

I4F Exhibit 1002

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

I4F LICENSING NV,
Petitioner,

v.

VILOX AB,
Patent Owner.

Case: Unassigned

**DECLARATION OF MR. EDDY BOUCKÉ IN
SUPPORT OF PETITION FOR *INTER PARTES*
REVIEW OF U.S. PATENT NO. 11,421,425**

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United States Patent and Trademark Office
PO Box 1450

Alexandria, Virginia 22313–1450

*Submitted Electronically via the Patent Trial and Appeal Case Tracking System
(P-TACTS)*

I, Eddy Boucké, declare as follows:

1. I am over the age of 21 and I have been retained in this case by Petitioner i4F Licensing NV (“i4F”) as an expert witness. I have been asked in this case by Petitioner i4F to provide my opinions as an expert. I have personal knowledge of the facts set forth in this declaration, and I submit this declaration in support of i4F’s petition in the Patent Trial and Appeal Board (“PTAB”) in the United States Patent and Trademark Office (“USPTO”) for the *inter partes* review (“IPR”) of U.S. Patent No. 11,421,425 (“the ’425 Patent”). I declare, under penalty of perjury, that the following is true and correct.

2. I have been asked to review the ’425 Patent to evaluate its validity in light of relevant prior art. I have been provided guidance on patent law in the United States by The Webb Law Firm. I have relied on the prior art cited herein, the ’425 Patent, its prosecution history, and my education, training, experience, and personal knowledge in forming these opinions. The Exhibits to this declaration are labeled as follows:

Exhibit	Brief Description
EX. 1001	U.S. Patent No. 11,421,425 (“the ’425 Patent”)
EX. 1003	Prosecution History for U.S. Patent No. 11,421,425
EX. 1004	U.S. Pat. No. 7,441,384 to Miller et al. (“Miller”)
EX. 1005	U.S. Pat. No. 6,216,409 to Roy et al. (“Roy”)
EX. 1006	U.S. Pat. No. 6,006,486 to Moriau et al. (“Moriau”)
EX. 1007	U.S. Pat. Publication No. 2002/0020127 to Thiers et. al. (“Thiers”).

Exhibit	Brief Description
EX. 1008	European Pat. No. 1338721 B1 to Moriau et al. (EP721)
EX. 1009	French Pat. Publication FR 2819532A1 to Strub (“Strub”)
EX. 1010	U.S. Pat. Publication No. 2006/026253 to Brice (“Brice”)
EX. 1011	U.S. Pat. No. US 6,505,452 to Hannig et al. (“Hannig”)
EX. 1012	Canadian Pat. No. 991373A to Hebgen (“Hebgen”)
EX. 1013	U.S. Pat. No. 6,591,568 to Pålsson et al. (“Pålsson”)
EX. 1014	WIPO Publication No. 2002/055810 to Pervan (“WO 02/055810”)
EX. 1015	U.S. Pat. No. 7,398,625 to Pervan (“Pervan”)
EX. 1016	U.S. Pat. No. 6,711,869 to Tychsen (“Tychsen”)
EX. 1017	U.S. Pat. No. 6,766,622 to Thiers (“the ’622 patent”)
EX. 1018	U.S. Pat. No. 7,093,399 to Thiers (“the ’399 patent”)
EX. 1019	U.S. Pat. No. 8,756,899 to Nilsson (“Nilsson”)
EX. 1020	U.S. Pat. Publication No. 2003/0033777 to Thiers (“the ’777 publication”).
EX. 1021	U.S. Pat. Publication No. 2004/0031225 to Fowler (“Fowler”)
EX. 1022	U.S. Pat. Publication No. 2016/0097204 to Meersseman (“Meersseman”)
EX. 1023	U.S. Pat. Publication No. 2017/0016235 to Hannig et al. (“the ’235 publication”)
EX. 1024	U.S. Pat. Publication No. 2020/0232226 to De Rick (“De Rick”)
EX. 1025	<i>Curriculum vitae</i> of Mr. Eddy Boucké (“Boucké CV”)

3. Based on my review, analysis, education, training, and experience, I have reached the opinions presented in this declaration to a reasonable degree of engineering certainty.

I. QUALIFICATIONS

4. I have a bachelor degree in mechanical engineering. I have been active in the field of flooring technology since 1998. During the period of 1998-2008, I worked for Berry Floor, and, since 1999, I have been involved with the development of locking profiles of floorboards and co-related patents. In the period of 2008-2010, I worked for Välinge, and subsequently, in the period of 2010-2012, I worked for Kronospan. During the period of 1998-2012, I drafted various patent applications. In 2012, I founded my own consultancy firm offering consultancy services to various mechanical fields of industry, including the flooring industry. Since 2013, I have been involved as a consultant with i4F and have acted as head of Research and Development. I am now Chief Technology Officer of i4F. Additional details of my experience and education can be found in my attached *curriculum vitae*, which is attached as Exhibit 1016.

II. U.S. PATENT NO. 11,421,425

5. The '425 Patent discloses a “joining system for floor panels” having a tongue and groove on opposites of the panel, two locking recesses formed on a lower portion of the groove and two locking lugs formed in a lower portion of the tongue for engagement with the recesses. '425 Patent at Abstract.

6. Independent claim 1 is as follows:

1. A joining system for floor panels, said floor panels comprising coupling parts on at least two opposite sides for joining floor panel

together, said coupling parts including a groove and a tongue, where the groove is shaped for insertion of the tongue of an adjoining floor panel, said tongue of the adjoining floor panel being shaped for locking engagement with the groove in a direction perpendicular to said sides and parallel to a horizontal floor plane defined by the joined panels, said coupling parts exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts, locking means for locking the tongue of the adjoining floor panel within the groove, wherein the locking means comprises dual consecutive locking recesses arranged in a lower portion of the groove, a first locking recess located in an internally extending portion within the groove and a second locking recess located in a lip portion protruding from an entrance opening of the groove, the locking means further comprises dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking engagement in the groove, a first locking lug extending downwardly from a lower tip portion of the tongue and a second locking lug extending downwardly from a root portion of the tongue, the first locking recess and the first locking lug are provided with matching curved horizontal locking surfaces and the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces.

'625 Patent, col. 13, line 34-col.14, line 9.

III. LEGAL STANDARDS

7. I understand that under 35 U.S.C. § 102, a patent claim is not novel and anticipated by a single prior art reference if the reference teaches each and every element of the claimed invention, as set forth and arranged in the claim, either expressly or inherently. I understand that anticipation analysis is a two-step process. The first step is to determine the meaning and scope of the asserted claims, and the second is to compare the claims to the prior art. Each claim must be viewed as a whole, and it is improper to ignore any element of the claim. I understand that claim

limitations that are not expressly found in a prior art reference are inherent if the prior art necessarily functions in accordance with, or includes, the claim limitation in question. I understand that it acceptable to examine evidence outside the prior art reference in determining whether a feature, while not expressly discussed in the reference, is necessarily present in it and, therefore, is inherent. I understand that where even one element is not disclosed in a reference, the anticipation contention fails.

8. I further understand that material from other written sources, such as other patents and patent applications, that is incorporated by reference into a prior art reference is considered part of the prior art reference as if the material from the other written sources had been explicitly contained in the prior art reference.

9. I also understand that under 35 U.S.C. § 103 a patent claim is invalid if the claimed subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time the of the alleged invention. Patent claims may be found obvious in light of particular references or combinations of references. I also understand that an obviousness analysis takes into account the scope and content of the prior art, the differences between the claimed subject matter and the prior art, and the level of ordinary skill in the art at the time of the invention.

10. It is my understanding that a reference is appropriately considered in the obviousness inquiry if it falls within the relevant field of endeavor or if it is

reasonably pertinent to the particular problem with which the inventor was involved. A reference is reasonably pertinent if it logically would have commended itself to an inventor's attention in considering the problem.

11. Additionally, I understand that when a reference is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

12. A patent claim may also be obvious if inventions arise from ordinary innovation, ordinary skill, or common sense. In this regard, a patent claim is obvious if it would have been obvious to try or there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims.

13. I also understand that several rationales may support a finding of obviousness:

(A) combining prior art elements according to known methods to yield predictable results;

(B) simple substitution of one known element for another to obtain predictable results;

(C) use of known technique to improve similar devices (methods, or products) in the same way;

(D) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(E) choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success, i.e., that it would have been “obvious to try”;

(F) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;

(G) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

14. I also understand that an obviousness analysis must consider additional objective evidence of patentability, i.e., “secondary considerations,” namely, long-felt need, unexpected results of the invention, skepticism of the invention, a teaching away from the invention, commercial success of the invention, praise by others for the invention, copying of the invention. I am not aware of any such evidence that would suggest the '425 Patent would have been non-obviousness.

IV. PERSON OF ORDINARY SKILL IN THE ART (“POSITA”)

15. It is my understanding that patent claims are to be interpreted according to the perspective of a person of ordinary skill in the art (“POSITA”) at the time of invention. For purposes of this case, I have presumed the priority date of the ’425 Patent to be the invention date since there is no evidence to the contrary. The earliest priority date of the ’425 Patent is May 4, 2018.

16. Based on my experience and knowledge of the art at the time the invention was made, it is my opinion a POSITA would have at least an undergraduate degree in the mechanical, materials, or engineering arts or equivalent experience, and would have a minimum of 2 years of practical experience in the design, analysis or manufacturing of flooring technologies. The sheer number of references cited on the face of the references attached hereto as Exhibits 1004, 1007, and 1016-1024 demonstrate that the field is quite crowded, and a certain level of flooring industry specific experience (at least 2 years in my opinion) is necessary to have an understanding of the relevant art, terminology and differences in the relevant art.

V. CLAIM CONSTRUCTION

17. I understand that the scope of patent claims depends on how the claims are construed. I understand patent claims are construed according the ordinary and customary meaning to a POSITA at the time of invention, unless the patent

specification or prosecution history reveals a specific definition given to a claim term by the patentee. I further understand that a patent applicant can disclaim aspects of an invention that would otherwise fall within the scope of a patent claim by making a clear and unmistakable statement during prosecution disavowing that aspect.

18. I understand that in instances where claim terms do not have a particular meaning in the field of art, claim construction can involve little more than the application of the widely-accepted meaning of commonly understood words. I also understand that there are instances where the inventor acts as his or her own lexicographer by either explicitly defining a term or attributing a particular meaning to a term.

19. I understand that interpreting a term contained in a patent claim involves reading the language of the claim, and that while it is improper to read a limitation into a claim from the specification, the POSITA does not read the claim term in a vacuum, but in the context of both the specification and the prosecution history, which are called the patent's intrinsic record or the intrinsic evidence. Additionally, I understand that the prosecution history is part of the intrinsic evidence for claim construction because the prosecution history may demonstrate how the patentee understood the invention.

20. I also understand that evidence outside of the claims, specification and prosecution history, such as textbooks, treatises, and scientific journals, is called

extrinsic evidence and may also be consulted. However, I understand that such evidence must also be considered in the context of the claim language, patent specification, and the prosecution history.

21. I understand that if, despite the various sources of evidence listed above, a POSITA still could not understand the boundaries of the claim with reasonable certainty, then the claim feature at issue is indefinite.

22. I have assumed, where not indicated otherwise, that the claim terms have the plain and ordinary meaning they would have had to a POSITA as of the invention date.

VI. TECHNICAL BACKGROUND

23. Panels have been used as finishing surfaces, such as floor and wall panels, for centuries. Over the years floor panels have been made of various materials - including but not limited to sawn wood, processed wood products such as wood fiber boards, high density fiberboard (HDF) and medium density fiberboard (MDF), PVC, such as vinyl composite tiles (VCT) or luxury vinyl tiles (LVT), a combination of PVC and wood fibers such as wood-plastic composite (WPC) boards, or a combination of PVC and stone material, such as stone plastic composite (SPC) boards. Floor panels are often built with several layers, which include a core layer made of, for example, any of the materials described above. Other layers include a décor or print layer on the top of the panel, a wear layer to protect the décor

or print layer, and a balancing and/or acoustic layer positioned on the back of the core. Floor panels or floorboards are typically placed over, or fastened to an underlayment, sub-floor, or structural floor system. Various methods have been used to attach the floorboards both to the underlying materials and to each other - including fasteners such as nails, adhesives, and mechanically interlocking joints formed by carving or machining a locking profile out of the panel cores themselves. Furthermore, the attachment methods may be used separately or in combination with one another. For example, a mechanically interlocking joint with a locking profile machined out of the core may be used in combination with nails or adhesives.

24. Mechanical floor panel locking systems have been well known in the industry since the first half of the 20th century if not earlier. Mechanical locking systems may provide for engagement or locking in either or both a direction parallel to the floor plane (horizontal) or a direction perpendicular to the floor plane (vertical). Most commercially available floorboards today and throughout history are and have been square or rectangular in shape. The floorboards are installed in rows, where each row is formed by connecting rectangular floorboards along their short sides, and the rows are connected together along the floorboards' long sides.

25. In the industry and in the much of the prior art, mechanical locking systems are often referred to by a two word designation, where the first word refers to the fastening method employed for the long side, and the second word refers to

the fastening method employed for the short side, such as angle / angle, angle / snap, and angle / drop. In angle fastening, the edges are fastened by bringing them together at an angle and downward rotation process. Angle or rotational fastening was well known in the art well before the earliest effective filing date '425 Patent. This much is admitted by the '425 Patent. *See* '425 Patent at col. 4, lines 25-50. Other examples of angle locking profiles / mechanisms that are engaged by rotational or angular movement are shown, for example, at Ex. 1004 (US 7,441,384); Ex. 1006 (US 6,006,486); Ex. 1005 (US 6,216,409); Ex. 1009 (FR2819532); Ex. 1010 (US 2006/0260253); Ex. 1011 (US 6,505,452); Ex. 1012 (CA991373); Ex. 1013 (US 6,591,568); Ex. 1014 (WO 02/055810).

26. It was also well known prior to the earliest effective filing date of the '425 Patent to include matching curved horizontal locking surfaces on the bottom surface of the tongue and a bottom surface of the groove in angular or rotational locking systems, as demonstrated in several of the above-mentioned prior art patents. *See, e.g.*, Ex. 1014 (WO 02/055810) at page 16, lines 9-17 (in describing a WIPO equivalent of Ex. 1006 (Moriau) noting that “WO 9747834 also discloses mechanical joint systems which comprise a circular-arc-shaped tongue and a correspondingly formed groove in the opposite side edge of the floorboard (*cf.* Figs 14d-14e in the accompanying drawings). When connecting such locking systems, the tip of the tongue is put towards the opening of the arcuate groove, after which

downward angling is begun. In this downward angling, there is a large surface contact between all the arcuate surfaces of tongue and groove.”)

27. Mechanical locking systems and floor panel materials have been an area of considerable focus for research and development activities. These activities have sought to improve the mechanical properties and locking by providing for easier and more consistent assembly and disassembly, improved installed appearance and in-service performance, reduction of manufacturing costs, and other benefits. As a result, floor panels made of resilient materials, such as LVT, WPC and SPC, that allowed for bending or deformation within the mechanical locking mechanisms while providing strength were broadly known and utilized prior to any invention claimed in the '425 Patent.

28. As further discussed in the invalidity analyses in the following sections, a POSITA would have had access to a broad range of prior art related to surface panel mechanical locking systems, and would have been readily motivated to modify the locking profiles machined from the core materials to optimize locking properties and manufacturing of the panels regardless of the material used for the core.¹

¹ I note that the following analyses in the body and charts of this declaration include annotated drawings certain of which annotated drawings include measurements. How those measurements were taken is explained in the attached Annex A.

**VII. CLAIMS 1-2, 5-12 and 15 OF THE '425 PATENT ARE
ANTICIPATED BY U.S. PATENT NO. 7,441,384 TO MILLER ET AL.**

29. Miller discloses a locking system for floor covering panels having complementary coupling or locking members as explained, for example, in the Abstract, Summary of the Invention and Detailed Description at column 2, line 60-column 5, line 57, and as shown in the FIGS. 1-4, for example. Additional details of the disclosure of Miller can be found in the claim chart attached to my declaration hereto, which includes the bulk of my analysis. As demonstrated in the attached Chart 1, Miller discloses each and every element of claims 1-2, 5-12 and 15.

30. It is my opinion, therefore, that Miller anticipates claims 1-2, 5-12 and 15. With respect to certain limitations of these claims, however, some additional explanation is warranted.

31. Concerning element 1.4, claim 1 of the '425 requires the following: *“said coupling parts exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts.”* This feature is disclosed by Miller as explained in Chart 1. However, I also note that this feature is admitted prior art by the '425 Patent. The '425 Patent explains the following in the BACKGROUND section of that patent:

A joining system for floor panels of the described type is known from EP 1 338 721 B1. In this joining system, a groove is shaped for insertion of a tongue on an adjoining panel. The tongue is shaped for locking 30

engagement with the groove. The locking engagement is achieved by means of a locking element on the tongue which engages a locking recess or protrusion in a lip portion protruding from an entrance opening of the groove. *The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force being delivered by elastic compression of the material of the coupling parts.* The joining system according to EP 1 338 721 B1 and its equivalents is a well proven and widely used design which is suitable for most practical floor coverings. The lip portion in this design is arranged to elastically deflect from the plane defined by two adjoining panels when the tongue is inserted into the groove, which allows the two joined panels to flex in relation to each other and thus deviate from the mutual plane if subjected to an external force directed perpendicularly to the individual planes of the panels.

'425 Patent at column 1, lines 25-46 (emphasis added).

32. EP721 (Ex. 1008), discussed in the above passage from the '425 Patent, is a European equivalent of Moriau (Ex. 1006). As noted in the above passage, the '425 Patent notes that EP721 "*and its equivalents* is a well proven and widely used design which is suitable for most practical floor coverings." *Id.* (emphasis added).

33. The EP721 equivalent, Moriau, is incorporated by reference in its entirety into the disclosure of Miller: "The coupling members 20 and 22 of the present invention provide a means for joining two adjacent floor covering panels 10a, 10b together as illustrated in FIGS. 1 and 3. One non-limiting example of such a means for adjoining adjacent panels is set forth in U.S. Pat. No. 6,006,486 to Moriau et al. (which is incorporated herein in its entirety by the reference)."

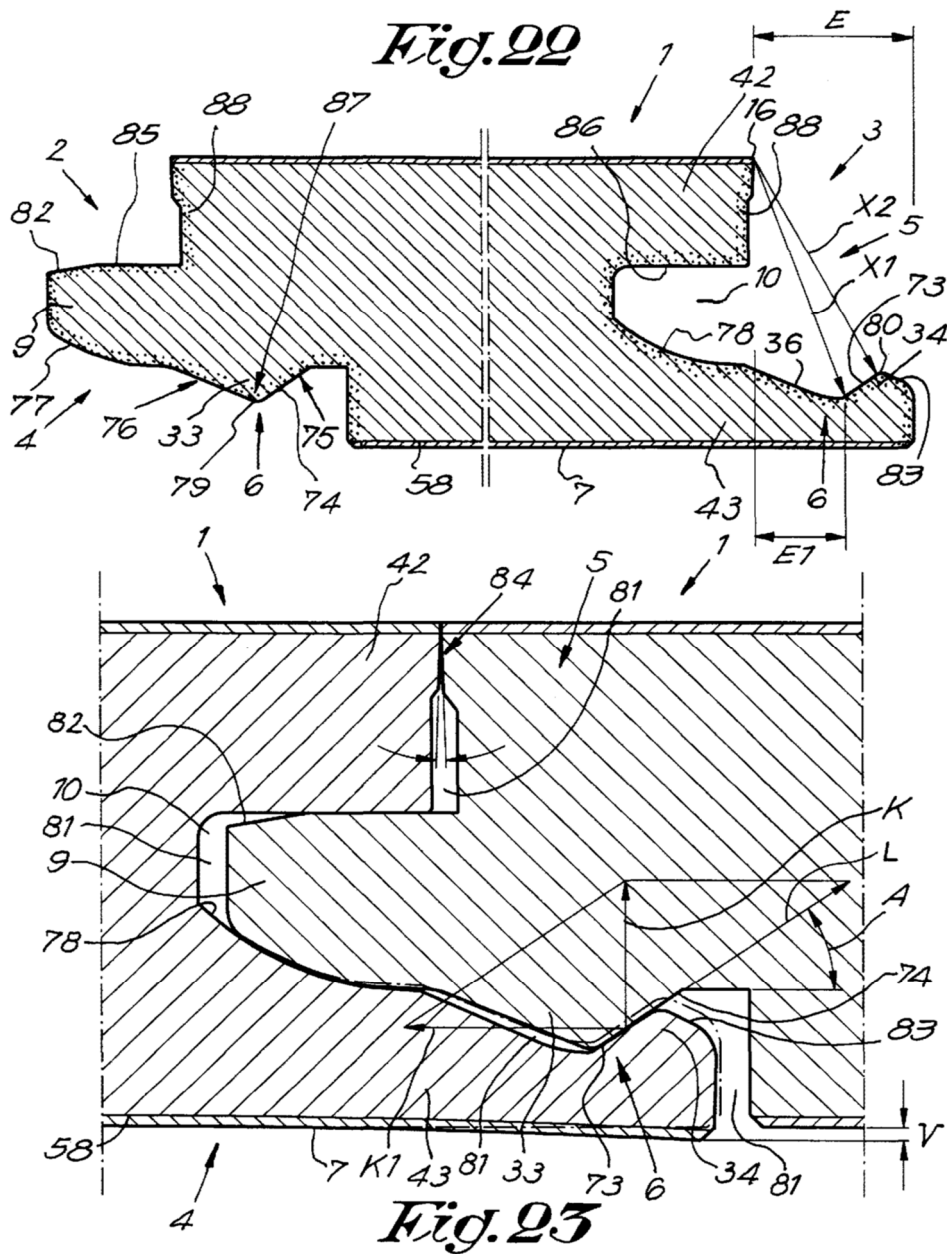
34. As noted above, I understand that when material is incorporated by reference into a prior art document, the incorporated material is considered to be

disclosed by the prior art document as if it had been explicitly laid out in that prior art document. Therefore, Miller also discloses the features admitted to be prior art by the '425 Patent.

35. To be sure, however, I note that Moriau explicitly discloses a tongue and groove coupling system that creates a horizontal locking force and tensioning force by elastic compression of the material of the coupling parts. *See* Moriau (Ex. 1006.) at col 2, lines 30-37 (“In a first important preferred form of embodiment, the coupling parts are provided with *locking elements which, in the engaged position of two or more of such floor panels, exert a tension force upon each other which force the floor panels towards each other.* As a result of this that not only the formation of gaps counteracted during installation, but also in a later stage development of gaps, from any causes whatsoever, is counteracted.”) (emphasis added); *id.* at col. 3, lines 5-7 (“[T]he locking means exert a tension force upon each other when panels are joined together.”); col. 9, line 63-col. 10, line 67 (discussing the tensioning force and elastic compression with reference to FIGS. 22-25 and noting that an important characteristic of the disclosure is that the locking element in the engaged condition “exert a tension force upon each other, as a result of which the engaged floor portions 1 are forced toward each other in compression. As represented, this is realized preferably by providing the coupling parts with an elastically yieldable or bendable portion . . .”).

36. The figures of Moriau demonstrate this concept. See the force vectors

K1 and K below:



37. These disclosure of Moriau are thus part of the disclosure of Miller given Miller's incorporation by reference of Moriau in its entirety. Thus, in addition

to the explicit disclosure of Miller indicating that “the contact zone 42 [of Miller, FIG. 3] urges the panels together and promotes a tight joint,” the disclosure of incorporated by reference Moriau is a further reason this feature 1.4 of ’425 Patent, claim 1 is disclosed in Miller.

38. I also note that Miller discloses the use of an adhesive. My reading of Miller suggests that the use of the adhesive is not required to achieve the locking, tension or compression forces required by the claims in any of the locking elements. Reading the Background section of Miller in context with the rest of the disclosure, suggests to me that the adhesive’s purpose is not to cause engagement, but is merely to maintain engagement between locking elements or the edges of the floor boards over time as the locking strength weakens or to simply increase the strength of the joints. The claims of the ’425 Patent do not require any specific level or strength of locking, tensioning, or compression force provided by the claimed locking profile. Such forces must simply exist.

39. The claims of the ’425 Patent also do not have a time limitation in them suggesting the tensioning, locking or compression forces are required to be maintained over a certain period of time. *See* Ex. 1004 (Miller) at col. at col. 1, lines 40-59 (suggesting the problem to be addressed by the use of an adhesive is to maintain strength over time or increase strength of already existing locking profiles). Thus, that an adhesive merely helps to maintain strength over time or increase

strength does not negate that the locking profiles of Miller create the tensioning, locking or compression forces required by the '425 Patent claims without use of an adhesive.

40. The adhesive of Miller is simply not required to achieve the locking, compression or tension forces described in Miller or its incorporated by reference material of Moriau. Moriau, incorporated by reference in Miller, discloses tension force urging panels together is achieved by elastic compression of the materials, but also does not require an adhesive. Ex. 1006 (Moriau) at col. 9, line 63-col. 10, line 67 (describing the tensioning force between coupling parts caused by elastic compression of the material with reference to FIGS. 22-25).

