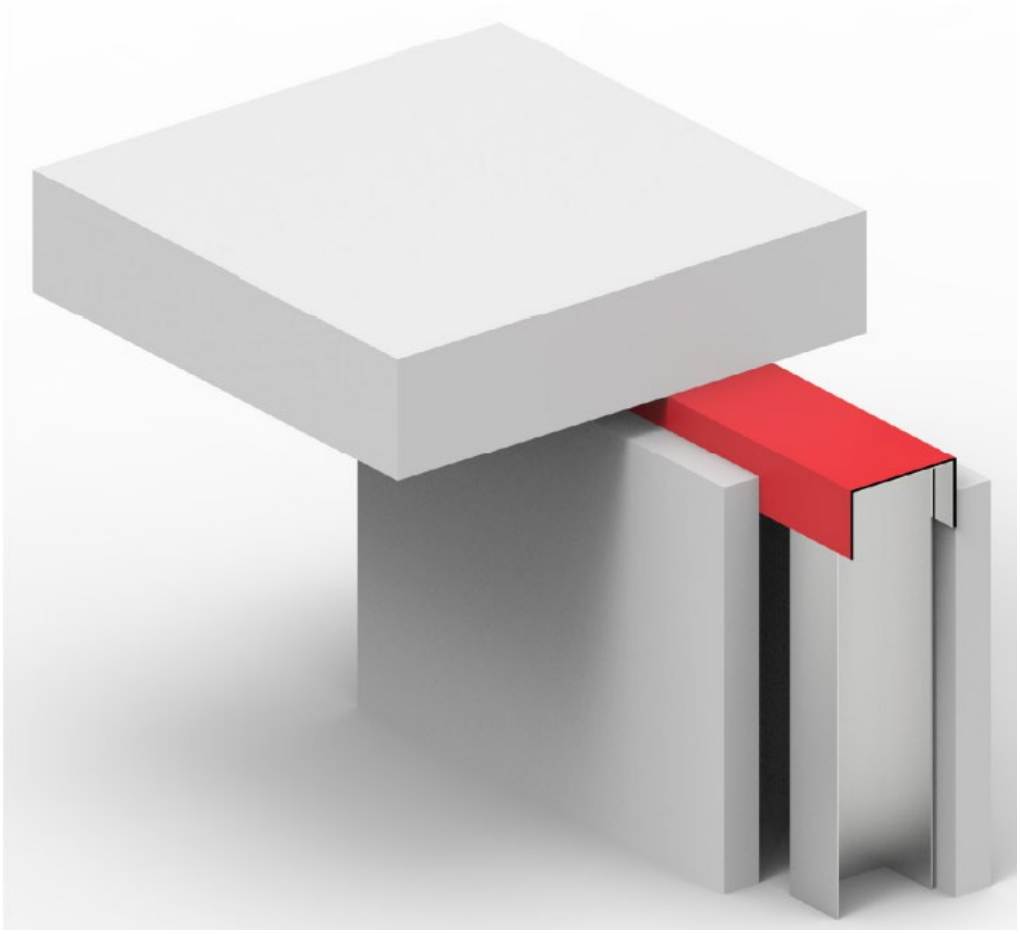
Products TTG350F and TTG600F embody claims 6-12 of the ’232 patent. Ex. 1013 at 20.[12]

116. A “data sheet” published by STI shows a graphical depiction of the structure of its Track Top Gasket Products, which is reproduced below.



[12] I note that there is a typographical error in the document that references claims 6-12 of the U.S. Patent No. 10,143,868 or the ’868 patent, which is another patent asserted by Patent Owner in the District Court Litigation and which does not relate to Track Top Gaskets. In context, Patent Owner clearly meant to refer to the ’232 patent.

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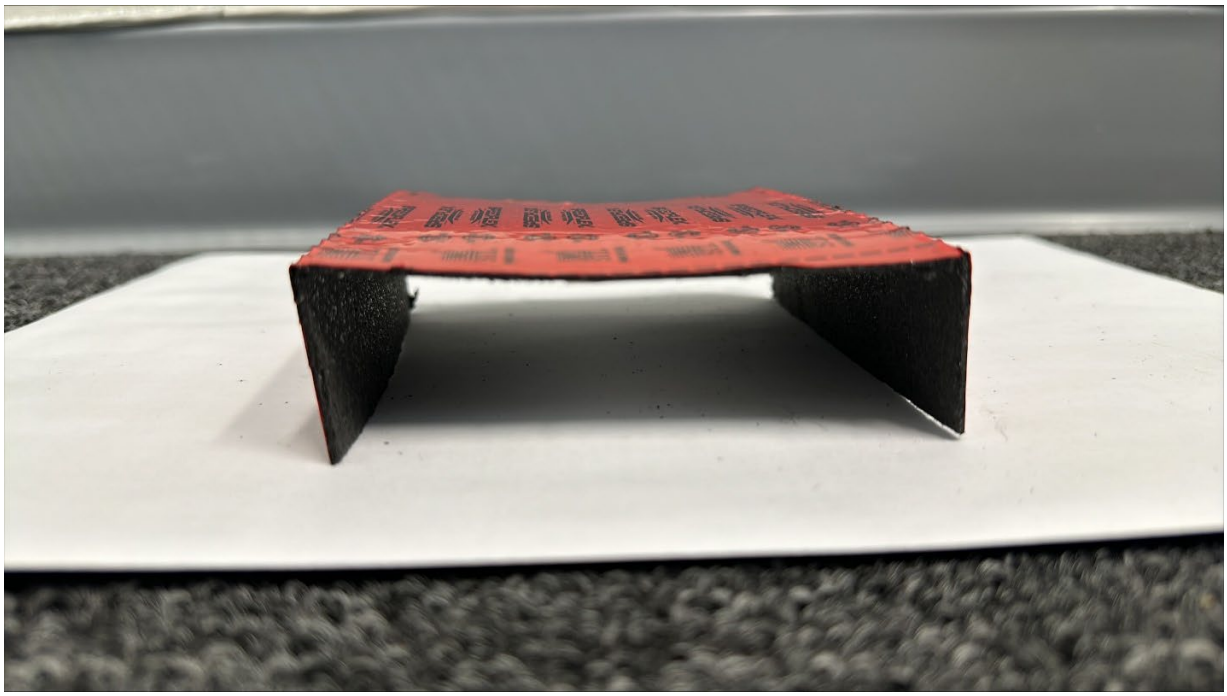
Ex. 1011 at 1.

117. As shown, the device includes two L-shaped gasket sections. The data sheet is consistent with the below image of a TTG350F, which I understand was taken by Petitioner's counsel.



Ex. 1012, ¶7.

[6a1] a first gasket upper panel of insulating material positioned immediately above the main track section of the ceiling track and extending generally horizontally thereover

[6b1] a second gasket upper panel of insulating material positioned immediately above the main track section of the ceiling track and extending generally horizontally thereover at a position spatially disposed from said first gasket upper panel; and

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118. Pilz I discloses that the two L-shaped gasket sections each include gasket upper panels of insulating material (e.g. intumescent material) positioned immediately above a main track section and extending horizontally thereover as shown below with reference to Pilz I's C-shaped gasket embodiment as shown below. Ex. 1004, ¶0054.

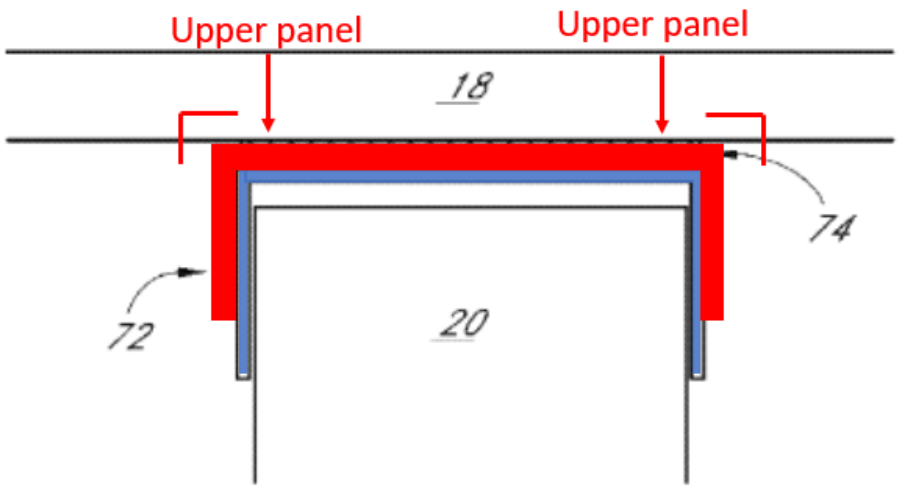

FIG. 8

Ex. 1004, Fig. 8 (annotated).

[6a2] a first gasket side panel of insulating material attached with respect to said first gasket upper panel and extending generally downwardly therefrom across the first track side section for insulating thereover, said first gasket side panel extending downwardly from said first gasket upper panel to define the generally L-shaped configuration

of the first L-shaped gasket section, said first gasket upper panel and said first gasket side panel together defining a track receiving recess facing downwardly therebelow

[6b2] a second gasket side panel of insulating material attached with respect to said second gasket upper panel and extending generally downwardly therefrom across the second track side section for insulating thereover, said second gasket side panel extending downwardly from said second gasket upper panel to define the generally L-shaped configuration of the second L-shaped gasket section, said second gasket upper panel and said second gasket side panel and said first gasket upper panel and said first gasket side panel together defining a track receiving recess facing downward therebelow for receiving a ceiling track positionable therewithin for facilitating insulating therearound

119. Pilz I discloses that the two L-shaped gasket sections each include gasket side panels of insulating material (e.g. intumescent material) attached to their respective gasket upper panels and that extend generally downward across respective track side sections in the C-shaped gasket embodiment as shown in the figure below. Ex. 1004, ¶0054.

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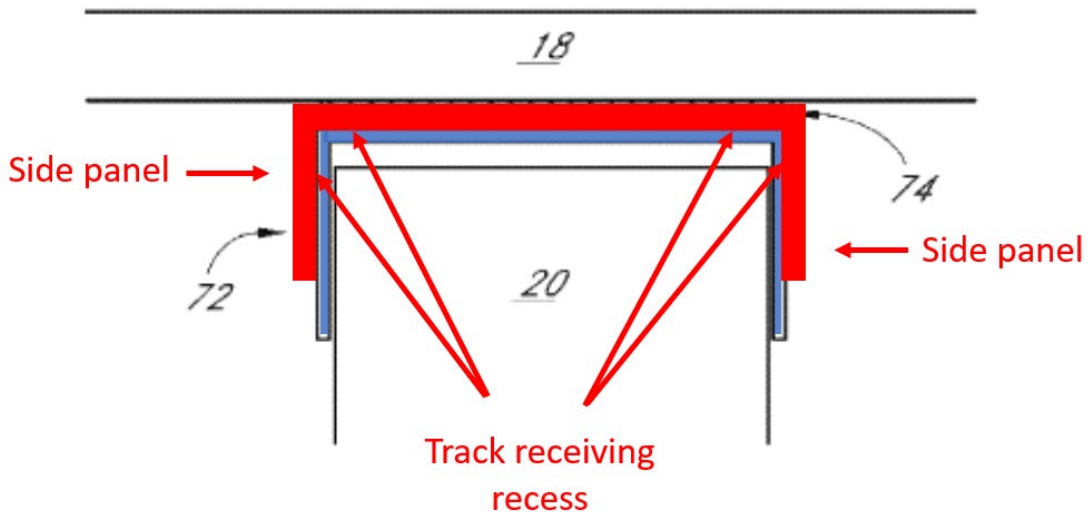

FIG. 8

Ex. 1004, Fig. 8 (annotated).

120. As shown in the figure, the side panels are attached with respect to the upper panels and extend generally downwardly from the upper panels and across the track side sections of the ceiling track. This has the effect of insulating the side track sections. The extension of the side panels from the upper panels defines the generally L-shaped configuration of the L-shaped gasket section. The gasket upper panels and side panels together define a track receiving recess facing downwardly therebelow.

[6c] a first panel adhesive means mounted on said first gasket upper panel at a position between said first gasket upper panel of said first L-shaped gasket section and the main track section of the ceiling track to facilitate engagement therebetween

6[d] a second panel adhesive means mounted on said second gasket upper panel at a position between said second gasket upper panel of said second L-shaped gasket section and the main track section of the ceiling track to facilitate engagement therebetween

121. Pilz I discloses that intumescent material 74 is "attached to the top surface" of the ceiling track 72. Ex. 1004, ¶0054. Fig. 8 depicts this embodiment as shown below.

