

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Owens Corning,
Petitioner

v.

CertainTeed Corporation,
Patent Owner

Patent No. 7,781,046

Issued: August 24, 2010

Filed: April 13, 2009

Inventors: Husnu M. Kalkanoglu and Stephen A. Koch

Title: SHINGLE WITH REINFORCEMENT LAYER

Inter Partes Review No. 2014-01397

PETITION FOR INTER PARTES REVIEW

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Attachment A. Proof of Service of the Petition

Attachment B. List of Evidence and Exhibits Relied Upon in Petition

I. Compliance with Requirements of an *Inter Partes* Review Petition

A. Certification that the Patent May Be Contested via *Inter Partes* Review by the Petitioner

Petitioner certifies it is not barred or estopped from requesting *inter partes* review of U.S. Patent No. 7,781,046 (“the ’046 patent”) (Ex. 1001). Neither Petitioner, nor any party in privity with Petitioner: (i) has filed a civil action challenging the validity of any claim of the ’046 patent; or (ii) has been served a complaint alleging infringement of the ’046 patent more than one year prior to the present date. Also, the ’046 patent has not been the subject of a prior *inter partes* review or a finally concluded district court litigation involving Petitioner.

Petitioner also certifies this petition for *inter partes* review is filed in compliance with 35 U.S.C. § 315(b). Petitioner Owens Corning was served a complaint alleging infringement of the ’046 patent on April 22, 2014 resulting in Civ. A. No. 1:14-cv-00510-SLR (D. Del.). *See* Ex. 1045 (Complaint).

B. Fee for Inter Partes Review (§ 42.15(a))

The Director is authorized to charge Deposit Account No. 50-1597.

C. Mandatory Notices (37 CFR § 42.8(b))

1. Real Party in Interest (§ 42.8(b)(1))

The real party in interest is Owens Corning, located at One Owens Corning Parkway, Toledo, OH 43659.

2. Other Proceedings (§ 42.8(b)(2))

The '046 patent is the subject of litigation in the District of Delaware (Civ. A. No. 1:14-cv-00510-SLR), which names Owens Corning as defendant. Patents related to the '046 patent, by continuation, are the subject of petitions for *inter partes* review filed concurrently herewith (IPR Nos. 2014-01401-1404).

3. Lead and Backup Lead Counsel (§ 42.8(b)(3))

<u>Lead Counsel</u> Jeffrey P. Kushan Reg. No. 43,401 jkushan@sidley.com (202) 736-8914	<u>Backup Lead Counsel</u> Peter S. Choi Reg. No. 54,033 peter.choi@sidley.com (202) 736-8076
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4. Service on Petitioner

Service on Petitioner may be made by mail or hand delivery to: Sidley Austin LLP, 1501 K Street, N.W., Washington, D.C. 20005. The fax number for Petitioner's counsel is (202) 736-8711.

D. Proof of Service (§§ 42.6(e) and 42.105(a))

Proof of service of this petition is provided in **Attachment A**.

II. Identification of Claims Being Challenged (§ 42.104(b))

Claims 1–9 of the '046 patent are unpatentable. Specifically:

- (1) Claims 1–8 are anticipated under § 102(b) by Venrick 1939.
- (2) Claim 9 would have been obvious under § 103 based on Venrick 1939.
- (3) Claims 1–9 would have been obvious under § 103 based on Venrick 1939 in view of Frankoski 1998.

- (4) Claims 1–9 would have been obvious under § 103 based on Venrick 1939 in view of Kiik 2001.

Petitioner’s proposed claim construction, the evidence relied upon, and precise reasons why the claims are unpatentable are provided in § IV, below. A list of evidence relied upon in support of this petition is set forth in Attachment B.

III. Relevant Information Concerning the Contested Patent

A. Background of the Technology

1. The Basic Asphalt Shingle Coated on Both Sides with Asphalt and Granules Had Been Known for Decades

Asphalt shingles have been used to cover roofs since the late-1800s. *See, e.g.*, Ex. 1005, Cash, “Asphalt Roofing Shingles,” Proc. 11th Conf. Roofing Tech. (1995) (Cash 1995), at 1; Ex. 1003 (Bryson Decl.), at ¶ 46. By the mid-1990s, three styles predominated: (1) the individual shingle; (2) the strip shingle (with or without tabs), and (3) the laminated shingle. Ex. 1005 (Cash 1995), at Figs. 10–12; Ex. 1003 (Bryson Decl.), at ¶¶ 46-47.

Asphalt waterproofs the shingle. Ex. 1007, Noone, “Asphalt-Shingles – A Century of Success and Improvement,” Proc. 11th Conf. Roofing Tech. (1993) (Noone 1993), at 2; Ex. 1003 (Bryson Decl.), at ¶ 48. In general, making an asphalt shingle involves passing a base mat through a coater, where layers of hot asphalt are applied to the top and back surfaces. Ex. 1007 (Noone 1993), at 2; Ex. 1003 (Bryson Decl.), at ¶ 48. Colored or non-colored granules are then dropped on

the front surface and other granular materials are applied to the back. Ex. 1007 (Noone 1993), at 2, 5; Ex. 1003 (Bryson Decl.), at ¶ 48. The granular material on the front adds color and texture. Finely ground talc and sand or other granular materials are added on the back to prevent sticking during storage and shipment. Ex. 1007 (Noone 1993), at 2, 5-6; Ex. 1003 (Bryson Decl.), at ¶ 48.

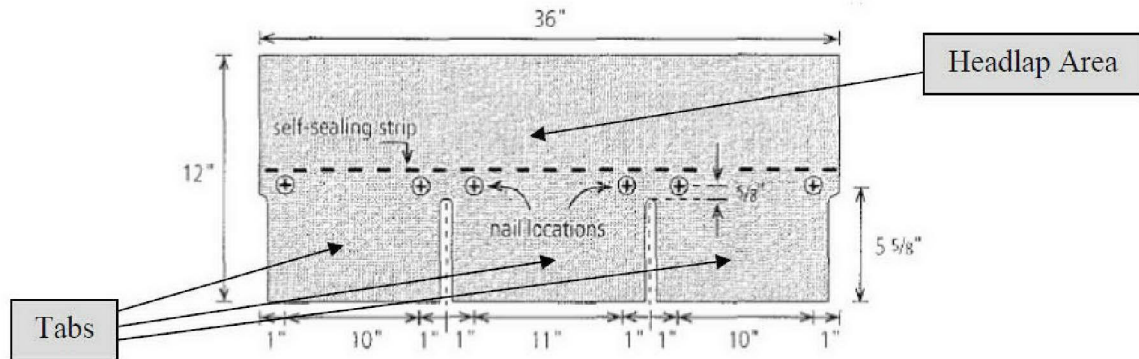
The basic steps for making an asphalt shingle, including coating both sides of the base mat (*i.e.*, substrate) with asphalt and applying granular material on both sides, have remained the same for decades. Ex. 1003 (Bryson Decl.), at ¶¶ 49-50. U.S. Patent No. 2,099,131 to Miller (issued in 1937) (Miller 1937) (Ex. 1008) states, for example:

It has heretofore been *common practice* to manufacture prepared roofing by saturating a suitable absorbant fabric, such as roofing felt, with a liquid bituminous material, e.g., asphalt, *coating both sides* of the saturated fabric with a *bituminous material, surfacing the bituminous coating on one side of the fabric with mineral grit*, such as crushed slate, and *applying mica, soapstone, or other anti-stick material to the coating on the other side of the fabric.*

Id. at 4, col. 1:13–24 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶ 50.

A typical strip shingle includes a plurality of tabs (*i.e.*, flaps) that extend downwardly from a headlap area. Ex. 1003 (Bryson Decl.), at ¶¶ 56-57. Each asphalt shingle has a nailing zone or fastening zone for attachment to a roof. *Id.* As shown below in the 1997 edition of the ARMA Residential Roofing Manual

(ARMA Manual 1997) (Ex. 1009), Fig. 10, the nailing zone typically is located just above the tabs in the headlap area. Also shown is the generally longitudinal dimensions of the typical strip shingle, *i.e.*, 36" x 12".



Ex. 1003 (Bryson Decl.), at ¶ 57. As shown, the nailing zone is (a) generally longitudinal like the shingle itself, (b) located between the right and left shingle edges, and (c) generally intermediate of the upper and lower edges of the shingle.

Ex. 1003 (Bryson Decl.), at ¶ 57-58.

Claim 1 of the '046 patent provides: “[a] shingle having front and rear surfaces, a width defined by upper and lower edges and a length defined by right and left edges.” Elements (a)-(d) of claim 1 require the following:

- (a) a base layer of mat having front and rear surfaces;
- (b) a coating of asphaltic material on both front and rear surfaces of the mat;
- (c) coatings of granular material on both front and rear surfaces and adhered thereto, which, together with said base layer of mat and coatings of asphaltic material comprise a first thickness layer; and

(d) a longitudinal fastening zone between right and left shingle edges generally intermediate said upper and lower edges.

Ex. 1001 ('046 patent), col. 6:30-42.

These elements describe nothing more than the basic asphalt shingle, or what was “common practice” since at least the 1930s. Ex. 1003 (Bryson Decl.), at ¶¶ 59-68.

The '046 patent acknowledges that the components of the “basic” asphalt shingle were known in the prior art. Ex. 1001 ('046 patent), at col. 2:38–63; Ex. 1003 (Bryson Decl.), at ¶¶ 59-68.

To the basic asphalt shingle, elements (e)-(f) of claim 1 of the '046 patent add and describe a “reinforcement second thickness layer”:

(e) a generally longitudinal reinforcement second thickness layer of a substantially thinner dimension than said first thickness layer, adhered to said shingle and extending at least substantially between right and left edges of the shingle; and

(f) said reinforcement layer extending at least partially into the fastening zone.