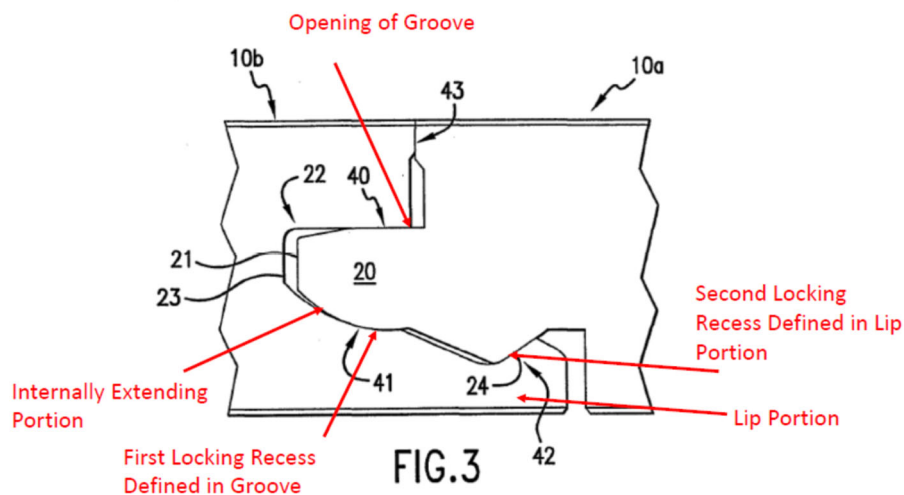
41. Moreover, the claims of the '425 Patent use the transitional phrase "comprising." I understand that under U.S. patent law, a transitional phrase of "comprising" in a patent claim means the claim is open ended, and that subject matter that includes all the features of a "comprising" claim plus other elements or features still come within the scope of the patent claim. Thus, although it is my opinion Miler does not disclose an adhesive is required to be present, even if Miller did, in fact, require an adhesive, it does not change the fact that Miller discloses each and every element and anticipates claims 1-2, 5-12 and 15 of the '425 Patent. Moreover, these claims do not require the absence of an adhesive so, again, the fact Miller may disclose an adhesive does not change my opinion that all features of

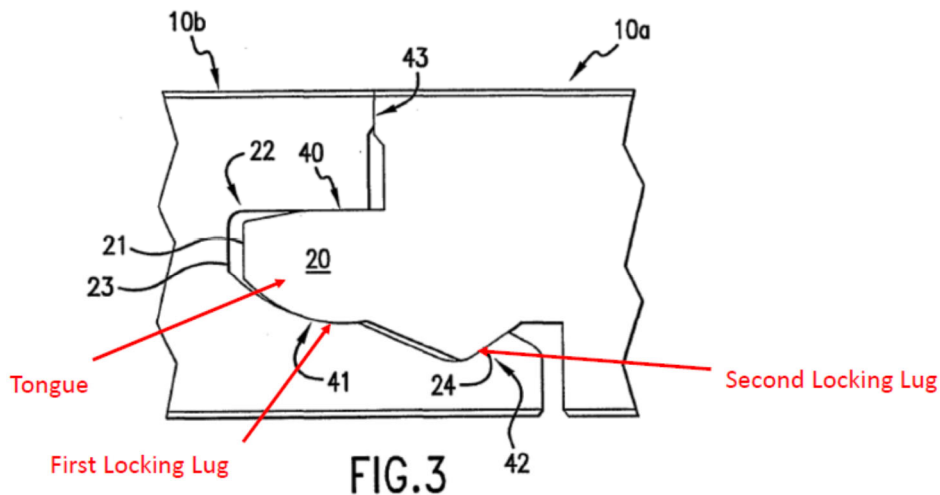
claims 1-2, 5-12 and 15 of the '425 Patent are met by Miller. For at least these reasons, the mere fact that an adhesive can be applied to the locking profiles of Miller does not change my opinion that Miller discloses each and every element of claims 1-2, 5-12 and 15 of the '425 Patent. In fact, Miller's disclosure that the adhesive is intended to maintain locking strength over time and/or increase locking strength, as explained above, actually underscores that the locking surfaces/recesses pointed to in the attached chart for elements 1.5-1.9 are indeed locking surfaces/recesses since Miller discloses that the adhesive could be applied to those surfaces. *See* Miller at col. 5, lines 63-66 and FIG. 3 (noting that the adhesive "may be selectively applied to . . . the contact zones 40-43.").

42. A final note on the adhesive of Miller is that its use, in my opinion, is optional. The repeated use of "as desired" in the text of Miller with respect to the adhesive suggests to me it is not required to achieve the locking, tensioning or compression features disclosed in Miller and claimed in the '425 Patent. *See, e.g.,* Ex. 1004 (Miller) at col. 3, lines 5-8 ("An adhesive . . . is selectively applied . . . as desired"); *id.* at col. 5, line 58-col. 6, line 7("adhesive . . . may be selectively applied . . ."); *id.* at col. 6, lines 8-23 (describing "selectively applied"); *id.* at col. 6, lines 24-40 (describing options for applying the adhesive including at the edges or on the coupling parts). Miller also consistently explains that the adhesive is "selectively applied," which Miller notes means the adhesive is only applied to the intended area

of application and not other areas of the locking profile. Miller also notes that the adhesive may be “selectively applied” to the edges of the floor panels, meaning at the seam. *Id.* at col. 6, lines 38-40. This further suggests that it is not the adhesive that creates the locking, tensioning or compression forces because it is the other features of the locking profiles of Miller that urge the seam or edges together. *Id.* col. 5, lines 27-30.

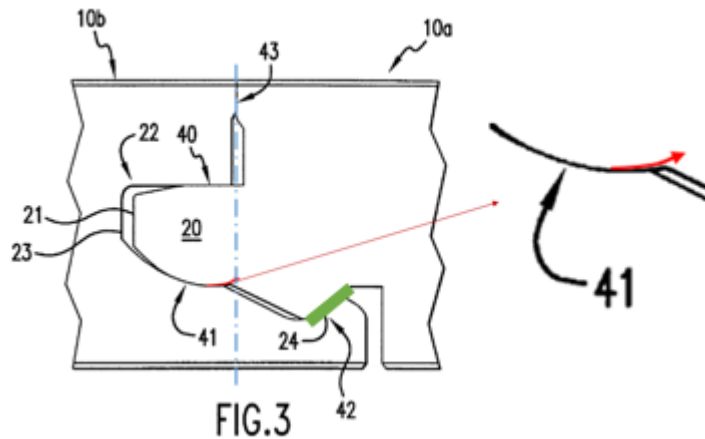
43. As noted in Chart 1 appended to the end of this declaration, my opinion is that Miller teaches the claimed locking means in elements 1.5-1.9, including a first locking recess and first locking lug with matching curved horizontal locking surfaces and second locking recess and second locking lug with matching inclined locking surfaces, as shown below:





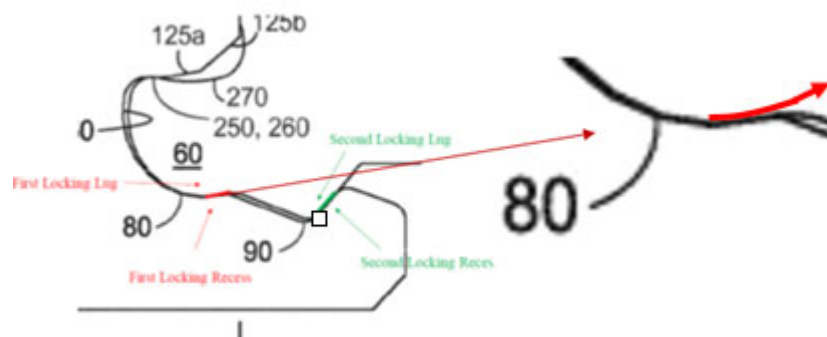
44. The first locking recess and first locking lug as pointed to above at the lower curved surfaces of the groove and tongue, respectively, provide a horizontal locking force. Due to the compression and tension force generated by the locking mechanism, *see* Ex. 1004 (Miller) at col. 5, lines 27-30 and Ex. 1006 (Moriau) col. 9, line 63-col. 10, line 67, the matching curved surfaces will exert a horizontal pressure in a direction parallel to the board surfaces and in a direction going from panel 10a toward panel 10b. Likewise, the matching inclined horizontal locking surfaces, highlighted in green in the below annotated figure of paragraph 45, will also experience the same compression/tension forces.

45. Moreover, as shown in the below figures, which includes a figure zoomed in on the relevant portion of the tongue and groove in Miller, FIG. 3, the surfaces highlighted in red includes an upward curvature in the groove:



46. This upward curvature will create an impediment or obstruction to horizontal movement of the panels 10a and 10b away from each other. This obstruction will require some amount of horizontal force to be applied in a direction parallel to the plane of the floor boards to cause the first locking lug to be disengaged from the first locking recess at the red highlighted surfaced above, thus moving the panels 10a and 10b away from each other. The matching inclined horizontal locking surfaces (highlighted in green above), will also present an obstruction that will require horizontal force to be applied to cause disengagement

47. The '425 Patent discloses a similar embodiment of the first locking recess and first locking lug, as claimed, in FIG. 11, as shown and annotated below:



48. As shown above, the embodiment of FIG. 11 of the '425 Patent demonstrates a curvature in the locking recess 80 (with matching curvature on the first locking lug) that is virtually identical to, and perhaps even more shallow than, the curvature of the first locking recess/curve locking surfaces of Miller. Indeed, in the description of FIG. 11, the '425 Patent notes that the groove 60, and thus, the locking surface 80 is "shallower" than that of FIG. 10. '425 Patent at col. 8, lines 11-28. From the figures it is evident that the groove of FIG. 11 is shallower than the other embodiments of the '425 Patent as well. Despite locking recess 80 of FIG. 11 being more shallow than locking recess 80 shown in the other embodiments of the '425 Patent, locking recess 80 of FIG. 11 still creates a horizontal lock and, thus, qualifies as a curved horizontal locking surface. The '425 Patent also confirms that locking recess 80 of FIG. 11 is indeed a locking surface since reference number 80 is used in all other embodiments to denote a locking recess. *See* '425 Patent at col. 4, line 43 ("In the drawings, like numbers refer to like elements."); *id.* at col. 7, lines 24-31 ("The embodiments shown in FIGS. 10 and 11 are compatible with the other embodiments of this disclosure, and most features and functions are shared with the other embodiments.") This confirms my opinion above, that the red highlighted surfaces of the first locking recess and first locking lug of Miller shown and explained in the paragraphs 43-46 above, and as shown in my Chart 1, constitute the

matching curved horizontal locking surfaces of the first locking lug and first locking recess as recited in '425 Patent claim 1.

49. Additional details of my anticipation analysis over Miller as to the remaining claim elements of claims 1-2, 5-12 and 15 of the '425 Patent are found in Chart 1 appended to the end of this declaration. Based on this analysis, it is my opinion that Miller teaches each and every element, as recited in claims 1-2, 5-12 and 15 of the '425 Patent and, thus, anticipates those claims.

**VIII. CLAIMS 1-15 OF THE
'425 PATENT ARE INVALID AS OBVIOUS OVER MILLER**

50. While I believe Miller anticipates claims 1-2, 5-12 and 15 of the '425 Patent, and that each and every element, as recited in those claims, are disclosed in Miller, both explicitly, and as incorporated by reference, to the extent the patentee argues or Board believes that either the locking, tensioning or compression force of element 1.4 or the first locking recess/first locking lug/matching curved horizontal locking surfaces of elements 1.5-1.9 are not disclosed in Miller it is my further opinion that those features would have been obvious modifications of Miller. It is also my opinion that claims 3-4 and 13-14 are obvious over Miller, as demonstrated in attached Chart 1.

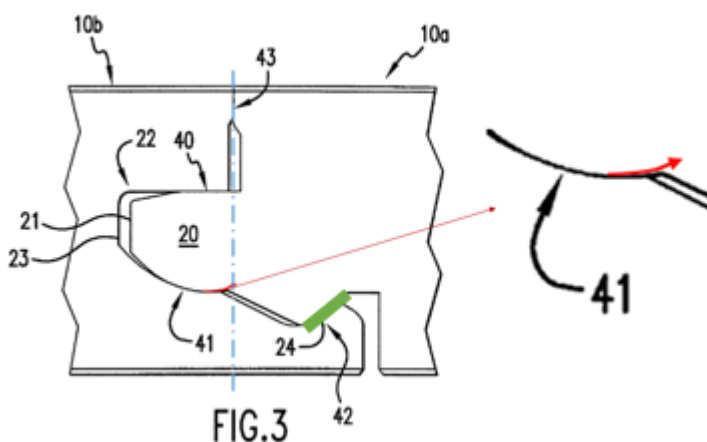
51. First, with respect to element 1.4, as noted above, it is my opinion that the adhesive disclosed in Miller is optional and that it is not required to create the tensioning, locking or compression forces recited in claim 1 of the '425 Patent. It is

also my opinion, as stated above, that even if it were required, the addition of the adhesive to the locking surfaces of Miller would have only underscored the fact that those surfaces are, indeed, “locking” surfaces. However, should the Board disagree or the patentee argue otherwise, it would have been obvious to create the locking profiles of Miller without the disclosed adhesive. In particular, Miller incorporates Moriau by reference in its entirety and, as noted above, Moriau discloses the claimed tensioning/locking/compression forces without use of an adhesive. *See* Ex. (1006) at col. 9, line 63-col. 10, line 67. While I understand that Moriau and Miller are two references, given that Moriau is incorporated by reference in its entirety into Miller, I am considering the disclosures of Moriau to be disclosures of Miller. Thus, my opinions in this section are that the above-referenced claims would have been obvious over Miller alone, such as if combining different embodiments of the same reference.

52. Moriau also suggests that its tensioning/locking/compression force features can be combined with other locking mechanisms. *See id.* at col. 10, lines 17-37; col. 12, lines 40-44; col. 13, lines 39-50. Thus, a POSITA would have recognized a suggestion in Miller to combine the features of Moriau and Miller. The POSITA would have also recognized a reasonable expectation of success in doing so at the time of the invention of the '425 Patent given the disclosures in Moriau that

tensioning features are combinable with other locking mechanisms, including the widely varying profiles of the other embodiments of Moriau.

53. Moreover, a POSITA would have been motivated to make such a modification to increase the horizontal locking capabilities of the surfaces highlighted in red and green in Miller below, and, thus, the overall locking profile:



54. As Miller recognizes, locking strength of tension/compression-based locking profiles was a concern in the art well before the earliest effective filing date of the '425 Patent. *See* Ex. 1004 (Miller) at col. 1, lines 40-59. Additionally, the locking profiles of FIG. 3 of Miller and FIG. 23 of Moriau are strikingly similar. A POSITA at the time of the invention of the '425 Patent would have recognized this similarity, which would have underscored the reasonable expectation of success in combining Moriau's tensioning features with Miller.

55. Further, to the extent that the patentee argues or the Board determines that the first locking recess/first locking lug/matching curved locking surfaces

features of elements 1.5-1.9 of claim 1 of the '425 Patent are not present in Miller, it is my opinion that these features also would have been obvious modifications of Miller's locking profile.

56. In particular, the only modifications of Miller that would be necessary to ensure these features were met is to machine the bottom of the groove so that the upward curvature of the red highlighted surface below was more drastic or less shallow, and to machine the tongue to include a matching curvature on its bottom portion. First, as demonstrated above in paragraphs 25 and 26, matching curved locking surfaces on the bottom of a tongue and groove profile, such that the tongue includes a locking lug and the groove includes a locking recess, were well known in the art. Even Moriau, incorporated by reference into Miller discloses multiple embodiments having these features. *See, e.g.*, Ex. 1006 at FIGS. 2-4, 9 and 10 and associated description. Second, making small adjustments to the machining of a floor panel is quite simple and was simple at the time of the invention of the '425 Patent.

57. In the manufacturing process, a tongue and groove profile is typically machined out of a piece of core material of the panel. This is typically referred to as a milling process. Tongue and groove profiles are typically machined out of core material in a continuous and/or automated manner using tools that remove material from the core material. An example of a machining (or milling) process is shown in

Moriau at FIGS. 12-21 and col. 9, lines 16-57. *See also* Ex. 1005 (Roy) at col. 3, line 53-col. 4, line 2 (disclosing another milling process). Given the very small scale of the locking profiles like the ones at issue here (*see* paragraph 59 below describing the scale of locking profiles), very, very little adjustment would need to be made to the milling process. A simple regrinding of the first locking recess of Miller to remove additional material is all that would be necessary to machine slightly more material out of the groove to create a more prevalent upward curvature. This was also the case before the earliest effective filing date of the '425 Patent, and at the time of Moriau and Miller.

58. Lastly, dual consecutive locking recess and dual consecutive locking lug pairs on lower tongue and groove surfaces in angling or rotational locking profiles were well known in the art before the earliest effective filing date of the '425 Patent. For example, *see* Ex. 1009 (Strub); Ex. 1005 (Roy). This demonstrates that a POSITA would have been aware that using a double locking recess and lug configuration increases the horizontal locking ability and, thus, horizontal locking strength of the locking profile. *See, e.g.*, Ex. 1005 (Roy) at col. 1, line 66-col. 2, line 24 (discussing advantages of the disclosed double “clipping means” or locking recess/lug pairs, including locking strength); *id.* at col. 5, lines 22-36 (describing that the two consecutive locking recess/lug pairs having two consecutive locking

surfaces 35, 36 increase resistance to pulling joined panels apart, which is another way of saying horizontal locking strength).

59. With respect to Miller, the dimensions would only have to be adjusted slightly to make the upward curvature to the right of reference number 41 in FIG. 3 slightly more prevalent. However, this would not have required much effort on the part of the POSITA at the time of the '425 Patent's invention. These locking profiles and their various features, such as locking surfaces, tongues and grooves, are exceedingly small, and were so prior to the invention of the '425 Patent. Thus, making the upward curvature of the first locking surface of Miller more prevalent would require very little additional material to be removed from the first locking recess. Likewise, very little more material must be added to the first locking lug/tongue when machining that element. These are changes that would have been on the order of fractions of a millimeter, and likely less than a tenth of a millimeter in magnitude. Thus, very little adjustment would be necessary to achieve the desired result. A POSITA would have recognized this during the relevant time period.

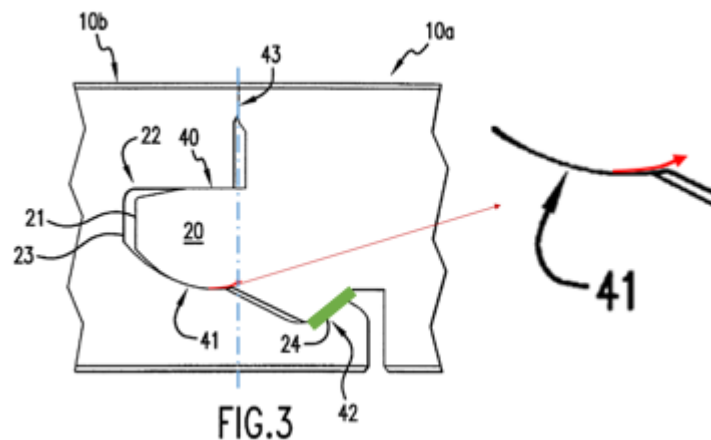
60. Given that, at the time of the invention of the '425 Patent, the machining process to manufacture these types of panels was well known, that matching curved locking surfaces located at the bottom portions of tongues and grooves, respectively, were well known and easily manufactured, and that consecutive double locking recess/locking lug/locking surfaces at the bottom portions of tongues and grooves

were well known and known to increase strength of a locking profile, a POSITA would have found it obvious to modify the contact surfaces between the tongue and groove to be less shallow and include a more prevalent upward curvature at the time of time of the invention of the '425 Patent and at the time Miller published. Accordingly, it is my opinion that claims 1-15 of the '425 Patent are invalid as obvious over Miller. Additional details of my obvious analysis over Miller can be found in Chart 1 attached hereto.

IX. CLAIMS 1- 15 OF THE '425 PATENT ARE INVALID AS OBVIOUS OVER MILLER IN VIEW ROY

61. For the same reasons above in Section VIII, I also believe that claims 1-2, 5-12 and 15 would have been obvious well before the invention of the '425 Patent over Miller in view of Roy. I further believe, however, that would have also been obvious over Miller in view of Roy. Details of my analysis can be found in Chart 2 appended to the end of this declaration. However, I note for reasons expressed above in paragraphs 54-60, it would have been obvious to combine the teachings of Miller and Roy. As Miller and Roy both recognize, increasing locking strength of known locking profiles was an area of significant concern at the time of Miller's publication (October 2008), *see* paragraphs 54 and 58 above, well before the earliest effective filing date of the '425 Patent. And as Roy discloses, its double locking recess/locking lug configuration increases horizontal locking strength. Further, Roy and Miller are both "tongue and groove" style locking mechanisms that

can be engaged using a rotational or angular movement of one floor panel with respect to another. *See* EX1004 (Miller) at col. 5, lines 4-12; EX1005 (Roy) at col. 2, lines 59-67. A POSITA would have recognized this similarity and a reasonable expectation of success in combining the teachings of Roy and Miller. Thus, a POSITA would have been motivated to modify Miller to increase the horizontal locking ability of the surfaces highlighted below in red, thereby creating a locking recess and locking lug in addition to the already existing locking recess/lug at the green highlighted surfaces:

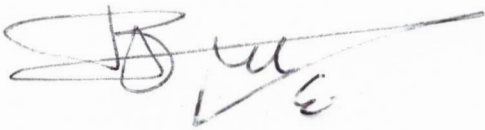


62. Given the ubiquity of matching curved locking surfaces on the bottom of a tongue and groove at the relevant time, a POSITA would have recognized that the red highlighted surfaces above need only be milled so that the upward curvature is more pronounced to create the locking surfaces, and would have recognized a reasonable expectation of success in doing so. Thus, for these reasons, the additional

reasons expressed above in Section VIII and the reasons expressed in Chart 2 attached hereto, it is my opinion that 1-15 would have been obvious to a POSITA at the time of the invention of the '425 Patent

63. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed On: February 20, 2024

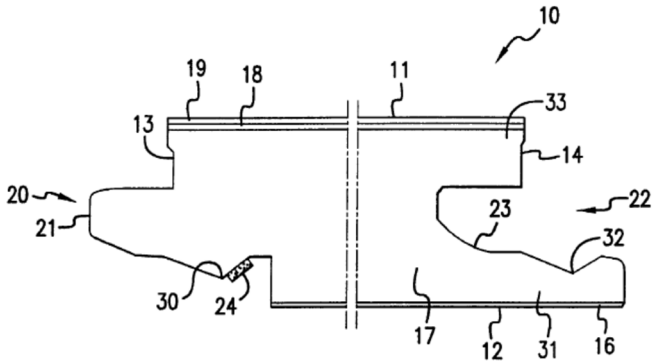
A handwritten signature in black ink, appearing to read 'Eddy Boucké', with a long horizontal stroke extending to the right.

Eddy Boucké

Chief Technology Officer

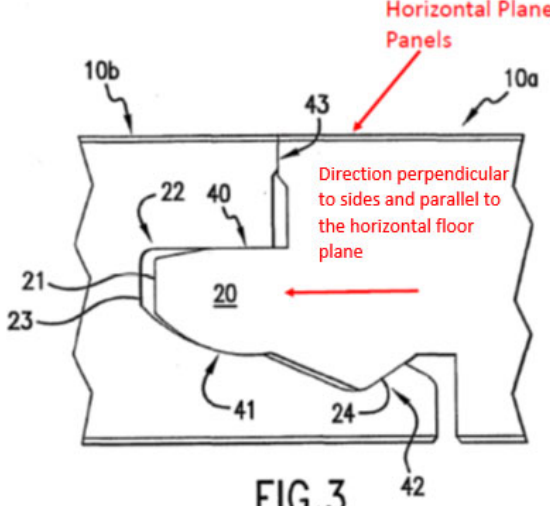
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CHART 1

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
Claim 1	
1.1 A joining system for floor panels,	<i>See Abstract (“The invention provides a new floor covering panel (10) and floor covering system....”). Fig. 2 of Miller shows a first coupling member 20, defined within the first side edge 13. The first coupling member 20 includes a protrusion 21 extending therefrom. The second side edge 14 includes a second complementary coupling member 22 defined therein that includes a recess 23 sized and shaped to receive the protrusion 21 of a second one of the floor covering panels therein. Miller at col. 2, line 66-col. 3, line 5.</i>
1.2 said floor panels comprising coupling parts on at least two opposite sides for joining floor panel together,	<i>See Abstract (“... the floor covering panels (10) include first and second generally planar surfaces (11, 12), first and second side edges (13, 14) containing first and second complementary coupling members (20, 22); respectively. . . .”)</i> 

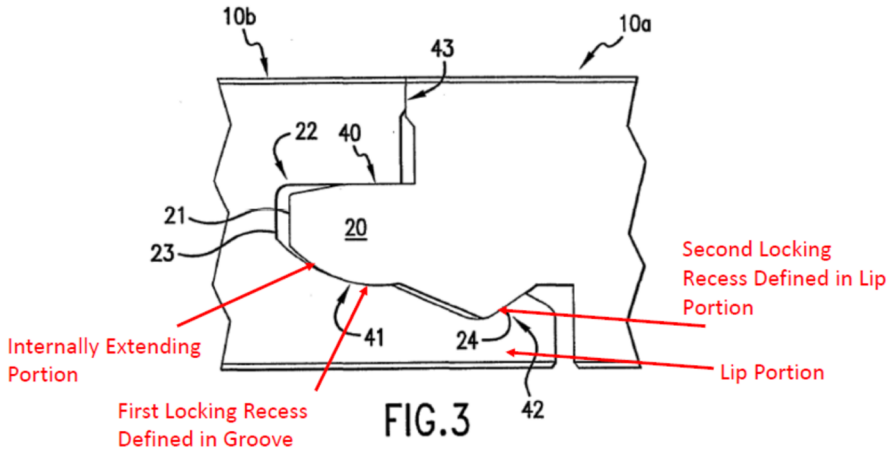
² Miller was made public on February 19, 2004, which is more than one year prior to May 4, 2018, the earliest priority date of United States Patent No. 11,421,425. Accordingly, Miller qualifies as prior art under 35 U.S.C. §102(a)(1).

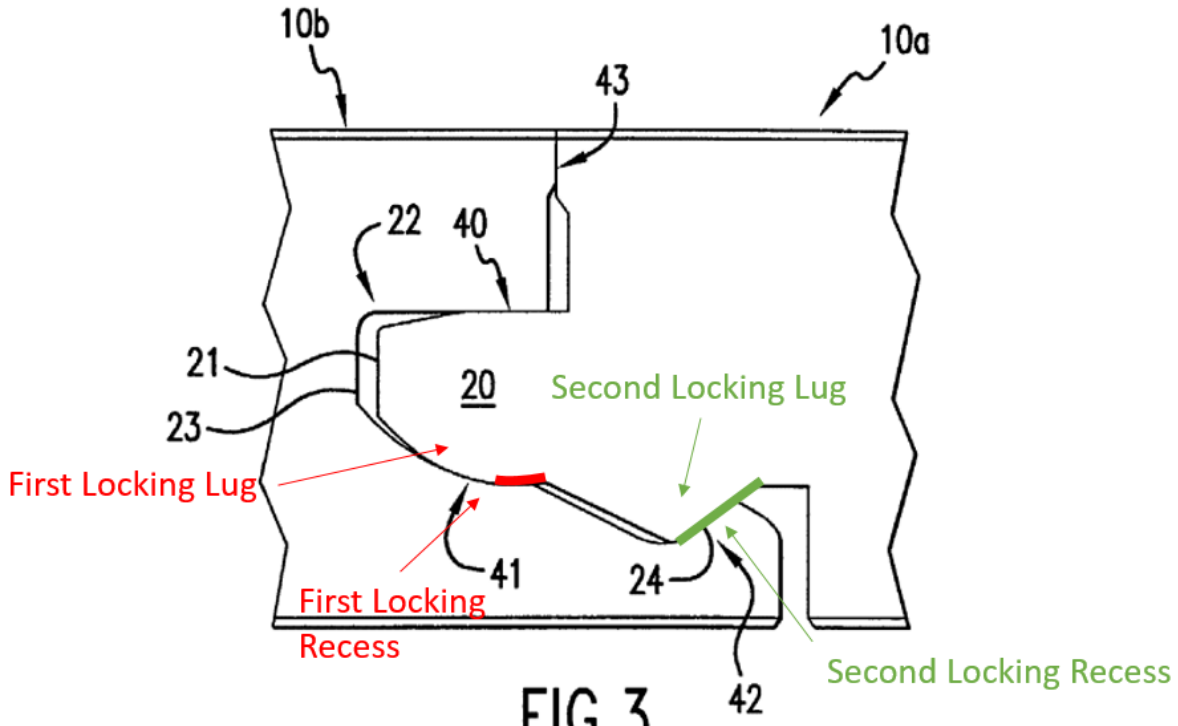
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	Fig. 2 of Miller
1.3 said coupling parts including a groove and a tongue, where the groove is shaped for insertion of the tongue of an adjoining floor panel, said tongue of the adjoining floor panel being shaped for locking engagement with the groove in a direction perpendicular to said sides and parallel to a horizontal floor plane defined by the joined panels,	<i>See</i> col. 3, lines 20-23 of Miller (“Still further, the floor covering panel may be a tongue and groove wooden flooring material”) <i>See</i> col. 2, line 66 – col. 3, line 5 of Miller (“Defined within the first side edge 13 is a first coupling member 20, which includes a protrusion 21 extending therefrom. The second side edge 14 includes a second complementary coupling member 22 defined therein that includes a recess 23 sized and shaped to receive the protrusion 21 of a second one of the floor covering panels therein.”). <i>See</i> col. 5, lines 30-34 of Miller (“This locking structure defined by the rib 30 of panel 10a and the detent 32 of panel 10b prevents substantial separation of the two panels 10a and 10b in a direction perpendicular to the side edges 13,14 of the panels 10a, 10b and parallel to the respective first surfaces 11.”).