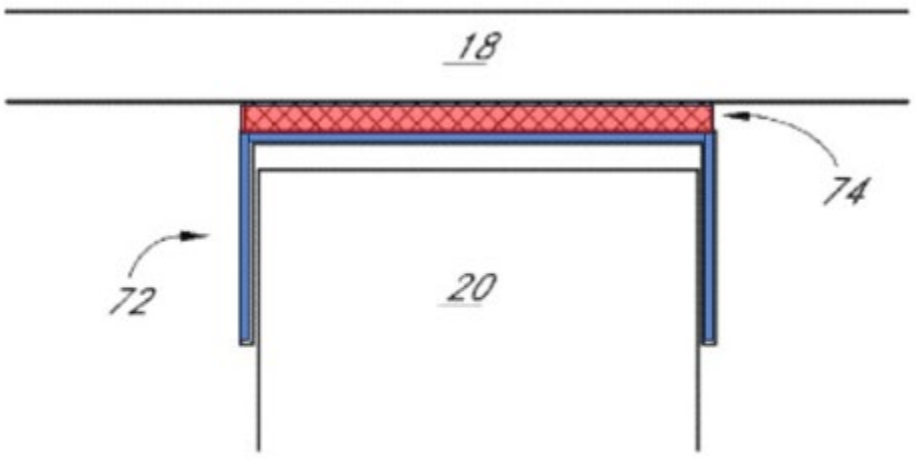

FIG. 8

Ex. 1004, Fig. 8 (annotated).

122. From the embodiment described with respect to Figs. 6A and 6B, a POSITA would understand that the intumescent material could be "attached to the top surface" of the ceiling track with an "adhesive backing." Ex. 1004, ¶¶0050, 0054. The adhesive backing would facilitate engagement between the main ceiling

track section and the gasket upper panel. To the extent that this does not expressly disclose placing an adhesive on the upper panel of Pilz I's L-shaped gasket sections, it would have been obvious to do so in view of Morgan as discussed above at paragraphs 58-66. The figure below shows the location of the adhesive in the gasket of Pilz I in view of Morgan and Pilz II.

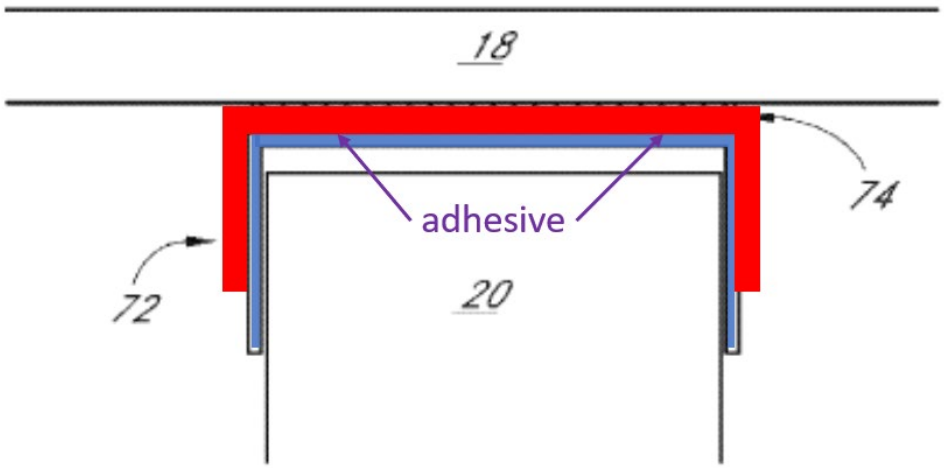

FIG. 8

Ex. 1004, Fig. 8 (annotated).

> **[6e]** at least one connecting strap positioned above the main track section of the ceiling track and attached to said first L-shaped gasket section and to said second L-shaped gasket section to limit spatial separation therebetween.[13]

[13] This limitation requires only that the connecting strap be "***positioned***" above the main track section and attached to the L-shaped gasket sections. It does not limit

123. Pilz I discloses at least one connecting strap positioned above the main track section and attached to said first L-shaped gasket section and to said second L-shaped gasket section to limit spatial separation therebetween in the C-shaped gasket embodiment as shown in the figure below.

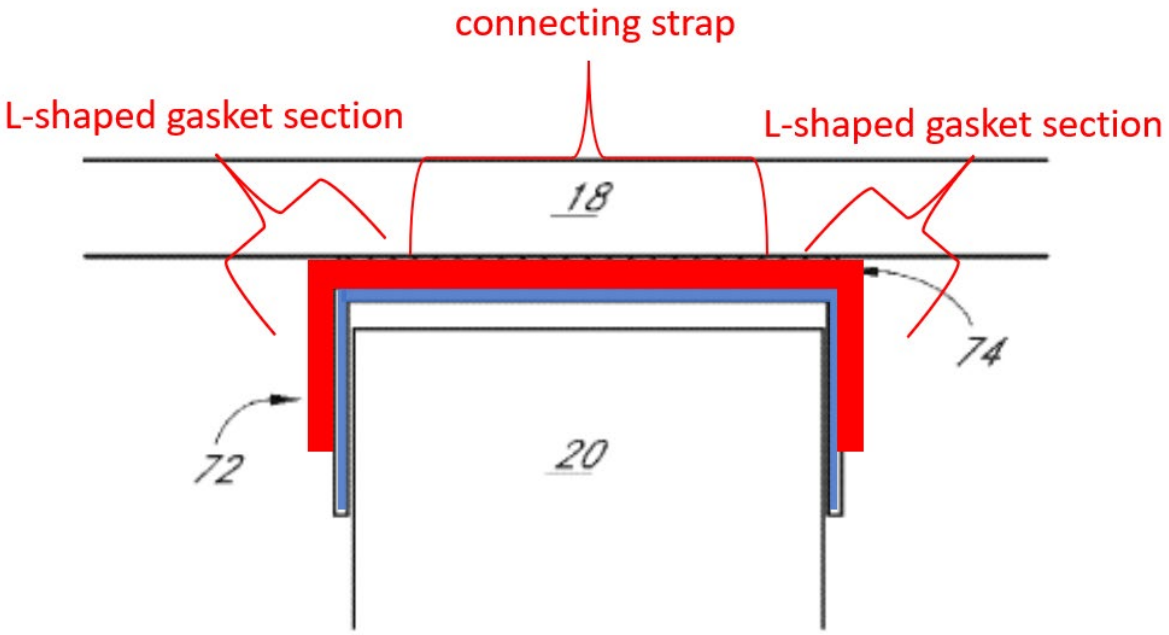

FIG. 8

when the strap must be positioned and attached to the L-shape gasket sections. Accordingly, a POSITA would understand that claim 6 covers both gaskets that are preformed and then installed as a well as gaskets that are formed as their components are installed. A POSITA would understand that the claim requires the gasket to be actually "positioned," not just positionable.

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Ex. 1004, Fig 8 (annotated).

124. As shown in the figure, the portion of Pilz I's insulating gasket between the L-shaped gasket sections is a connecting strap as claimed in claim 6. Because the connecting strap is part of the same integrated piece of intumescent material as the L-shaped gasket sections, the connecting strap is attached to the L-shaped gasket sections. The strap will limit spatial separation between the L-shaped gasket sections. In fact, most any strap that connects two objects will limit spatial separation between those two objects (i.e., the space between the two objects is limited by the strap connecting those two objects).[14]

125. Patent Owner's positions concerning its own Track Top Gasket products embodying claims 6-12 of the '232 patent confirm a POSITA's understanding that Pilz I's C-shaped embodiment includes the claimed connecting strap as discussed in the immediately preceding paragraphs. The annotated figure from Patent Owner's data sheet illustrates this with the connecting strap portion indicated by the green bracket and the two L-shaped gasket sections indicated by the light blue brackets. The image immediately below that image show the top view of

[14] The fact that other objects (e.g., adhesive) may contribute to the limiting of spatial separation between the two L-shaped gasket sections is of no importance because claim 6 does not require the connecting strap to be the ***only*** component that may limit spatial separation between the two L-shaped gasket sections.

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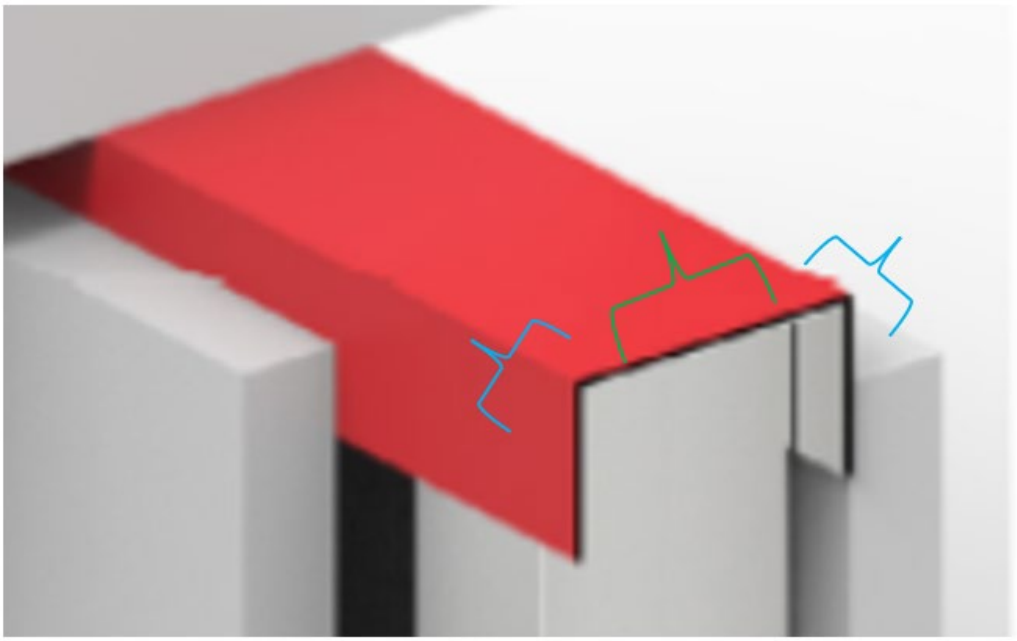
a Track Top Gasket product. As shown the connecting strap portion is fully integrated with the L-shaped gasket sections.