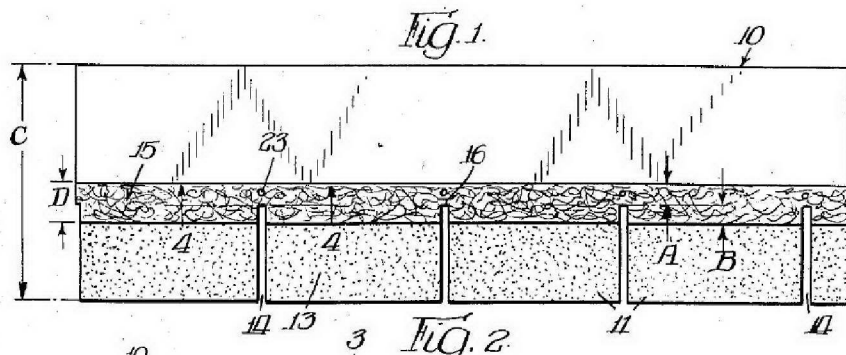
Ex. 1001 ('046 patent), at col. 6:43-49; *see also id.* col. 3:5-7 (“the shingle 20 is similar to that of the [prior art] shingle 10 of FIG.1, but with a reinforcement layer”). Reinforcement layers having the claimed features were known in the prior art. Ex. 1003 (Bryson Decl.), at ¶¶ 69-120.

2. The Prior Art Disclosed a Generally Longitudinal Second Thickness Layer For Reinforcement in the Nailing Zone

U.S. Patent No. 2,161,440 to Venrick (Venrick 1939) describes a

“reinforcing strip” for “strengthening,” to “reduce...tear,” and to “provide a ***reinforced*** area for nailing the shingle to the roof.” Ex. 1013 (Venrick 1939), at 3, col. 1:40–46 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶¶ 93-97.

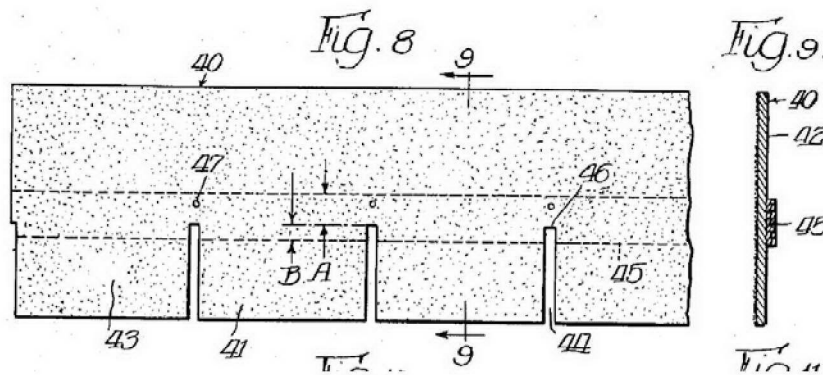
The Venrick 1939 strip, which may be made of felt, metal, or “layers of roofing tape,” Ex. 1013 (Venrick 1939), at 4, col. 2:74-75, also functions to add “rigidity” to the tabs to “resist[] the action of the wind.” *Id.* at 5, col. 1:1-9; Ex. 1003 (Bryson Decl.), at ¶ 94. “[I]mproved resistance to failure upon bending” is also a function of the reinforcement layer in the ’046 patent. Ex. 1001 (’046 patent), col. 5:28-29; Ex. 1003 (Bryson Decl.), at ¶ 94. The reinforcing strip is shown in Fig. 1 of Venrick 1939 as 15 on the front surface of a shingle.



Ex. 1003 (Bryson Decl.), at ¶ 95. Venrick 1939 also teaches that the reinforcement strip can be placed on the “undersurface,” or rear. Ex. 1013 (Venrick 1939), at 4, col. 2:60–63, *see also* Figs. 8–14; Ex. 1003 (Bryson Decl.), at ¶ 96. Also, the strip is preferably “cemented” onto the granule surfacing, Ex. 1013 (Venrick 1939), at 2, col. 1:32–37, and overlaps with the nailing zone to “give greater nailing strength to the shingle,” Ex. 1013 (Venrick 1939), at 4, col. 2:11–

23; Ex. 1003 (Bryson Decl.), at ¶ 96.

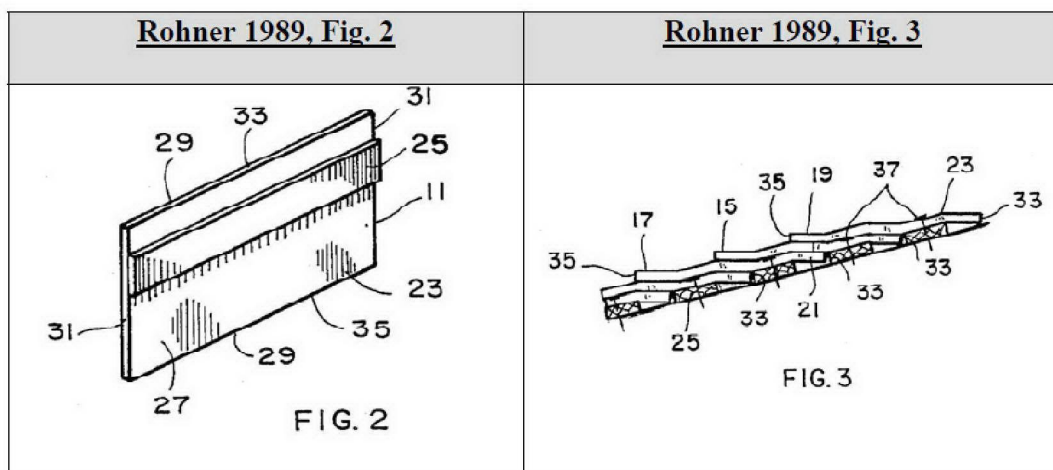
Figs. 8 and 9 of Venrick 1939 show the reinforcement strip 45 as a visible component that is adhered to the exterior rear surface of the shingle. Ex. 1013 (Venrick 1939); Ex. 1003 (Bryson Decl.), at ¶ 97. It extends at least partially into the zone having nailing holes 47, and as shown by the hashed lines, it also extends at least partially lower than the nailing zone (*i.e.*, into the tab portion toward the lower edge of the shingle). *Id.* It also extends toward the upper edge of the shingle into the headlap area. *Id.* The reinforcement strip clearly forms a second thickness layer. *Id.* The strip is also generally longitudinal. *Id.*



It was known in the art that nailing through multiple layers of shingle material provided strength and contributed to roofing integrity. Ex. 1003 (Bryson Decl.), at ¶ 98. *E.g.*, U.S. Patent No. 6,145,265 (Ex. 1011), at col. 1:60–62 (“[N]ailing through a double layer of material provides strength, which is essential for roofing integrity in windy conditions.”). Because the nailing zone was generally longitudinal, *see* Ex. 1009 (ARMA Manual 1997), at Fig. 10, it would

only make sense to make the reinforcement layer generally longitudinal while extending it at least partially into the nailing zone. Ex. 1003 (Bryson Decl.), at ¶ 98. This is what Venrick 1939 teaches. See Ex. 1013 (Venrick 1939), at 5, col. 1:50-54 (“The shingles are nailed preferably... where the raised median strip is.”); Ex. 1003 (Bryson Decl.), at ¶ 98.

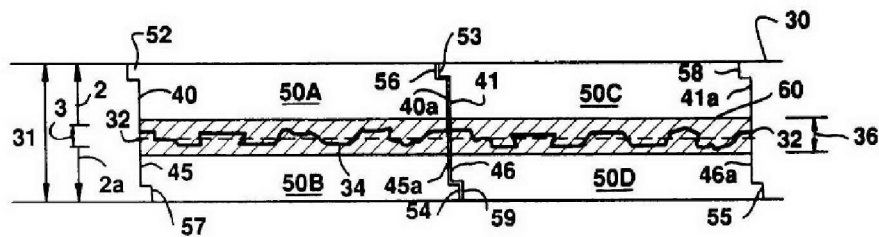
Examples of reinforcing layers affixed to the rear surface abound. U.S. Patent No. 4,875,321 to Rohner (Rohner 1989) (Ex. 1015) discloses a “backing strip” (Fig. 2, 25) that can be made of “light-weight weather-resistant material” which functions to “provide a stiffer shingle which grips the nails....” *Id.* at col. 1:55–59; Ex. 1003 (Bryson Decl.), at ¶ 103. Fig. 2 of the reference exemplifies a shingle with a reinforcing backing layer 25. Ex. 1003 (Bryson Decl.), at ¶¶ 103-104. Fig. 3 of Rohner 1989 confirms that the rear facing reinforcing layer 25 extends at least partially into the nailing zone 37. Ex. 1015 (Rohner 1989); Ex. 1003 (Bryson Decl.), at ¶¶ 103-104.



The Rohner 1989 “backing strip” forms a second thickness layer on the rear and is generally longitudinal. Ex. 1003 (Bryson Decl.), at ¶¶ 103-104.

Similarly, U.S. Patent No. 5,860,263 to Sieling (Sieling 1999) (Ex. 1016) shows a “reinforcement” strip 60 affixed to the back portion of an asphalt shingle. Ex. 1003 (Bryson Decl.), at ¶ 105.

FIG.5



Sieling 1999 describes the reinforcing strip as having dimensions which the person of ordinary skill would understand to fall within the nailing zone of the shingle. Ex. 1016 (Sieling 1999), at col. 3:23–28; Ex. 1003 (Bryson Decl.), at ¶ 106. The reinforcing strip in Sieling 1999 is on the exterior surface of the shingle, forms a second thickness layer, and is generally longitudinal in orientation, like the shingle itself. Ex. 1003 (Bryson Decl.), at ¶ 106.

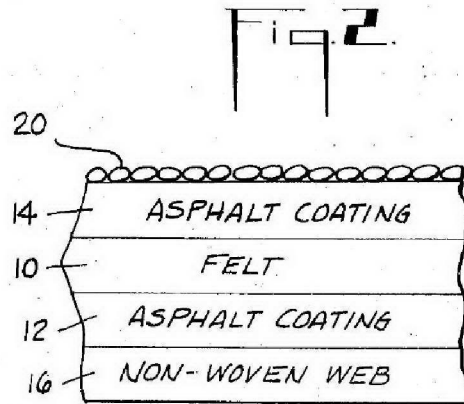
3. The Prior Art Taught Thin Reinforcement Material

As Venrick 1939, Rohner 1989, and Sieling 1999 show, the concept of using a reinforcing layer on the back of a shingle was not new. Ex. 1003 (Bryson Decl.), at ¶¶ 69-120. Nor was the concept of using thin material for reinforcement. *Id.*

U.S. Patent No. 3,813,280 to Olszyk (Olszyk 1974) (Ex. 1014) issued in

1974 and shows (Fig. 2) a web layer 16 affixed to the back of an asphalt shingle.