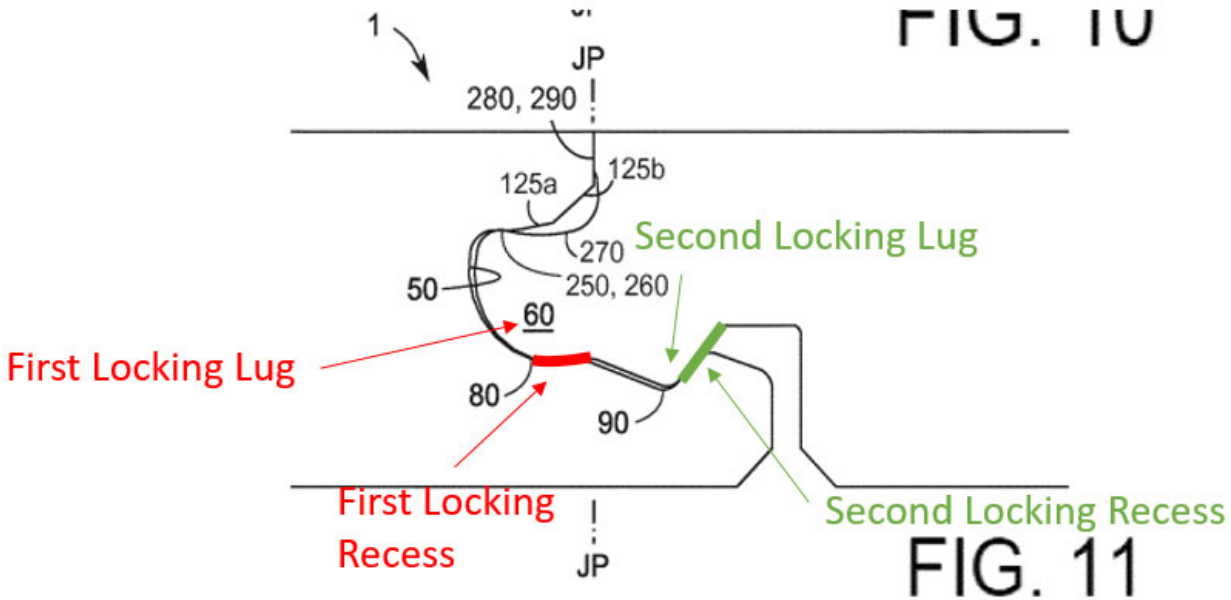
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	 FIG. 3 FIG. 3 of Miller
1.4 said coupling parts exerting a tension force towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts,	<i>See col. 5, lines 27-30 of Miller (“This configuration ensures that the contact force between the adjacent panels 10a, 10b at the contact zone 42 urges the panels together and promotes a tight joint.”)</i> <i>See Col. 1 lines 25-37 (“[a] joining system for floor panels of the described type is known from EP 1 338 721 B1 . . . The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force being delivered by elastic compression of the material of the coupling parts.”)</i> <i>See col. 4, lines 56-59 of Miller (“[One non-limiting example of such a means for adjoining adjacent panels is set forth in U.S. Pat. No. 6,006,486 to Moriau et al. (which is incorporated herein in its entirety by the reference).”)</i>

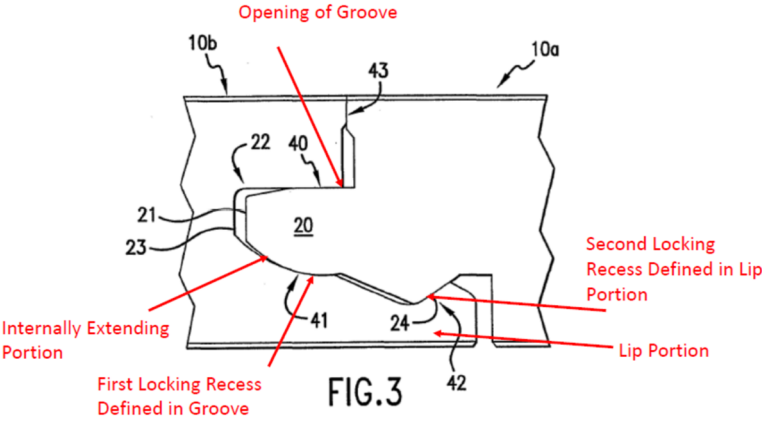
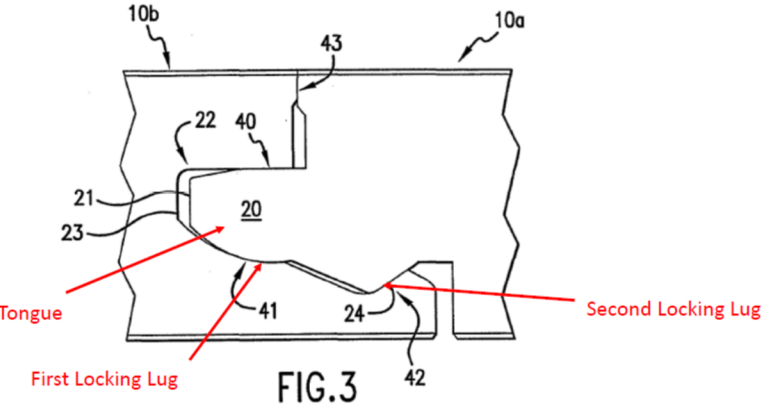
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	EP 1 338 721 B1 (Ex. 1008) is a European equivalent of U.S. Pat. No. 6,006,486, Ex. 1004 (“Moriau”) and is admitted prior art in the ’425 Patent. The ’425 Patent admits that the configuration disclosed in EP 1 338 721 B1 and, thus, Moriau discloses the following: “[t]he locking engagement [of Moriau] is achieved by means of a locking element on the tongue which engages a locking recess or protrusion in a lip portion protruding from an entrance opening of the groove. <i>The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force being delivered by elastic compression of the material of the coupling parts.</i> The joining system according to EP 1 338 721 B1 and its equivalents is a well proven and widely used design which is suitable for most practical floor coverings. The lip portion in this design is arranged to elastically deflect from the plane defined by two adjoining panels when the tongue is inserted into the groove, which allows the two joined panels to flex in relation to each other and thus deviate from the mutual plane if subjected to an external force directed perpendicularly to the individual planes of the panels.” ’425 Patent at column 1, lines 25-46 (emphasis added). Because Moriau discloses this claim feature, Miller also discloses this feature by way of Miller’s incorporation by reference of Moriau. See col. 3, lines 55-67 of Miller (“In one embodiment, the core layer 17 may be formed from medium density or high density fiberboard, such as those marketed by companies including Louisiana Pacific, Georgia Pacific, Temple Inland, and Weyerhaeuser. One fiberboard core material found to produce acceptable results is a high density fiberboard, which is a hardwood/softwood fiber compound compressed at 900-960 kg/m³. Such fiberboard core material is usually available in 4 or 5 feet (1.22 or 1.52 meters) widths and lengths of up to 18 feet (5.49 meters). In other embodiments, core layers 17 constructed of different materials or having different properties may be utilized, including but not limited to other timber-based products, such as plywood, chipboard or particleboard.”)

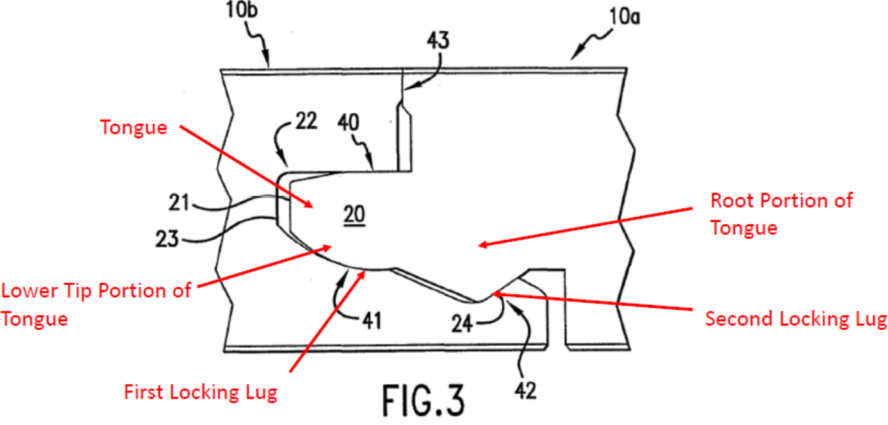
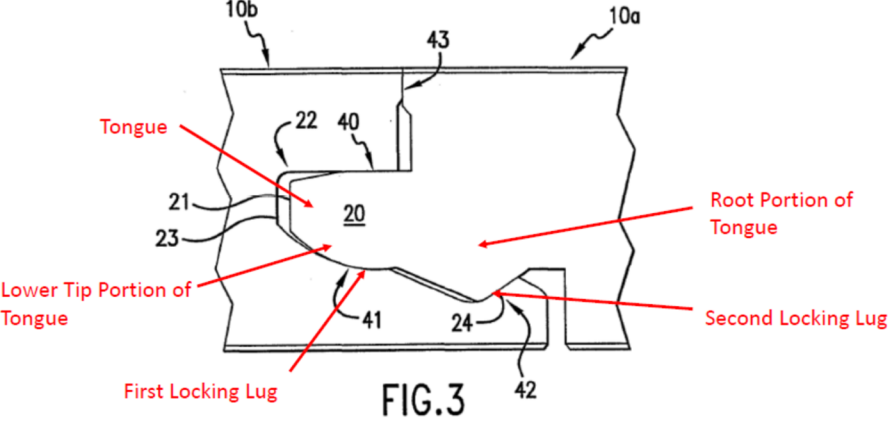
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	<i>See</i> Col. 1 lines 25-37 (““[a] joining system for floor panels of the described type is known from EP 1 338 721 B1 . . . The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force being delivered by elastic compression of the material of the coupling parts.”) Miller specifically discloses that the coupling members 20, 22 are configured to “provide a means for joining two adjacent floor covering panels 10a, 10b together”, but does not suggest the adhesive composition 24 is required for this purpose. <i>Id.</i>, col. 4, lines 54-59. <i>See, e.g.</i> col 4, lines 54-59 of Miller (discussing Moriau without reference to adhesive, and also which does not itself require adhesive.) <i>See</i> Col 9 line 63- col 10 line 67 (describing the tensioning force between coupling parts caused by elastic compression of the material with reference to FIGS. 22-25)
1.5 locking means for locking the tongue of the adjoining floor panel within the groove, wherein the locking means comprises dual consecutive locking recesses arranged in a lower portion of the groove,	<i>See</i> col. 5, lines 15-23 of Miller (“The protrusion 21 of panel 10a contacts the upper lip 33 and the lower lip 31 of panel 10b at zones 40 and 41, respectively. Contact zones 40 and 41 help locate the panels into substantially the same horizontal plane. The rib 30 (Fig. 2) of panel 10a engages the detent 32 of panel 10b at contact zone 42. In this embodiment, the contact zone 42 is substantially planar; however, any contact zone may be formed in any shape depending on the profile desired.”)

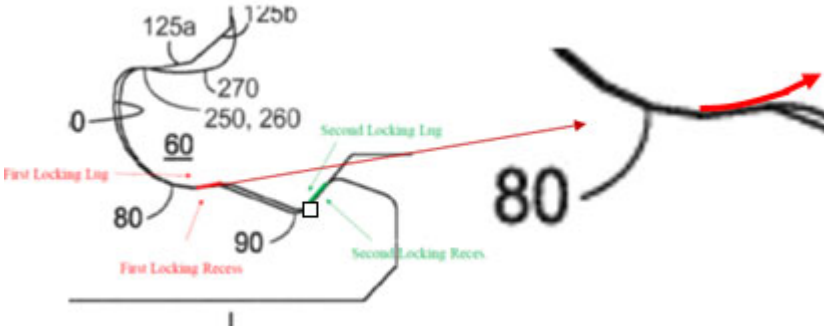
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	 FIG.3 FIG. 3 of Miller

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	 FIG.3 FIG. 3 of Miller

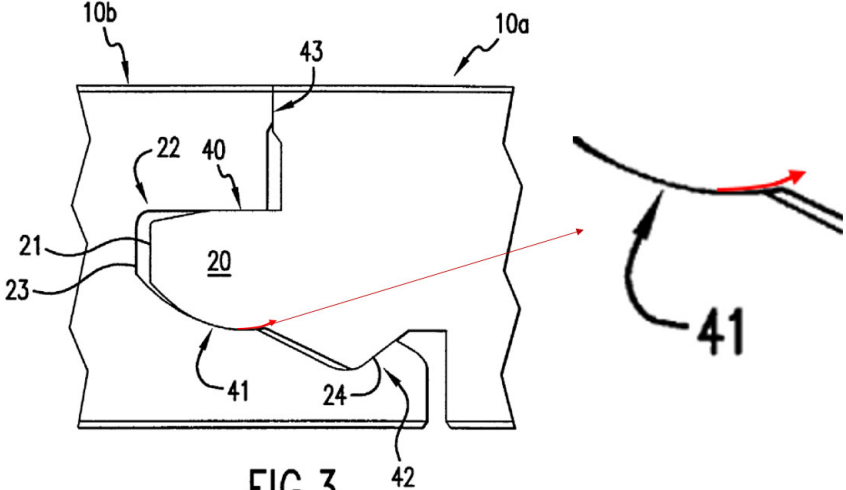
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	 The diagram shows a cross-section of a locking mechanism. A horizontal line at the top is labeled 'JP' and '280, 290'. Below this, a curved line is labeled '125a' and '125b'. A vertical line is labeled '270'. A horizontal line is labeled '250, 260'. A curved line is labeled '50'. A horizontal line is labeled '60'. A curved line is labeled '80'. A horizontal line is labeled '90'. A vertical line is labeled 'JP'. The diagram is labeled 'FIG. 10' at the top right and 'FIG. 11' at the bottom right. Red arrows point to the 'First Locking Lug' and 'First Locking Recess'. Green arrows point to the 'Second Locking Lug' and 'Second Locking Recess'. Annotated FIG. 11 of the '425 Patent This understanding is consistent with the embodiments illustrated in the '425 Patent. <i>See</i> FIG. 11 (illustrating dimensions of a first locking recess and a first locking lug similar to those of FIG. 3 of Miller). As shown above, the first locking recess for Miller is virtually identical to the embodiment of FIG. 11 of the '425 Patent. <i>See also</i> paragraphs 43-48 of this declaration.

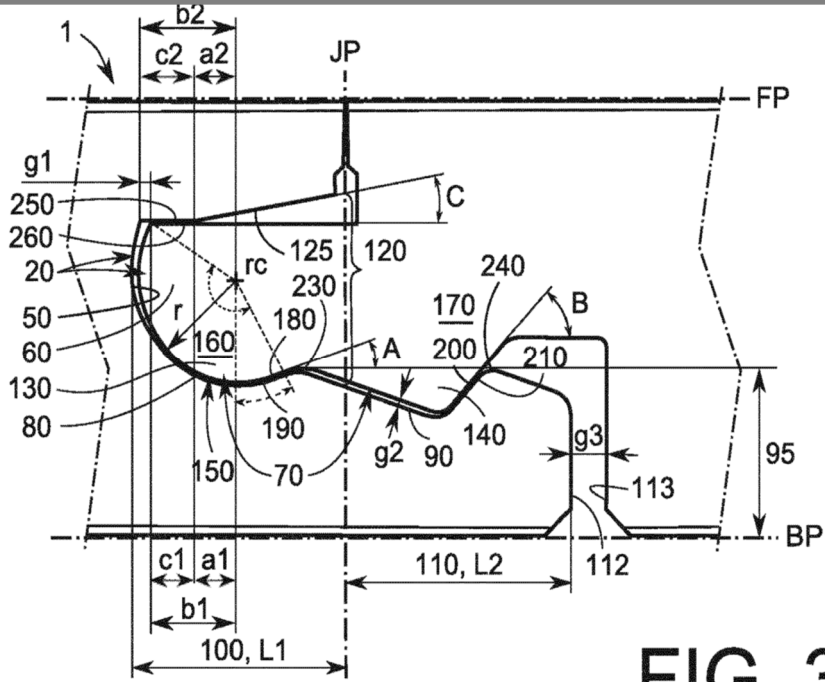
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
1.6 a first locking recess located in an internally extending portion within the groove and a second locking recess located in a lip portion protruding from an entrance opening of the groove,	 FIG. 3 of Miller <i>See also paragraphs 43-48 of this declaration.</i>
1.7 the locking means further comprises dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking	 FIG. 3

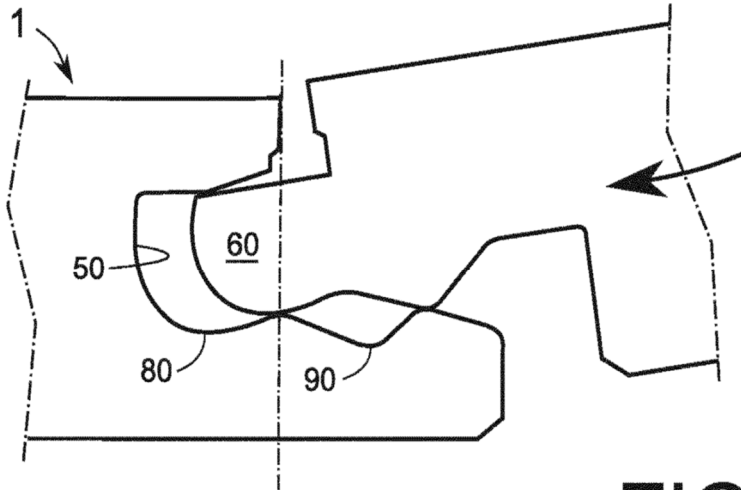
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
engagement in the groove,	FIG. 3 of Miller <i>See also paragraphs 43-48 of this declaration.</i>
1.8 a first locking lug extending downwardly from a lower tip portion of the tongue and a second locking lug extending downwardly from a root portion of the tongue,	 FIG. 3 of Miller
1.9 the first locking recess and the first locking lug are provided with matching curved horizontal locking surfaces and the second locking recess and the second locking lug are provided with matching	 FIG. 3

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	 Annotated FIG. 11 of the ‘425 Patent
Claim 2	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
2. The joining system for floor panels according to claim 1, wherein an intermediate transitional ridge between the first locking lug and the second locking lug is located inside of the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined floor panels.	FIG. 3

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	 FIG.3 FIG. 3 of Miller As demonstrated by the above annotated figures, the intermediate ridge is located inside of the entrance opening. The entrance opening, labeled as “entrance of groove,” above, is located in the main vertical joint plane between the two joined floor panels. This understanding is consistent with the explanation of this feature in reference to FIG. 3 in the ’425 Patent:

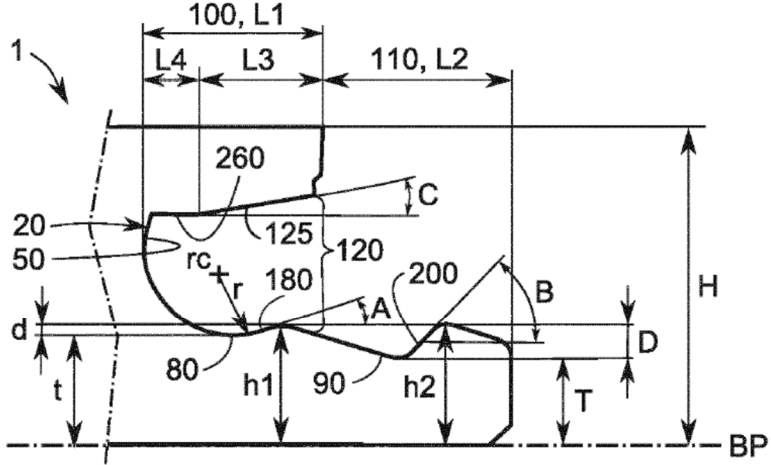
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	 FIG. 3 <i>See '425 Patent at FIG. 3 and col. 5, lines 49-54 ("As is further shown in FIG. 3, an intermediate transitional ridge 230 is located between the first locking lug 130 and the second locking lug 140 inside of the entrance opening 120 of the groove 50. As illustrated in the figure, the entrance opening 120 is more particularly located in a main vertical joint plane JP between two joined floor panels 1.")</i>
Claim 3	
3. The joining system for floor panels according to claim 1, wherein an intermediate	This feature would have been a matter of obvious design choice, and therefore, would have been obvious to a POSITA at the time of the claimed invention as made. The '425 Patent includes a single example wherein the intermediate transitional ridge between the first locking lug and the second locking lug is "aligned with the entrance opening of the groove"

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
transitional ridge between the first locking lug and the second locking lug is aligned with the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined panels.	at FIG. 8 and col. 7, lines 9-19. FIG. 8 and the entirety of the description concerning this embodiment are shown below: "FIG. 8 is a simplified side view of a floor panel 1 demonstrating the profile contours of the tongue 60 according to a second, optional embodiment of the invention. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. In this embodiment, the intermediate transitional ridge 230 between the first locking recess 80 and the second locking recess 90 is aligned with the entrance opening 120 of the groove 50." ²425 Patent, col. 7, lines 9-19.  FIG. 8

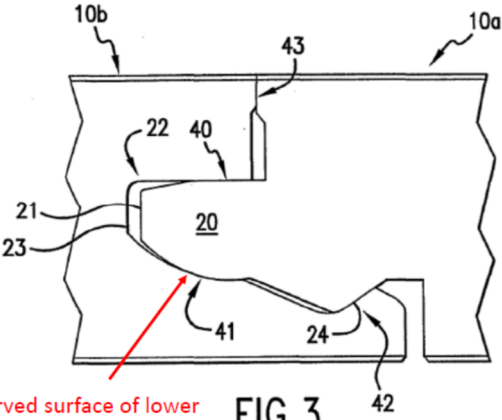
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	The disclosure above and the ’425 Patent in general does not attribute any importance or criticality to the feature that the intermediate transitional ridge is aligned with the entrance opening of the groove. Further, based on my experience and knowledge of flooring panel locking systems, movement of the location of this intermediate ridge in the horizontal direction from just inside the entrance opening to aligned with the entrance opening, and, thus, the joint plane, will have no effect on the locking ability or strength of the construction, provided the tongue and groove are machined in a complementary manner, which of course is necessary to achieve locking of adjacent floor panels. Putting the ridge in line with the entrance opening or inside of it is, thus, simply a matter of design preference. Moreover, in practice, these locking profiles are exceedingly small. Thus, changing the position of certain elements, even for more dramatic changes, results in a change of position that is often, and at most, just a few tenths of a millimeter. Thus, slight movement of the intermediate ridge from just inside the entrance opening to being aligned with the entrance opening would have likely been a movement of less than a tenth of a millimeter and likely just a few hundredths of a millimeter. Any changes to the locking ability or function of the system would have been unnoticeable at the time of the invention of the ’425 Patent. Indeed the changing of position in such a slight manner would likely have been within the manufacturing tolerances of the manufacturing equipment anyway. Manufacturing tolerances are typically set to be 5 hundredths of a millimeter or less. All of this would have been the case at the time of the invention of the ’425 Patent. <i>See, e.g.</i> Ex. 1015 (U.S. Patent No. 7,398,625) at col. 12, lines 13-18 (noting “modern” manufacturing tolerances of ± 0.01 mm and ± 0.1 mm). That positioning the intermediate ridge in line with the entrance opening of the groove would have no appreciable effect on the locking system is consistent with the ’425 Patent itself, which ascribes no criticality, importance or benefit to moving the intermediate ridge from