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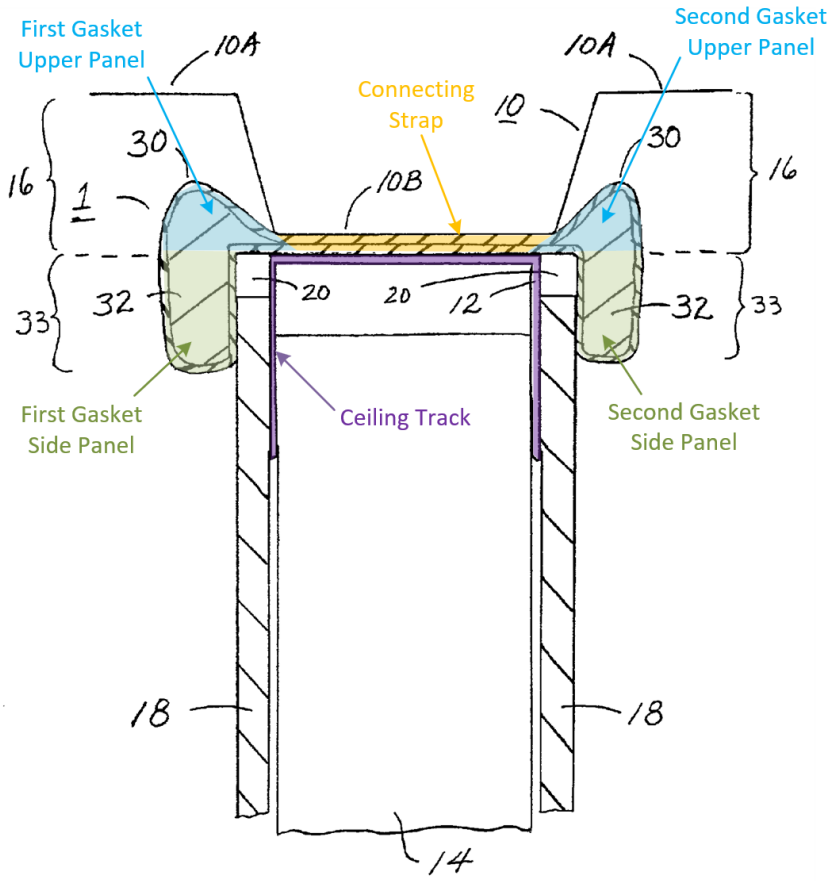
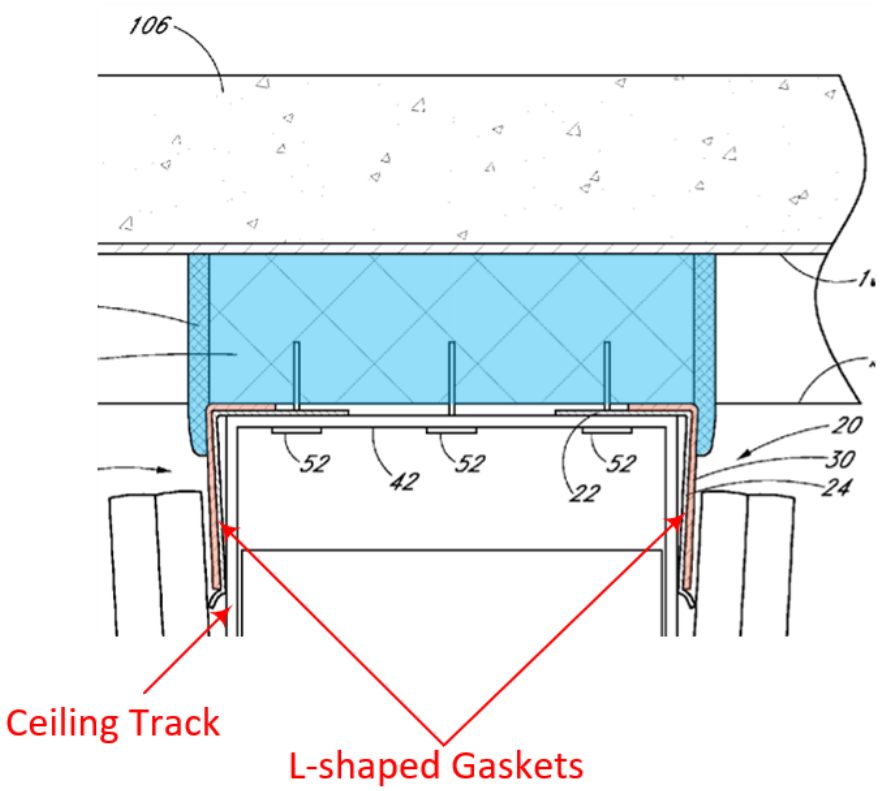
Ex. 1011 at 1 (excerpted and annotated); Ex. 1012, ¶9.

126. Prior to the ’232 patent’s effective filing date, the prior art disclosed that it was known to limit spatial separation between two objects through a strap like material. For example, the annotated figure below from Morgan discloses this.



Ex. 1005, Fig. 4 (annotated).

127. Similarly, Pilz II discloses the use of material to form a type of strap (the combination of spray and mineral wool colored blue in the figure below) to connect two L-shaped components.



128. While the structures from Morgan and Pilz II shown above do not exactly meet the "connecting strap" limitation as recited in claim 6 of the '232 patent, they confirm a POSITA's understanding of Pilz I's fire strap 116 as a connecting strap positioned above the main ceiling track section and attached to L-shaped gasket sections to limit the spatial separation therebetween.

> **[7]** An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 6 wherein said at least one connecting strap is attached with respect to said first gasket upper panel of said first L-shaped gasket section and is also attached with respect to said second gasket upper panel of said second L-shaped gasket section

129. Pilz I discloses this element. Because the connecting strap is part of the same integrated piece of intumescent material as the L-shaped gasket sections, the connecting strap is attached to the upper panels of the L-shaped gasket sections as shown in the figure below.

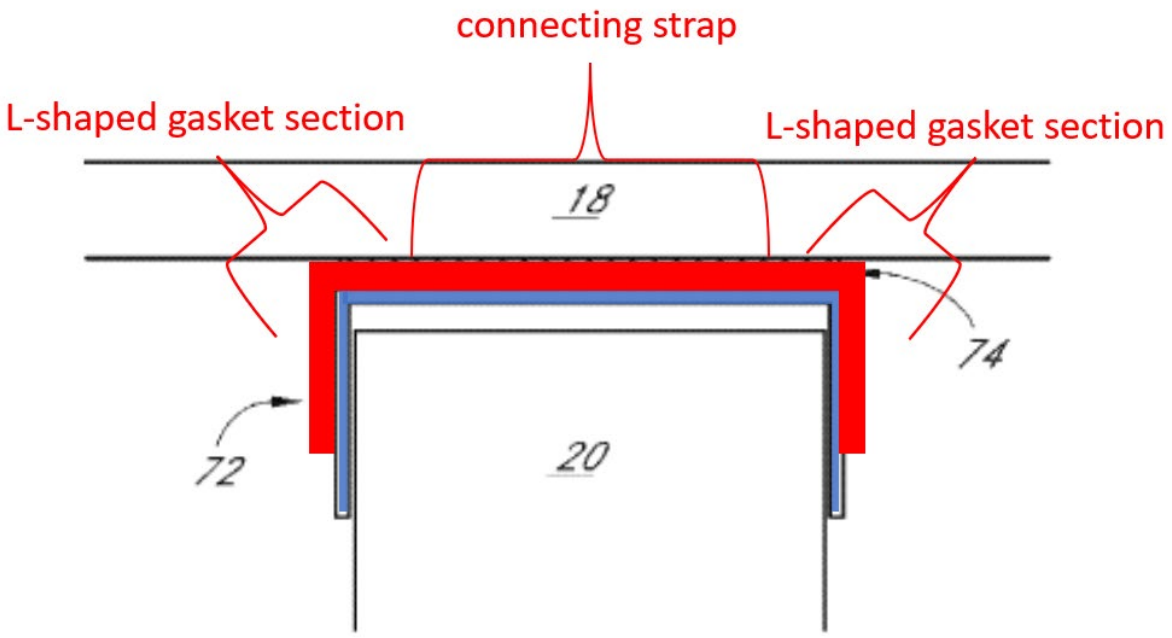


FIG. 8

Ex. 1004, Fig. 8 (annotated).

130. A POSITA's understanding of the above disclosure is consistent with Patent Owner's own assertion that its C-shaped Track Top Gasket products embody claim 7 of the '232 patent. *See* above at paragraphs 114-120.

[8] An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 6 wherein said first gasket side

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panel is spatially disposed from the first track side section to be moveable with respect thereto responsive to relative movement between the wall configuration and the upper building structure thereabove and wherein said second gasket side panel is spatially disposed from the second track side section to be moveable with respect thereto responsive to relative movement between the wall configuration and the upper building structure thereabove.

131. Pilz I in view of Morgan and Pilz II disclose this element. Specifically, in the combined gasket, the upper panels of Pilz I's L-shaped gasket section are adhesively joined to the ceiling track while the side panels of the L-shaped gasket sections are free to move. A POSITA would thus understand that the gasket side panel is spatially disposed from the track side sections to be moveable relative to the side track sections and such movement would be responsive to movement between the wall configuration and the upper building structure above it (e.g., the ceiling).

[9] An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 6 wherein said first gasket upper panel and said first gasket side panel are made from an insulating material which includes a firestopping insulating component therewithin.

132. Pilz I discloses that the L-shaped gasket sections (including the side and upper panels) comprise an "intumescent material 74," which a POSITA would understand to be a "firestopping insulating component." Ex. 1004, ¶0054.

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[10] An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 9 wherein the firestopping insulating component is intumescent.

133. Pilz I discloses that the L-shaped gasket sections (including the side and upper panels) comprise an "intumescent material." Ex. 1004, ¶0054.

[11] An adjustable head-of-wall insulating construction for sealing a head-of-wall area as **defined** in claim 6 wherein said first gasket upper panel and said first gasket side panel are made from an insulating material which includes an acoustical insulating component therewithin

134. Pilz I explains that "the area of contact between the intumescent material and the floor element 18 can inhibit air and sound from moving past the header track 10." Ex. 1004, ¶0040. Floor element 18 is shown in the below figure.

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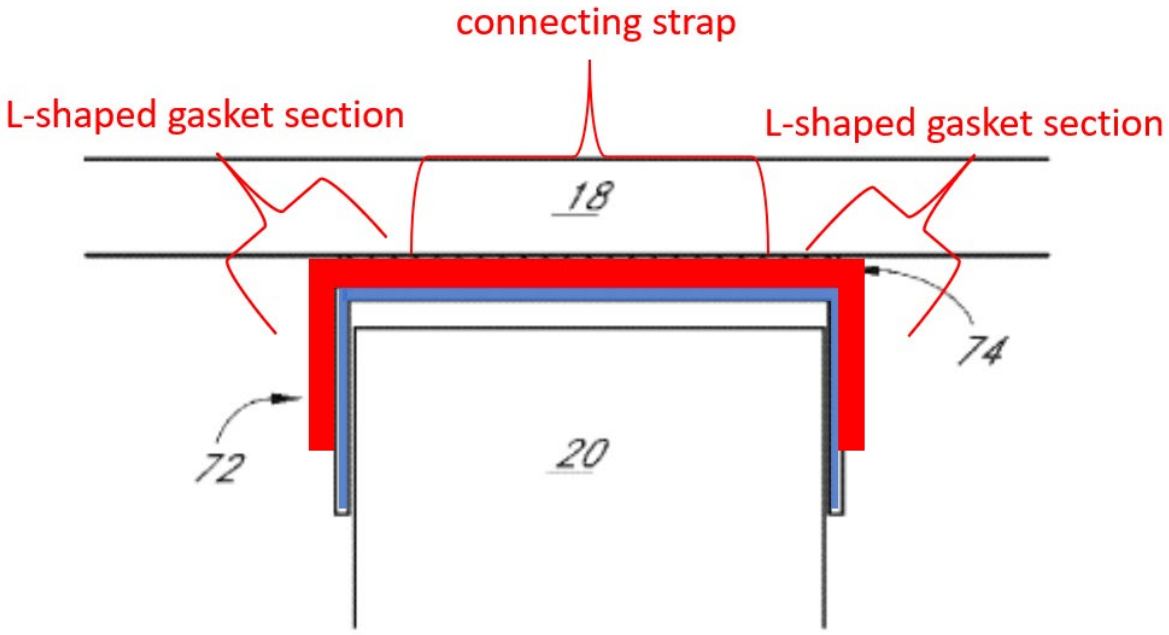

FIG. 8

135. A POSITA would thus understand that the insulating material of Pilz I would thus include an acoustical insulating component therewithin that blocks sound passing between ceiling 18 and the ceiling track.

> **[12]** An adjustable head-of-wall insulating construction for sealing a head-of-wall area as defined in claim 6 wherein said first gasket upper panel is integrally formed with respect to said first gasket side panel and wherein said second gasket upper panel is integrally formed with respect to said second gasket side panel.

136. Pilz I discloses that the L-shaped gasket upper and side panels for each L-shaped gasket section are "integrally formed." In the C-shaped embodiment of

Pilz I, the intumescent gasket consists of a single piece of intumescent material as shown in the figure below. Ex. 1004, ¶0054.