Ex. 1003 (Bryson Decl.), at ¶ 99.



Among other things, the purpose of the web layer in Olszyk 1974 is “adding reinforcement ... and providing additional tear strength.” Ex. 1014 (Olszyk 1974), at col. 4:17–27 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶ 100. The thickness of the web is on the order of 1/1000th of an inch. Ex. 1014 (Olszyk 1974), at col. 3:59-60 (“a thickness of between 10 mils or less to about 30 mils.”); Ex. 1003 (Bryson Decl.), at ¶ 101.

Petitioner Owens Corning itself has developed technology to improve the “impact resistance” of roof shingles by fusing a web coating made of, for example, thermoplastic polymer fibers, on the rear surface of an asphalt shingle. U.S. Patent No. 6,228,785 to Miller (Miller 2001) (Ex. 1017), which issued on May 8, 2001, discloses a shingle made of such materials. *E.g., id.* at col. 2:19–32, col. 4:13–24, col. 7:4–26; Ex. 1003 (Bryson Decl.), at ¶ 107. These materials would have been

understood to be considerably thinner than the main body of the shingle. *Id.* at ¶¶ 107-108. The purpose of this material was to provide impact resistance. *Id.* at ¶108.

U.S. Patent Publ. No. 2001/0055680 to Kiik (Kiik 2001) (Ex. 1018) published on December 27, 2001. Kiik 2001 discloses an asphalt roof shingle having a “backing material” that can be made of woven polyester and latex fiber bound by latex. *Id.* at [0004], [0006]; Ex. 1003 (Bryson Decl.), at ¶ 110. The exemplary backing materials have a thickness of 13 or 23 1/1000th of an inch. Ex. 1018 (Kiik 2001), at [Table 1]; Ex. 1003 (Bryson Decl.), at ¶ 110.

Data in Kiik 2001 show that reinforced laminated shingles exhibited improved tear strength and nail pull strength. Ex. 1018 (Kiik 2001), at Table 1 and 2; Ex. 1003 (Bryson Decl.), at ¶ 113. Thus, like Venrick 1939, Olszyk 1974, and Miller 1998, Kiik 2001 would have provided the person of ordinary skill with the understanding that thin material could be affixed to the back of an asphalt shingle to provide reinforcing properties. Ex. 1003 (Bryson Decl.), at ¶ 113.

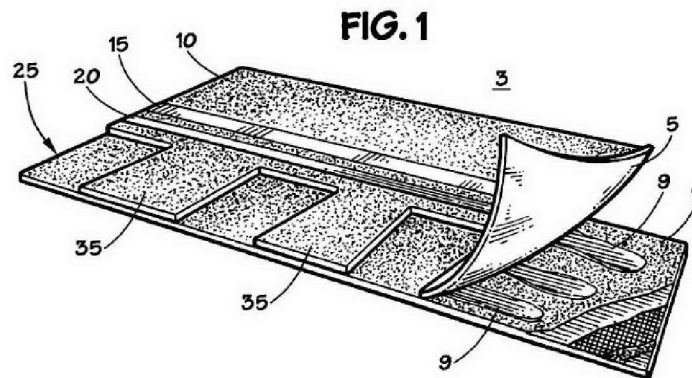
Another example of the use of thin material to reinforce shingles is found in U.S. Patent No. 5,571,596 to Johnson (Johnson 1996) (Ex. 1022) issued in 1996. Johnson 1996 discloses “reinforcement material” made of E-glass fabric (fiberglass) and Kevlar fabric. *Id.* at col. 3:48–51; Ex. 1003 (Bryson Decl.), at ¶¶ 119-120. The addition of the reinforcing material did not materially affect the

thickness of the shingle because “the mat 20 is *much thicker* than the [reinforcement] fabrics 24 and 28.” Ex. 1022 (Johnson 1996), at col. 4:54–56 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶¶ 119-120. As shown in Fig. 3 of the patent (Ex. 1022), reinforcing layers 24 and 28 extend into the nailing zone. Ex. 1003 (Bryson Decl.), at ¶¶ 119-120.

4. Laminated Shingles Including Multiple Reinforcement Layers Were Known

U.S. Patent No. 5,822,943 to Frankoski (Frankoski 1998) (Ex. 1010) issued in 1998. Ex. 1003 (Bryson Decl.), at ¶ 71. The '046 patent incorporates by reference Frankoski 1998 and says that the “basic” asphalt shingle can be made according to its teachings. Ex. 1001 ('046 patent), at col. 2:60-63.

Frankoski 1998 (Ex. 1010) discloses a laminated shingle, which is exemplified by Figures 1 and 2 of the reference. Ex. 1003 (Bryson Decl.), at ¶ 71. A laminated shingle is simply a shingle made of two layers that are glued together. *Id.* This is shown in Figure 1 of Frankoski 1998 (Ex. 1010).

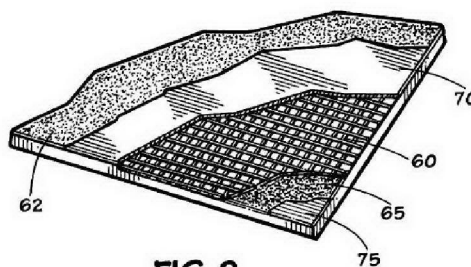


The shingle comprises an upper layer 5 and a lower layer 7, which are glued

together with a sealant 9. Ex. 1003 (Bryson Decl.), at ¶ 72. The upper layer has a headlap area 10 and a number of tabs (shown as 35). *Id.* The lower layer is generally longitudinal, and extends between the right and left edges. *Id.*

It was widely known that gluing an extra shingle layer to the back surface of what was essentially a single layer strip shingle, as in a laminated shingle, provided reinforcement properties by enabling a roofer to nail through two, rather than one, layer of material. *Id.* at ¶ 76. U.S. Patent No. 6,145,265 (Malarkey 2000) (Ex. 1011) explains this common sense principle by noting that “nailing through a double layer of material provides strength.” *Id.* at col. 1:54-62 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶ 76. Laminated shingles, which by the late 1990s and early 2000s were among the most popular shingles made and sold, therefore utilized a second thickness layer of material that was recognized to provide reinforcement. Ex. 1003 (Bryson Decl.), at ¶ 76.

Fig. 2 of Frankoski 1998 (Ex. 1010) also shows a scrim layer 60 in the laminated shingle. Ex. 1003 (Bryson Decl.), at ¶¶ 77-78.



Scrim is thin material that can be made from any number of different fabrics,

synthetic, or composite materials. *Id.* The scrim layer “provides a superior strength and nail pull-through resistance to withstand, for example, hurricane force winds.” Ex. 1010 (Frankoski 1998), at col. 3:20–24; Ex. 1003 (Bryson Decl.), at ¶ 78. Frankoski 1998 states that the reinforcing scrim preferably extends the entire length of the shingle. Ex. 1010 (Frankoski 1998), at col. 5:27–28. This would be understood to mean that the reinforcing scrim is generally longitudinal given that most shingles were longer than they were wide. Ex. 1003 (Bryson Decl.), at ¶¶ 78–81. Frankoski 1998 also states that the scrim should “coincide with at least a portion of the nail zone.” Ex. 1010 (Frankoski 1998), at col. 5:38–39; Ex. 1003 (Bryson Decl.), at ¶ 81.

As discussed *infra* at § III.C.2., Patent Owner distinguished the alleged invention over Frankoski 1998 by arguing that the reinforcing layer of the alleged invention is not “embedded” within the shingle as the scrim 60 is in Frankoski 1998, and that it instead is affixed to the exterior, rear surface of the shingle. At the time these arguments were made, neither Venrick 1939, Rohner 1989 nor Sieling 1999 (each discussed above) were before the Patent Office. *See generally*, Ex. 1003 (Bryson Decl.), at §§ III.F. - III.H.

B. General Overview Of The '046 Patent

The '046 patent issued on August 24, 2010, to inventors Kalkanoglu and Koch. The title of the '046 patent is “Shingle With Reinforcement Layer.” Ex.

1001 ('046 patent), at col. 1:1.

1. The '046 Patent Recognizes the Basic Asphalt Shingle Was Known

The '046 patent acknowledges that the basic components of an asphalt shingle were known in the prior art. Ex. 1001 ('046 patent), at col. 2:38–63.

Referring to Fig. 1, the '046 patent describes the “prior art shingle” as follows:

Referring now to the drawings in detail, reference is first made to FIG. 1, wherein a prior art shingle is illustrated as comprising a shingle generally designated by the numeral 10, constructed as a mat of preferably fiberglass mesh, having asphalt, or some other form of bitumen material impregnated therein, and forming layers on each surface thereof, with a granular material on each exposed surface. On the upper exposed surface, will be granules of a size desired to resist sun and other weather conditions, and on the opposite, or undersurface 11, there will be preferably smaller granules of a mica, sand or like material, for example.

Id. at col. 2:39–59. The '046 patent states that the “basic” prior art shingle can be made by the methods disclosed in, among other references, Frankoski 1998. *Id.* at col. 2:60–61; Ex. 1003 (Bryson Decl.), at ¶ 70.

2. Only a Rear Exterior Surface Reinforcement Layer Is Disclosed in the '046 Patent

The person of ordinary skill would understand that the reinforcement layer disclosed in the '046 patent is affixed to the rear surface of the asphalt shingle, and nowhere else. Ex. 1003 (Bryson Decl.), at ¶ 135.

The abstract of the '046 patent states: “A shingle and a method of making it is provided in which ***the rear surface of the shingle*** is provided with an attached reinforcement layer” Ex. 1001 ('046 patent), at 1 (emphasis added). The specification also states: the “***present invention*** is directed toward providing a shingle, wherein a separate, ***exterior reinforcement layer*** is provided ***outside the rear surface of the shingle...***” *Id.* at col. 1:43–47 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶¶ 136-137.