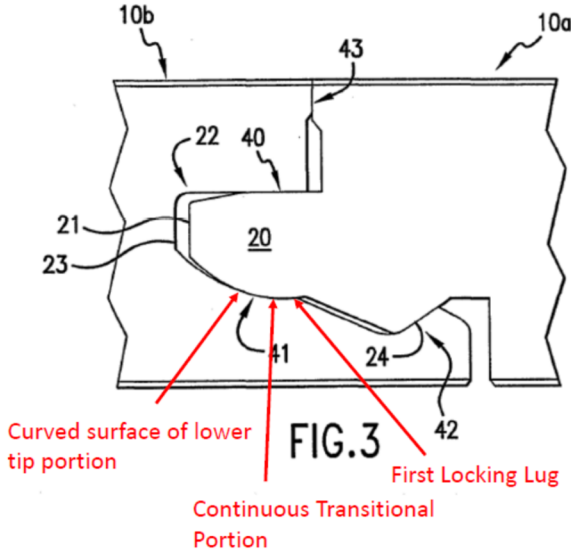
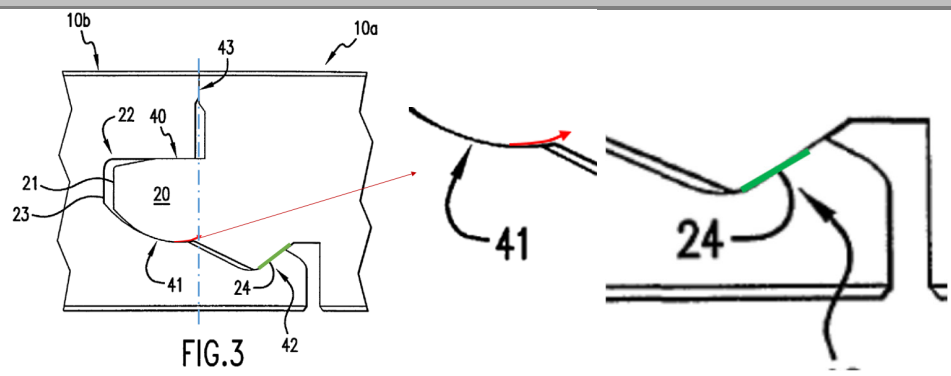
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	inside of the groove entrance opening to aligned with the entrance opening. <i>See</i> above, showing the entirety of the ’425’s disclosure describing the intermediate ridge being aligned with the entrance opening. And even if the changes were minimally noticeable, a POSITA would have been skilled enough, given their experience in the industry to adjust the position slightly to achieve the desired result, namely, acceptable locking of the floor panels. In practice, today and at the time of the invention of ’425 Patent, a POSITA would simply have to have made sure the corresponding locking profiles on a first and second floorboard were shaped in a way to be complementary to each other, which would have very much been within the level of skill of a POSITA at the time of the invention of the ’425 Patent. <i>See, e.g.</i>, Exhibits 1004 -1014 (demonstrating complimentary locking mechanisms); Ex. 1006 (Moriau) (explaining a typical machining process for locking profiles; Ex. 1005 (Roy) (showing same and demonstrating complementary dual consecutive locking lugs and locking recesses, including wherein the “intermediate transitional ridge” has a height equal to or less than that of “inlet ridge” of the second locking recess). Accordingly, a POSITA would have recognized a reasonable expectation of success in modifying Miller to move the intermediate transitional ridge slightly from inside the entrance opening of the groove to being aligned with it. For these reasons, this feature would have been an obvious design choice to a POSITA at the time of the invention of the ’425 Patent.
Claim 4	
4. The joining system for floor panels according to claim 3, the	This feature would have been a matter of obvious design choice, and therefore, would have been obvious to a POSITA at the time of the claimed invention as made. The ’425 Patent includes a single example wherein the intermediate transitional ridge has a height that is

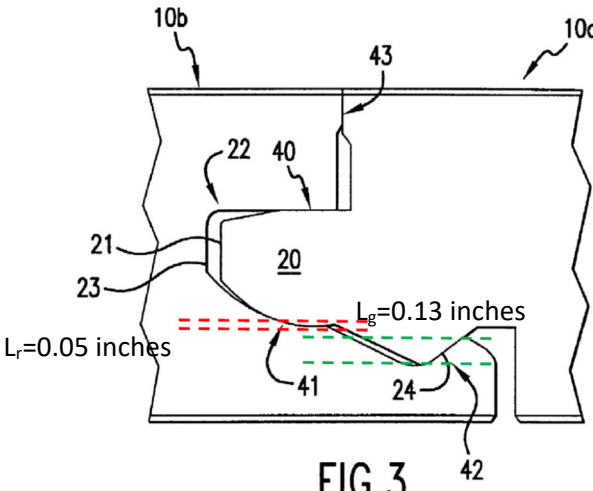
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
intermediate transitional ridge having a height measured from a bottom plane of the floor panel and a corresponding inlet ridge of the second locking recess having a height, the height of the intermediate transitional ridge being equal to or less than the height of an inlet ridge of the second locking recess.	equal to or less than the height of the inlet ridge of the second locking recess. FIG. 4 and the entirety of the description concerning this embodiment are shown below: “FIG. 4 is a simplified side view of a floor panel demonstrating the profile contours of the groove according to the first embodiment of the invention as previously shown in FIGS. 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. As shown in the figure, the first locking recess 80 is shallower than the second locking recess 90. In the shown embodiment, the depth d of the first locking recess 90 is less than half of the depth D of the second locking recess 90. Furthermore, the height h1 of the intermediate transitional ridge 230 measured from a bottom plane BP of the floor panel 1 is equal to or less than the corresponding height h2 of a corresponding inlet ridge 240 of the second locking recess 90. The minimum thickness t between the first locking recess 80 and a bottom plane BP of the of the floor panel 1 exceeds a third of the total height H of the floor panel 1.”

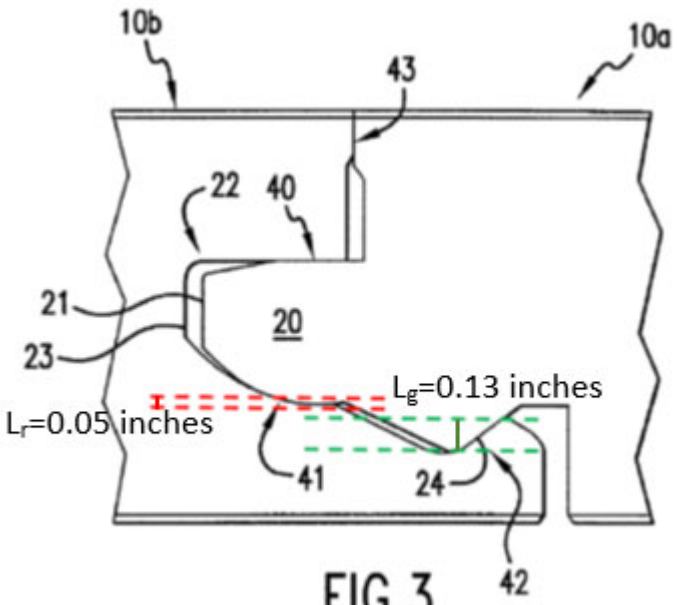
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	 FIG. 4 The disclosure above and the '425 Patent in general do not attribute any importance or criticality to the feature that the intermediate transitional ridge height is the same or less than the height of the inlet ridge of the second locking recess. Further, based on my experience and knowledge of flooring panel locking systems, I am not aware of any effects caused by adjusting the two heights h1, h2 shown above in FIG. 4, such that h1 (the intermediate transitional ridge height) is "equal to or less than" h2 (the inlet ridge of the second locking recess height). Adjusting these heights in this way would not have any significant, if any, effect on the locking characteristics or performance of the locking system. This is simply a matter of design choice or preference. A POSITA would simply have to have made sure the corresponding locking lugs were shaped in a way to be complementary

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	to the resulting locking recesses, which would have very much been within the level of skill of a POSITA at the time of the invention of the '425 Patent because the basic requirement of a locking profile is that the tongue and groove sides of a locking profile must be complementary to each other so that they actually “lock” adjoining panels together. <i>See, e.g.</i>, Exhibits 1004-1014 (demonstrating complimentary locking mechanisms); Ex. 1006 (Moriau) (explaining a typical machining process for locking profiles; Ex. 1005 (Roy) (showing same and demonstrating complementary dual consecutive locking lugs and locking recesses, including wherein the “intermediate transitional ridge” has a height equal to or less than that of “inlet ridge” of the second locking recess). Accordingly, a POSITA would have recognized a reasonable expectation of success in doing so. Moreover, in practice, as explained above with respect to claim 3, these locking profiles are exceedingly small. Thus, changing the position of certain elements, even for more dramatic changes, results in a change of position that is often, and at most, just a few tenths of a millimeter. Thus, a change of height of either the intermediate transitional ridge or inlet ridge of the second locking recess of Miller such that the intermediate transitional ridge of Miller would have a height equal to that of the second recess inlet ridge would have been merely a few hundredths of a millimeter. Any changes to the locking ability or function of the system would have been insignificant and unnoticeable at the time of the invention of the '425 Patent. Changing the heights of the ridges in this manner would have been within the manufacturing tolerances of the manufacturing equipment anyway. Manufacturing tolerances are typically set to be five hundredths of a millimeter or less. <i>See, e.g.</i> Ex. 1015 (U.S. Patent No. 7,398,625) at col. 12, lines 13-18 (noting “modern” manufacturing tolerances of ± 0.01 mm and ± 0.1 mm).
Claim 5	

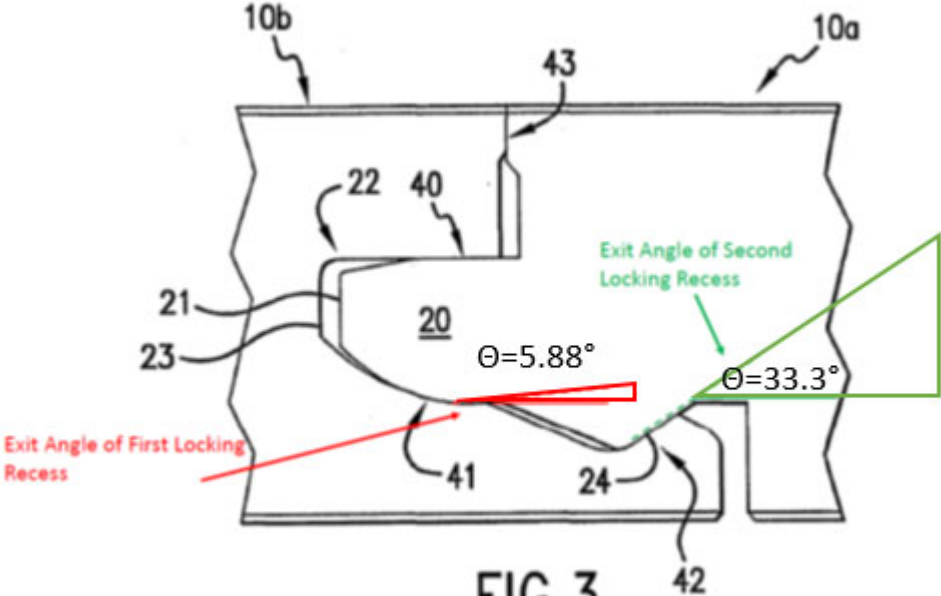
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
5. The joining system for floor panels according to claim 1, wherein the lower tip portion of the tongue is curved.	 FIG. 3 FIG. 3 of Miller
Claim 6	

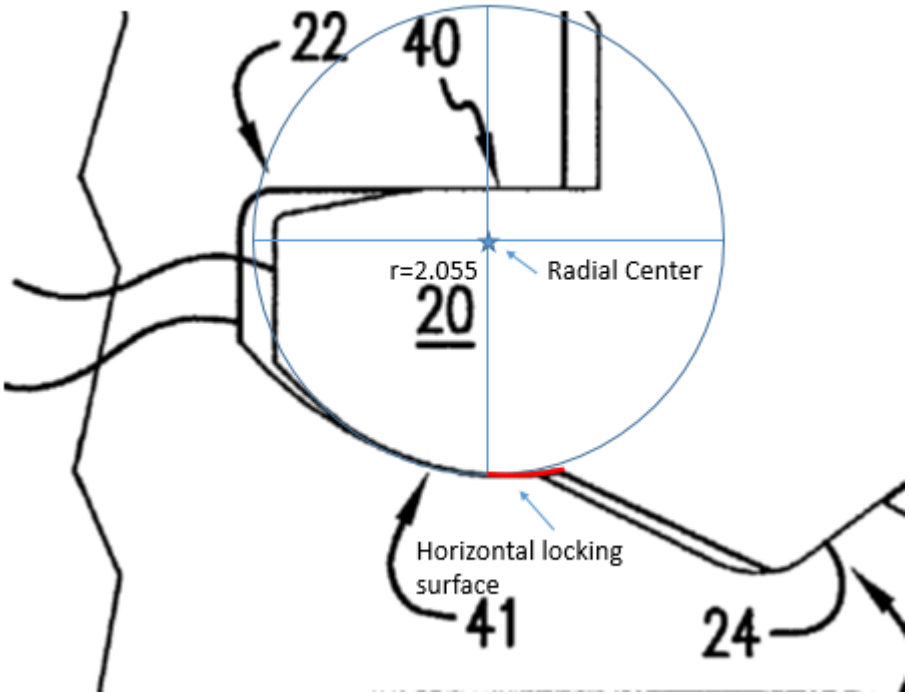
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
6. The joining system for floor panels according to claim 5, wherein the curvature of the curved lower tip portion of the tongue merges continuously with a corresponding curvature of the horizontal locking surface of the first locking lug.	 FIG. 3 of Miller
7. The joining system for floor panels according to claim 1, wherein the first locking recess is shallower than the second locking recess.	 FIG. 3

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	The angle of the red highlighted surface of the first locking lug is shallower than the angle of the green highlighted surface of the second locking lug. Additionally, measurements also show that the first locking recess is shallower than the second locking recess:  FIG.3 L_r (for “red”) is the depth of the first locking recess, and L_g (for “green”) is the depth of the second locking recess.
Claim 8	
8. The joining system for floor panels according to claim 1, wherein the first locking	As highlighted in the annotated FIG. 3 of Miller provided below, the depth of the first (red) locking recess, represented by L_r is less than half of the depth of the second (green) locking recess, Represented by L_g. In the image below, L_r is 0.05 inches and L_g is 0.13 inches.

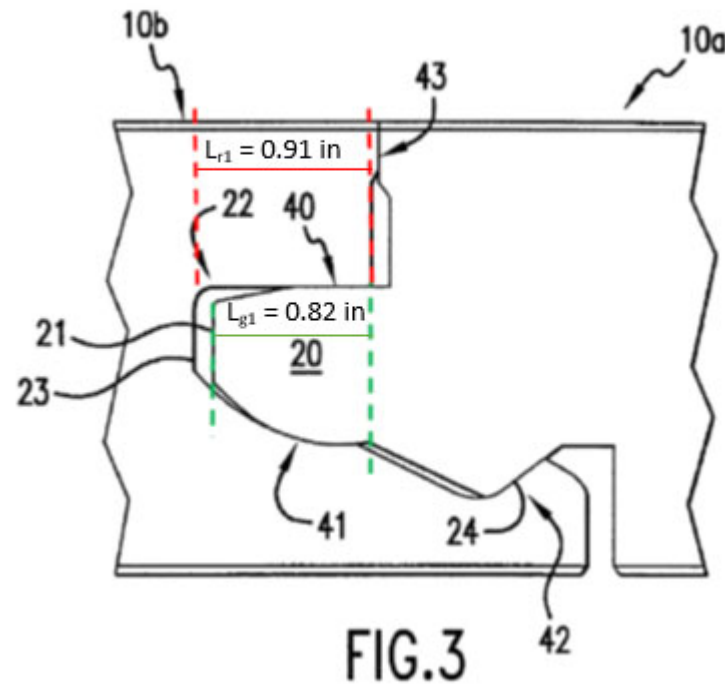
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
recess extends downwardly to a depth and the second locking recess extends downwardly to a depth, the depth of the first locking recess is less than half of the depth of the second locking recess.	 FIG.3 Annotated FIG. 3 of Miller

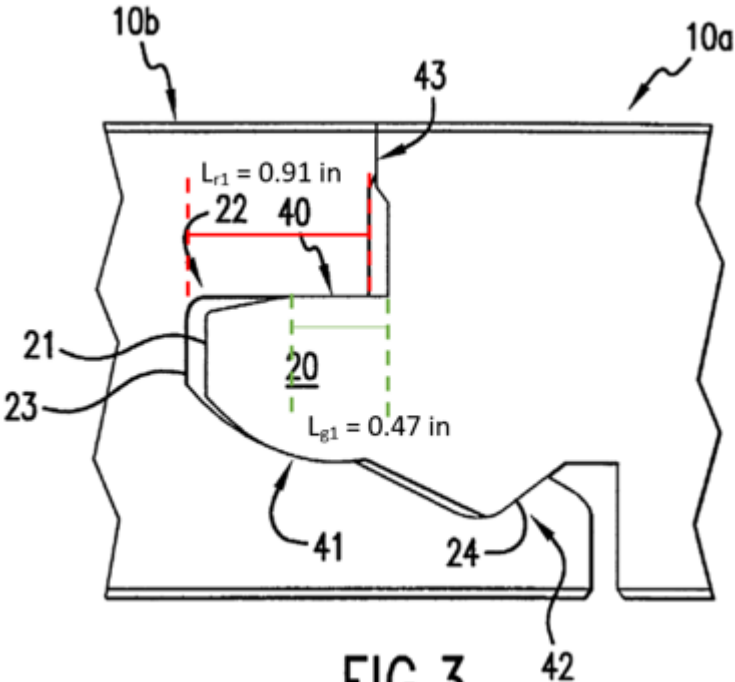
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
Claim 9	
9. The joining system for floor panels according to claim 1, wherein an exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is less than the inclined locking angle of the second locking recess.	FIG. 3 FIG. 3 of Miller As demonstrated above, the angle of exit tangent of the curved horizontal locking surface is less than that of the inclined locking surface of the second locking recess

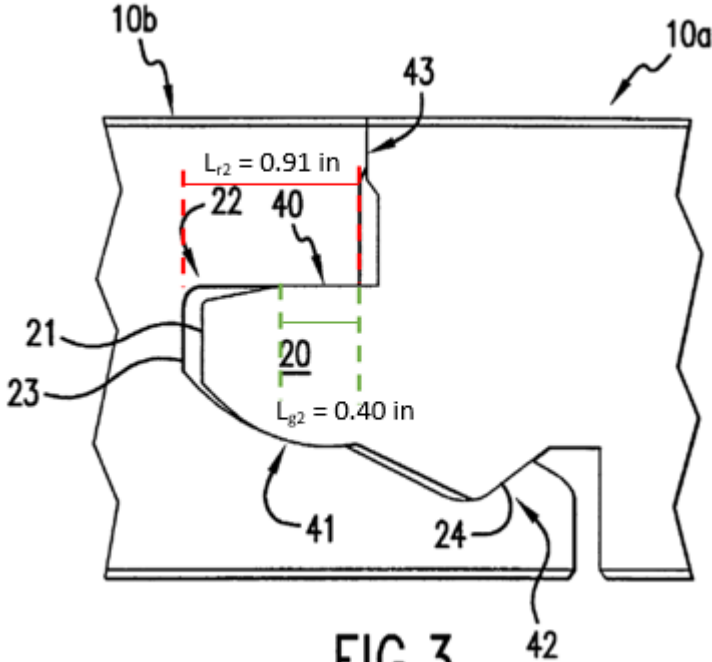
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
Claim 10	
10. The joining system for floor panels according to claim 9, wherein said exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is equal to or less than half the inclined locking angle of the second locking recess.	 FIG. 3 FIG. 3 of Miller The red exit angle for the first locking recess is less than half of the green exit angle for the second locking recess. the exit tangent inclination angle of the first locking recess is 5.88° (width =0.68 inches, height = 0.07 inches), whereas the exit angle of the second locking recess is 33.3° (width = 1.02 inches, height = 0.67 inches). To find the exit tangent inclination angle of the first locking recess a line tangent to the center point of the arc that makes up the first locking recess was drawn and the angle of that line was measured from the horizontal.
Claim 11	

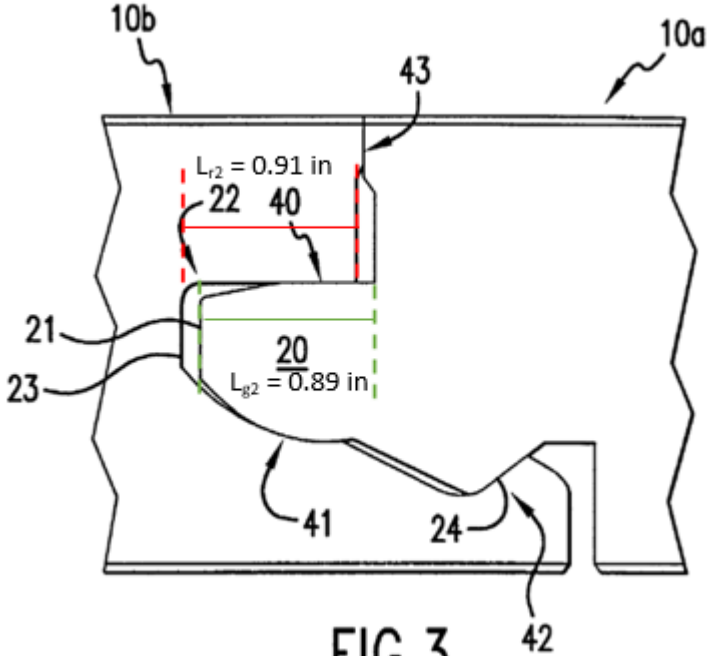
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
11. The joining system for floor panels according to claim 1, wherein the curved horizontal locking surface extends from a point located essentially directly below a radial center of the curved first locking recess in a direction towards the second locking recess.	 FIG. 3 of Miller See explanation of my radial measurement at page 138-39 below.
Claim 12 12. The joining system for floor panels according to claim 1, wherein the of tongue includes a vertical locking surface	As shown below, Miller discloses that the length of the vertical locking surface of tongue is less than the vertical locking surface of the groove:

having a length and the groove includes a vertical locking surface having a length, the vertical locking surface of the tongue being less than the length of the vertical locking surface of the groove.



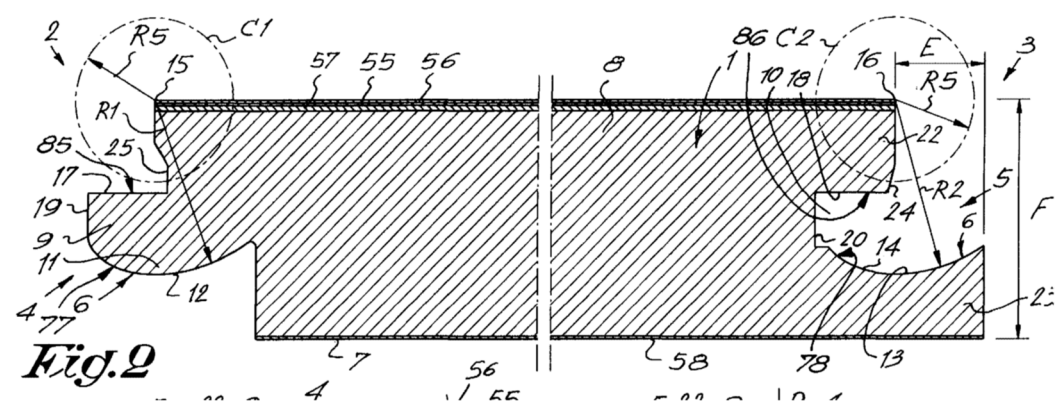
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	 FIG. 3

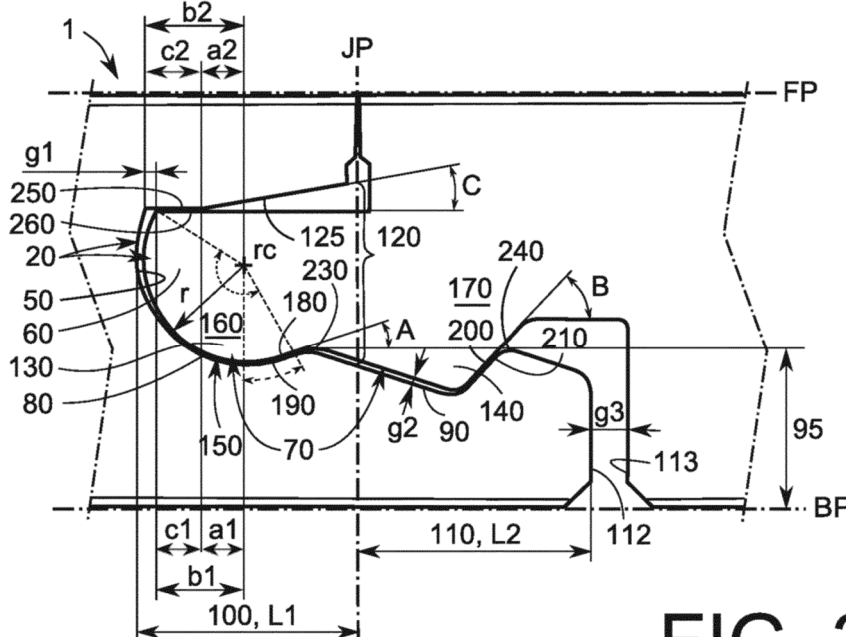
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	 FIG.3

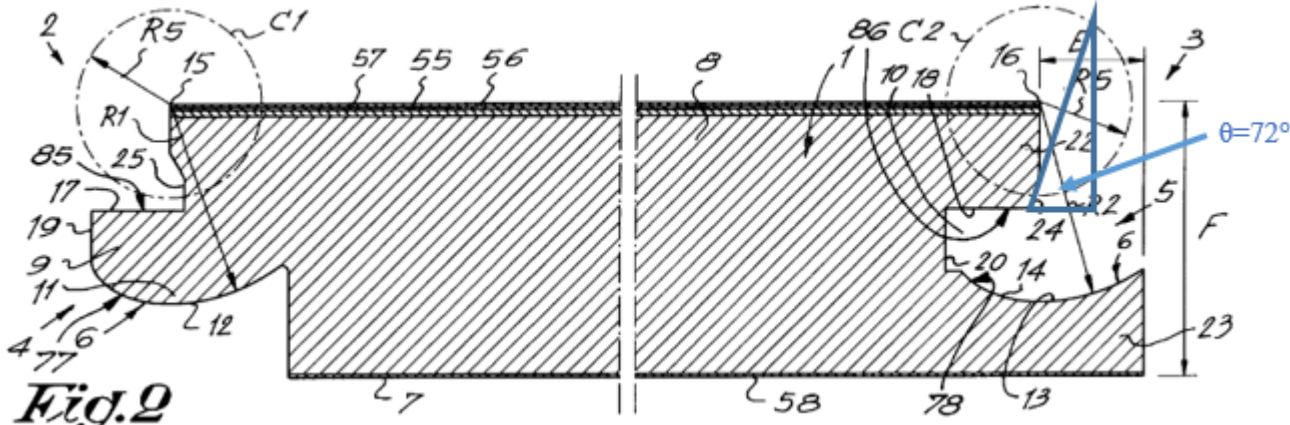
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	 FIG. 3 FIG. 3 of Miller The green highlighted vertical locking surface of the tongue is less than the red highlighted vertical locking surface of the groove, under any interpretation of the lengths of the vertical lockings surfaces of groove and tongue, respectively. However, I note that the highlighted measurements in the third (second to last) annotated FIG. 3 of Miller corresponds most closely to the “vertical locking surfaces” measurements described in the ’425 Patent. See ’425 Patent at col. 6, lines 26-28 (The length c1 of a vertical locking surface 250 of the tongue 60 is less than the corresponding length c2 of a matching vertical locking surface 260 of the groove”); FIG. 3:

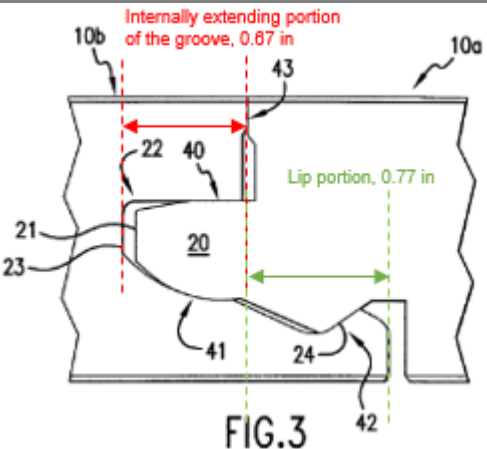
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
a bottom plane of the floor panel exceeds a third of the total height of the floor panel.	between the first locking recess and a bottom plane of the floor panel exceeds a third of the total height of the floor panel. To the extent that the patentee argues that the language in the ‘425 patent describing that “[a thicker and more robust lower portion of the groove] is important for floor panels made of inherently brittle and less dense materials,” the benefits of thickness were well known in the art at the time of patenting. Both Miller and Moriau (which is incorporated by reference here) attribute additional volume or “thickness” to added strength. <i>See</i>, Miller, at col. 3, lines 44-47 (“Additionally, the backing layer 16 may improve the structural integrity of the floor panel 10 by increasing overall thickness and reducing the warp and wear tendencies of the uncoated core material.”); <i>see also</i>, Moriau, at col. 8, lines 28-37 (“In order to allow for a smooth assembly, to guarantee the necessary stability and firmness and in order to limit the quantity of material to be cut away, the difference E between the distally outer edge of the upper lip 22-42 and the distally outer edge of the lower lip 23-43, measured in the plane of the floor panel and perpendicular to the longitudinal direction of the groove 10, should preferably be kept smaller than one time the total thickness F of the floor panel 1. For stability's sake, normally this total thickness F shall never be less than 5 mm.”) Thus, prior to the invention of the ‘425 Patent, the relationship between thickness of a floor panel or associated element and the strength/stability of that floor board or particular element was well known in the art. Thus, a POSITA would have been motivated to maximize the thickness between the minimum thickness of the locking recess and the bottom plane of the floor panel such that it was larger than at least a third of the total height of the floor panel in order to increase the strength of the lower portion of the groove. A POSITA also would have had a reasonable expectation of success in doing so given that it was well known how to machine these locking profiles. <i>See</i> discussion relating to manufacturing processing in connection with claims 3 and 4, above.