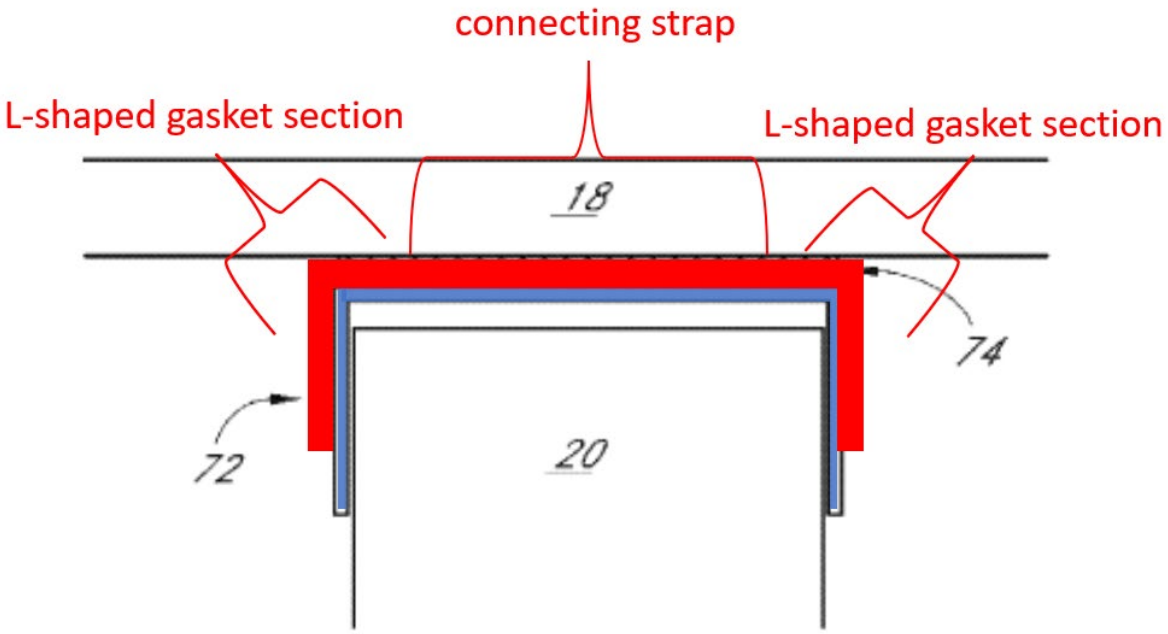

FIG. 8

C. The Examiner Overlooked Key Teachings from the Prior Art During Prosecution of the '232 Patent.

137. As discussed above at paragraphs 30-36, the examiner rejected application claim 7 over the '198 patent. The examiner found that the '198 patent disclosed each limitation of claim 6 of the '232 patent except the "connecting strap" limitation (element [6e]). The examiner found that if the "connecting strap" limitation were included in application claim 7, the claim would be allowable. As such, the examiner apparently found that the prior art did not disclose a "connecting

strap" as claimed in element (E) of claim 6 of the '232 patent. It is my opinion that this finding was in error because Pilz I discloses two separate embodiments that disclose a "connecting strap" as claimed in issued claim 6. My analysis above at paragraphs 58-136 shows that Pilz I did in fact disclose—in two separate embodiments—a "connecting strap" as claimed in claim 6 of the '232 patent.

138. The examiner's error appears to have been material in that the only basis for allowance of claim 6 of the '232 patent (application claim 7, as amended) was that the prior art supposedly did not disclose a "connecting strap" as claimed. Had the examiner recognized the two separate disclosures of a "connecting strap" in Pilz I, it does not appear that the examiner would have allowed claim 6 of the '232 patent to issue in the form it did.

139. It also appears from the prosecution history that the examiner may have narrowly construed the "connecting strap" limitation as being limited to a preferred embodiment in which a "connecting strap" extending through "slits" in the L-shaped gasket sections. Ex. 1001 at 10:49-52. In my opinion, there is nothing in the '232 patent specification or file history that requires that the claimed "connecting strap" extends through "slits" in L-shaped gasket sections. Instead, that is simply an embodiment. Indeed, Patent Owner's own position that its Track Top Gasket products embody claims 6-12 of the '232 patent demonstrates that Patent Owner

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understands its "connecting strap" limitation to be broader in scope than its preferred embodiment, including "slits" in the L-shaped gasket sections.

D. Objective indicia of non-obviousness

140. I understand that in the District Court Litigation, Patent Owner has asserted that STI's commercial products (TTG350F and TTG600F) "have been commercially successful in terms of sales and market share." Ex. 1014 at 30. I have been provided with no information to determine whether there is a connection between the sales of those products and the patented features. Nor have I been given access to the financial numbers or any information concerning market share. If Patent Owner provides such information in this proceeding, I would expect to respond.

141. I further understand that in the District Court Litigation, Patent Owner has asserted that prior the earliest filing date of the '232 patent there had been a long-felt but unsolved need for a firestopping device for construction joints that could easily be cut to size to minimize waste and could be installed more quickly than existing sealants or sprays." Ex. 1014 at 30. I disagree because any such need had been filled as discussed with respect to the prior art references above. Moreover, I have been presented with no information to establish a connection between the patented features and this alleged long felt need. If Patent Owner provides such information in this proceeding, I would expect to respond.

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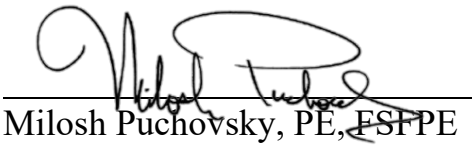
142. I currently hold the opinions expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

143. I hereby declare that all statements made are of my own knowledge, are true, and that all statements made on information and belief are believed to be true. I further declare 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 the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this proceeding.

Dated: November 16, 2023 By: 

Milosh Puchovsky, PE, FSFPE

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Appendix A

Milosh T. Puchovsky, PE, FSFPE

Professor: Fire Protection Engineer

milosh@wpi.edu
508-498-3154
www.wpi.edu/people/faculty/milosh

Professional Experience Summary

As WPI's only Fire Protection Engineering Professor of Practice, Milosh is engaged in a wide range of professional activities bringing a practical and unique perspective to the student's learning experience. He teaches a range of subjects, advises research projects and consults on a range of fire safety concerns. Milosh leads and serves on numerous industry technical committees responsible for the development of fire safety regulations, design methods and standards of practice.

Milosh is a registered professional engineer possessing 35 years of international experience with (a) fire protection and detection systems including sprinkler, standpipe, fire pump, and special suppression; (b) design, installation and inspection standards such as NFPA 13, 14, 20, 25, 72, 92, 99, 101, 130 and 855 (c) means of egress & occupant response; (d) building codes, fire regulations and testing protocols; (e) fire hazard analysis including that of lithium ion battery Energy Storage Systems and (f) the application of computer fire and egress models.

Through his professional practice and application of NFPA 921, Milosh provides analysis and litigation support of fire incidents and system performance. He authors and reviews technical publications, speaks at industry conferences, and serves prominent roles with the National Fire Protection Association (NFPA), Society of Fire Protection Engineers (SFPE), Fire Protection Research Foundation (FPRF) and Underwriter's Laboratories (UL).

As Standards Council Secretary and Assistant Vice President at NFPA, Milosh held responsibility for the technical and procedural development of all NFPA codes and standards. He also led NFPA's performance-based design codes initiative facilitating the greater application of engineering methods in fire safety practice. Milosh worked in the insurance industry evaluating fire risks and protection systems, and as an engineering consultant designing systems, specifying products, developing fire hazard mitigation strategies, and engaging prospective clients.

Milosh is Past President and Fellow of SFPE, a member of the Society's Engineering Licensing Committee and a technical editor of the Handbook of Fire Protection Engineering. He is also a principal member of the UL Fire Council that advises UL on its product test standards and fire safety initiatives and serves as a principal instructor for NFPA's seminar program. Milosh holds two engineering degrees, and an Engineering license.

Skills and Qualifications Highlights

- Professor and subject matter expert
- Litigation support providing expert analysis and testimony for fire loss, system malfunction and patent dispute through the application of NFPA 921
- Fire protection system design and performance evaluation
- Building and fire code development and consultation
- Calculation of fire behavior and effects using computer models and numeric techniques
- Occupant egress analysis including timed egress studies
- 3rd party design and code compliance reviews
- Standardized fire testing protocols and procedures
- Insurance loss control services and inspections
- Technical program development and delivery in traditional and virtual formats
- Engineering project management for domestic and international projects
- Business development including engaging prospective clients, writing proposals and marketing services
- Professional society leadership & strategic planning
- Author, editor, and technical reviewer for industry publications

Employment History

Worcester Polytechnic Institute, Department of Fire Protection Engineering, Worcester, MA
2017 – Present Associate Department Head, and Principal Industry Liaison
2008 – Present Professor of Practice, and Director of Corporate & Professional Education
2003 – 2007 Adjunct Associate Professor

Milosh Puchovsky & Associates, LLC, Mendon, MA
2008 - Present, Principal - Fire & Life Safety System Consulting

National Fire Protection Association, Quincy, MA
2007- 2008 Assistant Vice President – Codes & Standards Administration; Standards Council Secretary
2003 – 2007 Principal Fire Protection Engineer – Building and Life Safety Codes
1993 – Present Principal Instructor – NFPA Technical Fire Safety Seminars

Arup, (Ove Arup & Partners Massachusetts Inc.) Cambridge, MA
2001 – 2003 Senior Consulting Fire Engineer

National Fire Protection Association, Quincy, MA
2000-2001 Director, Codes and Standards Development – Standard Administration
1996-2000 Senior Fire Protection Engineer - Systems and Applications Engineering
1993-1996 Fire Protection Engineer – Systems and Applications Engineering

Chubb Group of Insurance Companies, Boston, MA
1992-1993 Risk Engineer

Foehl Sherman, Inc. Burlington, Ma
1991 Consulting Fire Protection Engineer and Building Code Consultant

Rolf Jensen and Associates, Inc. Concord, CA (Fire Protection Engineering Consulting Firm)
1988-1989 Fire Protection Engineer & Building Code Consultant

Education

- M.S. (Fire Protection Engineering) Worcester Polytechnic Institute, Worcester, MA, 1991
- B.S. (Mechanical Engineering) Worcester Polytechnic Institute, Worcester, MA, 1988

Registration

Registered Professional Engineer (Fire Protection), Massachusetts (License number 38530)

Professional Affiliations

National Fire Protection Association
Society of Fire Protection Engineers
Underwriters Laboratories

Honors

Fellow – SFPE (2008); Hats Off Award – SFPE (2015); Faculty Achievement Award – WPI (2016, 2020)

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Teaching, Training and Course Development Responsibilities

WPI Department of Fire Protection Engineering - Graduate Engineering Courses (responsible for development and delivery; traditional face-to-face, virtual and blended delivery methods)

- FP 553 – Fire Protection Systems – Students who complete FP 553 will have developed a practical technical understanding of design principles for automatically activated fire protection systems including sprinkler, standpipe, fire pump and water supply. Relevant physical phenomena, functionality and purpose of these systems are introduced, as are associated calculation and assessment techniques, regulations, equipment requirements, and product approval evaluations. (Co-instructed prior to full time appointment at WPI in 2008)
- FP 554 – Advanced Fire Suppression – Students who complete FP 554 will have developed a practical technical understanding of the purpose and design principles for water spray, water mist, residential sprinkler, clean agent, halon, carbon dioxide, foam, and wet chemical fire suppression systems and devices. Structural support and bracing of fire suppression systems are also introduced.
- FP 555 – Detection, Alarm and Smoke Control - Students who complete FP 555 will have developed a practical technical understanding of design principles for: (a) fire detection systems using flame, heat and smoke detector technology, (b) fire alarm, occupant notification and control systems, and (c) smoke control systems based on buoyancy and pressure differences across barriers for the purpose of occupant survivability.
- FP 570 – Building Fire Safety – Students who complete FPE 570 will have developed a practical technical understanding of the building design process and the roles of project stakeholders in addressing fire and life safety concerns principally through the application of building regulations, standards of practice, construction features, passive and active systems, means of egress, fire test methods, and the use of interior finish materials.
- FP 571 – Performance Based Design – Students who complete FPE 571 will have developed a practical technical understanding of the differences between applying traditional code mandated prescribed fire protection, and the need for implementing computer models and other calculation techniques in developing and assessing solutions for specific fire safety concerns. (Co-instructed prior to full time appointment at WPI in 2008)
- FP 580B – Business Practices in Fire Protection Engineering – This course introduces and strengthens business concepts, skills and services associated with fire protection engineering. Students learn how technical and engineering skills need to be blended into a professional business practice environment. Students develop an understanding of financial considerations, managerial responsibilities, and the soft skills necessary for successful engineering and research operations. Students monetize services and products, prepare business plans, identify customers, and develop technical and cost proposals, workflow timelines, project budgets, invoice and cash flow models, and professional quality technical reports. Written and oral communication skills are advanced. Executives from the FPE industry will provide guest lectures and insight on key topics.