Each of the figures provided in the '046 patent show the reinforcement layer to be located on the rear surface of the shingle. Ex. 1003 (Bryson Decl.), at ¶¶ 138-143. For example, Fig. 2 shows a prior art shingle with a “***reinforcement layer applied to the rear surface*** thereof, in ***accordance with the present invention.***” Ex. 1001('046 patent), at col. 2:9-11 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶139. Figure 3 also shows the “rear surface” of the shingle. Ex. 1003 (Bryson Decl.), at ¶ 141.

Indeed, the specification consistently emphasizes that the reinforcement layer is located on the “rear surface.” *See, e.g.*, Ex. 1001 ('046 patent), at Figs. 4 and 4A (reinforcement layer 29 on rear surface of shingle), col. 1:42–47 (“reinforcement layer is provided ***outside the rear surface***”), col. 3:7–10 (“a reinforcement layer . . . ***added on the rear*** 21 of the shingle”); col. 4:1–2 (“the scrim ***46 applied to the undersurface***”); col. 5:24–6:24 (extolling performance of

“scrim reinforcement embedded *on their rear sides*,” a “polyester mat reinforcement layer *on their rear surfaces*,” a heavier “reinforcement layer *on the rear surface*,” “fiber-glass scrim *on the rear surface*,” and “reinforcement material that is *applied to the rear*”) (emphasis added). Ex. 1003 (Bryson Decl.), at ¶ 143. Not once is there any indication that the reinforcement layer can be placed elsewhere. *Id.*

Moreover, the specification describes only one method for making the described shingle, and this method places the reinforcement layer on the rear. Ex. 1001('046 patent), at col. 3:47-59 (“[T]he reinforcement layers 29, 39 may . . . [be] either embedded in the asphaltic layer *on the rear* of the shingle or adhered *to the rear* of the shingle “The reinforcement layer 29, 39 will be adhered to *the rear surface* 21, 31 of the shingles *of this invention*, by means of any suitable adhesive. . . .”) (emphasis added); Ex. 1003 (Bryson Decl.), at ¶ 144.

Placement on the rear is also described to be critical to performance. Ex. 1003 (Bryson Decl.), at ¶ 145. Figure 4 of the '046 patent illustrates that “[w]hen wind forces occur in the general direction indicated by the arrow 43 in FIG. 4, such that they tend to bend the tab portion 44 of the shingle upwardly to an angle “a”, as shown by the dotted arrow 45, the scrim 46 *applied to the undersurface of the shingle* 41 will tend to resist upward bending of the shingle tab portion 44, largely because of the resistance to such bending that is provided by the reinforcement

layer 29, 39 as shown in FIGS. 2 and 3 which will resist stretching and thereby inhibit bending.” Ex. 1001 (’046 patent), at col. 3:65-4:6 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶¶ 145-147.

3. The Reinforcement Layer Is “Adhered” to the Surface in All the Claims

The specification draws a distinction between a reinforcement layer that is “adhered” to the shingle and one that is “embedded”: “the reinforcement layers” are “either embedded in the asphaltic layer on the rear of the shingle or adhered to the rear of the shingle....” Ex. 1001 (’046 patent), col. 3:51-56 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶¶ 149-151.

The claims of the ’046 patent all require a reinforcement layer that is “adhered” to the shingle. Ex. 1001 (’046 patent), at col. 6:30-8:16. As explained *infra* at §III.C.2., during prosecution of related applications, Patent Owner distinguished Frankoski 1998 on the basis that it disclosed an “embedded” reinforcement layer, as opposed to one applied to an external, rear surface of the shingle. *See infra*, at § III.C.2.

4. The Reinforcing Layer Provides Strength and Stability

The function of the reinforcement layer described in the ’046 patent is to provide additional strength and stability to the shingle. Ex. 1003 (Bryson Decl.), at ¶¶ 154-160. As discussed, the purpose of the alleged invention is to, among other things, provide “improved resistance to damage due to wind uplift.” Ex. 1001

(’046 patent), at col. 5:32–34. Another purpose is to “resist tearing.” *Id.* at col. 4:23–33. Results from “bending tests” and “[n]ail pull tests” are presented to illustrate the qualities of shingles made according to the claimed invention. *Id.* at col. 4:34-6:9.

C. Prosecution History and Effective Filing Date of the ’046 Patent

1. Prosecution of the ’046 Patent

The ’046 patent issued on August 24, 2010, from U.S. Application No. 12/422,506, which was filed on April 13, 2009. Ex. 1001 (’046 patent). As filed, the abstract read as follows:

A shingle and a method of making it is provided in which *the rear surface of the shingle* is provided with an attached reinforcement layer through which fasteners may be applied when the shingle is applied to a roof.

Id. (emphasis added).

None of the claims were rejected for prior art reasons. Venrick 1939 was not before the Patent Office during prosecution of the ’506 application. Ex. 1003 (Bryson Decl.), at ¶¶ 224-226.

2. Prosecution of Related Patent Applications

The ’506 application that resulted in the issuance of the ’046 patent is related, by continuation, to a number of other applications filed both before and after the issuance of the ’046 patent. Frankoski 1998 played a prominent role

during the prosecution of several of these applications. On the one hand, Patent Owner first sought to supplement the specification by incorporating Fig. 1 of Frankoski 1998 into the disclosure, claiming that the new figure reflected the “preferred” embodiment of the alleged invention. But when the claims were rejected in view of Frankoski 1998, Patent Owner then went to great lengths to distinguish the alleged invention from the Frankoski 1998 reference. Patent Owner’s actions shed important light on the nature and scope of the alleged invention.

a) U.S. Appl. No. 10/871,911

U.S. Application No. 10/871,911 was filed on June 18, 2004. Ex. 1027 (’794 patent), at 1. It issued on October 10, 2006, as U.S. Patent No. 7,118,794. *Id.*; Ex. 1003 (Bryson Decl.), at ¶ 234.

All the pending claims were rejected in an Office Action dated June 1, 2005. Ex. 1024 (’911 Appl. File Wrapper), at 52. Among other things, the claims were rejected as being anticipated by, or obvious in view of, Frankoski 1998.

In response to the rejection, the Patent Owner amended claim 1 to require that the claimed wind resistant layer be on the “rear surface of said shingle”, and argued that Frankoski 1998 did not anticipate or render obvious the claims: “Frankoski does not disclose a scrim on an outer surface of the shingle,” whereas “the scrim of the instant invention is on the rear surface of the shingle, having a

front surface thereof adhered to the asphaltic material on the ***rear surface*** of the shingle, and the ***rear surface*** of the scrim being uncoated, to resist upward lift via wind.” *Id.* at 67-71 (emphasis added). The Patent Owner stated: “The invention of Frankoski is directed to how one makes a substrate; it has nothing to do with applying a layer of scrim on to the ***rear surface*** of a shingle to resist wind lift-up.” *Id.* at 72.

The Examiner was apparently persuaded by the Patent Owner’s arguments. The rejections based on Frankoski 1998 were withdrawn, and the application subsequently allowed to issue. *See id.* at 119.

b) U.S. Appl. No. 12/857,868

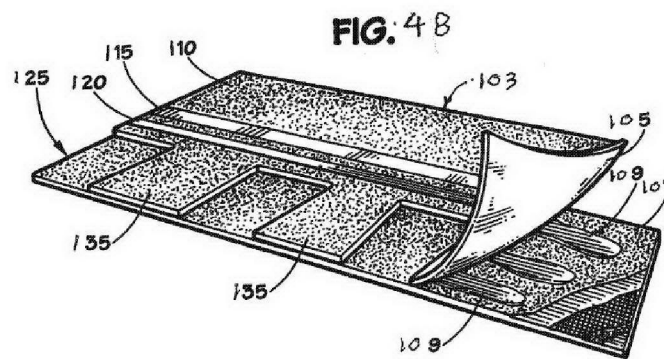
U.S. Appl. No. 12/857,868, filed on August 17, 2010 claims to be a continuation of the ’506 application. Ex. 1034 (’243 patent), at 1. It issued on May 8, 2012, as U.S. Patent No. 8,173,243. *Id.*; Ex. 1003 (Bryson Decl.), at ¶¶ 244-245.

The original application was filed with eleven claims. Ex. 1029 (’868 Appl. File Wrapper), at 19-22. As filed, the abstract read as follows:

A laminated shingle and a method of making it is provided in which ***the rear surface of the shingle*** is provided with an attached reinforcement layer through which fasteners may be applied when the shingle is applied to a roof.

Id. at 23 (emphasis added).

In a preliminary amendment, new Fig. 4B was added. *Id.* at 52. The stated purpose of the addition was to “incorporate subject matter from one or more other patents that were incorporated by reference in the specification.” *Id.* at 50. New Fig. 4B was presented as a photocopy of Fig. 1 from Frankoski 1998, with handwritten annotations increasing the item numbers by 100. Ex. 1003 (Bryson Decl.), at ¶¶ 247-248:



A new description corresponding to Fig. 4B was also added to the specification. Ex. 1034 ('243 patent), at col. 4:40–49; *see* Ex. 1029 ('868 Appl. File Wrapper), at 50-51. This passage is identical to the passage in Frankoski 1998 except for the re-numbering of the items and the introduction of a typographical error. Ex. 1003 (Bryson Decl.), at ¶ 252.

In the amended excerpt, Patent Owner stated that Fig. 4B showed “[t]he *preferred laminated roofing shingle*” “*in accordance with the present invention.*” *See* Ex. 1029 ('868 Appl. File Wrapper), at 51; Ex. 1034 ('243 patent), at col. 4:40–41 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶ 253. This material is the

only description of a laminated shingle contained in the specification. This material was added on 9/22/2010 in the '868 application and does not appear in the specification of the '046 patent.

In an office action dated October 15, 2010, all the pending claims were rejected in view of Frankoski 1998. Ex. 1029 ('868 Appl. File Wrapper), at 57. In the rejection, the Examiner indicated that the scrim 60 in Frankoski 1998 satisfied the “reinforcement second thickness layer” limitation required by the claims. *Id.* at 60-62; Ex. 1003 (Bryson Decl.), at ¶ 255.