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	Additionally, based on my experience and knowledge of flooring panel locking systems, I am not aware of any effects caused by adjusting the height of locking recess to be, in particular, greater than one third of the total height of the floor panel. Thus, the minimum thickness between the first locking recess and a bottom plane of the floor panel exceeding a third of the total height of the floor panel is merely a design choice. While thickness of the first recess, and thus, the lower portion of the groove, in general, can impact the strength or stability of the lower groove portion, the minimum thickness of the first locking recess being greater than at least a third of the total height of the floor panel does not provide any unique or particular advantage other than the known principle that increased thickness will increase strength. Further, demonstrating that this feature is not critical and is an obvious design choice is the fact that no figure in the ‘425 patent shows the claimed ratio exceeding one third. Upon measuring t and H as shown in Fig. 4, t does not exceed a third of H. In the annotated figure shown below t is 0.6 inches and 1.80 inches. Exactly a 1 to 3 ratio.

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
the groove includes an introduction angle, the introduction angle of the groove being equal to or greater than 10 degrees.	4, as a result of which the subsequent floor panels 1 can easily be pushed and guided into each other, such that no possible ridges in the subflooring or such render good insertion difficult." Ex. 1006 at col. 6, lines 29-35. <i>See also</i> FIGS. 2-4 of Moriau.  Fig. 2 As shown above in FIG. 2 of Moriau, a chamfer 24 is located at the entrance opening of the groove. The '425 Patent discloses that "[i]n order to ensure an easy access for the tongue during the joining procedure, the introduction angle C of the groove 50 is equal to or greater than 10 degrees. Said introduction angle C is defined as the inclination of an inclined introduction guiding chamfer 125, as illustrated in FIG. 3." '425 Patent at col. 5, lines 61-65, FIG. 3.

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	 FIG. 3 Thus, like the '425 Patent, Moriau (and therefore Miller) discloses a chamfer at the entrance opening of the groove to make introduction of the tongue into the groove and thus connection of adjacent floor panels easier. Because the '425 Patent defines the angle of introduction to be the angle of inclination of a guiding chamfer, the angle of introduction of Moriau and, thus, Miller, would likewise be equal to chamfer 24 of Moriau, FIG. 2. As Moriau and Miller were published well before the time the invention of the '425 patent, this feature of the '425 would have been known to those skilled in the art at that time. As shown in the below annoated FIG. 2 of Moriau, the angle of the chamfer and thus the introduction angle of the groove is 72°, which is of course greater than 10 degrees. It

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	would have been obvious to a POSITA to include this introduction angle in the embodiment of Miller, FIGS. 2-3 given that Moriau is a part of the disclosure of Miller, and Moriau notes that the chamfer, which creates the introduction angle, <i>see</i> 425 Patent at col. 5, lines 61-65, makes engagement of adjacent floor panels (and thus of the tongue and groove) easier. Thus, a POSITA would have recognized a suggestion and been motivated to modify FIGS. 2-3 of Miller to have an introduction angle of greater than 10 degrees.  Annotated Fig. 2 of Moriau The POSITA also would have recognized a reasonable expectation of success given that such introduction angles were already known in the art. Even if the Board does not agree with the '425 Patent's definition of “angle of introduction” being defined by a guiding chamfer, FIG. 3 of Moriau nevertheless demonstrates a tongue being inserted into a groove at an angle of greater than 10 degrees. <i>See</i> the annotated FIG. 3 of Moriau below:

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ²
	fall within the scope of the present invention. As a further example, a tongue and groove profile in which substantially full contact is maintained along the entire mating edges of the panels is also contemplated as being within the scope of the invention." <i>See also</i>, Moriau at col. 10, lines 17-37; col. 12, lines 40-44; col. 13, lines 39-50, Teaching that its tensioning/locking/compression force features can be combined with other locking mechanisms. For these reasons, this feature would have been an obvious modification for a POSITA of the primary embodiment (FIGS. 2-3) of Miller in view of the embodiments of FIGS. 2-4 of Moriau at the time of the invention of the '425 Patent.
Claim 15	
15. The joining system for floor panels according to claim 1, wherein the length of the internally extending portion within the groove is less than the length of the lip portion protruding from an entrance opening of the groove.	 FIG. 3 of Miller

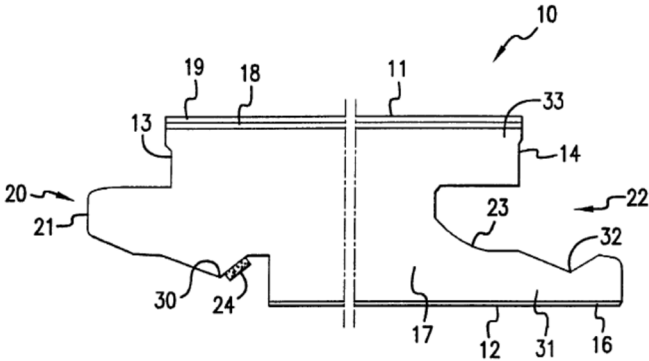
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ²
	The red highlighted dimension of the internally extending portion of the groove (0.67 in) is less than the green highlighted dimension of the lip portion protruding from the entrance opening of the groove (0.77in).

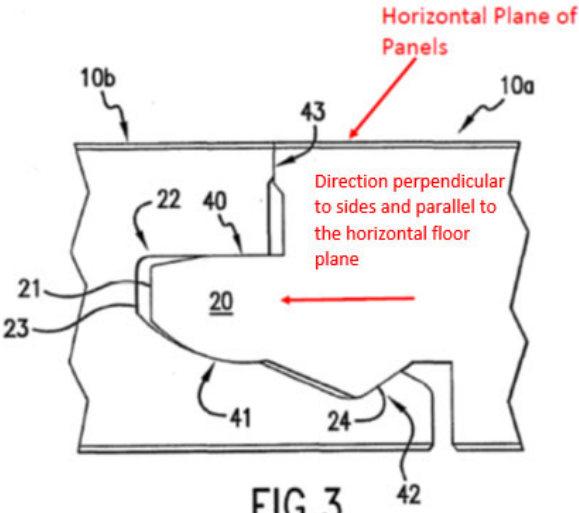
CHART 2

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
Claim 1		
1.1 A joining system for floor panels,	See Abstract ("The invention provides a new floor covering panel (10) and floor covering system...."). Fig. 2 of Miller shows a first coupling member 20, defined within the first side edge 13. The first coupling member 20 includes a protrusion 21 extending therefrom. The second side edge 14 includes a second complementary coupling member 22 defined therein that includes a recess 23 sized and shaped to receive the protrusion 21 of a second one of the floor covering panels therein. Miller at col. 2, line 66-col. 3, line 5.	
1.2 said floor panels comprising coupling parts on at least two	See Abstract ("... the floor covering panels (10) include first and second generally planar surfaces (11, 12), first and second side edges (13, 14) containing first and second	

³ Miller was made public on February 19, 2004, which is more than one year prior to May 4, 2018, the earliest priority date of United States Patent No. 11,421,425. Accordingly, Miller qualifies as prior art under 35 U.S.C. §102(a)(1).

⁴ Roy was made public on April 17, 2001, which is more than one year prior to May 4, 2018, the earliest priority date of United States Patent No. 11,421,425. Accordingly, Roy qualifies as prior art under 35 U.S.C. §102(a)(1).

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
opposite sides for joining floor panel together,	complementary coupling members (20, 22); respectively. . . .”)  Fig. 2 of Miller	
1.3 said coupling parts including a groove and a tongue, where the groove is shaped for insertion of the tongue of an adjoining floor panel, said tongue of the adjoining floor	<i>See</i> col. 3, lines 20-23 of Miller (“Still further, the floor covering panel may be a tongue and groove wooden flooring material”) <i>See</i> col. 2, line 66 – col. 3, line 5 of Miller (“Defined within the first side edge 13 is a first coupling member 20, which includes a protrusion 21 extending therefrom. The second side edge 14 includes a second complementary coupling member 22 defined therein that includes a recess 23 sized and shaped to receive the protrusion 21 of a second one of the floor covering panels therein.”).	

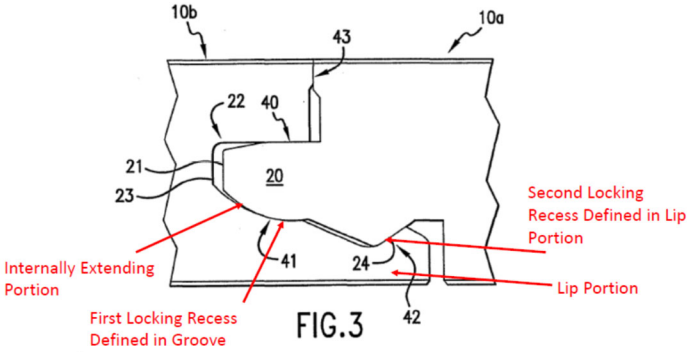
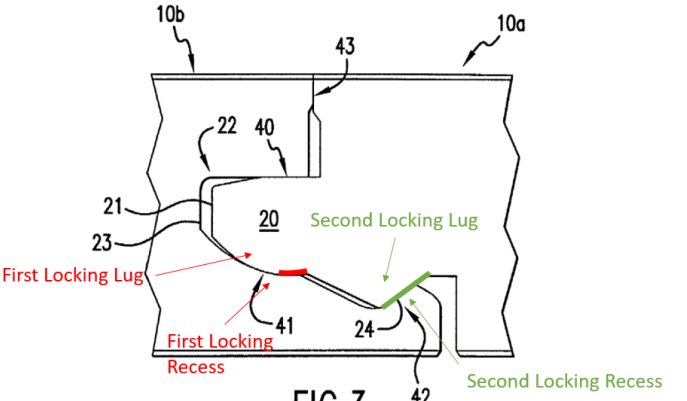
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
panel being shaped for locking engagement with the groove in a direction perpendicular to said sides and parallel to a horizontal floor plane defined by the joined panels,	See col. 5, lines 30-34 of Miller (“This locking structure defined by the rib 30 of panel 10a and the detent 32 of panel 10b prevents substantial separation of the two panels 10a and 10b in a direction perpendicular to the side edges 13,14 of the panels 10a, 10b and parallel to the respective first surfaces 11.”).  FIG. 3 of Miller	
1.4 said coupling parts exerting a tension force	See col. 5, lines 27-30 of Miller (“This configuration ensures that the contact force between the adjacent panels 10a, 10b at the	

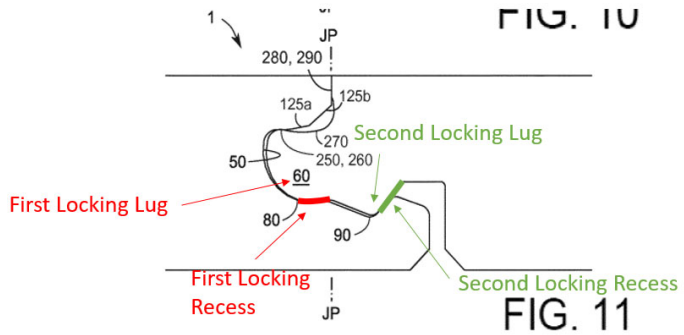
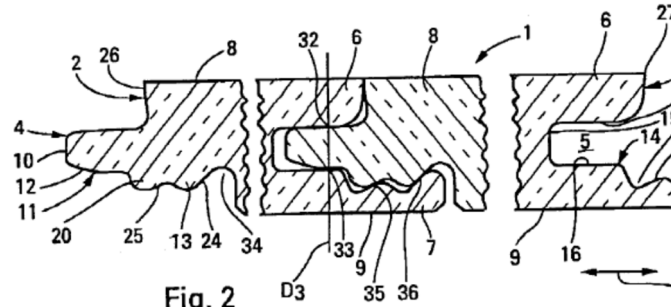
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
towards each other in a mutually engaged position, the tension force being achieved by elastic compression of the material of the coupling parts,	contact zone 42 urges the panels together and promotes a tight joint.”) <i>See</i> Col. 1 lines 25-37 (““[a] joining system for floor panels of the described type is known from EP 1 338 721 B1 . . . The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force being delivered by elastic compression of the material of the coupling parts.”) <i>See</i> col. 4, lines 56-59 of Miller (“[One non-limiting example of such a means for adjoining adjacent panels is set forth in U.S. Pat. No. 6,006,486 to Moriau et al. (which is incorporated herein in its entirety by the reference).”) EP 1 338 721 B1 (Ex. 1008) is a European equivalent of U.S. Pat. No. 6,006,486, Ex. 1004 (“Moriau”) and is admitted prior art in the ’425 Patent. The ’425 Patent admits that the configuration disclosed in EP 1 338 721 B1 and, thus, Moriau discloses the following: “[t]he locking engagement [of Moriau] is achieved by means of a locking element on the	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	tongue which engages a locking recess or protrusion in a lip portion protruding from an entrance opening of the groove. <i>The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force being delivered by elastic compression of the material of the coupling parts.</i> The joining system according to EP 1 338 721 B1 and its equivalents is a well proven and widely used design which is suitable for most practical floor coverings. The lip portion in this design is arranged to elastically deflect from the plane defined by two adjoining panels when the tongue is inserted into the groove, which allows the two joined panels to flex in relation to each other and thus deviate from the mutual plane if subjected to an external force directed perpendicularly to the individual planes of the panels.” ’425 Patent at column 1, lines 25-46 (emphasis added). Because Moriau discloses this claim feature, Miller also discloses this feature by way of Miller’s incorporation by reference of Moriau.	

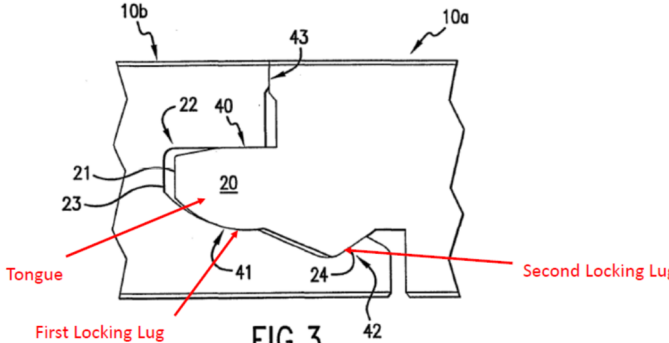
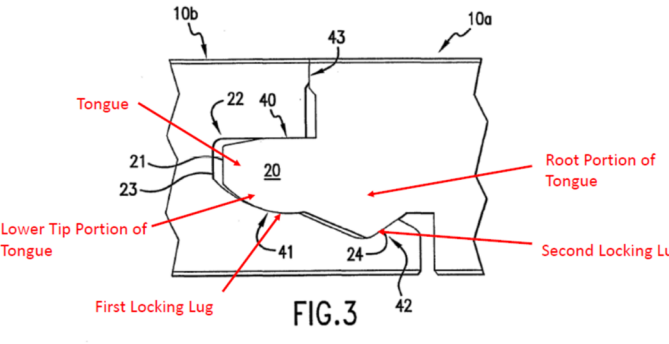
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	<i>See</i> col. 3, lines 55-67 of Miller (“In one embodiment, the core layer 17 may be formed from medium density or high density fiberboard, such as those marketed by companies including Louisiana Pacific, Georgia Pacific, Temple Inland, and Weyerhaeuser. One fiberboard core material found to produce acceptable results is a high density fiberboard, which is a hardwood/softwood fiber compound compressed at 900-960 kg/m³. Such fiberboard core material is usually available in 4 or 5 feet (1.22 or 1.52 meters) widths and lengths of up to 18 feet (5.49 meters). In other embodiments, core layers 17 constructed of different materials or having different properties may be utilized, including but not limited to other timber-based products, such as plywood, chipboard or particleboard.”) <i>See</i> Col. 1 lines 25-37 (“ “[a] joining system for floor panels of the described type is known from EP 1 338 721 B1 . . . The coupling parts exert a tension force towards each other in a mutually engaged position, the tension force	

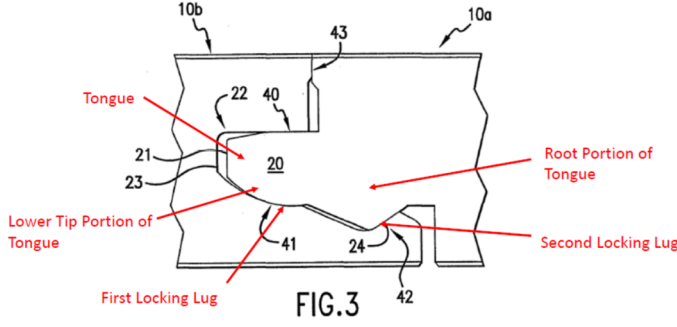
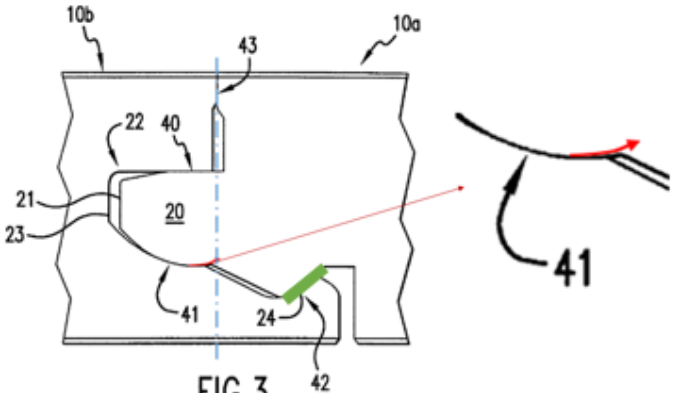
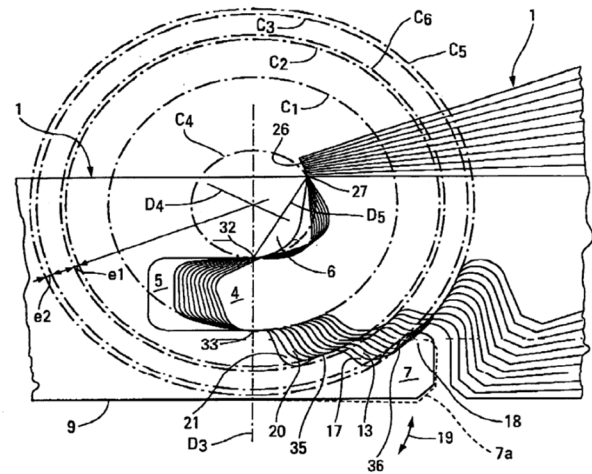
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
	being delivered by elastic compression of the material of the coupling parts.”) Miller specifically discloses that the coupling members 20, 22 are configured to “provide a means for joining two adjacent floor covering panels 10a, 10b together”, but does not suggest the adhesive composition 24 is required for this purpose. <i>Id.</i>, col. 4, lines 54-59. <i>See, e.g.</i> col 4, lines 54-59 of Miller (discussing Moriau without reference to adhesive, and also which does not itself require adhesive.) <i>See</i> Col 9 line 63- col 10 line 67 (describing the tensioning force between coupling parts caused by elastic compression of the material with reference to FIGS. 22-25)	
1.5 locking means for locking the tongue of the adjoining floor panel within the groove, wherein the locking means	<i>See</i> col. 5, lines 15-23 of Miller (“The protrusion 21 of panel 10a contacts the upper lip 33 and the lower lip 31 of panel 10b at zones 40 and 41, respectively. Contact zones 40 and 41 help locate the panels into substantially the same horizontal plane. The rib 30 (Fig. 2) of panel 10a engages the detent 32 of panel 10b at contact zone 42. In this embodiment, the contact zone 42 is substantially planar;	<i>See</i> col. 3, lines 23-31 of Roy (“In cross section the tongue 4 has, starting from its free end 10 and on its bottom face 11, a substantially circular first section 12 followed by a downwardly projecting raised portion 13. The bottom lip 7 has on its top face 14, starting from the back 15 of the groove 5, a first section 16 on which the first section 12 of the tongue 4 rolls and slides followed by a recess 17

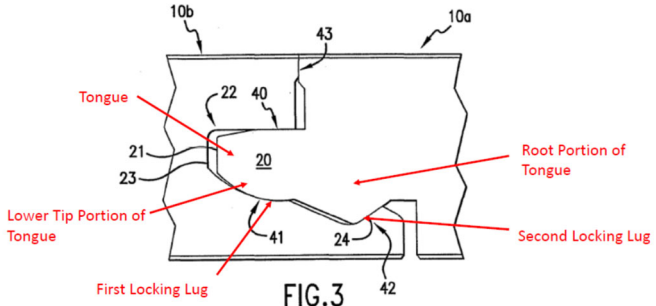
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
comprises dual consecutive locking recesses arranged in a lower portion of the groove,	however, any contact zone may be formed in any shape depending on the profile desired.")  FIG. 3 of Miller  FIG. 3 of Miller	complementary to the raised portion 13 of the tongue 4 followed by a bead 18 delimiting the recess 17.") <i>See</i> col. 3, lines 37-45 of Roy ("[T]he tongue 4 has on its bottom face 11 and the bottom lip 7 of the groove 5 has on its top face 14, respectively, a second raised portion 20 projecting downward in the direction D2 and a complementary second recess 21 shaped so that the second raised portion 20 of the tongue 4 of a panel 1 interengages with the second recess 21 of the groove 5 of an adjacent panel when one panel 1 is turned relative to the other, so as to form a second means of clipping the tongue 4 into the groove 5.") <i>See</i> col. 3, lines 46-55 of Roy ("The FIGS. show that the second raised portion 20 is between the section 12 and the first raised portion 13 on the bottom face 11 of the tongue 4. The transition between the section 12 and the raised portion 20 is at a point of inflection 32, as explained hereinafter, the plane tangential at this point 32 to the bottom

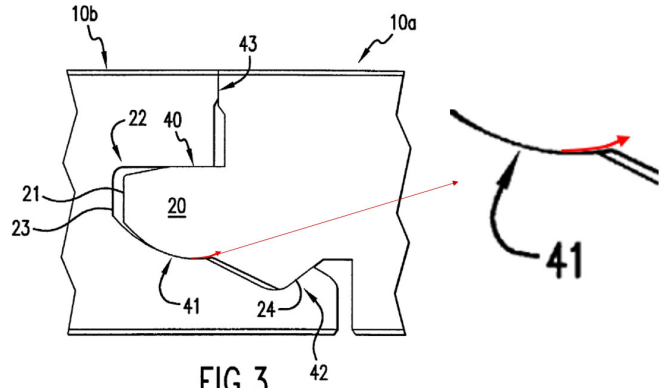
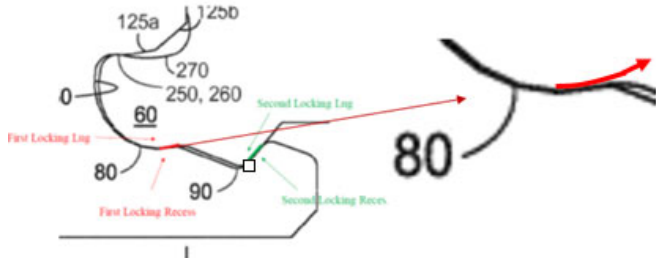
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	 Annotated FIG. 11 of the '425 Patent This understanding is consistent with the embodiments illustrated in the '425 Patent. <i>See</i> FIG. 11 (illustrating dimensions of a first locking recess and a first locking lug similar to those of FIG. 3 of Miller). As shown above, the first locking recess for Miller is virtually identical to the embodiment of FIG. 11 of the '425 Patent. <i>See also</i> paragraphs 43-48 of this declaration.	face 11 of the tongue 4 being parallel to the main faces 8, 9 of the panel 1. Similarly, the second recess 21 on the top face 14 of the bottom lip 7 is between the section 16, which is parallel to the main faces 8, 9 of the panel 1, and the first recess 17.”)  Fig. 2 of Roy It would have been obvious to one of skill in the art at the time of invention to replace the first and second locking recesses and locking lugs of Miller with the raised portions 13, 20 and the recesses 17, 23 of Roy to assist in increasing the horizontal locking features of the floor panels 10a, 10b of Miller. This would have been considered an obvious modification