WPI Department of Fire Protection Engineering - Undergraduate Engineering Courses

- FP 3070 – Fundamentals of Fire Safety – Guest lecturer
- FP 3080 – Introduction to Building Fire Safety System Design – Content development and lead instructor

Northeastern University - Industry Related Seminars (traditional face-to-face program, 1995 - 2002)

- Professional Engineering Exam Preparation Course for Fire Protection Engineering

NFPA – Industry Related Seminars (traditional face-to-face programs, 1993 – present)

- Installation of Sprinkler Systems (NFPA 13)
- Inspection, Maintenance and Testing of Water-Based Fire Protection Systems (NFPA 25)
- Fire Pumps (NFPA 20)
- Sprinkler System Hydraulics
- Automatic Sprinkler Systems & Fire Alarm Systems Plans Review
- Life Safety Code Essentials, Life Safety Code for Health Care, Plans Review (NFPA 101)
- Health Care Facilities (NFPA 99)
- National Fire Alarm & Signaling Code (NFPA 72)
- Special Suppression Systems (NFPA 11, NFPA 12, NFPA 15, NFPA 17, NFPA 17A, NFPA 750, NFPA 2001, and NFPA 2010)
- Code Requirements for Maintaining Fire & Life Safety Systems
- Smoke Control Systems (NFPA 92)
- Fixed Guideway Transit & Passenger Rail Systems (NFPA 130)

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Technical Committees, Panels and Boards

NFPA TC on Fire Pumps (NFPA 20) – Chair, 2018 – Present; Member 2001-2003, 2009-2018; Staff Liaison, 1996-2001

NFPA TC on Energy Storage Systems (NFPA 855) – Task Group Member - Fire Protection/Suppression – Explosions, 2022 - Present

NFPA TC on Sprinkler System Discharge Criteria (NFPA 13) – Member, 2001-2003, 2014 – Present; Staff Liaison, 1996-2000

NFPA TC on Safety to Life Fundamentals (NFPA 101, NFPA 5000) – Member, 2001-2003, 2009 - Present

NFPA TC on Residential Sprinkler Systems (NFPA 13D & 13R) - Member, 2010 – Present; Staff Liaison, 1996 -2000;

NFPA TC on Hyperbaric Chambers (NFPA 99B) – Chair, 2023- Present

SFPE: President 2016; Board of Directors 2017-2007; Strategic Planning Committee Chair, 2014

Underwriters Laboratories Fire Council – Member, 2010 – Present

UL Standards Technical Panel 199 – Sprinkler Equipment for Fire Protection – Member, 2015 - Present

SFPE Professional Engineering Exam Licensing Committee – Member, 2003 - Present

FPRF Technical Panel on Fire Risk Terminology – Member, 2019

FPRF Technical Panel on Oxygen Reduction Systems for Warehouse Storage Applications – Member, 2018

SFPE Executive Director Search Committee – Member, 2008 – 2009

NFPA TC on Commissioning & Integrated Testing (NFPA 3 & NFPA 4), Member 2011 - Present

NFPA Technical Committee on Water Mist Systems (NFPA 750) - Member 2009 – Present; Staff Liaison, 1994 - 1997

NFPA TC on Cultural Resources (NFPA 909, 914) - Member 2009 – present; Staff Liaison, 2003 - 2007

NFPA TC on Contents & Furnishings (NFPA 101 & NFPA 5000) -Member 2010 – Present; Staff Liaison, 2003 – 2007

NFPA TC on Health Care Facilities – Fundamentals (NFPA 99) – Member 2014 - Present

FPRF Technical Advisory Panel on Residential Sprinkler Systems – 2008 - 2009

NFPA Standards Council – Secretary, 2007 - 2008

FPRF Research Advisory Panel – Member, 2007 – 2008

ANSI Executive Standards Council – Member, 2007 - 2008

FPRF Technical Advisory Panel on Risk Methods – Member, 2006 – 2007

FPRF Technical Advisory Panel on Evacuation of High-Rise Occupants – Member, 2006 - 2007

NFPA High-Rise Building Safety Advisory Committee – Secretary, 2004 – 2007

NFPA TC on Fire Risk Assessment Methods (NFPA 550, NFPA 551) Staff Liaison, 1999-2001, 2003-2007

NFPA TC on Industrial and Storage Occupancies (NFPA 101 and NFPA 5000) Staff Liaison, 2003 – 2007

NFPA TC on Fire Safety Features (NFPA 101 and NFPA 5000) - Staff Liaison, 2003 – 2007

NFPA TC on Mercantile and Business Occupancies (NFPA 101 and NFPA 5000) - Staff Liaison, 2003 – 2007

NFPA TC on Smoke Control Systems (NFPA 92, NFPA 204) - Staff Liaison, 2003 – 2007

NFPA TC on Fire Doors (NFPA 80, NFPA 105) - Staff Liaison, 2003 – 2007

NFPA In-house Task Group on Performance-Based Codes – Chair, 1993 – 2001, 2003 – 2007

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NFPA In-house Resource Team on Homeland Security and Critical Infrastructure – Member, 2005 - 2008

SFPE Task Group on Performance-Based Design and Analysis – Member 2003 – Present

TC on Hazards and Risk of Contents and Furnishings (NFPA 555, NFPA 556, NFPA 557) - Staff Liaison, 2003 – 2007

Inter-jurisdictional Regulatory Collaboration Committee (International Performance-Based Building Codes) - Member, 2003 – 2007

NFPA TC on Fire Tests (30 fire test standards) - Staff Liaison, 2003 – 2005

NFPA TC on Manufactured Housing (NFPA 225, NFPA 501, NFPA 501A) – Staff Liaison, 2003 - 2005

NFPA TC on Automatic Sprinkler Systems (NFPA 13, NFPA 13D, NFPA 13R) Staff Liaison, 1996 -2000, Principle Member, 2001-2003

SFPE Design Team Liaison Task Group – Member, 1999 - 2003

NFPA TC on General Storage (NFPA 231, 231, NFPA 231D, NFPA 231E, NFPA 231F, NFPA 46) Staff Liaison, 1993-2000

ISO TC 21/SC5 – Sprinkler and Water Spray Extinguishing Systems – Secretary, 1996 – 2001

NFPA TC on Standpipe Systems (NFPA 14) Staff Liaison, 1993-1997

NFPA TC on Private Water Supply Piping (NFPA 24, NFPA 291) Staff Liaison, 1993 – 1997

NFPA TC on Water Spray Systems (NFPA 15) Staff Liaison, 1993-1997

NFPA TC on Foam Water Sprinkler Systems (NFPA 16, NFPA 16A) Staff Liaison, 1993-1997

NFPA TC on Record Protection (NFPA 232, NFPA 232A) Staff Liaison, 1993-1997

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Selected Engineering & Consulting Experience

Ultium Cells, Lordstown, OH
Conducted fire and egress study for large scale lithium-ion manufacturing facility to demonstrate building code compliance through an alternative design approach. Included fire hazard analysis of lithium-ion manufacturing operations, computational modeling of fire effects and timed egress calculations.

Utility-Scale Battery Storage Zoning Case, MA
Provided consulting services regarding fire risk and fire-fighting issues with respect to a petition concerning the siting and construction of a proposed utility scale energy storage facility.

OMMA Concert Hall, Athens, Greece
Project leader responsible for conducting an NFPA 101 fire and life safety analysis for Greece's premier concert hall expansion. Served as primary contact for this Athens based architectural and construction firm. The project, most of which was underground, included two new concert halls (one of which was 13 stories in height), parking facilities, banquet facilities, exhibition center and numerous vertical openings. A combination of prescriptive and performance-based design methods was employed.

High Museum, Atlanta, GA
Conducted fire engineering analysis involving computational fluid dynamics computer program to form the basis of a code variance for a sprinkler system installation. Fire development and sprinkler response were assessed to identify options for preserving the unique ceiling structure proposed by the architect. Successfully negotiated the approach and solution with the building official.

Downtown Transit Center, New York City, NY
Conducted fire, life safety and risk assessments for the redevelopment of the former World Trade Center site. Included analysis of potential extreme events including those associated with fire, blast and biochemical threats.

Massachusetts Institute of Technology, Main Group Master Plan, Cambridge, MA
Conducted fire protection and life safety master plan for the renovation of MIT's main group buildings. Identified options for preserving the historic character and functionality of this cluster of historic buildings that function as a single structure.

King Abdulaziz Airport, Jeddah, Saudi Arabia
Project included a major airport expansion project including airport terminal building and parking facilities. Client was an architect based in the Hague, Netherlands. Conducted an NFPA 101 analysis and developed alternate means of protection.

Dulles Airport Expansion, Sterling, Virginia
Code analysis, fire safety strategy development, computational fire and smoke management study for the construction of a new midfield concourse and APM station. Included CFD computer modeling, egress analysis and assessment of fire size and growth for APM vehicles.

Unified Science Center, Hamilton College, Clinton, New York
Smoke management study for the renovation of a 1920's era building. Included strategy development and smoke movement calculations for a complex new atrium.

Honolulu International Airport, Honolulu, HI
Development and expansion of new international airport terminal. Prepared overall fire protection strategy, conducted code analysis, and identified and resolved code issues.

Harvard University, Cambridge, MA
Master plan survey and evaluation of various university buildings including hospitals, dormitories and academic buildings to identify deficiencies with regard to code compliance and fire protection systems.

Leeds School of Business, Boulder, CO
Smoke management system and life safety analysis for a new atrium building.

Ritz Carlton Hotel, San Francisco, CA
Renovation of a historic college building to a new luxury hotel. Prepared overall fire protection program, conducted egress analysis, and developed and negotiated alternative means of fire protection and life safety to preserve historic character of the building.

Downtown Plaza, Sacramento, CA
Development of six city blocks into a new covered shopping mall and entertainment complex. Prepared overall fire and life safety program, conducted egress analysis, and identified and developed alternative means of protection where strict compliance with building and fire code requirements was not possible.

FuelCell Energy, Torrington, CT
Fire hazard analysis of process equipment used in the production of fuel cells. Developed plan to mitigate associated fire and explosion hazards.

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Publications and Technical Programs

Texts

SFPE Handbook of Fire Protection Engineering, 6th edition, SFPE, Technical Editor, Chapters on Design Calculations for Fire Protection Systems – Sprinklers, Hydraulics & Water Supplies, Detection & Alarm, Smoke Control, Hydraulics, Halon, Clean Agents, Carbon Dioxide, Water Mist, Foam) – In Preparation

"Automatic Sprinkler System Calculations," SFPE Handbook of Fire Protection Engineering, 6th edition, SFPE (In Preparation)

"Engineering Considerations for Fire Protection System Selection," SFPE Handbook of Fire Protection Engineering, 6th edition, SFPE, (In Preparation)

"The Role of Performance-Based Codes and Standards in Fire Safety Design," Section 4, Chapter 13, Fire Protection Handbook, 21th ed, NFPA

NFPA 20 Stationary Fire Pump Handbook, 2019 Edition, NFPA (Contributing Author)

"Interrelationship of NFPA Standards Pertaining to a Fire Pump Installation" Supplement 2, Stationary Fire Pumps Handbook, 5th Edition, NFPA, 2016.

Automatic Sprinkler Systems for Residential Occupancies Handbook, 2016 Edition, NFPA (Contributing Author)

SFPE Handbook of Fire Protection Engineering, 5th edition, SFPE, 2015 (Section Technical Editor for chapters on Design Calculations for Fire Protection Systems)

"Engineering Considerations for Fire Protection System Selection," SFPE Handbook of Fire Protection Engineering, 5th edition, SFPE, 2015

Automatic Sprinkler Systems for Residential Occupancies Handbook, 2013 Edition, NFPA (Contributing Author)

Stationary Fire Pumps Handbook, 2013 Edition, NFPA (Contributing Author)

"Section 12, Structural Fire Protection", Fire Protection Handbook, 20th edition, NFPA, 2008 (Section Technical Editor)

"Performance-Based Fire Codes and Standards," Section 4, Chapter 13, Fire Protection Handbook, 19th ed, NFPA, 2003

"The Application of Performance-Based Design Concepts for Fire and Life Safety", Supplement 7, Life Safety Code Handbook, 9th and 10th editions, NFPA, 2003, 2006

"Section 10, Water Based Fire Protection Systems", Fire Protection Handbook, 19th edition, NFPA, 2003 (Section Technical Editor)

"Fire Pump Controllers and Electric Power Supplies for Fire Pumps", Section10, Chapter 8, Fire Protection Handbook, 19th edition, NFPA, 2003 (with James Nasby)

"Automatic Sprinkler Systems", Section 10, Chapter 11, Fire Protection Handbook, 19th edition, NFPA, 2003

"Pumps for Fire Protection," 1st edition, NFPA, 2002 (with Ken Isman)

"A Brief Introduction to Sprinkler Systems for Life Safety Code Users," Supplement 3, Life Safety Code Handbook, 8th edition, NFPA, 2000

"Automatic Sprinkler Systems Handbook" 8th edition, NFPA 1999

"Fire Pump Handbook," 1st edition, NFPA, 1998 (with Ken Isman)

"Automatic Sprinkler Systems Handbook" 7th edition, NFPA 1996

"Performance-Based Fire Codes and Standards," Section 11, Chapter 9, Fire Protection Handbook, 18th ed, NFPA, 1997

"General Indoor Storage," Section 9, Chapter 18, Fire Protection Handbook, 18th edition, NFPA, 1997

"Outdoor Storage Practices," Section 9, Chapter 19, Fire Protection Handbook, 18th edition, NFPA 1997

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Reports & Periodicals

"Inert Gas Discharge Time Effects on Full and Reduced Scale Wood Crib Extinguishing Experiments (with J. Zimak, J. Cuevas, J. Senecal, J. Pierce, F. Penden and A. Simeoni), *Fire Safety Journal,* March 2023.