In response, the Patent Owner argued that the claimed reinforcement layer is located “on ‘said rear surface of said posterior layer of said shingle,’” whereas the reinforcement layer of Frankoski 1998 is shown “as being above the mat layer.” Ex. 1029 ('868 Appl. File Wrapper), at 84 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶¶ 256-257.

Patent Owner also argued that, unlike the alleged invention, the reinforcement layer of Frankoski 1998 is embedded in the shingle: “While in Frankoski et al, the scrim may be either above or below the mat, ***it is nevertheless embedded in the shingle layer.***” Ex. 1029 ('868 Appl. File Wrapper), at 84 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶ 258.

The Patent Owner also argued that the position of the reinforcement layer on the rear surface of the shingle was critical to the performance of the shingle:

the scrim appears on the rear of the posterior layer of the shingle and *it is because of this* that such provides the favorable force bending characteristics for the shingle shown in Fig.4, that resist upward lifting due to wind conditions. *This is different than applying a scrim inwardly of the shingle*, and serves to maximize resistance to upward bending under wind conditions. Again, on page 5 of the specification of the instant application, *the presence of the scrim layer on the rear of the shingle is emphasized.*

Ex. 1029 ('868 Appl. File Wrapper), at 84-85; Ex. 1003 (Bryson Decl.), at ¶ 259 (emphasis added).

When these arguments proved unsuccessful, Patent Owner appealed the rejections. Ex. 1029 ('868 Appl. File Wrapper), at 117. In the summary of the subject matter, the Patent Owner stated: “A reinforcement layer is *on the rear surface* of the shingle.” *Id.* at 125-26 (emphasis added). Ultimately, without any decision the appeal, the Examiner allowed the claims and the application issued as the '243 patent. *Id.* at 180; Ex. 1003 (Bryson Decl.), at ¶¶ 266-267.

3. Effective Filing Date of the Claims

For the purposes of this proceeding, Petitioner will assume that the effective filing date of claims 1–9 of the '046 patent is not earlier than November 6, 2002, the earliest filing date of any application to which the '046 patent claims priority. Ex. 1003 (Bryson Decl.), at ¶ 45.

D. Person of ordinary skill

The person of ordinary skill has a bachelor's degree, and potentially some advanced schooling, in chemistry, engineering (such as chemical, civil, or mechanical engineering), materials science, physical science, or a related discipline, and approximately 3–5 years of additional training and experience in the field of roofing materials and asphalt shingles. Ex. 1003 (Bryson Decl.), at ¶ 44.

E. Construction of Terms Used in the Claims

In an IPR, claims must be given their broadest reasonable construction in light of the specification. *See* 37 CFR 42.100(b); M.P.E.P. § 2111.01.

1. Elements (a)-(d) of Claim 1

As discussed *supra* at § III.A.1., the preamble and elements (a)-(d) of claim 1 describe nothing more than the “basic” prior art asphalt shingle, made by methods considered “common practice” since at least the 1930s. And as discussed, *supra* at § III.A.1., the '046 patent itself acknowledges that basic asphalt shingle was known. Ex. 1001 ('046 patent), at col. 2:39–59; Ex. 1003 (Bryson Decl.), at ¶¶ 59-68. The preamble and elements (a)-(d) therefore encompass nothing more than an asphalt shingle made of (i) a base layer of mat having front and rear surfaces, (ii) a coating of asphaltic material on both front and rear surfaces of the mat, and (iii) a coating of granular material on the asphaltic material on both front and rear surfaces, which combined together form a “first thickness layer.” Ex.

1003 (Bryson Decl.), at ¶ 293.

2. “said shingle”

Claim 1 uses the term “shingle” three times. “Shingle” is used in the preamble to describe the claimed product as a whole. “Shingle” also appears twice in element (e), describing the location where the “reinforcement second thickness layer” is “adhered.” Ex. 1001('046 patent), at col. 6:43-47; Ex. 1003 (Bryson Decl.), at ¶ 294.

The use of the term “shingle” to describe both (1) the claimed product as a whole and (2) the location where a component of the claimed product is adhered is internally inconsistent and raises questions as to claim scope. Ex. 1003 (Bryson Decl.), at ¶ 295. For example, if the “reinforcement second thickness layer” is one component of the claimed “shingle,” while at the same time being adhered to the same “said shingle,” then one possibility, based on the literal reading of the claim, is that the “reinforcement second thickness layer” is adhered to itself. *Id.* But this obviously makes no sense. *Id.*

This logical inconsistency is resolved only if, for the purposes of this proceeding, different meanings are assigned to the term “shingle” depending on the context. In the preamble, the term “shingle” clearly refers to the claimed product as a whole, which includes a “reinforcement second thickness layer.” *Id.* at ¶ 297. But in element (e), the “said shingle” cannot already include a “reinforcement

second thickness layer” because element (e) states that the “reinforcement second thickness layer” is “adhered to said shingle.” *Id.* at ¶ 298.

To make any sense of this otherwise illogical claim, the “shingle” in element (e) should be interpreted to mean the “first thickness layer” identified in element (c). Claim 1 requires a distinct “first thickness layer” and a distinct “reinforcement second thickness layer.” *Id.* at ¶ 299. The “first thickness layer” comprises “a base layer of mat,” “a coating of asphaltic material on both front and rear surfaces of the mat,” and “coatings of granular material on both front and rear surfaces.” *Id.* at ¶ 300. Because of the requirement for distinct first and second thickness layers, the only location to which the “reinforcement second thickness layer” may be adhered is the outside exterior surface (*i.e.*, “coatings of granular material”) of the first thickness layer. *Id.* at ¶ 300.

Adhering the “reinforcement second thickness layer” to any other recited claim element (*e.g.*, the “base layer of mat”) would amount to inserting the “reinforcement second thickness layer” within the “first thickness layer” thereby violating the claim requirement for distinct first and second thickness layers. *Id.* at ¶ 300. Further, as *supra* at § III.C.2., during prosecution of related applications, Patent Owner repeatedly emphasized that the reinforcement layer of the alleged invention was not “embedded” within the shingle, and instead positioned on the outside surface of the shingle. If the “said shingle” of element (e) is construed to

encompass any component, then the “reinforcement second thickness layer” could be positioned within the larger shingle itself, or embedded within it, which would be wholly inconsistent with how the Patent Owner distinguished the alleged invention from Frankoski 1998.

This understanding is also supported by the specification itself, which states that, when the reinforcing layer is “adhered,” this is done by means of “an additional post-applied thin layer of asphaltic or non-asphaltic adhesive.” Ex. 1001 (’046 patent), at col. 3:55-56; Ex. 1003 (Bryson Decl.), at ¶ 300. “Post-applied” would be understood to refer to a manufacturing step downstream of the steps in which asphalt and granular material are applied to the mat. Ex. 1003 (Bryson Decl.), at ¶ 301. Figs. 2A, 4 and 4A are in accord as each shows the reinforcement layer as a distinct thickness layer. *Id.*

Thus, the meaning of the term “said shingle” in element (e) of claim 1 must be “first thickness layer,” such that the requirement for the “reinforcement second thickness layer” to be “adhered to said shingle” means that it must be adhered to the first thickness layer, as discussed further below. *Id.* at ¶¶ 301-302.

This construction is necessary to preserve the claim’s requirement for distinct first and second thickness layers, notwithstanding the usage of the term “shingle” in the preamble to mean the finished product as a whole and would apply not only to the use of the term “said shingle” in element (e) of claim 1, but also any

where else where reference is made to where or how the “second reinforcement layer” is “adhered.” *Id.*

3. “adhered to said shingle”

Claim 1 requires that the “reinforcement second layer” be “adhered to said shingle.” The specification of the ’046 patent describes how the “reinforcement second layer” is attached. Specifically, the patent states that the reinforcement layer is:

either embedded in the asphaltic layer on the rear of the shingle ***or adhered*** to the rear of the shingle by an additional post-applied thin layer of asphaltic or non-asphaltic adhesive. The reinforcement layer 29, 39, will be adhered to the rear surface 21, 31 of the shingles of this invention, by means of any suitable adhesive, such as a bitumen or the like, or any other adhesive.

Ex. 1001 (’046 patent), at col. 3:53–59 (emphasis added).

The person of ordinary skill would understand that a clear distinction is being drawn between an “embedded” reinforcement second layer and one that is “adhered.” Ex. 1003 (Bryson Decl.), at ¶ 305. In fact, as discussed *supra* at §III.C.2., the inventors distinguished Frankoski 1998 on the basis that it disclosed an “embedded” reinforcement layer whereas the claimed invention did not. *See supra*, at § III.C.2.

In general, the term “embedded” means that something is fixed into a

surrounding mass, usually by mechanical or physical means. *See, e.g.*, Ex. 1039 American Heritage Dictionary, 4th Ed. (2000) (American Heritage 2000), at 4 (defining “embed” as “[t]o fix firmly in a surrounding mass”); Ex. 1003 (Bryson Decl.), at ¶ 306. In the asphalt roofing industry, embedded material is material that is mechanically affixed into surrounding material, such as asphalt. Ex. 1003 (Bryson Decl.), at ¶ 306. In other words, physical contact and overlap between the materials results in attachment. *Id.*

“Adhered” generally means stuck together as if by glue or cement. *See, e.g.*, Ex. 1039 (American Heritage 2000), at 3 (defining “adhere” as “[t]o stick fast by or as if by suction or glue”); Ex. 1003 (Bryson Decl.), at ¶ 307. Unlike “embedded” material, when materials are said to be “adhered,” the person of ordinary skill would understand that attachment generally occurs via chemical interactions between the two materials, or between each of the materials and a separate adhesive, particularly in a context, such as in the ’046 patent, where a clear distinction is being drawn between “adhered” and “embedded.” Ex. 1003 (Bryson Decl.), at ¶ 307.