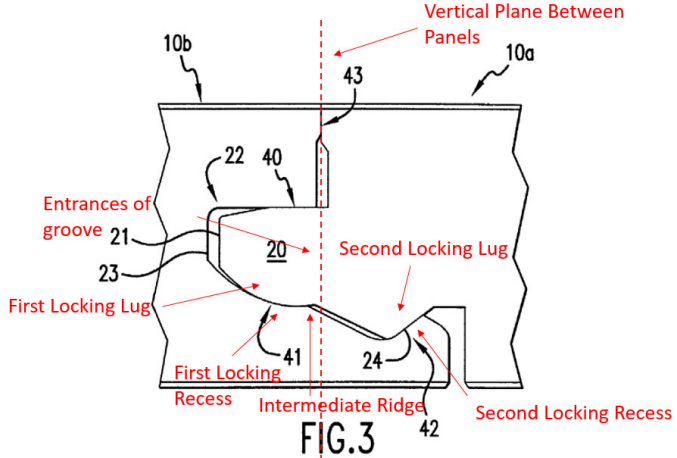
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
		of the floor panels 10a, 10b of Miller achieved by a simple substitution of one structural element (the locking recesses and locking lugs of Miller) with another equivalent structural element (the raised portions 13, 20 and recesses 17, 23 of Roy). Additionally, it would have been obvious to combine the teachings of Roy with Miller for the reasons expressed in paragraphs 52-58 and 61-62.
1.6 a first locking recess located in an internally extending portion within the groove and a second locking recess located in a lip portion protruding from an entrance opening of the groove,	FIG. 3 of Miller <i>See also paragraphs 43-48 of this declaration.</i>	<i>See 1.5 & 1.9</i>

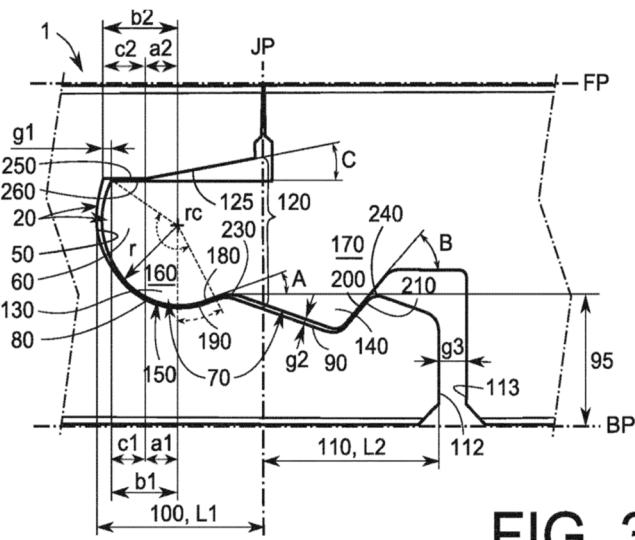
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
1.7 the locking means further comprises dual consecutive locking lugs arranged in a lower portion of the tongue for horizontally interlocking engagement in the groove,	 FIG. 3 of Miller See also paragraphs 43-48 of this declaration.	See 1.5 & 1.9
1.8 a first locking lug extending downwardly from a lower tip portion of the tongue and a second locking lug extending downwardly from a root portion of the tongue,	 FIG. 3 of Miller	See 1.5 & 1.9

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
1.9 the first locking recess and the first locking lug are provided with matching curved horizontal locking surfaces and the second locking recess and the second locking lug are provided with matching inclined horizontal locking surfaces.	 FIG. 3 of Miller  FIG. 3 of Miller The red and green surfaces of the locking recesses highlighted in the drawings above each have a curvature that creates an upward curving surface defined in the groove that	See col. 5, lines 31-35 of Roy (“The points 32, 33 are points of contact at which a slight clearance is provided to facilitate insertion of the tongue 4 into the groove 5 without significantly deforming the bottom lip 7 at the point 33 so that the elastic deformation of said bottom lip 7 is entirely reserved for the clipping and clamping functions at the points 35 and 36.”)  Fig. 3 of Roy Roy discloses that, at points 35 and 36, which are formed on the recesses 17, 23, a clipping

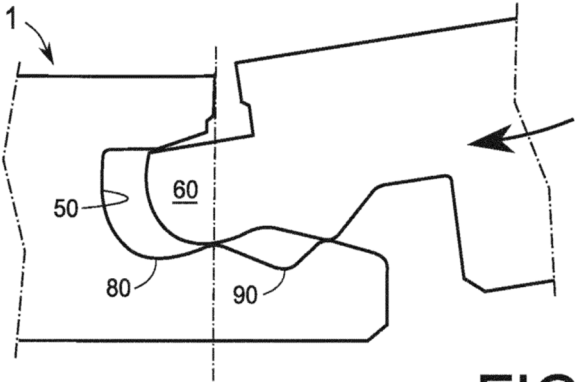
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	assists in creating horizontal locking surfaces for the locking lugs. Due to the upward curvature of the locking recesses, these locking surfaces would create an obstruction to the tongue moving horizontally relative to the groove, thereby assisting in creating a horizontal locking of the two panels. Furthermore, the red highlighted surface in the annotated drawing of Miller provided below is consistent with and virtually identical to the corresponding locking surface disclosed in the specification of the ‘425 patent as illustrated in Fig. 11 of the ‘425 patent reproduced below. 	and clamping function is established between the respective panels due to elastic deformation of the bottom lip 7. One of ordinary skill in the art would have understood that this clipping and clamping function is equivalent to a horizontal locking arrangement for the panels. Additionally, it would have been obvious to combine the dual locking lug/locking recess teachings of Roy with Miller for the reasons expressed in paragraphs 52-58 and 61-62.

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
	 FIG. 3 Annotated Fig. 3 of Miller  Annotated FIG. 11 of the '425 Patent	
Claim 2		

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
2. The joining system for floor panels according to claim 1, wherein an intermediate transitional ridge between the first locking lug and the second locking lug is located inside of the entrance opening of the groove, said entrance opening being located in a main vertical joint plane between two joined floor panels.	 FIG. 3 of Miller As demonstrated by the above annotated figures, the intermediate ridge is located inside	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
	of the entrance opening. The entrance opening, labeled as "entrance of groove," above, is located in the main vertical joint plane between the two joined floor panels. This understanding is consistent with the explanation of this feature in reference to FIG. 3 in the '425 Patent:  FIG. 3 See '425 Patent at FIG. 3 and col. 5, lines 49-54 ("As is further shown in FIG. 3, an intermediate transitional ridge 230 is located between the first locking lug 130 and the second locking lug 140 inside of the entrance opening 120 of the groove 50. As illustrated in	

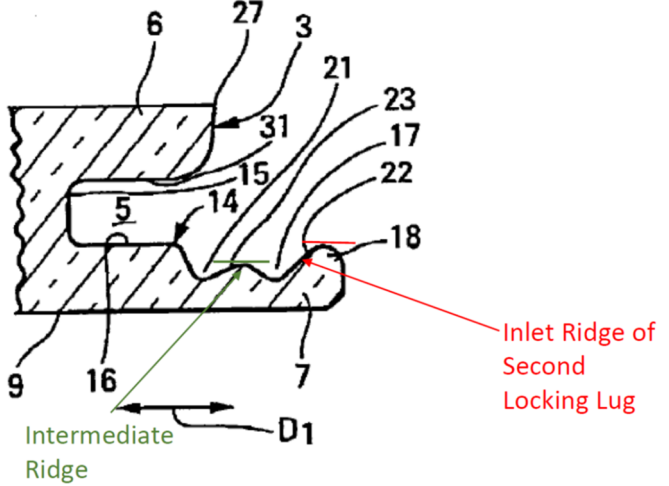
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	the figure, the entrance opening 120 is more particularly located in a main vertical joint plane JP between two joined floor panels 1.”)	
Claim 3		
3. The joining system for floor panels according to claim 1, wherein an intermediate transitional ridge between the first locking lug and the second locking lug is aligned with the entrance opening of the groove, said entrance opening being located in a main vertical joint plane	This feature would have been a matter of obvious design choice, and therefore, would have been obvious to a POSITA at the time of the claimed invention as made. The ’425 Patent includes a single example wherein the intermediate transitional ridge between the first locking lug and the second locking lug is “aligned with the entrance opening of the groove” at FIG. 8 and col. 7, lines 9-19. FIG. 8 and the entirety of the description concerning this embodiment are shown below: “FIG. 8 is a simplified side view of a floor panel 1 demonstrating the profile contours of the tongue 60 according to a second, optional embodiment of the invention. The figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. In this embodiment, the intermediate transitional ridge 230 between the first locking recess 80 and the second locking recess 90 is	

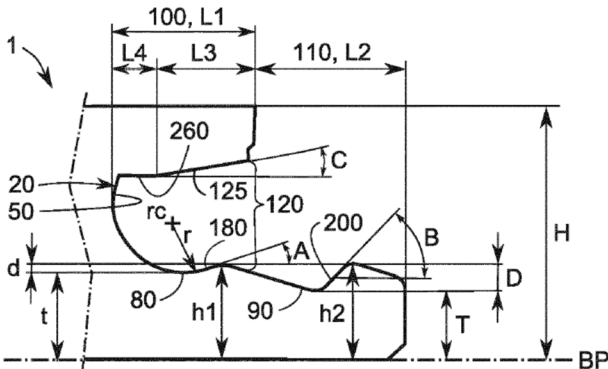
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
between two joined panels.	aligned with the entrance opening 120 of the groove 50.” ’425 Patent, col. 7, lines 9-19.  FIG. 8 The disclosure above and the ’425 Patent in general does not attribute any importance or criticality to the feature that the intermediate transitional ridge is aligned with the entrance opening of the groove. Further, based on my experience and knowledge of flooring panel locking systems, movement of the location of this intermediate ridge in the horizontal direction from just inside	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	the entrance opening to aligned with the entrance opening, and, thus, the joint plane, will have no effect on the locking ability or strength of the construction, provided the tongue and groove are machined in a complementary manner, which of course is necessary to achieve locking of adjacent floor panels. Putting the ridge in line with the entrance opening or inside of it is, thus, simply a matter of design preference. Moreover, in practice, these locking profiles are exceedingly small. Thus, changing the position of certain elements, even for more dramatic changes, results in a change of position that is often, and at most, just a few tenths of a millimeter. Thus, slight movement of the intermediate ridge from just inside the entrance opening to being aligned with the entrance opening would have likely been a movement of less than a tenth of a millimeter and likely just a few hundredths of a millimeter. Any changes to the locking ability or function of the system would have been be unnoticeable at the time of the invention of the '425 Patent. Indeed the changing of position in such a slight manner would likely have been within the	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	manufacturing tolerances of the manufacturing equipment anyway. Manufacturing tolerances are typically set to be a tenth of a millimeter or less. All of this would have been the case at the time of the invention of the '425 Patent. <i>See, e.g.</i> Ex. 1015 (U.S. Patent No. 7,398,625) at col. 12, lines 13-18 (noting “modern” manufacturing tolerances of ± 0.01 mm and ± 0.1 mm). That positioning the intermediate ridge in line with the entrance opening of the groove would have no appreciable effect on the locking system is consistent with the '425 Patent itself, which ascribes no criticality, importance or benefit to moving the intermediate ridge from inside of the groove entrance opening to aligned with the entrance opening. <i>See above</i>, showing the entirety of the '425's disclosure describing the intermediate ridge being aligned with the entrance opening. And even if the changes were minimally noticeable, a POSITA would have been skilled enough, given their experience in the industry to adjust the position slightly to achieve the	

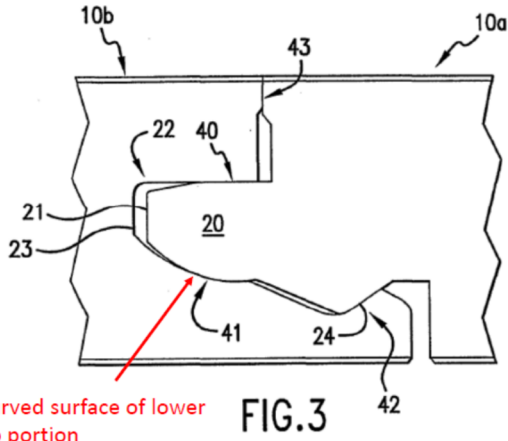
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	desired result, namely, acceptable locking of the floor panels. In practice, today and at the time of the invention of '425 Patent, a POSITA would simply have to have made sure the corresponding locking profiles on a first and second floorboard were shaped in a way to be complementary to each other, which would have very much been within the level of skill of a POSITA at the time of the invention of the '425 Patent. <i>See, e.g.</i>, Exhibits 1004 -1014 (demonstrating complimentary locking mechanisms); Ex. 1006 (Moriau) (explaining a typical machining process for locking profiles; Ex. 1005 (Roy) (showing same and demonstrating complementary dual consecutive locking lugs and locking recesses, including wherein the “intermediate transitional ridge” has a height equal to or less than that of “inlet ridge” of the second locking recess). Accordingly, a POSITA would have recognized a reasonable expectation of success in modifying Miller to move the intermediate transitional ridge slightly from inside the entrance opening of the groove to being aligned with it.	

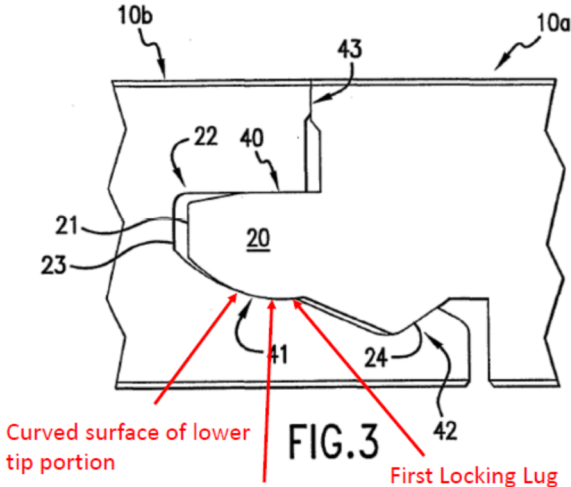
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	For these reasons, this feature would have been an obvious design choice to a POSITA at the time of the invention of the '425 Patent.	
Claim 4		
4. The joining system for floor panels according to claim 3, the intermediate transitional ridge having a height measured from a bottom plane of the floor panel and a corresponding inlet ridge of the second locking recess having a height, the height of the intermediate transitional ridge being	This feature would have been a matter of obvious design choice, and therefore, would have been obvious to a POSITA at the time of the claimed invention as made. The '425 Patent includes a single example wherein the intermediate transitional ridge has a height that is equal to or less than the height of the inlet ridge of the second locking recess. FIG. 4 and the entirety of the description concerning this embodiment are shown below: “FIG. 4 is a simplified side view of a floor panel demonstrating the profile contours of the groove according to the first embodiment of the invention as previously shown in FIGS. 1 and 3. Again, the figure is drawn with emphasized contour lines and without cross-sectional markings for the sake of clarity. As shown in the figure, the first locking recess 80 is shallower than the second locking recess 90. In the shown embodiment, the depth d of the	 To the extent the Board disagrees with my conclusion that it would have been obvious to include an intermediate transitional ridge having a height equal to or less than the height of inlet ridge of the second locking recess in view of Miller alone, this feature is clearly disclosed in Roy as demonstrated above in the annotated figure. The green highlighted

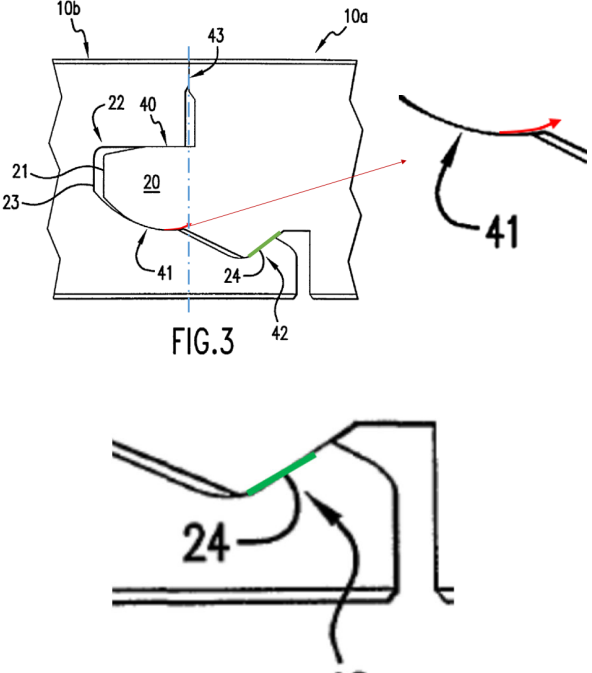
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
equal to or less than the height of an inlet ridge of the second locking recess.	first locking recess 90 is less than half of the depth D of the second locking recess 90. Furthermore, the height h1 of the intermediate transitional ridge 230 measured from a bottom plane BP of the floor panel 1 is equal to or less than the corresponding height h2 of a corresponding inlet ridge 240 of the second locking recess 90. The minimum thickness t between the first locking recess 80 and a bottom plane BP of the of the floor panel 1 exceeds a third of the total height H of the floor panel 1.”  FIG. 4	height of the intermediate ridge is less than the red highlighted inlet ridge of the second locking lug. As mentioned in paragraphs 54 and 58 of this declaration, both Miller and Roy recognize the importance of increasing locking strength, and Roy’s locking profile is disclosed as increasing horizontal locking strength. And as Roy discloses, its double locking recess/locking lug configuration increases horizontal locking strength. Further, Roy and Miller are both “tongue and groove” style locking mechanisms that can be engaged using a rotational or angular movement of one floor panel with respect to another. <i>See</i> EX1004 (Miller) at col. 5, lines 4-12; EX1005 (Roy) at col. 2, lines 59-67. A POSITA would have recognized this similarity and a reasonable expectation of success in combining the teachings of Roy and Miller. This is further evidenced by the fact that both Roy and Miller (through its incorporation by reference of Moriau) disclose how their respective locking mechanisms are machined or milled. <i>See</i> paragraph 57 of this declaration.

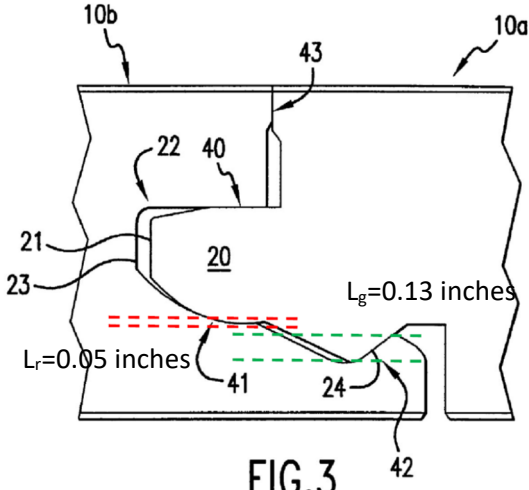
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
	The disclosure above and the '425 Patent in general do not attribute any importance or criticality to the feature that the intermediate transitional ridge height is the same or less than the height of the inlet ridge of the second locking recess. Further, based on my experience and knowledge of flooring panel locking systems, I am not aware of any effects caused by adjusting the two heights h1, h2 shown above in FIG. 4, such that h1 (the intermediate transitional ridge height) is "equal to or less than" h2 (the inlet ridge of the second locking recess height). Adjusting these heights in this way would not have any significant, if any, effect on the locking characteristics or performance of the locking system. This is simply a matter of design choice or preference. A POSITA would simply have to have made sure the corresponding locking lugs were shaped in a way to be complementary to the resulting locking recesses, which would have very much been within the level of skill of a POSITA at the time of the invention of the '425 Patent. <i>See, e.g.,</i> Exhibits 1004 -1014 (demonstrating	For these reasons, it would have been obvious to combine the teaching of Roy that the height of the intermediate transitional ridge is less than the inlet ridge of the second recess with the teachings of Miller, and thus, the features of claim 4 would have been obvious to a POSITA at the time of the invention of the '425 Patent.

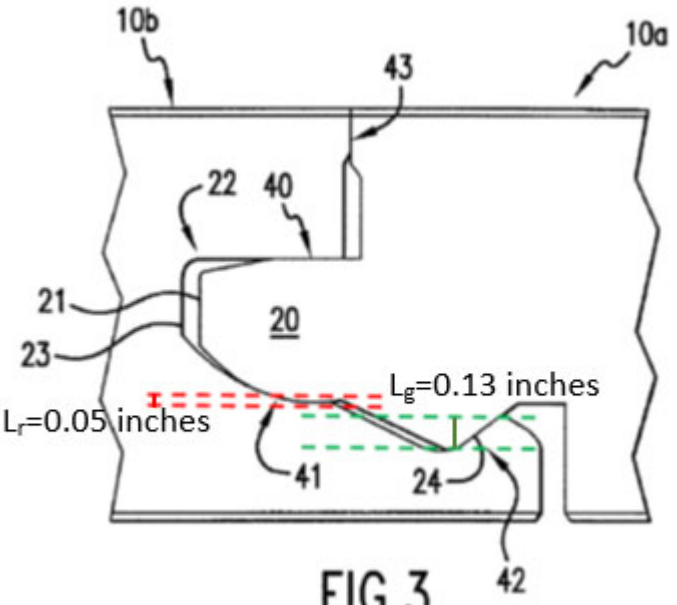
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	complimentary locking mechanisms); Ex. 1006 (Moriau) (explaining a typical machining process for locking profiles; Ex. 1005 (Roy) (showing same and demonstrating complementary dual consecutive locking lugs and locking recesses, including wherein the “intermediate transitional ridge” has a height equal to or less than that of “inlet ridge” of the second locking recess). Accordingly, a POSITA would have recognized a reasonable expectation of success in doing so. Moreover, in practice, as explained above with respect to claim 3, these locking profiles are exceedingly small. Thus, changing the position of certain elements, even for more dramatic changes, results in a change of position that is often, and at most, just a few tenths of a millimeter. Thus, a change of height of either the intermediate transitional ridge or inlet ridge of the second locking recess of Miller such that the intermediate transitional ridge of Miller would have a height equal to that of the second recess inlet ridge would have been merely a few hundredths of a millimeter. Any changes to the locking ability or function of the system would	

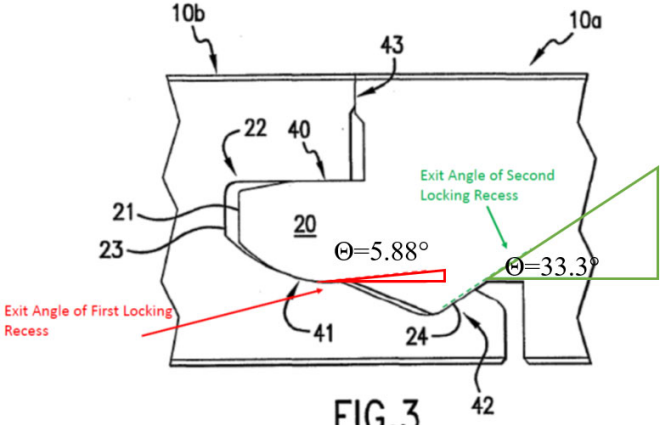
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	have been insignificant and unnoticeable at the time of the invention of the '425 Patent. Changing the heights of the ridges in this manner likely would have been within the manufacturing tolerances of the manufacturing equipment anyway. Manufacturing tolerances are typically set to be a tenth of a millimeter or less. <i>See, e.g.</i> Ex. 1015 (U.S. Patent No. 7,398,625) at col. 12, lines 13-18 (noting “modern” manufacturing tolerances of ± 0.01 mm and ± 0.1 mm).	
Claim 5		
5. The joining system for floor panels according to claim 1, wherein the lower tip portion of the tongue is curved.	 FIG. 3 FIG. 3 of Miller	
Claim 6		

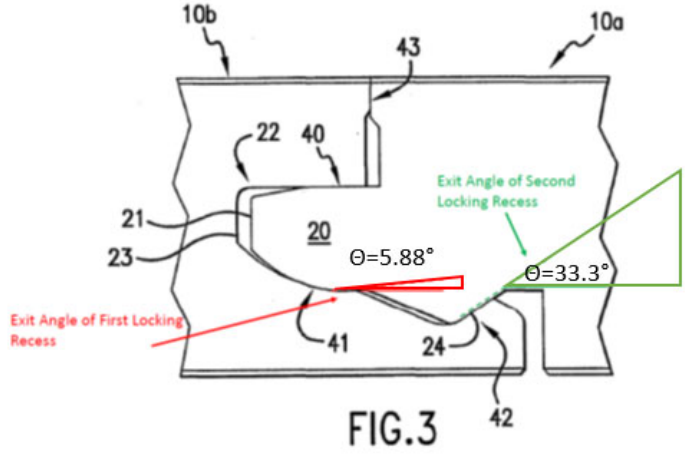
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
6. The joining system for floor panels according to claim 5, wherein the curvature of the curved lower tip portion of the tongue merges continuously with a corresponding curvature of the horizontal locking surface of the first locking lug.	 FIG. 3 of Miller	
Claim 7		

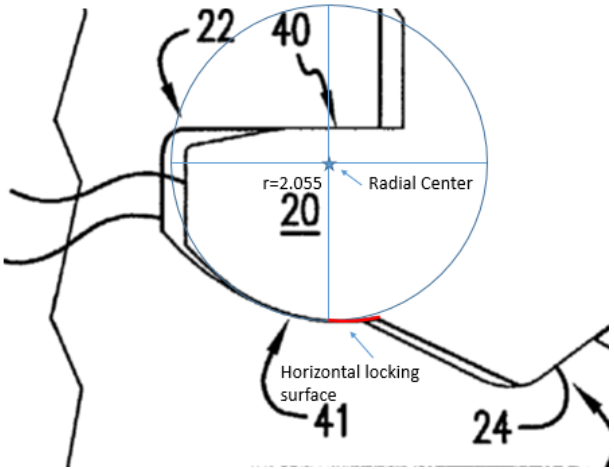
Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
7. The joining system for floor panels according to claim 1, wherein the first locking recess is shallower than the second locking recess.	 FIG. 3 The angle of the red highlighted surface of the first locking lug is shallower than the angle of the green highlighted surface of the second locking lug. Additionally, measurements also show that the first locking recess is shallower than the second locking recess:	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	 FIG. 3 Lr (for “red”) is the depth of the first locking recess, and Lg (for “green”) is the depth of the second locking recess.	
Claim 8		
8. The joining system for floor panels according to claim 1, wherein the first locking recess extends downwardly to	As highlighted in the annotated FIG. 3 of Miller provided below, the depth of the first (red) locking recess, represented by L_r is less than half of the depth of the second (green) locking recess, Represented by L_g . In the image below, L_r is 0.05 inches and L_g is 0.13 inches.	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
a depth and the second locking recess extends downwardly to a depth, the depth of the first locking recess is less than half of the depth of the second locking recess.	 FIG. 3 Annotated FIG. 3 of Miller	
Claim 9		

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
9. The joining system for floor panels according to claim 1, wherein an exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is less than the inclined locking angle of the second locking recess.	 FIG. 3 of Miller	
Claim 10		

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
10. The joining system for floor panels according to claim 9, wherein said exit tangent inclination angle of the curved horizontal locking surface of the first locking recess is equal to or less than half the inclined locking angle of the second locking recess.	 FIG. 3 of Miller The red exit angle for the first locking recess is less than half of the green exit angle for the second locking recess. the exit tangent inclination angle of the first locking recess is 5.88° (width =0.68 inches, height = 0.07 inches), whereas the exit angle of the second locking recess is 33.3° (width = 1.02 inches, height = 0.67 inches). To find the exit tangent inclination angle of the first locking recess a line tangent to the center point of the arc that makes up the first locking recess was drawn and the angle of that line was measured from the horizontal.	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
Claim 11		
11. The joining system for floor panels according to claim 1, wherein the curved horizontal locking surface extends from a point located essentially directly below a radial center of the curved first locking recess in a direction towards the second locking recess.	 FIG. 3 of Miller	
Claim 12		
12. The joining system for floor panels according to	As shown below, Miller discloses that the length of the vertical locking surface of tongue is less than the vertical locking surface of the groove:	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
claim 1, wherein the of tongue includes a vertical locking surface having a length and the groove includes a vertical locking surface having a length, the vertical locking surface of the tongue being less than the length of the vertical locking surface of the groove.		