"Title One Fire Protection Analysis Report - Gardiner Laundry and Storage Facility", Yellowstone National Park, U.S. National Park Service, December 2022 (Graduate Student Research Project in Partnership with the National Park Service)

"Pump Speed as a Design Consideration," *Consulting Specifying Engineer Magazine,* June 2022.

"Title One Fire Protection Analysis Report – Old Faithful Upper Store & Employee Dormitory," Yellowstone National Park, U.S. National Park Service, December 2021 (Graduate Student Research Project in Partnership with the National Park Service)

"Increased Functionality & Cost Effectiveness of Smart Building Technologies Incorporating Addressable Fire Alarm Notification," (w/ C. Cyr and D. Parrow), Worcester Polytechnic Institute, Worcester, MA, May 2021.

"Case Study in the Application of an Exterior Automated Fire Suppression System: A Graduate Independent Study Research Project," (with A. Riley and J. Troio), Worcester Polytechnic Institute, Worcester, MA, December 2018.

"Case Studies in the Application of Electronic Sprinkler Technology for Warehouse Operations: A Graduate Independent Study Research Project," (with A. Riley and J. Troio), Worcester Polytechnic Institute, Worcester, MA, December 2018.

"Addressing the Impact of Excess Fire Pump Pressures", *Consulting Specifying Engineer Magazine,* November 2018.

"Addressable versus Conventional Fire Alarm Notification: An Observation of Installation and Material Costs," White Paper prepared for Johnson Controls Inc, May 2018.

"Li-Ion Battery Energy Storage Systems - Effect of Separation Distances based on a Radiation Heat Transfer Analysis: A Graduate Independent Study Research Project" (with V. Hutchison), Worcester Polytechnic Institute, Worcester, MA, June 2017

"The Cookbook Approach: Just Follow the Recipe for Success", *Fire Protection Engineering Magazine*, President's Column, SFPE, 4th Quarter, 2016

"The Most Interesting Person in the World", *Fire Protection Engineering Magazine*, President's Column, SFPE, 3rd Quarter, 2016

"Home Sweet Home" *Fire Protection Engineering Magazine*, President's Column, SFPE, 2nd Quarter, 2016

"Do Your Job" *Fire Protection Engineering Magazine*, President's Column, SFPE, 1st Quarter, 2016

"Forensic Fire Scene Analysis Using Computational Fluid Dynamics (CFD): A Major Qualifying Project Report", (with F. Kang, R. Kennedy, D. Savva, T. Rabidou, C. Wood), Worcester Polytechnic Institute, Worcester, MA, May 2016

"Occupant Egress Time: An Interactive Qualifying Project Report", (with C. Parisi, L, Renner, A, Teliska, L. Waugh), Worcester Polytechnic Institute, Worcester, MA, May 2016

"Piping Arrangements for Fire Pumps" *Consulting Specifying Engineer Magazine,* March 2015

"Inspection, Testing and Maintenance Of Fire Safety Systems in Oil Refineries" *Conference Proceedings - 5th SFPE Saudi Arabian Chapter Conference*, Dammam, Saudi Arabia, September 2014

"The Effect Wood Pallets Have on Warehouse Sprinkler System Design: Graduate Student Project Report," Worcester Polytechnic Institute, Worcester, MA, January 2014

"Deciding on Fire Protection Systems: What Factors Come into Play?" *Consulting Specifying Engineer Magazine,* May 2013

"New Approaches for Designing Fire Pump Installations", *Consulting Specifying Engineer Magazine*, December 2012

"Evaluating Occupant Load Factors For Business Operations" (with T. Muha, B. Merrifield, T. Thackeray and T. Wood), Fire Protection Research Foundation, Quincy, MA, April 2012.

"New Design Considerations for Clean Agent Fire Suppression Systems", *Consulting Specifying Engineer Magazine*, May 2011

"High Concept - Life Safety in Tall Buildings", *NFPA Journal,* March/April 2007

"Performance Design Anxiety", *Engineering News Record*, February 21, 2005 (Contributing Author)

"Smoke Control: to CFD or not to CFD – M/E Roundtable", *Consulting Specifying Engineer*, January 2005

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"Fire Protection Engineer, At Your Service," *Consulting Specifying Engineer,* January 2005

"Peak Pump Performance," *NFPA Journal*, May/June 2000.

"Performance-Based Design from Start to Finish", *NFPA Journal,* January/February 2000

"NFPA 13: What You Need to Know About the 1999 Edition," *NFPA Journal*, May/June 1999

"Fire Protection Strategies for Lumber Storage Yards," *Journal for Lumberyard Operators,* August 1998

"Restructuring NFPA's Sprinkler Project," *Sprinkler Age*, February 1998.

"What's New In Sprinklers," *NFPA Journal,* January/February 1998 (contributing author)

"Just Ask – Sprinklers Systems," *NFPA Journal,* September/October 1997

"Sprinkler Obstructions - How NFPA 13 Deals with Them," *Sprinkler Age*, June 1997

"Performance-Based Versus Prescriptive Fire Safety Codes," *Skylines*, October 1996

"Thirty Years of Suppression Systems," *NFPA Journal,* September/October 1996 (contributing author)

"NFPA's Perspectives on Performance-Based Codes and Standards," *Fire Technology,* Nov/Dec 1996

"Changes to NFPA's Sprinkler Standard," *Plumbing Engineer*, June 1996

"Entering the Next 100 Years of Standardized Sprinkler System Technology," *Sprinkler Age*, March 1996

"Changes to NFPA 13D," *Sprinkler Age*, March 1996

"Developing Performance-Based Documents One Step at a Time," *NFPA Journal*, Jan/Feb 1996

"NFPA's Future in Performance-Based Codes and Standards," National Fire Protection Association, July 1995 (with A. Cote, R. Coté, R. Fahy, C. Crant, J. Hall, and R. Vondrasek)

NFPA's Standards Making System, *Sprinkler Age,* October 1993

Technical Peer Reviews

"Experimental Study of Fire Containment using Water Curtains in a Reduced-scale Deck of a Ro-Ro Ship," Fire Safety Journal, Manuscript ID: FISJ -D-22-00533, February 2023

"A Competency Framework for Fire Safety Engineering," Fire Safety Journal, Manuscript ID: FISJ-D-21-00136, May 2021.

"Effects of Discharge Area and Atomizing Gas Type in Full conde Twin-fluid Atomizer on Extinguishing Performance of Heptane Pool Fire with Different Heat Release Rates," Applied Sciences, Manuscript ID: applsci-1139162, March 2021.

"Numerical Investigation of the Required Quantity of Inert Gas Agents in Fire Suppression Systems," Energies, Manuscript ID: energies-787546, April 2020.

"Combatting Wildfire Fast and Cost Effectively with a New Technology," Environmental Science and Pollution Research, Ms. No. ESPR-D-19-03479, March 2020.

"The Development and Deployment of Water Mist Fire Suppression Technology," DiNenno Prize Nomination, Subject Matter Expert Peer Review, (http://www.nfpa.org/dinenno), January 2020.

"Ensuring Fire Safety of Closed Warehouses by Optimizing the Number of Fire-Fighting Devices," Safety & Fire Technology, Ms. Ref. SFT-00037-2019-01, December 2019.

"Reliability of Automatic Sprinkler Systems for Fire Protection: How to Collect, Analyze, and Present Reliability Data," (pre-publication proposal review), CRC Press, December 2018.

"An Efficacy Evaluation of Water Mist Protection of Solid Combustible Fires in an Open Environment," Fire Technology, Ms. Ref. FIRE-D-18-00095

"Post Construction Fire Safety Regulation in England: Shutting the Door Before the Horse Has Bolted," Policy and Practice in Health

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and Safety, Ms. Ref. No.: TPHS-2018-0016

"Assessing Vulnerability and Fire Risk in Old Urban Areas: The Case of the Historical Center of Guimaraes," Fire Technology, Ms. Ref. No.: FIRE-D-18-00052, March 2018.

"Tenability Analysis in a Tobacco Workshop with an Enclosure Fire Zone Model," *Fire & Materials,* Ms. Ref. No.: FAM-15-0125, February, 2016.

"Characterization of Water Mist Systems using Full-scale Tests and Computer Modeling", *Fire Technology,* Ms. Ref. No.: FIRE-D-15-00204, August, 2015.

"2014 Assessment Report of the Halon Technical Options Committee", United Nations Environment Programme (UNEP), Ozone Secretariate, P.O. Box 30552, Nairobe, Kenya, 2014.

"Probabilistic Assessment of Occupant Load Density in Retail Buildings", *Fire Safety Journal*, Ms. Ref. No.: FISJ-D-14-00014, April 2014.

"Distinction of Fire Source from Smoke using Discrete Probability Distribution and Neural Networks", *Fire Technology*, Ms. Ref. No.: FIRE-D-13-00134, January 2014.

"Comparative Investigation of Smoke Control Modes in Long Corridor of High-rise Buildings", *Fire Technology,* Ms. Ref. No.: FIRE-D-13-00006, April 2013.

"Theoretical Analyses and Experimental Studies on Flashover Inhibition by Water Mist", *Fire Technology,* Ms. Ref. No.: FIRE-D-12-00589, January 2013.

"A Review of State of Art in Pyrolysis / Evaporation Model and Integrated Artificial Neural Network (ANN)-Genetic Algorithm (GA) for Model's Property Estimation", *Fire and Materials*, Ms. Ref. No.: FAM-12-0022, June 2012.

"Assessment of Fire Safety for Mezzanine Floors Compared with Prescriptive Code Requirements", *Fire Safety Journal*, Ms. Ref. No.: FISJ-D-11-00106, July 2011.

Student Project Advising

"Wildfire and Hardening Structures," K. Coleman, B. Corcoran, H. Murray, C. Plummer, J. Smith, (Co-Advisors L. Albano, M. Puchovsky, A, Simeoni, & S. VanDessel), Major Qualifying Project for Degree Completion, Worcester Polytechnic Institute, Worcester MA, May 2021

"The Creation of an Engineering Standard for Evaluating Fixed Wildfire Fighting Systems For Structures at the Wildland Urban Interface," C. Fawcett, M. Mitchell, J. Zimak, (Co-Advisors M. Puchovsky & A, Simeoni), Major Qualifying Project for Degree Completion, Worcester Polytechnic Institute, Worcester MA, March 2020

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"The Feasibility of Protecting Residential Structures from Wildfires using a Fixed Exterior Fire Fighting System," E. Han, D. Parrow and A. Rozen , (Co-Advisor with A, Simeoni), Major Qualifying Project for Degree Completion, Worcester Polytechnic Institute, Worcester MA, March 2020

"Consideration of an Exterior Water Spray System for the Protection of Residential Structures from the Impingement of Firebrands During a Wildfire Event," S. Alvarez & M. Pastizzo, (Co-Advisor with A, Simeoni), Major Qualifying Project for Degree Completion, Worcester Polytechnic Institute, Worcester MA, March 2019

Technical Programs & Presentations

"Reconstruction of a High-Rise Fire using Computational and Experimental Techniques", (with A. Benoit, G. Cummings, P. Guertin, & M. Guarneri), *NFPA Conference and Exposition*, Las Vegas, NV, June 2023.

"Energy Storage Systems, Emergency Response Plans and the 2023 Edition of NFPA 855," *MA Fire Prevention Association Annual Seminar*, Southbridge, MA, May 2023.