While no examples of “embedded” material are described in the patent, the patent does describe how the reinforcing layer is “adhered” to the shingle. Ex. 1003 (Bryson Decl.), at ¶ 308. Specifically, the ’046 patent states that the reinforcement layer is adhered by an “additional” thin layer of asphalt or non-

asphaltic adhesive. Ex. 1001 ('046 patent), at col. 3:55-56. In other words, additional material is used as an adhesive. Ex. 1003 (Bryson Decl.), at ¶ 308. The specification states that the adhesive is “post-applied” meaning that it is applied at some point after “shingle” has been made, *i.e.*, after the mat has been coated with asphalt and covered with granular material. *Id.* at ¶ 309.

Further, the person of ordinary skill would understand that the “reinforcement second layer” is “adhered” to the rear surface of the “shingle,” *i.e.*, the “first thickness layer.” Ex. 1003 (Bryson Decl.), at ¶ 310. As discussed above, the clear focus of the invention is a reinforcing layer that is attached to the rear surface. *See supra*, at § III.B. Not only does the specification describe the location of the reinforcement layer in the “present invention” as being on the rear surface, but the specification states that this location is critical to performance. *Id.* The prosecution history confirms that the reinforcement layer must be on the rear surface. *See supra*, at § III.C.

Petitioner recognizes that claim 2 of the '046 patent requires that that the “reinforcement layer” of element (e) of claim 1 be “adhered to the rear surface of the shingle.” Ex. 1001 ('046 patent), at col. 6:51-52. But this claim is not a proper dependent claim because element (e) of the claim does not include a “reinforcement layer”—instead, it includes a “reinforcement *second thickness* layer.” *Pfizer Inc. v. Ranbaxy Labs.*, 457 F.3d 1284, 1292-93 (Fed. Cir. 2006)

(dependent claim invalid under § 112 because it did not further limit subject matter of independent claim). Even if the claim were proper, however, the doctrine of claim differentiation cannot overcome a contrary construction dictated by the written description and prosecution history. *E.g.*, *Microsoft Corp. v. Proxyconn, Inc.*, Case IPR2012-00026, 2013 WL 6327750, at *3 (PTAB Feb. 25, 2013) (“Petitioner’s claim differentiation argument is inconsistent with the specification and the figures showing three signals and is therefore unavailing”). Here, the specification and prosecution clearly compel a construction that requires the “reinforcement second thickness layer” of claim 1 to be adhered to the rear of the shingle.

Thus, the broadest reasonable construction of “adhered to said shingle” is “attached to the rear surface of the first thickness layer by means of glue, cement, or some other chemical interaction between one or more materials.”

4. “reinforcement . . . layer”

The broadest reasonable construction of “reinforcement layer” is a layer of material that provides the shingle with support or strength so as to, for example, resist bending under wind conditions, resist tearing, or resist nail pull. Ex. 1003 (Bryson Decl.), at ¶ 312.

5. “substantially thinner”

The term “substantially thinner” is used to describe the “reinforcement

second thickness layer,” but is not defined in the patent and does not carry with it a generally understood meaning in the field. Ex. 1003 (Bryson Decl.), at ¶¶ 312-313. Therefore, this term fails to “inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129-30 (2014).

While claim 4 of the ’046 patent specifically requires that the “reinforcement second layer” be made of woven or nonwoven thin fabric, plastic film, paper, parchment, foil, or scrim,” these materials can vary in thickness. Ex. 1003 (Bryson Decl.), at ¶¶ 314-315. These examples shed no light on what “substantially thinner” means. *Id.*

The figures in the ’046 patent confuse things further. *Id.* at ¶ 316. For example, Fig. 4A shows that the reinforcement material 46 has a thickness that is substantial enough to cause a hump in the shingle when attached to a roof 40. *Id.* Fig. 2A shows the reinforcing layer 29 is nearly as thick as the main part of the shingle. *Id.*

For the purpose of this proceeding, however, Petitioners will ignore this ambiguity and assume that any material made from woven or nonwoven thin fabric, plastic film, paper, parchment, foil, scrim, “or the like,” which the person of ordinary skill would understand could be fabricated to have a thickness smaller than a base shingle mat, meets the “substantially thinner” limitation of the claims.

Ex. 1003 (Bryson Decl.), at ¶ 317.

IV. Precise Reasons for Relief Requested

A. Claims 1–9 Are Unpatentable Over Venrick 1939

U.S. Patent No. 2,161,440 to Venrick (Venrick 1939) (Ex. 1013) is a printed patent publication that issued on June 6, 1939. Venrick 1939 is prior art to the claims under 35 U.S.C. § 102(b).

1. Venrick 1939 Anticipates Claim 1

The preamble of claim 1 and elements (a)-(d) of claim 1 describe nothing more than the components of a basic asphalt shingle. Ex. 1003 (Bryson Decl.), at ¶¶ 123-134, 419; *see supra* at § III.C.1. The '046 patent acknowledges that these components were known in the prior art. Ex. 1001 ('046 patent), at col. 2:38-63.

Venrick 1939 also discloses the basic asphalt shingle. Ex. 1003 (Bryson Decl.), at ¶¶ 340-344, 419-424. Venrick 1939 (Ex. 1013) discloses a “fabricated shingle strip consisting of a base of fibrous material to which asphalt or similar plastic material is applied and which is surfaced with comminuted or granular material.” *Id.* at 3, col. 1:1–7. The base mat in Venrick 1939 would have been understood to have a front surface and a rear surface, a width defined by upper and lower edges, and a length defined by right and left edges. Ex. 1003 (Bryson Decl.), at ¶ 341-343. The disclosed shingle would also be understood to be coated with asphalt on both sides and surfaced with granular material on both sides. *Id.*

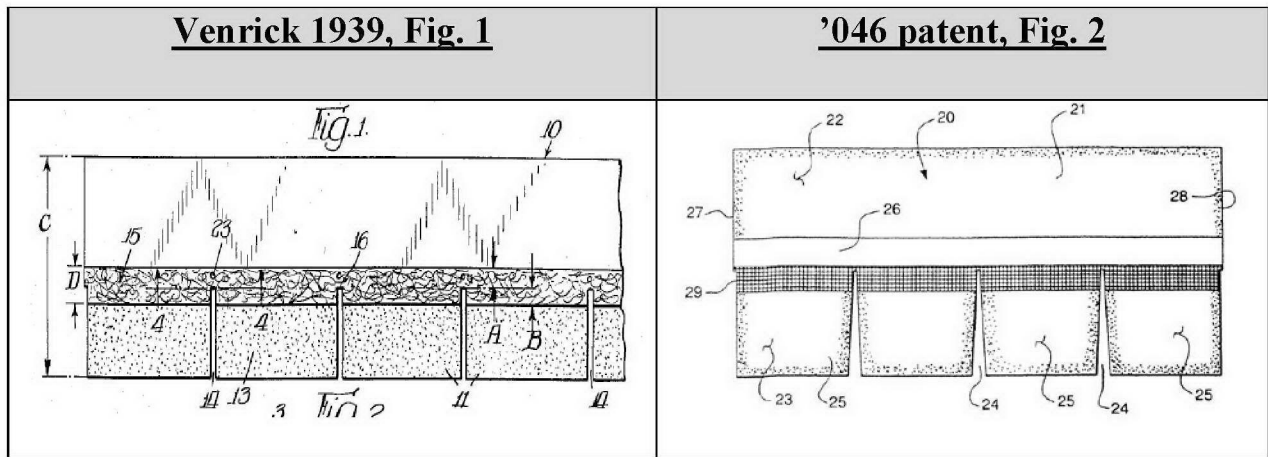
Venrick 1939 states, for example, that “the felt base 12 may be formed from rag, asbestos or the like, that has been saturated and coated with asphalt and surfaced with mineral granules 13 such as crushed slate, tile or natural stone.” Ex. 1013 (Venrick 1939), at 3, col. 2:47–51. Not only is coating the base mat on both sides with asphalt and granular material common practice now, but it was also “common practice” in the 1930s. *See, e.g.*, Ex. 1008 (Miller 1937), at 4, col. 1:13–24; *see also supra* at § III.A.1.

The asphalt shingle in Venrick 1939 (Ex. 1013) is shown to have a nailing zone that includes a number of “nail openings” 23 in Fig. 1 that extend longitudinally between the right and left edges of the shingle and between or intermediate the upper and lower edges of the shingle. Ex. 1003 (Bryson Decl.), at ¶¶ 344, 351. The nailing zone is also shown by the “nail openings” 47 in Fig. 8. *Id.* The person of ordinary skill would therefore understand that Venrick 1939 discloses the basic asphalt shingle described in the preamble of claim 1 and elements (a)-(d) of claim 1. Ex. 1003 (Bryson Decl.), at ¶¶ 123-134, 419.

Venrick 1939 (Ex. 1013) also discloses elements (e)-(f), *i.e.*, the “reinforcement second thickness layer.” Ex. 1003 (Bryson Decl.), at ¶¶ 345-59, 425-27. Specifically, Venrick 1939 discloses a “reinforcing strip” for, among other things, “strengthening the upper ends of the openings between the tabs to reduce the tendency of the shingle to tear” and to “provide a reinforced area for

nailing the shingle to the roof.” *Id.* at 3, col. 1:40–46.

Fig. 1 of Venrick 1939 shows the reinforcing strip on the front of the shingle. Its overall location is nearly identical to the location of the reinforcement layer disclosed in the '046 patent at, for example, Fig. 2, except that, in the '046 patent, the strip is on the rear. Ex. 1003 (Bryson Decl.), at ¶¶ 347-48.

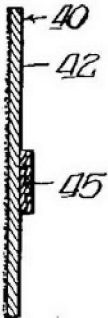
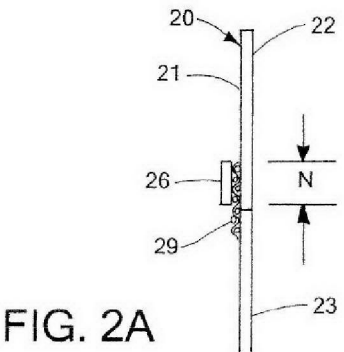


The reinforcing strip in Venrick 1939 (Ex. 1013) can be on the rear surface of the shingle. *See* Ex. 1013 (Venrick 1939), at Figs. 8–12; Ex. 1003 (Bryson Decl.), at ¶ 349. Venrick 1939 (Ex. 1013) states: “in Figures 8, 10, and 12 the raised median strip is located on the undersurface of the shingle.” *Id.* at 4, col. 2:60–62 (emphasis added); Ex. 1003 (Bryson Decl.), at ¶ 349.