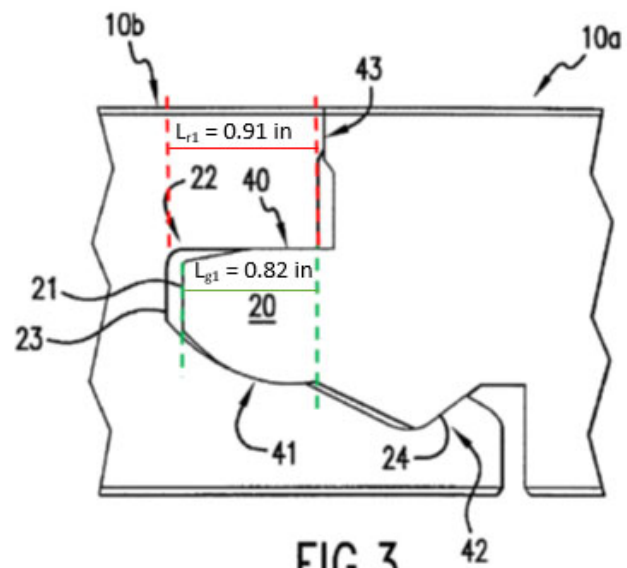
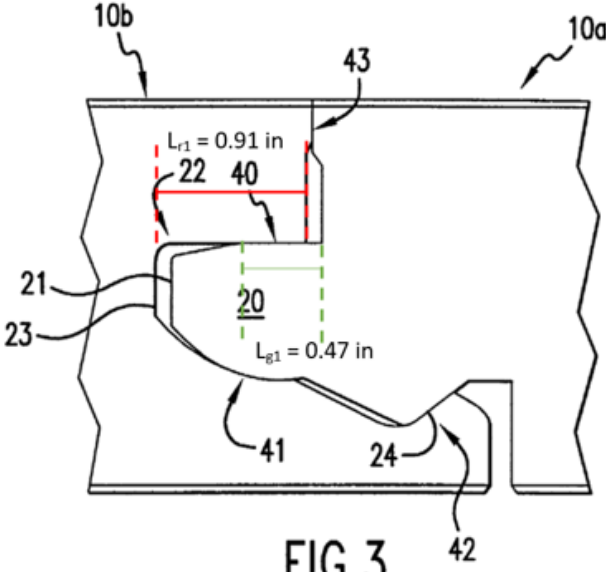
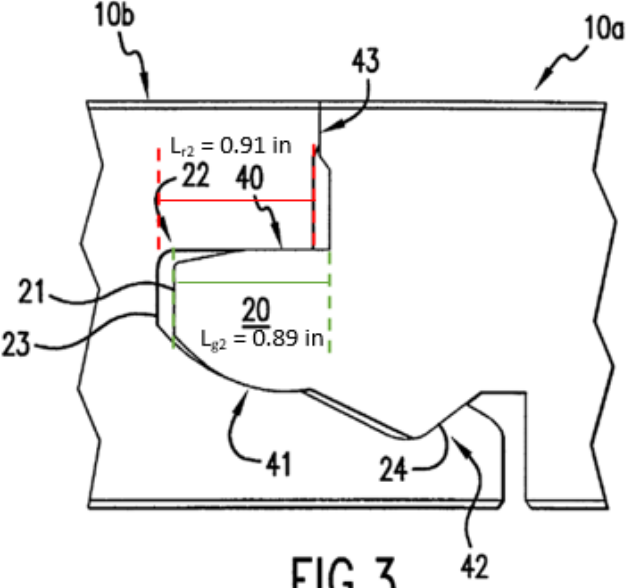
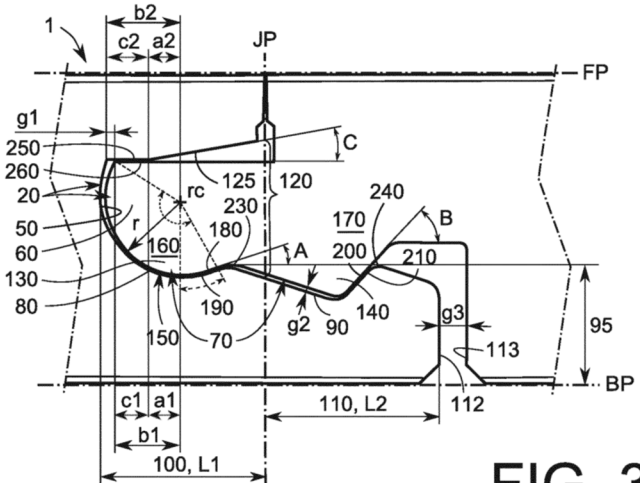


FIG.3

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
	 FIG.3	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
	FIG.3	

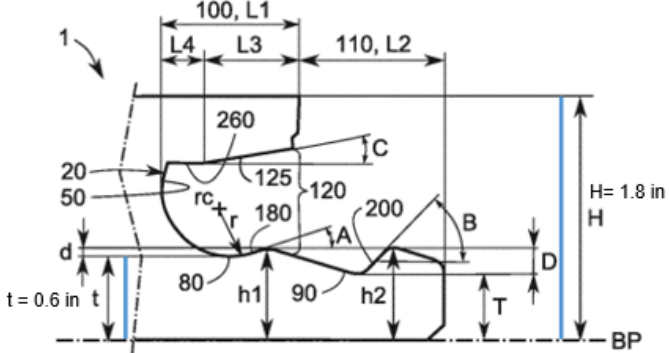
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	 FIG. 3 FIG. 3 of Miller The green highlighted vertical locking surface of the tongue is less than the red highlighted vertical locking surface of the groove, under any interpretation of the lengths of the vertical lockings surfaces of groove and tongue, respectively. However, I note that the highlighted measurements in the third (second to last) annotated FIG. 3 of Miller corresponds most closely to the “vertical locking surfaces” measurements described in the ’425 Patent.	

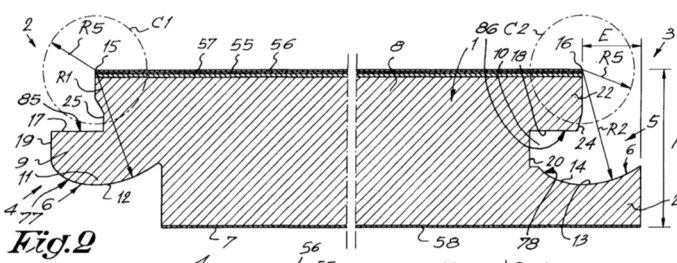
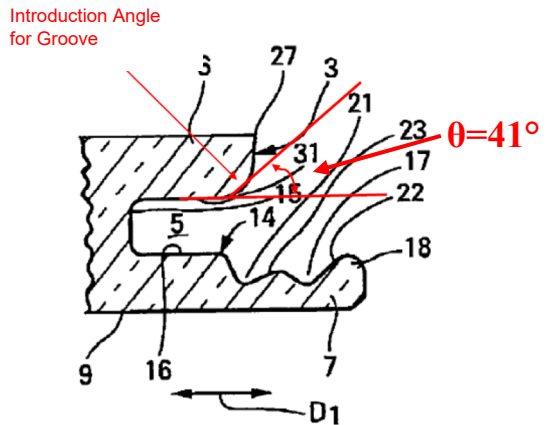
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	See ‘425 Patent at col. 6, lines 26-28 (The length c1 of a vertical locking surface 250 of the tongue 60 is less than the corresponding length c2 of a matching vertical locking surface 260 of the groove”); FIG. 3:  FIG. 3	
Claim 13		
13. The joining system for floor panels according to claim 1, wherein a minimum	This feature would have been a matter of obvious design choice, and therefore, would have been obvious to a POSITA at the time of the claimed invention as made. The ‘425 Patent notes that Fig 4 Shows “the minimum thickness t between the first locking recess 80 and a bottom plane BP of the of	

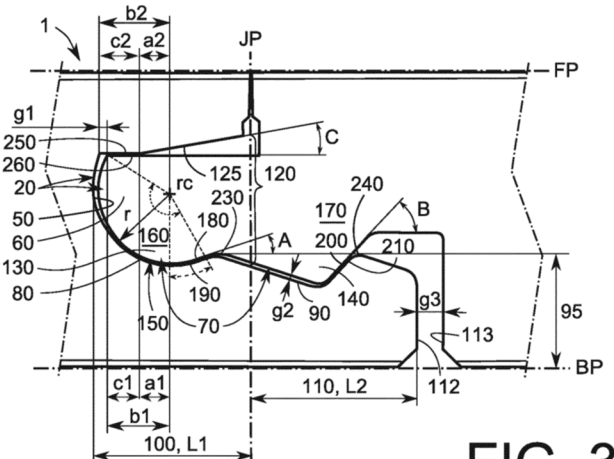
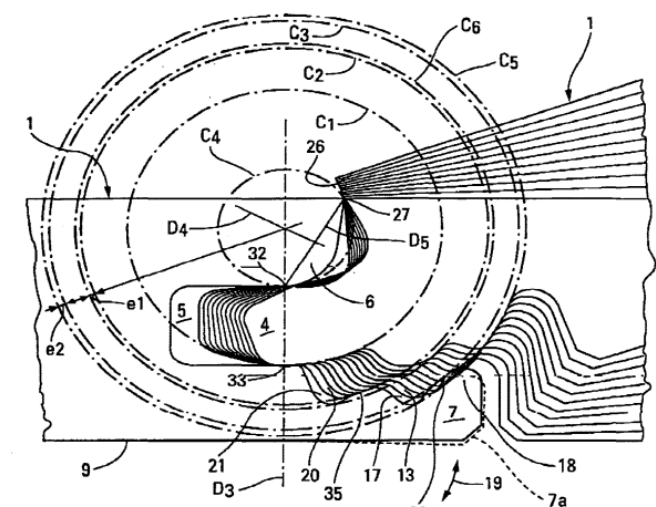
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
thickness between the first locking recess and a bottom plane of the floor panel exceeds a third of the total height of the floor panel.	the floor panel 1 exceeds a third of the total height H of the floor panel 1. ’425 Patent, col. 6, lines 45-48. The disclosure above and the ’425 Patent in general does not attribute any importance or criticality to the feature that the minimum thickness between the first locking recess and a bottom plane of the floor panel exceeds a third of the total height of the floor panel. To the extent that the patentee argues that the language in the ’425 patent describing that “[a thicker and more robust lower portion of the groove] is important for floor panels made of inherently brittle and less dense materials,” the benefits of thickness were well known in the art at the time of patenting. Both Miller and Moriau (which is incorporated by reference here) attribute additional volume or “thickness” to added strength. <i>See</i>, Miller, at col. 3, lines 44-47 (“Additionally, the backing layer 16 may improve the structural integrity of the floor panel 10 by increasing overall thickness and reducing the warp and wear tendencies of the uncoated core material.”); <i>see also</i>, Moriau, at col. 8, lines 28-37 (“In order to allow for a	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	smooth assembly, to guarantee the necessary stability and firmness and in order to limit the quantity of material to be cut away, the difference E between the distally outer edge of the upper lip 22-42 and the distally outer edge of the lower lip 23-43, measured in the plane of the floor panel and perpendicular to the longitudinal direction of the groove 10, should preferably be kept smaller than one time the total thickness F of the floor panel 1. For stability's sake, normally this total thickness F shall never be less than 5 mm.”) Thus, prior to the invention of the ‘425 Patent, the relationship between thickness of a floor panel or associated element and the strength/stability of that floor board or particular element was well known in the art. Thus, a POSITA would have been motivated to maximize the thickness between the minimum thickness of the locking recess and the bottom plane of the floor panel such that it was larger than at least a third of the total height of the floor panel in order to increase the strength of the lower portion of the groove. A POSITA also would have had a reasonable expectation of success in doing so given that it was well known how to machine	

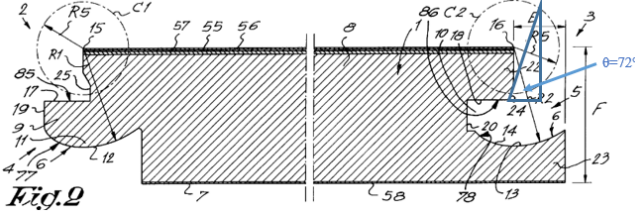
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	these locking profiles. <i>See</i> discussion relating to manufacturing processing in connection with claims 3 and 4, above. Additionally, based on my experience and knowledge of flooring panel locking systems, I am not aware of any effects caused by adjusting the height of locking recess to be, in particular, greater than one third of the total height of the floor panel. Thus, the minimum thickness between the first locking recess and a bottom plane of the floor panel exceeding a third of the total height of the floor panel is merely a design choice. While thickness of the first recess, and thus, the lower portion of the groove, in general, can impact the strength or stability of the lower groove portion, the minimum thickness of the first locking recess being greater than at least a third of the total height of the floor panel does not provide any unique or particular advantage other than the known principle that increased thickness will increase strength. Further, demonstrating that this feature is not critical and is an obvious design choice is the	

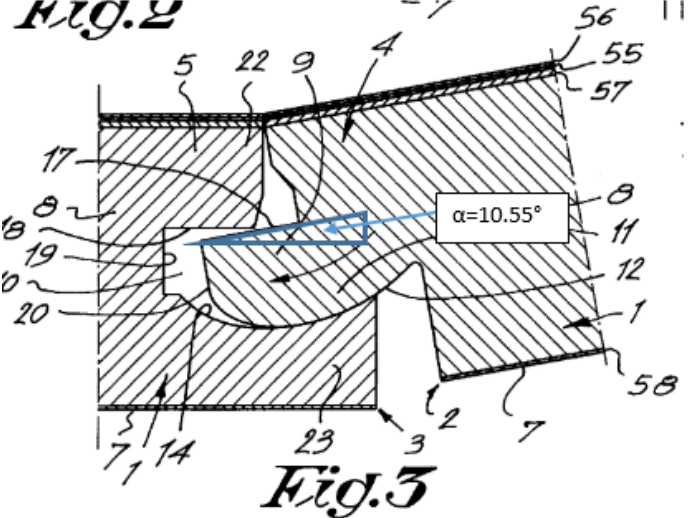
Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	fact that no figure in the ‘425 patent shows the claimed ratio exceeding one third. Upon measuring t and H as shown in Fig. 4, t does not exceed a third of H. In the annotated figure shown below t is 0.6 inches and 1.80 inches. Exactly a 1 to 3 ratio.  FIG. 4 Annotated Fig. 4 of ‘425 For at least the above reasons, this feature would have been an obvious design choice to POSITA at the time of the invention of the ‘425 Patent.	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
Claim 14		
14. The joining system for floor panels according to claim 1, wherein the groove includes an introduction angle, the introduction angle of the groove being equal to or greater than 10 degrees.	This feature would have been an obvious modification of the primary embodiment (FIGS. 2-3) of Miller in view of the embodiments of FIGS. 2-4 of Moriau (EX 1006), which is incorporated by reference into Miller and, thus, part of Miller's disclosure. Moriau notes that "a chamfer 24 and lip 22 and a recess 25 can be provided, as represented in FIGS. 2 to 4, as a result of which the subsequent floor panels 1 can easily be pushed and guided into each other, such that no possible ridges in the subflooring or such render good insertion difficult." Ex. 1006 at col. 6, lines 29-35. <i>See also</i> FIGS. 2-4 of Moriau.  <i>Fig. 2</i>	 Introduction Angle for Groove $\theta = 41^\circ$ Annotated Portion of FIG. 2 of Roy The introduction angle for the groove of Roy is 41° which is greater than the 10° of claim 14.

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	As shown above in FIG. 2 of Moriau, a chamfer 24 is located at the entrance opening of the groove. The '425 Patent discloses that “[i]n order to ensure an easy access for the tongue during the joining procedure, the introduction angle C of the groove 50 is equal to or greater than 10 degrees. Said introduction angle C is defined as the inclination of an inclined introduction guiding chamfer 125, as illustrated in FIG. 3.” '425 Patent at col. 5, lines 61-65, FIG. 3.  FIG. 3	 Fig. 3 Fig. 3 of Roy shows the panel introduced and the tongue staying incontact with the fillet throughout insertion. In order to determine angle of introduction I calculated the angle of the line tangent to the center of the fillet arc. While the introcution angle of Roy is aided by the use of a fillet rather than a chamfer for the particular purpose of guiding the positioning of an adjacent floor panel for rotational locking motion, this fillet is functionally equivalent to the Chamfer of the '425 patent. Further the chamfer is not a claimed element of claim 14 only the

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	Thus, like the ‘425 Patent, Moriau (and therefore Miller) discloses a chamfer at the entrance opening of the groove to make introduction of the tonuge into the groove and thus connection of adjacent floor panels easier. Because the ’425 Patent defines the angle of introduction to be the angle of inclination of a guiding chamfer, the angle of introduction of Moriau and, thus, Miller, would likewise be equal to chamfer 24 of Moriau, FIG. 2. As Moriau and Miller were published well before the time the invention of the ‘425 patent, this feature of the ‘425 would have been known to those skilled in the art at that time. As shown in the below annoated FIG. 2 of Moriau, the angle of the chamfer and thus the introduction angle of the groove is 72°, which is of course greater than 10 degrees. It would have been obvious to a POSITA to include this introduction angle in the embodiment of Miller, FIGS. 2-3 given that Moriau is a part of the disclosure of Miller, and Moriau notes that the chamfer, which creates the introduction angle, <i>see</i> 425 Patent at col. 5,	introduction angle. The 41° introduction angle is clearly greater than the 10° claimed. However, even to the naked eye, FIG. 3 of Roy, demonstrating the rotational locking movement, shows angles of introduction greater than 10 degrees. <i>See, e.g.</i>, the line indicated at reference numeral 1 at the top position. This line represents the top surface of the floor panel being rotated. It would have been obvious to a POSITA at the time of filing the ‘425 patent to combine the embodiments of Miller with the introduction angle taught by Roy to achieve the features of claim 14.

Claim Element	U.S. Patent No. 7,441,384 Miller et al. ("Miller") ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. ("Roy") ⁴
	lines 61-65, makes engagement of adjacent floor panels (and thus of the tongue and groove) easier. Thus, a POSITA would have recognized a suggestion and been motivated to modify FIGS. 2-3 of Miller to have an introduction angle of greater than 10 degrees.  Annotated Fig. 2 of Moriau The POSITA also would have recognized a reasonable expectation of success given that such introduction angles were already known in the art. Even if the Board does not agree with the '425 Patent's definition of "angle of introduction" being defined by a guiding chamfer, FIG. 3 of Moriau nevertheless demonstrates a tongue being inserted into a groove at an angle of greater than 10 degrees. See the annotated FIG. 3 of Moriau below:	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	<i>Fig. 2</i>  <i>Fig. 3</i> This angle is the same or greater if taken at the top surface or bottom surface of the floor panel as the vertical locking surface of the tongue (highlighted with the hypotenuse of the blue triangle above). Moreover, both Moriau and Miller disclose that their disclosures can be combined with other locking profiles. See Miller, at col. 5, lines 45-57, “Furthermore, Miller discloses “[i]t should also be noted that the embodiments shown in FIGS. 2 and 3 are for illustrative purposes only, and that the present invention is equally applicable to other	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
	coupling profiles known in the industry or that may be developed in the future. In other embodiments, the quantity, size and location of the contact zones may vary with the profile as desired, but the different profiles still fall within the scope of the present invention. For example, a tongue and groove profile without a locking structure would benefit from, and fall within the scope of the present invention. As a further example, a tongue and groove profile in which substantially full contact is maintained along the entire mating edges of the panels is also contemplated as being within the scope of the invention.” <i>See also</i>, Moriau at col. 10, lines 17-37; col. 12, lines 40-44; col. 13, lines 39-50, Teaching that its tensioning/locking/compression force features can be combined with other locking mechanisms. For these reasons, this feature would have been an obvious modification for a POSITA of the primary embodiment (FIGS. 2-3) of Miller in view of the embodiments of FIGS. 2-4 of Moriau at the time of the invention of the ’425 Patent.	

Claim Element	U.S. Patent No. 7,441,384 Miller et al. (“Miller”) ³	Secondary Reference – U.S. Patent No. 6,216,409 to Roy et al. (“Roy”) ⁴
Claim 15		
15. The joining system for floor panels according to claim 1, wherein the length of the internally extending portion within the groove is less than the length of the lip portion protruding from an entrance opening of the groove.	FIG. 3 of Miller The red highlighted dimension of the internally extending portion of the groove (0.67 in) is less than the green highlighted dimension of the lip portion protruding from the entrance opening of the groove (0.77in).	

Annex A

LENGTH MEASUREMENT

In order to measure the distance between two points in an image I used the built in measuring tool in Word. I explain this below:

1. Image is taken directly from the patent

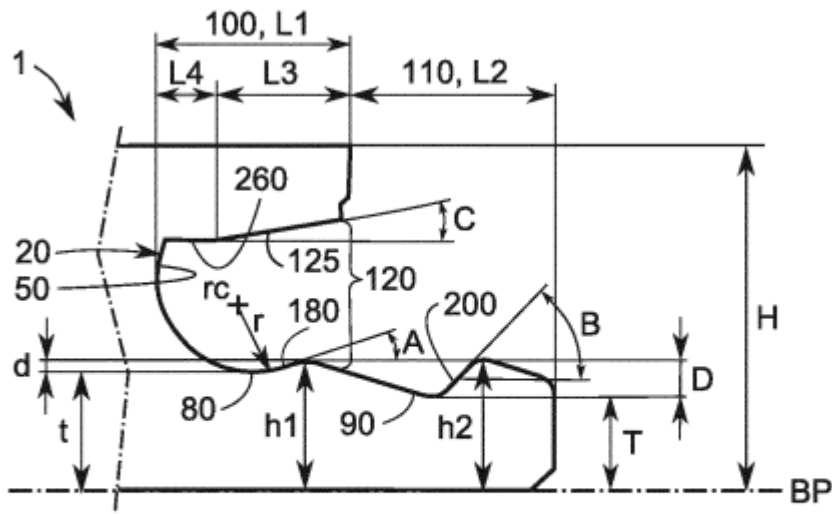
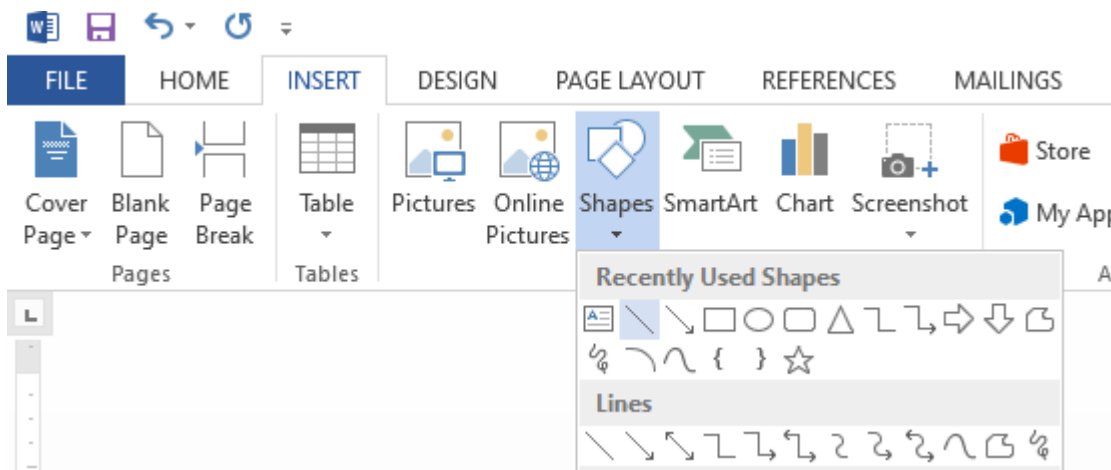
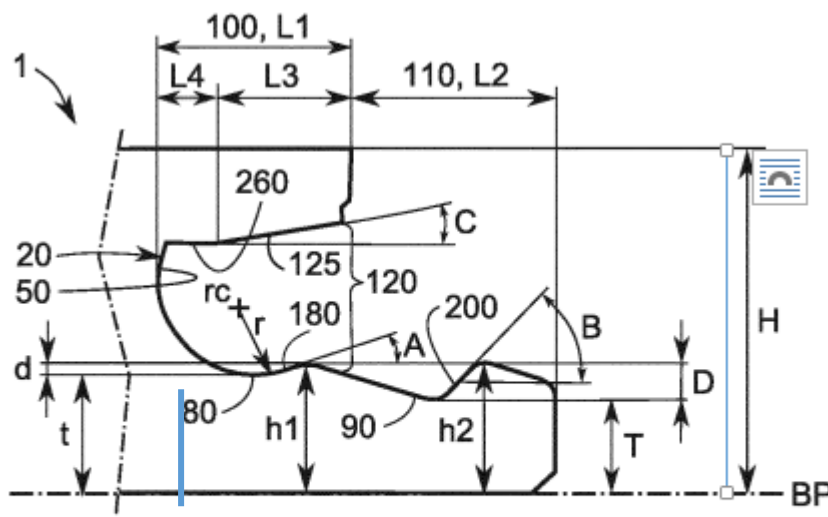
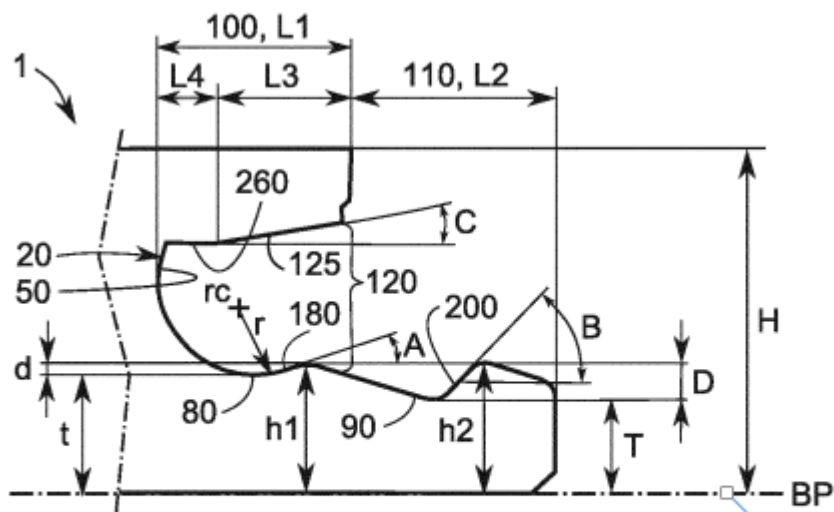


FIG. 4

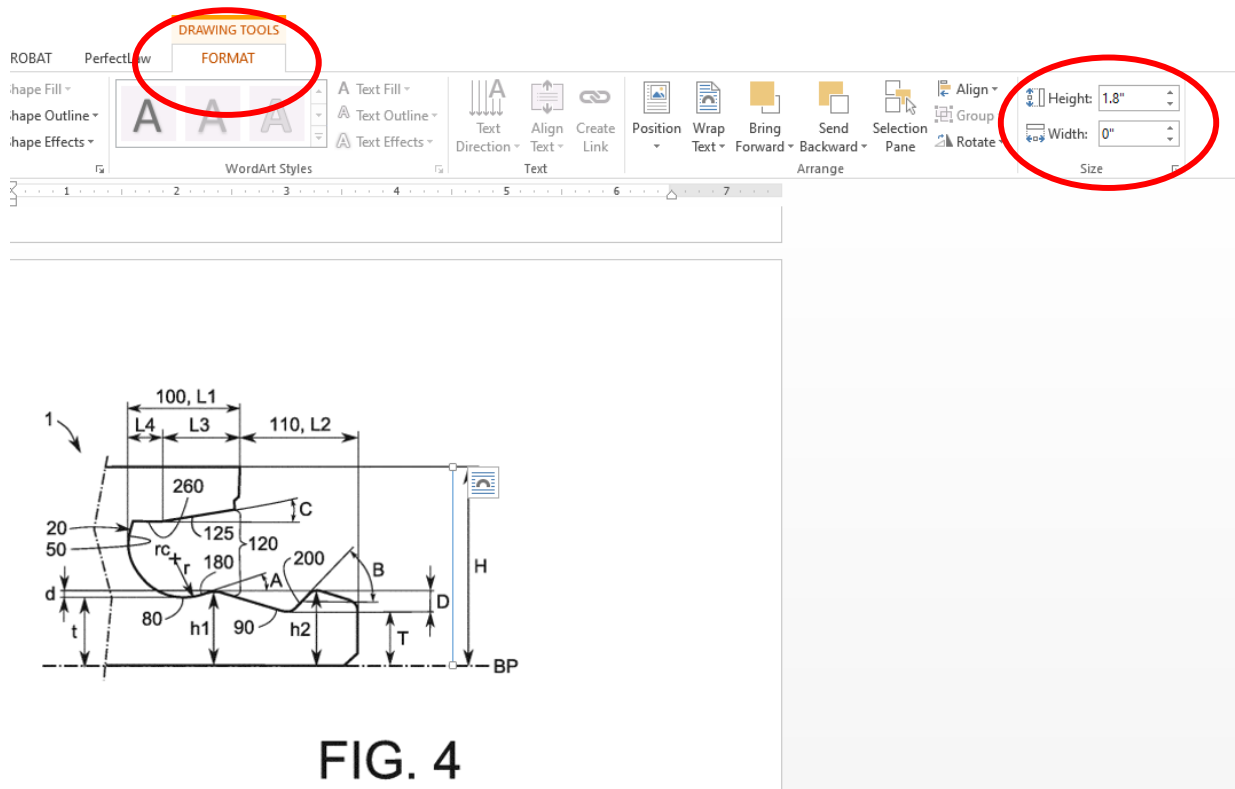
2. A Line is inserted representing the length that needs to be measured. For this Fig. I will do H then repeat the process with t.