"Hazard Mitigation Assessments and Emergency Response Plans for Lithium-Ion Energy Storage System Installations." *SFPE Greater Atlanta Annual Conference & Exposition*, Atlanta, GA, March 2023.

"Applying NFPA 101 Means of Egress Provisions," *Miami Dade Fire Department Annual Training Seminar*, Miami, FL, April 2023.

"Fire Safety Assessment of the Historic Old Faithful Upper Store at Yellowstone National Park," *CNVVF-NFPA Conference on Cultural Heritage Fire Safety,* Rome, Italy, October 2022.

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"Factors Impacting NFPA 101 Means of Egress Provisions," *Florida Fire Marshalls and Inspectors Association Annual Seminar,* Sarasota, FL, October 2022.

"Fire Alarm Systems - An Analysis of Addressable Fire Alarm Notification Appliances" (with C. Cyr & D. Parrow), *NFPA Conference and Exposition*, Boston, MA, June 2022.

"Fire Pumps and the 2022 Edition of NFPA 20," SFPE Greater Atlanta Chapter Annual Seminar (Virtual), Atlanta, GA, March 16-17, 2021.

"The Feasibility of Protecting Residential Structures from Wildfires using a Fixed Exterior Fire Fighting System," (with A. Simeoni, E. Han, D. Parrow and A. Rozen), SFPE New England Chapter Meeting, Norwood, MA, Feb 3, 2020.

"A Case Study in Utilizing an Existing High-Rise Building's Fire Protection System Infrastructure for Fighting Exterior Façade Fires," (with Zachary Magnone), Suppression, Detection and Signaling Research and Applications Conference (SUPDET), Denver, CO, September 17-20, 2019

"Case Studies in the Application of Electronic Sprinkler Technology for Warehouse Operations", NFPA Conference and Expo, San Antonio, TX, June 17-20, 2019

2nd Annual Center for Global Public Safety Industry Stakeholders' Forum – *Energy Initiatives & Their Impact on Public Safety*, Organizer and Moderator, Worcester Polytechnic Institute, March 27, 2019.

"Heroic Science: What is Fire Protection Engineering," (with E. Brecher, V. Hutchison and V. Kimmerly), 2018 Annual National Collegiate Honors Council, Boston, MA, November 9, 2018.

"Large-Scale Fire Testing to Determine Fire Protection Requirements for Battery Energy Storage Systems," (with Adam Barowy), SFPE Conference and Expo, Nashville, TN, October 29, 2018

2nd Annual Global Public Safety Symposium - *New Frontiers in Global Public Safety,* Organizer and Moderator, Worcester Polytechnic Institute, September 17, 2018.

"Introductory Overview on Using UL 9540A Data for Fire Safety Design Applications," Sustainable CUNY / SERTA Stakeholder Workshop, New York, NY, August 27, 2018

Center for Global Public Safety Industry Stakeholder's Forum – *Focus on Fire Protection, Water Security, Food Safety and Emergency Response*, Organizer and Moderator, Worcester Polytechnic Institute, April 30, 2018.

"Addressing Excess Fire Pump Pressures," 2018 Fire Protection Symposium - New England Association of Fire Protection System Designers, Bartlett, New Hampshire, March 2018

"A Radiation Heat Transfer Analysis of Lithium-Ion Battery Energy Storage Systems (ESS)" SFPE Conference and Expo, Montreal, Quebec, Canada, October 10, 2017

"Lithium-Ion Battery Energy Storage Systems: Characterizing Fire Incidents and Effective Protection Schemes," (with V. Hutchison), NFPA Conference and Expo, Boston, MA, June 6, 2017

"Fire Safety Engineering Practice – Graduate and Undergraduate Education and Research," (with T. El-Korchi), *First Workshop on Fire Safety Engineering,* University of Campinas, Campinas, Brazil, March 23, 2017

*"*Advanced Design Concepts and Calculations for Fire Alarm Systems," *Seminario: Bombas Contra Incendio Basado en NFPA 72*, Fire Prevention Institute, Mexico City, Mexico, February 28-29, 2017

"An Overview of the Fire Hazards Associated with Lithium Ion Batteries," (with V. Hutchison), *International Association of Arson Investigators – Massachusetts Chapter Technical Seminar,* Auburn, MA, November 17, 2016

"Advanced Topics on the Application and Use of Fire Pumps," *Seminario: Bombas Contra Incendio Basado en NFPA 20*, Fire Prevention Institute, Mexico City, Mexico, November 14-15, 2016

"Careers in Fire Protection," *Massachusetts STEM Summit 2016*, (with A. Kimball, K. Bigda, J.C. Harrington) Worcester, MA, November 1, 2016

"Using FDS for Fire Scene Analysis," *SFPE Conference and Expo*, (with B. Rabidou, D. Savva, F. Kang, R. Kennedy, C. Wood) Denver, CO, September 2016

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"Recent Changes to NFPA 13 and the SFPE Handbook of Fire Protection Engineering," *SFPE United Arab Emirates Chapter Meeting*, Dubai, UAE, April, 2016

"Computer Fire Modeling & Sprinkler System Design," *SFPE New York Metro Chapter Technical Seminar*, New York, NY, March 2016.

"New Design Options for Fire Pump Installations," 2016 NEAFPSD 25th Chapter Anniversary & Fire Protection Symposium, Bartlett, New Hampshire, March 2016

"The Proper Use of Fire Pumps & the 2016 Edition of NFPA 20," *Fire Sprinkler Americas Conference*, International Fire Sprinkler Association, Medellin, Columbia, February 2016

"SFPE's Strategic Plan", *Technical Committee Meeting of the Fire Suppression Systems Association,* Fajardo, Puerto Rico, February 2016

"The Critical Impact of Fire Protection System Maintenance", *SFPE United Arab Emirates Chapter Meeting*, Dubai, UAE, November 2015

"Designing for Inspection, Testing and Maintenance of Fire Protection Systems", *NFPA Conference and Exposition*, Chicago, IL, June 2015

"Using Fire Modeling to Establish Sprinkler System Design Criteria", *SFPE Minnesota Chapter Meeting*, Roseville, MN, May 2015

"New Means of Egress Provisions for NFPA 101", *SFPE United Arab Emirates Chapter Meeting*, Dubai, UAE, February 2015.

"SFPE's New Strategic Plan", *SFPE Conference and Expo*, Long Beach, CA, October 2014

"Fire Pumps, NFPA 20 and Tall Buildings", *SFPE United Arab Emirates Chapter Meeting*, Abu Dhabi, UAE, September 2014

"Fire Pump Installations for Tall Buildings", *NFPA Conference and Exposition*, Las Vegas, NV, June 2014.

"Explosion Hazard Classification and the Use of Electrical Equipment", *Technical Workshop for Riley Power, Inc.,* Worcester, MA, February 2014.

"Fire Pumps: What You Need to Know", *Fire Sprinkler America's Conference*, Panama City, Panama, February 2014.

"Setting Sprinkler System Performance Criteria when NFPA 13 Won't Cut It", *SFPE Rocky Mountain Chapter 1st Annual Fire Protection Symposium*, Boulder, CO, April 2013.

"Update on SFPE Activities," *SFPE New York Metro Chapter Meeting*, New York, NY, March 2013.

"New Design Considerations for Fire Pump Installations," *SFPE Engineering Technology Conference*, Savannah, GA October 2012

"Sprinklers in Fire Engineered Solutions," *9th International Fire Sprinkler Conference*, Paris, France, June 28-29, 2012

"Appropriateness of Current Occupant Load Factors for Business Occupancies," *NFPA Conference and Exposition*, Las Vegas, NV, June 2012

"New Options for Fire Pump Installations," *SFPE New York Metro Chapter Annual Seminar*, Brooklyn, NY, February 2012.

"Systems Selection for Fire Protection – Factors that Should Influence a FPE's Decision Making Process," *SFPE Engineering Technology Conference*, Portland, OR, October 2011

"Fire Protection Overview," *Consulting Specifying Engineer Magazine, Fire & Life Safety Channel, On-line Video Series,* May 2011.

"Update on NFPA-2001: Clean Agent Fire Extinguishing Systems," *Consulting Specifying Engineering Webcast: Update on Fire Codes, Standards and Guidelines*, April 21, 2011.

"Fire Protection System Selection for Special Hazards," *SFPE Greater Atlanta Chapter 7th Annual Fire Safety Conference*, Duluth, GA, March 2011.

"Applying NFPA 101, Life Safety Code," *General Services Administration Regional Seminar,* Mashantucket, CT, October 2010.

"Training Future Fire Protection Engineers," *NFPA Conference and Exposition*, Las Vegas, NV, June 2010.

"Advocating Sprinklers – A Report on Research, Code Changes and Other Initiatives at NFPA," *New England Fire Protection Symposium,* West Dover, VT, March 2008.

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"Predicting Detector Actuation," *Fire Protection Research Foundation Suppression and Detection Symposium,* Orlando, FL, March 2008 (session moderator)

"NFPA and Fire Safety in High Rise Buildings: A Status Report," *NFPA World Safety Conference and Exposition,* Boston, MA, June 2007.

"Using Risk Concepts in Codes and Standards Development," *NFPA World Safety Conference and Exposition,* Boston, MA, June 2007.

"An Approach for Applying Risk Concepts in the Development of Codes and Standards," *NFPA World Safety Conference and Exposition,* Boston, MA, June 2007.

"NFPA Regulations – Notices of Intent to Make a Motion for the National Electrical Code", *NFPA Electrical Inspectors Forum*, Quincy, MA, May 2007.

"NFPA High-Rise Building Safety Advisory Committee and the NIST/WTC Recommendations" *Fire Safety Directors Association of Greater New York – Spring Seminar*, New York, NY, May 2007.

"Fire Detection, Alarm Systems and Human Behavior," *Fire Protection Research Foundation Suppression and Detection Symposium*, Orlando, FL, March 2007 (session moderator)

"Code Options for Rehabilitating Historic Buildings," *Traditional Buildings Exhibition and Conference*, Boston, MA, March 2007

"High Rise Buildings – Where Are the Codes Heading?" *Society of Fire Protection Engineers – New England Chapter,* Norwood, MA, November 2006 (with B. Tubbs)

"NFPA 914 – Code for Fire Protection of Historic Structures and Building Rehabilitation," *Protection Heritage International Conference,* Ljubljana, Slovenia, May 2006

"Property and Life Safety in Health Care Facilities" *NFPA Niagara Frontier Chapter 2006 Spring Seminar*, Buffalo, NY, May 2006

"Status Report on NFPA's Response to the NIST WTC Recommendations," *National Institute for Building Sciences – Multi-hazard Mitigation Council,* Washington, D.C., May 2006

"The Concept of Fire Risk and Its Potential Impact on the Role of Sprinkler Systems," *NFSA 2006 Annual Seminar*, South Hampton, Bermuda, April 2006

"New Code Provisions for Building Rehabilitation," *Traditional Buildings Exhibition and Conference,* Chicago, IL, April, 2006

"NFPA's Perspectives on High Rise Safety," *National Council of Structural Engineering Associations*, Kansas City, MO, October 2005

"NFPA's Comments on Building and Fire Codes & Practices", *Technical Conference on the Federal Building and Fire Safety Investigation of the World Trade Center Disaster,* National Institute of Standards and Technology, Gaithersburg, MD, September 2005

"NFPA Comments to NIST's Federal Building and Fire Safety Investigation of the World Trade Center Disaster" National Fire Protection Association, August, 2005 (with R. Solomon, R. Fahy, *et al*.)

"Rehabilitating Tall Buildings in a Post 9/11 World," *Traditional Building Exhibition and Conference,* Philadelphia, PA, April 2005

"NFPA Comments to NIST's Report of the Technical Investigation of the Station Nightclub Fire," National Fire Protection Association, March 2005 (with R. Solomon, R. Cote, R.Fahy, *et al*.)