As shown in Figs. 8–12 of Venrick 1939 (Ex. 1013), the reinforcing strip forms a second thickness layer that is generally longitudinal in orientation like the shingle itself and extends between the right and left edges of the shingle. *See also*

id. at 5, col. 1:26–27 (“said strip extends longitudinally of the shingle and accordingly reinforces and strengthens the same.”); Ex. 1003 (Bryson Decl.), at ¶ 350.

According to Venrick 1939 (Ex. 1013), the reinforcing strip can be made of “felt, or metal, or... roofing tape suitably bonded together.” *Id.* at 4, col. 2:73– 5, col. 1:1. The person of ordinary skill would understand the described felt and metal to have a thickness that is thinner than the thickness of the asphalt and granule covered mat. Ex. 1003 (Bryson Decl.), at ¶¶ 353-55. The person of ordinary skill would have also understood that roofing tape has a thickness that is generally much thinner than the thickness of the asphalt and granule covered mat. *Id.* Notably, Fig. 9 of Venrick 1939 (Ex. 1013) shows the reinforcement strip 45 to have thickness on the same order as the reinforcement layer 29 shown in Fig. 2A of the '046 patent. Ex. 1003 (Bryson Decl.), at ¶ 356.

<u>Venrick 1939, Fig. 9</u>	<u>'046 patent, Fig. 2A</u>
 <p>A cross-sectional diagram showing a vertical assembly. It consists of three distinct layers. The top layer is labeled 40, the middle layer is labeled 42, and the bottom layer is labeled 45. The layers are stacked vertically and appear to be bonded together.</p>	 <p>A cross-sectional diagram of a vertical assembly. It shows several layers and components. At the top is a thin layer labeled 20. Below it is a thicker layer labeled 21. To the right of layer 21 is a vertical strip labeled 22. Below layer 21 is a layer labeled 26, which contains a textured or granular material. Below layer 26 is a layer labeled 29, which also contains a textured or granular material. At the bottom is a layer labeled 23. A downward-pointing arrow labeled 'N' is positioned to the right of the assembly, indicating a force or pressure applied to the right side of the assembly.</p> <p>FIG. 2A</p>

Venrick 1939 (Ex. 1013) also specifically contemplates that the reinforcing strip is applied to the shingle after the manufacture of the shingle using an adhesive such as cement. *Id.* at 4, col. 1:34–37 (“it is preferable to apply the strip 15 to the shingle after manufacture and thus said strip will be suitably cemented to the granule surfacing 13.”) (emphasis added). Indeed, attachment in a “post-applied” fashion is preferred. *Id.* Venrick 1939 therefore shows that the reinforcing strip is a “second” thickness layer that is adhered to the first thickness layer, *i.e.*, the layer made of the base mat and asphalt/granule coatings. Ex. 1003 (Bryson Decl.), at ¶¶ 358-59.

Venrick 1939 also shows that the reinforcing strip extends at least partially into the nailing area. Ex. 1003 (Bryson Decl.), at ¶ 351. Figs. 8 and 9 of Venrick 1939 (Ex. 1013), for example, show that the reinforcing strip is on the back of the shingle and that the width of the strip extends at least partially into the area where the “nail openings” 47 are located. Venrick 1939 explicitly states that the “shingles are nailed preferably ... where the raised median strip is [located]. . .” *Id.* at 5, col. 1:51–56; Ex. 1003 (Bryson Decl.), at ¶ 351.

Venrick anticipates claim 1. Ex. 1003 (Bryson Decl.), at ¶¶ 419-428.

2. Venrick 1939 Anticipates Claim 2

Claim 2 is dependent on claim 1 and requires that the reinforcement layer be “adhered to the rear surface of the shingle.” Ex. 1001 (’046 patent), at col. 6:51-

52. As discussed above with respect to claim 1, Venrick 1939 discloses a reinforcement layer that is adhered to the rear surface of the “shingle,” *i.e.*, the first thickness layer. Venrick 1939 anticipates claims 2. Ex. 1003 (Bryson Decl.), at ¶ 349.

3. Venrick 1939 Anticipates Claim 3

Claim 3 is dependent on claim 1 and specifies that “fasteners applied through the fastening zone will pass through the reinforcement layer.” Ex. 1001 (’046 patent), at col. 6:54-55. As discussed *supra* at § III.A.2, Venrick 1939 discloses a reinforcement layer that at least partially extends into the longitudinal nailing zone of the shingle. Nails applied through the fastening zone would therefore necessarily pass through the reinforcement layer. Ex. 1003 (Bryson Decl.), at ¶ 430. Venrick 1939 (Ex. 1013) explicitly states that the “shingles are nailed preferably ... where the raised median strip is [located].” *Id.* at 5, col. 1:51–56. Venrick 1939 anticipates claims 3. Ex. 1003 (Bryson Decl.), at ¶ 430.

4. Venrick 1939 Anticipates Claim 4

Claim 4 is dependent on claim 1 and specifies that the reinforcement layer “comprises a material selected from the group consisting of woven or nonwoven thin fabric, plastic film, paper, parchment, foil and scrim.” Ex. 1001 (’046 patent), at col. 6:56-64. Venrick 1939 (Ex. 1013) discloses a reinforcement layer that is made of roofing tape, which was understood to be made of, among other things,

paper. Ex. 1003 (Bryson Decl.), at ¶ 431. Venrick 1939 anticipates claim 4. *Id.*

5. Venrick 1939 Anticipates Claim 5

Claim 5 is dependent on claim 1 and requires that the reinforcement layer be “adhered to the lower surface of the shingle by an additional post-applied thin layer of asphaltic or non-asphaltic adhesive.” Ex. 1001 (’046 patent), at col. 6:65-67.

As above with respect to claim 1, Venrick 1939 contemplates that the reinforcement layer may be applied to the shingle “after manufacture” and that the reinforcement layer be applied with cement. Ex. 1013 (Venrick 1939), at 4, col. 1:34-37; Ex. 1003 (Bryson Decl.), at ¶ 432. Based on the specification of the ’046 patent, the person of ordinary skill would understand the “lower surface” of the shingle to be the same thing as the rear surface. Ex. 1001 (’046 patent), at col. 1:43-50; Ex. 1003 (Bryson Decl.), at ¶ 432. Venrick 1939 anticipates claim 4. Ex. 1003 (Bryson Decl.), at ¶ 432.

6. Venrick 1939 Anticipates Claim 6

Claim 6 is dependent on claim 1 and requires that the reinforcement layer be “exposed and uncovered on the rear surface of the shingle.” Ex. 1001 (’046 patent), at col. 7:1-3. The person of ordinary skill would understand this to mean that the reinforcement layer is exposed and uncovered prior to application of the shingle on the roof as this is the only construction that makes sense. Ex. 1003 (Bryson Decl.), at ¶ 433. Venrick 1939 discloses a reinforcement layer that is

affixed to the rear exterior surface of the shingle. *Id.* Such a reinforcing layer would necessarily be exposed and uncovered on the rear surface before the shingle is applied to the roof. *Id.* Venrick 1939 anticipates claim 6. *Id.*

7. Venrick 1939 Anticipates Claim 7

Claim 7 is directed to a method of making a shingle that is substantially identical to the shingle described in claim 1 of the patent. Ex. 1003 (Bryson Decl.), at ¶ 434. The only difference is that claim 7 does not require that the reinforcing layer be “substantially thinner” than the first thickness layer, *i.e.*, the asphalt and granule coated mat. Ex. 1003 (Bryson Decl.), at ¶ 434. Claim 7 also requires the reinforcement layer to be “against the outer surface of the granular material on the surface thereof,” but this is disclosed in Venrick 1939 as explained above for claims 1-6. Venrick 1939 anticipates claim 7 for the same reasons that Venrick 1939 anticipates claims 1–6. Ex. 1003 (Bryson Decl.), at ¶ 434.

8. Venrick 1939 Anticipates Claim 8

Claim 8 is dependent on claim 7 and states “that the shingle is provided with an upper headlap portion and a lower tab portion; the tab portion comprising a plurality of tabs spaced by slots that extend upward toward the headlap portion from the lower edge; and providing the fastening zone such that it is generally located above the tab portion.” Ex. 1001 (’046 patent), at col. 8:7-12.

Claim 8 discloses nothing more than known features of typical shingles as

shown, for example, in Figs. 1, 2, 6, 8, and 10 of Venrick 1939 (Ex. 1013), which disclose a shingle having an upper headlap region and lower tab portions, wherein the tab portion is made of a plurality of tabs spaced by slots that extend upward toward the headlap portion from the lower edge. Ex. 1003 (Bryson Decl.), at ¶ 437. As shown in the figures, the nailing zone is generally located above the tab portion. *Id.* A shingle having the described features is also shown in Fig. 1 of the '046 patent (Ex. 1001), which the patent describes as “prior art.” Venrick 1939 therefore anticipates claim 8. *Id.*

9. Venrick 1939 Renders Obvious Claim 9

The only difference between claim 8 and claim 9 is that the shingle of claim 9 has only a single tab. Ex. 1003 (Bryson Decl.), at ¶ 438. Single tab shingles were well known prior to November 6, 2002, and were considered to be one of the basic types of shingle shape. Ex. 1005 (Cash 1995), at 1; Ex. 1003 (Bryson Decl.), at ¶ 438.

The person of ordinary skill would have been motivated to utilize the reinforcing layer disclosed in Venrick 1938 with all of the most common types of shingles including single tab shingles in order to achieve the benefits of the reinforcing layer disclosed in Venrick 1939. Ex. 1003 (Bryson Decl.), at ¶ 438. Venrick 1939 renders obvious the subject matter of claim 9. *Id.*

B. Claims 1–9 Are Unpatentable Over Venrick 1939 in View of Frankoski 1998

U.S. Patent No. 5,882,943 to Frankoski (Frankoski 1998) (Ex. 1010) is a printed patent publication that was filed on July 10, 1996 and issued on October 20, 1998. Frankoski 1998 is prior art to the claims under 35 U.S.C. § 102(b). The '046 patent refers to the asphalt shingles described in Frankoski 1998 as the “basic” “prior art” shingle and incorporates by reference the disclosure of Frankoski 1998. Ex. 1001 ('046 patent), at col. 2:60–63.