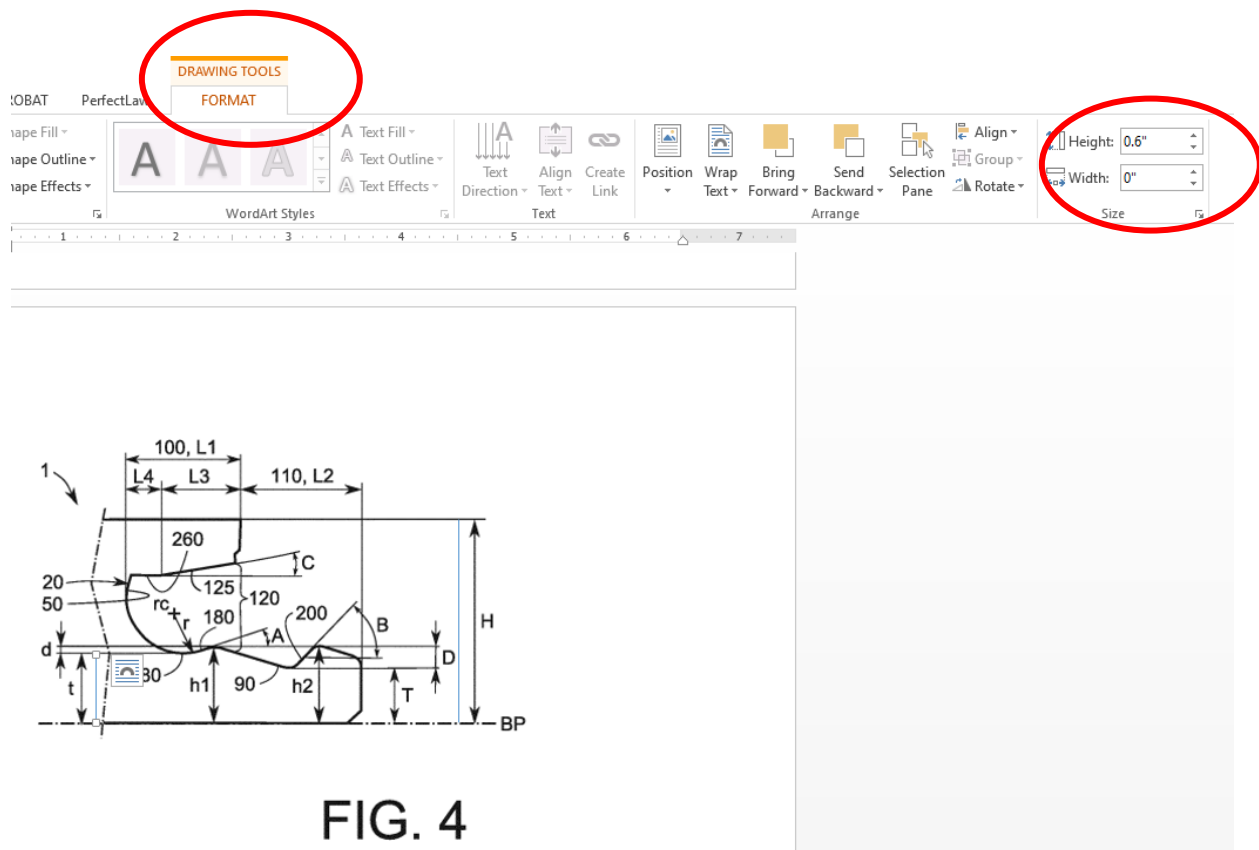


3. Next under the Drawing tool, format tab I will look at the length, here as the line is directly vertical the height represents the length of the line. If the line was horizontal, the width would represent the length and if the line was at an

angle I would utilize the Pythagorean Theorem ($a^2 + b^2 = c^2$) with the height as a, width as b, and measured length as c.



4. I repeated the process with any other measurement that is needed on the figure, here t.



5. At this point I formatted the lines changing the weight, color, or adding the lengths on to the annotated figure to assist with clarity.

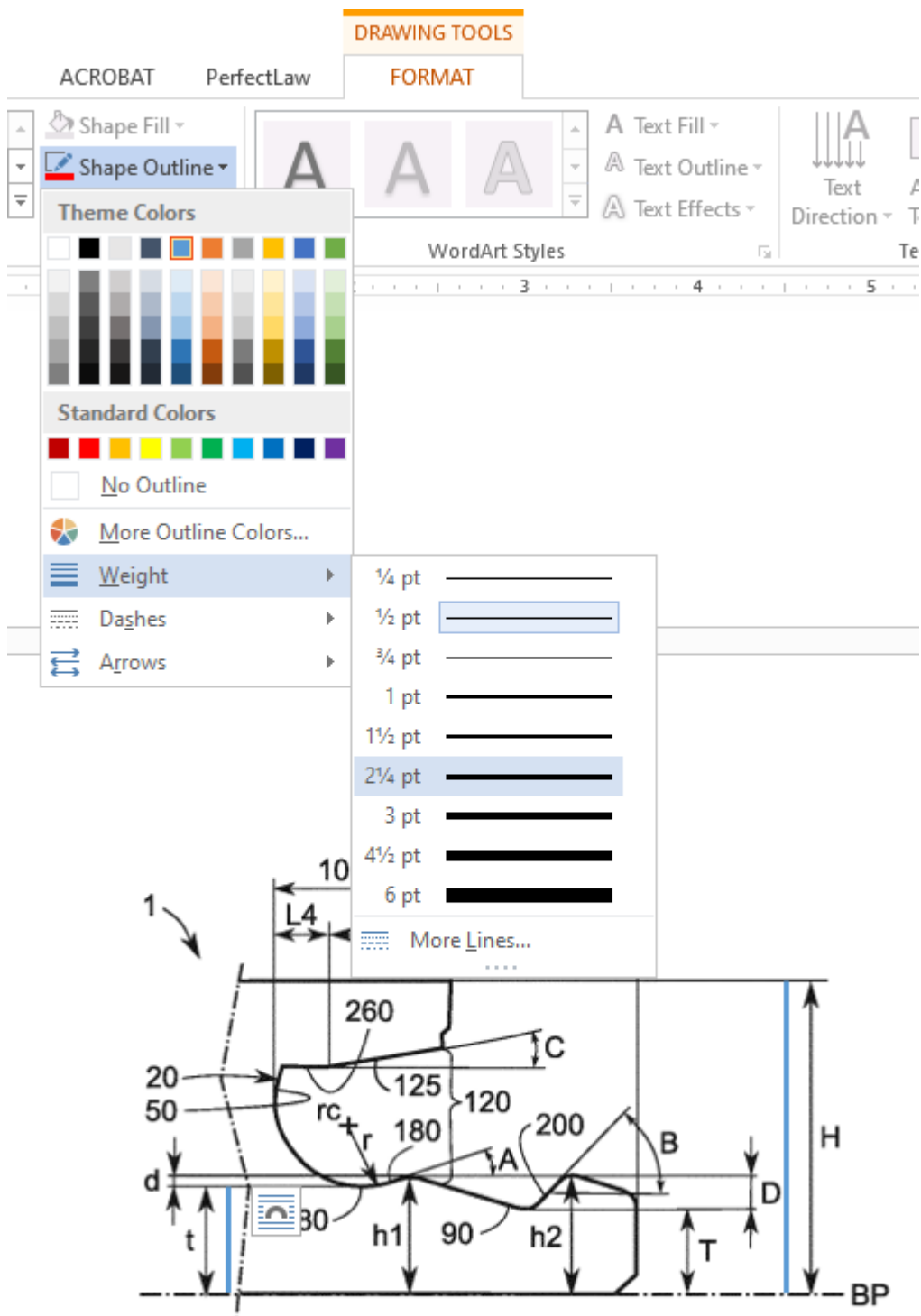


FIG. 4

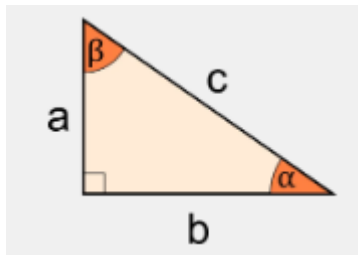
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Annotated Fig. 4 of '425

I4F Exhibit 1002 - 133

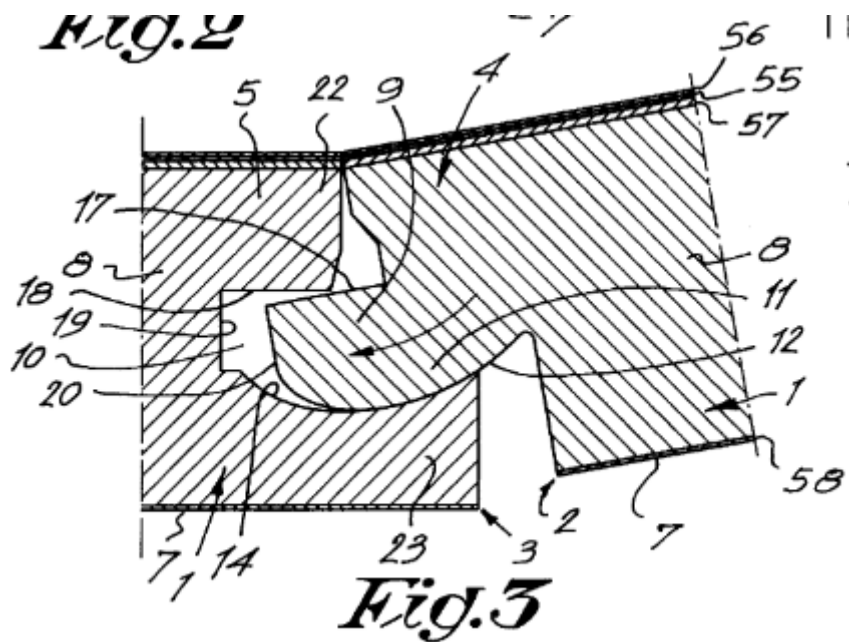
ANGLE MEAUREMENT

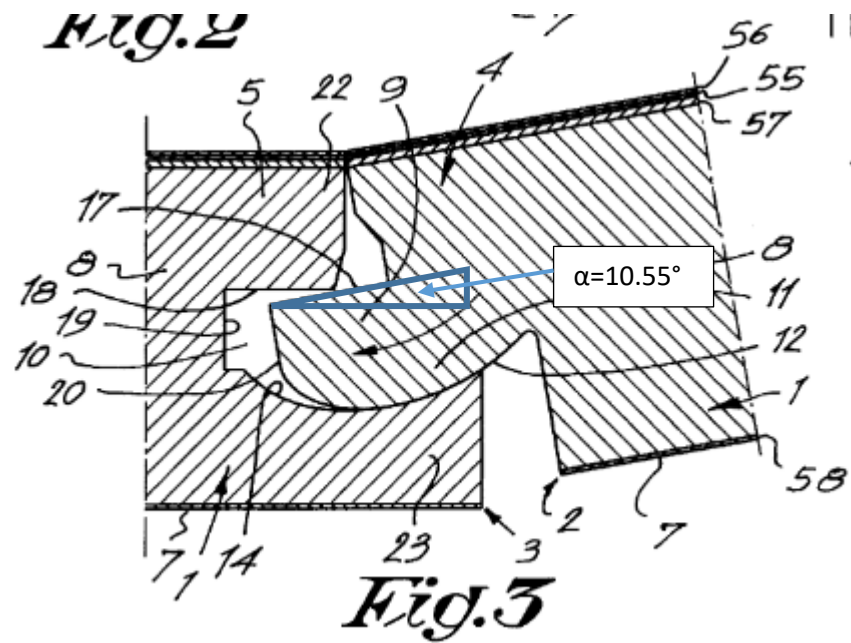
In order to measure an angle I used basic trigonometry.



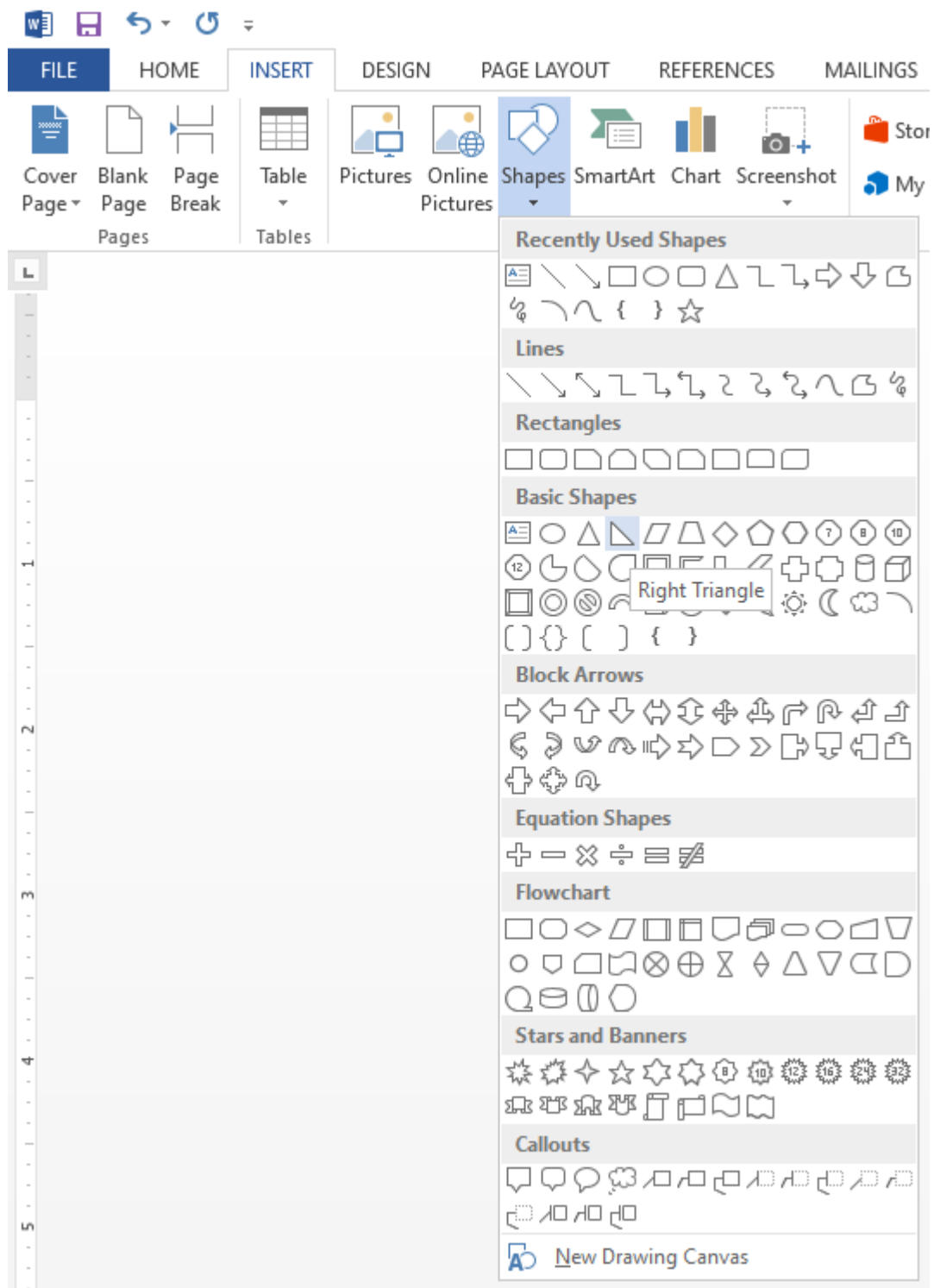
If you know lengths a and b , the angle α of any right triangle can be determined by $= \arctan\left(\frac{a}{b}\right)$. After measuring the height (a) and width (b) as described above I computed the desired angle. An example is shown below:

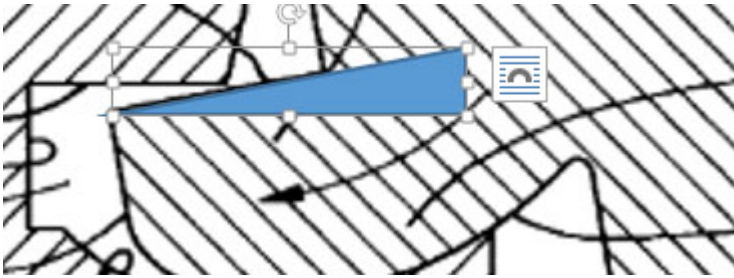
1. I insert the figure on interest here Fig. 3 of Moriau (US 6,006,486 A).



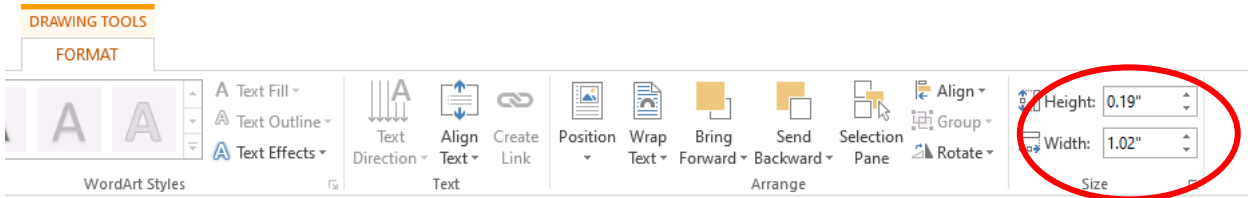


2. I insert a right triangle such that the desired angle (α) is between the Width (b) and the hypotenuse (c)





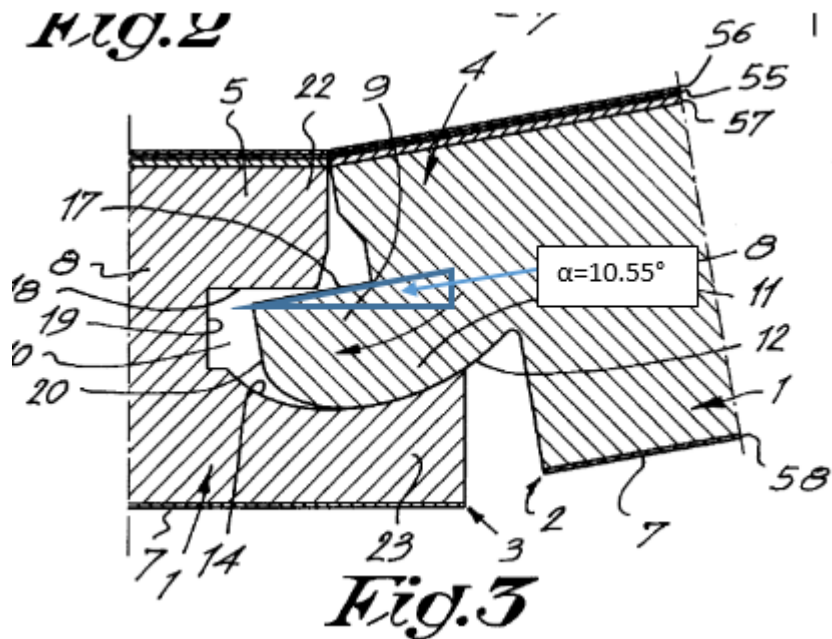
3. Then I look at the height and width of the right triangle. My height is a and my width is b.



4. Taking these values I plug them into $\alpha = \arctan\left(\frac{a}{b}\right)$ and determine the angle.

$$\alpha = \arctan\left(\frac{a}{b}\right) = \arctan\left(\frac{0.19}{1.02}\right) = \arctan(0.186) = 10.55^\circ$$

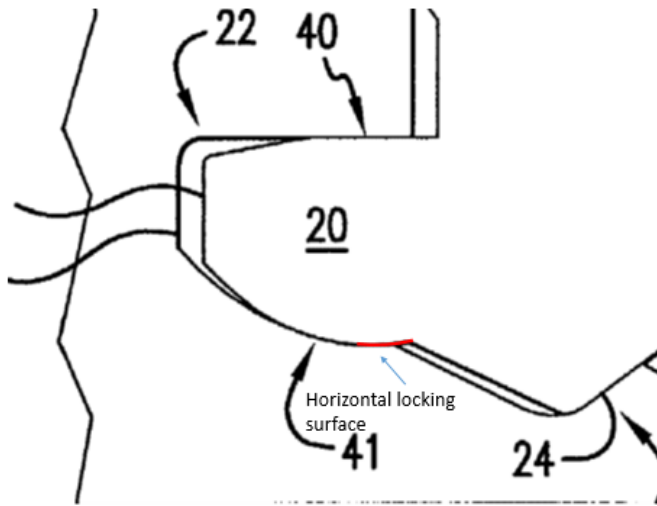
5. I format the annotated figure for clarity and insert it to my declaration or charts accordingly.



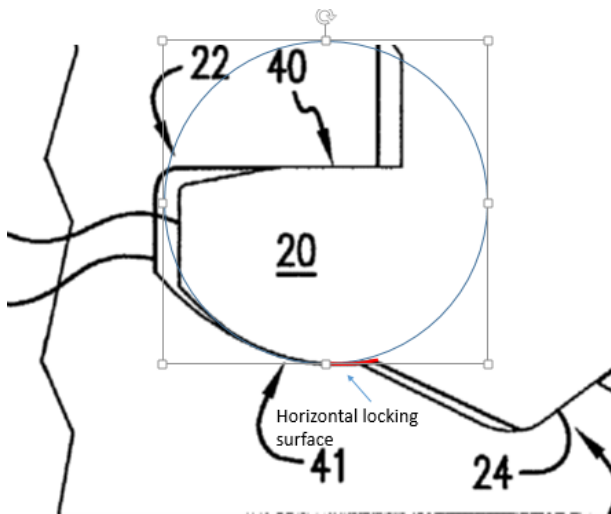
Annotated Fig. 3 of Moriau

Radial Center: In order determine the Radial center did the following:

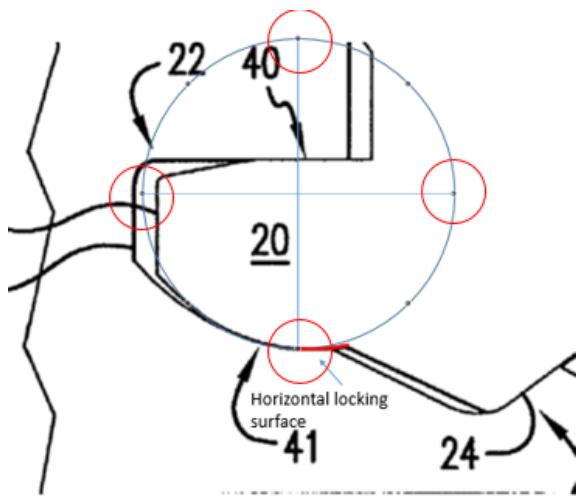
1. I identified and highlighted the horizontal locking surface



2. Used the Microsoft office tool to draw a circle whose arc followed the horizontal locking surface.



3. I inserted a vertical and horizontal diameter using the points provided in the drawing tool to ensure that the line was truly a diameter.



4. Where the lines crossed I identified as the radial center