"Balancing Life Safety with the Historic Preservation of Tall Buildings," *Council on Tall Buildings & Urban Habitat International Conference on Tall Buildings in Historical Cities - Culture & Technology for Sustainable Cities ,*Seoul, South Korea, October 2004

"A Bottom-Up Analysis for Performance Designs" *5th International Conference on Performance-Based Codes and Fire Safety Design Methods*, Luxembourg, October 2004

"Making Old Buildings Work: Building Rehab Code Provisions for Safety" *Restoration & Renovation Conference*, Boston, MA, April 2004 (with Marilyn Kaplan)

"Sprinkler Systems as a Design Option for Historic Buildings", *New England Fire Protection Symposium***,** West Dover, VT, March 2004

Global Policy Summit on the Role of Performance-Based Building Regulations in Addressing Societal Expectations, International Policy, and Local Needs, Washington, D.C., November 2003 (Session Chair and member of organizing committee)

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NIST Workshop on Fire Safety Design and Retrofit of Structures, Baltimore, MD, September 2003 (Work Group Facilitator)

"NFPA's Comments to the American Society for Healthcare Engineering of the American Hospital Association Alcohol-Based Hand Rub Solution Fire Modeling Analysis Report", NFPA, July 2003 (w/ R. Solomon)

"An Overview of Hanging and Bracing Requirements for Sprinkler Systems", *Fire Prevention Association of Massachusetts - 17th Annual Educational Seminar*, Amherst, MA, April 2003

"Sprinkler Systems – Which System for What Hazard?" *Massachusetts Building Commissioners and Inspectors Association – Monthly Meeting*, Sturbridge, MA, November 2002

"Design Vision, Building Codes and Fire Engineering", *Build Boston - Boston Society of Architects*, Boston, MA, November 2002 (with Jeff Tubbs)

"Consideration of Extreme Events in Building Management and Design", *Build Boston - Boston Society of Architects*, Boston, MA, November 2002 (with Brian Meacham and Jeff Tubbs)

"Sprinklers as A Code Solution," *4th International Fire Sprinkler Conference*, Prague, Czech Republic, July 2002

"Sprinkler Systems for Storage and Bulk Retail," *Fire Prevention Association of Massachusetts – 16th Annual Educational Seminar*, Amherst, MA, April 2002

Performance-Based Design Requirements for the First Edition of the NFPA Building Code, *4th International Conference on Performance-Based Codes and Fire Safety Design Methods*, Melbourne, Australia, March 2002 (with Greg Harrington)

"Using Fire Models to Demonstrate Sprinkler System Effectiveness, "*New England Fire Protection Symposium*, Bartlett, NH, March 2002

"An Overview of NFPA's New Project on Fire Risk Assessment Methods," *The International Conference on Engineered Fire Protection Design*, San Francisco, CA, June 2001 (with Ken Richardson)

"Electric Power Supply Requirements for Fire Pumps," *Society of Fire Protection Engineers - New England Chapter Annual Technical Seminar*, Randolph, MA, March 2001. (with Larry Wenzel)

"An Overview of Organizational and Technical Changes for the 1999 edition of NFPA 13," *NFPA Fall Meeting*, Orlando, FL, November 2000

"Future Considerations for NFPA 13" *New England Fire Protection Symposium*, Bartlett, NH, March 2000.

"Electrical Power Supply Requirements of NFPA 20", *New England Fire Protection Symposium*, Bartlett, NH, March 2000

"Automatic Sprinkler Systems" *Wisconsin Code Enforcement Officials Special Seminar*, Madison and Wausau, WI, February 2000

"NFPA Overview and Technical Changes ½ Day Program," *Wisconsin Building Code Refresher Program*, University of Wisconsin, Madison, WI, February 2000

"Implementing Performance-Based Design through the Application of Fire Safety Regulations," *2nd Conference on Fire Safety Design in the 21st Century*, Worcester, MA, June 1999

"NFPA 13 – Major Changes for the 1999 edition," *SFPE Southern Ontario Chapter Meeting*, Toronto, Canada, January 2000

"Technical and Organizational Changes for the 1999 Edition of NFPA 13," *SFPE New England Chapter Meeting*, Norwood, MA, December 1999

"An Introduction to NFPA 13," *NFPA Regional Conference*, Kuala Lumpur, Malaysia and Hong Kong, China, November, 1999

"NFPA 13 Plans Review Seminar," *Rhode Island Fire Marshall's Association*, Providence, RI, October 1999

"NFPA 13 Changes ½ Day Program," *American Fire Sprinkler Association*, New Orleans, LO, September 1999. (with R. Huggins and B. Caputo)

"NFPA 13 – The Next Century" *Fire Marshall's Association of North America - Delaware Valley Chapter Meeting*, Philadelphia, PA, September 1999

"Electric Power Supply for Motor Driven Fire Pumps," *National Fire Sprinkler Association Annual Seminar*, Chicago, IL, September, 1999

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"NFPA 13 / NFPA 25 Surveyor Training Course," *National Health Care Finance Administration*, Denver, CO, June 1999.

"Major Proposed Changes and Additions to the Next Edition of NFPA 13," *American Society of Plumbing Engineers - Boston Chapter Meeting*, Randolph, MA, January 1999

"The Reorganization and Expansion of NFPA 13," *3rd International Fire Sprinkler Conference*, Glasgow, Scotland, July 1998

"Seminar on Fire Protection Systems – Sprinklers and Fire Pumps," *NFPA Special Meeting*, Bangkok, Thailand, July 1998. (with D. Hague)

"An Overview of NFPA 13, NFPA 231 and NFPA 20," *NFPA Special Meeting and Workshop*, Kuala Lumpur, Malaysia, July 1998.

"An Introduction to Performance-Based Codes and Design Approaches," *South Carolina Fire Inspectors Association Spring Seminar*, Myrtle Beach, SC, June 1998.

"Technical Differences Between the 1991 and the 1996 editions of NFPA 13," *Montana Fire Marshall's Association – Monthly Meeting*, Helena, MT, June 1998

"Domestic Fire Protection Using Residential Sprinklers and Inspection, Testing and Maintenance Procedures for Water Based Fire Protection Systems," *Fire-X '98*, Birmingham, England, May 1998

"Sprinkler Technology and the Application of NFPA's Sprinkler Standards," *NFPA Regional Conference*, Mexico City, Mexico, April 1998

"Reorganization of NFPA's Sprinkler Project," *NEAFPSD New England Fire Sprinkler Technical Seminar*, Bethel, ME, March 1998

"NFPA 13 – Major Changes," *American Society of Plumbing Engineers – Miami Chapter*, Miami, FL, February 1998

"Proposed Changes to NFPA 231 and NFPA 231C," *American Fire Sprinkler Association's 16th Annual Convention*, Albuquerque, New Mexico, October 1997

"Performance Codes and the Role of NFPA," *Performance Codes: How Will They Happen*, American Institute for Architects, San Francisco, CA, October 1997

"Supervision of Automatic Sprinkler Systems," *Pennsylvania Tri-State Fire Alarm Seminar*, Philadelphia, PA, September 1997

"Performance-Based Regulations - What Role Will They Play," *Proceedings of the Fire Risk and Hazard Assessment Symposium*, National Fire Protection Research Foundation, San Francisco, CA, June 1997

"Performance-Based Language in Existing NFPA Codes," *SFPE Design Workshop – Introduction to Performance-Based Design for AHJ's*, Los Angeles, CA, May 1997

"Current Issues Facing Water-Based Fire Protection Systems," *NFPA Annual Meeting*, Los Angeles, CA, May 1997.
"New Orleans Warehouse Fire," *NFPA Annual Meeting*, Los Angeles, CA, May 1997

"Pumps for Fire Protection, and Fire Protection Technology Update" Fire-X '97, Birmingham, England, May 1997 (with K. Isman and M. Riffey)

"NFPA's Future in Performance-Based Codes and Standards," *Building Performance: What Is It?,* American Institute for Architects, Washington, D.C., April 1997

"Fire Sprinklers – NFPA 13 and 13D Update," *NFPA Western Regional Meeting*, Sacramento, CA, April 1997

"An Introduction to Performance-Based Codes and Design Approaches," *Connecticut Fire Marshall's Annual Seminar*, New Haven, CT, March 1997

"NFPA 101 and Sprinkler Protection," *New England Fire Sprinkler Technical Seminar*, Bethel, ME, March 1997

"NFPA 13 – An Overview of Major Changes," *New England Association of Fire Protection System Designers Monthly Meeting*, Westborough, MA, March 1997

"Review of NFPA 13 Code Changes," *American Society of Plumbing Engineers/Society of Fire Protection Engineers – Empire Chapter Joint Meeting*, Syracuse, NY, December 1996

"An Introduction to Fire Pumps," *NFPA Fall Meeting*, Nashville, TN, November 1996

"Recent NFPA Fire Investigations," *NFPA Fall Meeting*, Nashville, TN, November 1996 (with R. Bielen and Ed Comeau)

"Performance-Based Language in Existing NFPA Codes," *SFPE Design Workshop – Introduction to Performance-Based Design for AHJ's*, Nashville, TN, November 1996

"NFPA 13 Update," *New England Association of Fire Protection System Designers 3rd Biennial Fire Protection Product Show and Seminar*, Randolph, MA, October 1996

"Performance-Based Codes and Standards and Their Effect on Building Design," *International Performance Codes: The Coming Impact on Your Practice*, American Institute for Architects, Vancouver, Canada, October 1996

"A Dual Track Performance / Prescriptive Based Approach for Fire Safety Codes and Standards," *Proceedings - Fire Safety Conference on Performance Based Concepts*, Federal Institute of Technology, Zurich, Switzerland, October, 1996

"Sprinkler and Fire Suppression System Plan Review," *Connecticut Fire Marshall's Association Technical Seminar*, Fairfield, CT, August 1996

"NFPA 750 – NFPA's New Standard on Water Mist Systems, and Changes to the 1996 edition of NFPA 13" *National Fire Sprinkler Association Area 1 Seminar*, Saratoga Springs, NY, July 1996

"Update on Residential Sprinkler Systems," *Fire Marshall's Association of Colorado Annual Conference*, Vail, CO, July 1996

"Creating Performance-Based Documents at the NFPA," *Proceedings of the Fire Risk and Hazard Assessment Symposium*, National Fire Protection Research Foundation, San Francisco, CA, June 1996

"Perspectives on the Transition to Performance-Based Codes – Panel Discussion," *NFPA Annual Meeting*, Boston, MA, May 1996.

"Keeping Pace with Water-Based Technology," *NFPA Annual Meeting*, Boston, MA, May 1996

"NFPA's Perspective on Performance-Based Codes and Standards," *International Meeting of the Confederation of Fire Protection Associations*, Boston, MA, May 1996

"Fire Investigation Report - Warehouse Fire, New Orleans, Louisiana", National Fire Protection Association, March 1996 (with Edward Comeau)

"Supplementing NFPA's Codes and Standards with Performance-Based Provisions," *Proceedings for Interflam '96*, Cambridge, England, March 1996

"NFPA's Objectives in Pursuing Performance-Based Codes and Standards," *Proceedings of the International Conference on Performance-Based Codes and Fire Safety Design Methods*, Society of Fire Protection Engineers, Ottawa, Canada, 1996

"Implementing Emerging Technologies Through Fire Safety Codes and Standards," *Demonstration of Limited Water Supply Fire Suppression Technologies*, National Institute of Standards and Technology, Gaithersburg, MD, March 1996

"An Overview of the 1996 edition of NFPA 13," *American Society of Plumbing Engineers – NYC Chapter Meeting*, New York, NY, February 1996

"NFPA's Future in Performance-Based Codes and Standards", *NFPA Fall Meeting*, Chicago, IL, November 1995

"Performance Based Design in the United States," *Proceedings of the International Conference on Fire Research and Engineering*, Society of Fire Protection Engineers, Orlando, FL, September 1995

"Performance-Based Standards from the NFPA Perspective," *Urban Fire Marshall's Forum*, Quincy, MA, August, 1995

"NFPA Standards Adopted by the Uniform Fire Code," *Western Fire Chiefs / International Fire Code Institute Annual Meeting*, Las Vegas, NV, July 1995

"Performance Based Design in United States," *Pacific Rim Conference of Building Officials,* Darwin, Australia, May 1995

"Fire Case Studies – The Builders Square Fire – Panel Discussion," *NFPA Annual Meeting*, San Francisco, CA, May 1994

"Water Mist Systems for Fire Protection," *Video Fuego Technical Conference*, Badajoz, Spain, May 1994

"Fire Protection Standards for Records, Record Centers and Archives Facilities," *ARMA – Boston Chapter Meeting*, Boston, MA, April 1994 (with R. Ortisi-Best)

"Technical Changes to NFPA's Storage Standards," *NFPA Fall Meeting*, Phoenix, AZ, November 1993

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