1. Venrick 1939 in View of Frankoski 1998 Renders Obvious Claim 1

Like Venrick 1939, Frankoski 1998 discloses the “basic” “prior art” asphalt shingle, which the '046 patent acknowledges meets all the limitations of the preamble of claim 1, as well as elements (a), (b), and (c) of claim 1. Ex. 1003 (Bryson Decl.), at ¶¶ 367-73, 442; Ex. 1001 ('046 patent), at col. 2:60–63.

Venrick 1939 and Frankoski 1998 also disclose element (d) of claim 1, which is another component of the basic prior art asphalt shingle. Specifically, Venrick 1939 shows that the nailing zone (*i.e.*, fastening zone) is between the right and left edges of the shingle and generally intermediate of the upper and lower edges. *See supra*, at § III.A.2. and § IV.A.1. The nailing zone in Frankoski 1998 (Ex. 1010) is shown as 20 in Fig. 1 and it is located between the right and left edges of the shingle and generally intermediate of the upper and lower edges. Ex.

1003 (Bryson Decl.), at ¶ 449.

Frankoski 1998 discloses a scrim layer 60 that reinforces the asphalt shingle. *Id.* at ¶ 351. Scrim is the preferred reinforcing material in the '046 patent. Ex. 1001 ('046 patent), at col. 1:51-53. If the Board disagrees with Petitioner and construes claim 1 so that the “reinforcement second thickness layer” can be attached by any means to any component of the shingle (including components within the “first thickness layer), then Frankoski 1998 anticipates claim 1 because the scrim 60 in Frankoski would be understood to be generally longitudinal and extend at least partially into the nailing zone. *See supra*, at § III.A.4; Ex. 1003 (Bryson Decl.), at ¶ 447. Frankoski 1998 would also anticipate claims 1, 3, 4, and 8. *Id.*

Assuming that Frankoski 1998 does not anticipate claim 1 because the “reinforcement second thickness layer” must be “adhered” to the “shingle,” *i.e.*, the attached to the rear surface of the first thickness layer, then Venrick 1939 in view of Frankoski 1998 renders obvious claim 1. Ex. 1003 (Bryson Decl.), at ¶ 447.

Venrick 1939 discloses a reinforcing layer that is adhered to the rear exterior surface of the shingle as a second thickness layer. Ex. 1003 (Bryson Decl.), at ¶ 451. Venrick 1939 (Ex. 1013) states that the reinforcing layer can be made of “felt, or metal ...or layer of roofing tape suitably bonded together.” *Id.* at 4, col. 2:73-5, col. 1:1. Given that the purpose of the scrim layer in Frankoski 1998 is

reinforcement, the person of ordinary skill would have found it obvious to modify the asphalt shingle disclosed in Venrick 1939 with the scrim material disclosed in Frankoski 1998. Ex. 1003 (Bryson Decl.), at ¶ 451.

Recognizing that the materials disclosed in Venrick 1939 are old, and that newer more state of the art materials have since been developed, the person of ordinary skill would have been motivated to make such a change with the understanding that the scrim material disclosed in Frankoski 1998 is lighter and just as strong (if not stronger) than the materials disclosed in Venrick 1939. Ex. 1003 (Bryson Decl.), at ¶¶ 452-53. *See Leapfrog Enterprises, Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157 (Fed. Cir. 2007) ("adaption of an old idea" "in order to gain the commonly understood benefits of such adaption" is obvious).

The person of ordinary skill would have recognized that the scrim material disclosed in Frankoski 1998 would be much thinner than the asphalt and granule coated mat material that would make up the shingle. Ex. 1003 (Bryson Decl.), at ¶ 454. As in Venrick 1939 and other prior art such as Rohner 1989 and Sieling 1999 (*see supra* at § III.A.), the person of ordinary skill would recognize that the scrim material of Frankoski 1998 could be attached to the rear exterior surface of the shingle as a second thickness layer. Ex. 1003 (Bryson Decl.), at ¶ 454. To accomplish this, the person of ordinary skill would also understand that the scrim material could be adhered using, for example, a cement, such as that which is

disclosed in Venrick 1939. *Id.*

The person of ordinary skill would have reasonably expected the thin scrim material in Frankoski 1998 to function as reinforcing material given the data in Frankoski 1998 showing that the scrim improved the strength of the asphalt shingle and other prior art such as Venrick 1939, Olszyk 1974, Johnson 1996, and Miller 1999, which showed that thin material could be used as reinforcement material for asphalt shingles, and/or that the reinforcing material could be affixed to the rear surface of the shingle. Ex. 1003 (Bryson Decl.), at ¶ 455; *see also supra* at § III.A.

Venrick 1939 shows that the reinforcing layer extends at least partially into the nailing zone. Ex. 1003 (Bryson Decl.), at ¶ 456. Venrick 1939 explicitly states that the “shingles are nailed preferably ... where the raised median strip is.” Ex. 1013 (Venrick 1939), at 5, col. 1:51–53. Frankoski 1998 also states that the scrim will “coincide with at least a portion of the nail zone for the shingle and also extend into the shingle tab zone portions to provide added strength and increase the overall performance characteristics of the shingle.” Ex. 1010 (Frankoski 1998), at col. 5:29–42. Venrick 1939 in view of Frankoski 1998 renders obvious claim 1. Ex. 1003 (Bryson Decl.), at ¶¶ 448-56.

2. Venrick 1939 in View of Frankoski 1998 Renders Obvious Claim 2

As discussed above, Venrick 1939 discloses a reinforcement layer that is adhered to the rear surface of the shingle. Venrick 1939 in view of Frankoski 1998

renders obvious claim 2. Ex. 1003 (Bryson Decl.), at ¶ 457.

3. Venrick 1939 in View of Frankoski 1998 Renders Obvious Claim 3

As discussed, Venrick 1939 discloses a reinforcement layer that at least partially extends into the longitudinal nailing zone of the shingle. *See supra*, at § III.A.2; Ex. 1003 (Bryson Decl.), at ¶ 458. Nails applied through the fastening zone would therefore necessarily pass through the reinforcement layer and Venrick 1939 explicitly contemplates this configuration. *Id.* Frankoski 1998 also states that the scrim will “coincide with at least a portion of the nail zone for the shingle ... to provide added strength.” Ex. 1010 (Frankoski 1998), at col. 5:29-42.

Venrick 1939 in view of Frankoski renders obvious claim 3. Ex. 1003 (Bryson Decl.), at ¶ 458.

4. Venrick 1939 in View of Frankoski 1998 Renders Obvious Claim 4

Venrick 1939 discloses a reinforcement layer that is made of roofing tape. Ex. 1013 (Venrick 1939), at 4, col. 2:74-75; Ex. 1003 (Bryson Decl.), at ¶ 459.

Roofing tape was understood to be made of, among other things, paper. *Id.*

Frankoski 1998 discloses a reinforcement layer that is made of scrim, *i.e.*, one of the materials that is listed in claim 4. *Id.* Venrick 1939 in view of Frankoski 1998 therefore renders obvious claim 4. *Id.*

5. Venrick 1939 in View of Frankoski 1998 Renders Obvious Claim 5

As discussed at § IV.A.1, Venrick 1939 (Ex. 1013) contemplates that the reinforcement layer be applied to the shingle “after manufacture” and that the reinforcement layer be applied with cement. Ex. 1013 (Venrick 1939), at 4, col. 1:34–37; Ex. 1003 (Bryson Decl.), at ¶ 460. The person of ordinary skill would have found it obvious to use the scrim material of Frankoski 1998 in place of the reinforcement material described in Venrick 1939 and would have found it likewise obvious to adhere the scrim material onto the rear exterior surface of the shingle using an adhesive such as cement. Ex. 1003 (Bryson Decl.), at ¶ 460. Based on the specification, the person of ordinary skill would understand the “lower surface” of the shingle is the same thing as the rear surface. *Id.* Venrick 1939 in view of Frankoski 1998 therefore renders obvious claim 5. *Id.*

6. Venrick 1939 in View of Frankoski 1998 Renders Obvious Claim 6

As discussed, the person of ordinary skill would understand claim 6 to add that the reinforcement layer be exposed and uncovered prior to application of the shingle on the roof. *See supra*, at § IV.A.6. As discussed, the person of ordinary skill would have found it obvious to use the scrim material of Frankoski 1998 in place of the reinforcement material described in Venrick 1939 and would have found it likewise obvious to adhere the scrim material onto the exterior surface of

the shingle using an adhesive such as cement. Ex. 1003 (Bryson Decl.), at ¶ 461. Such a reinforcing layer would necessarily be exposed and uncovered on the rear surface before the shingle is applied to the roof. *Id.* Venrick 1939 in view of Frankoski 1998 therefore renders obvious claim 6. *Id.*

7. Venrick 1939 in View of Frankoski 1998 Renders Obvious Claim 7

For the same reasons that Venrick 1939 in view of Frankoski 1998 renders obvious the subject matter of claims 1–6, the combination of these references also render obvious claim 7. *Id.* at ¶ 464.

8. Venrick 1939 in View of Frankoski 1998 Renders Obvious Claim 8

As discussed, Venrick 1939 discloses shingles that meet the requirements of this claim. *See supra*, at § IV.A.8. Fig. 1 of Frankoski 1998 (Ex. 1010) also discloses a shingle having an upper headlap region and lower tab portions, wherein the tab portion is made of a plurality of tabs spaced by slots that extend upward toward the headlap portion from the lower edge. Ex. 1003 (Bryson Decl.), at ¶ 465. Fig. 1 of Frankoski 1998 (Ex. 1010) also shows that the nailing zone 20 is located generally above the tab portion. Ex. 1003 (Bryson Decl.), at ¶ 465. A shingle having the described features is also shown in Fig. 1 of the '046 patent (Ex. 1001), which the patent describes as “prior art.” Venrick 1939 in view of Frankoski 1998 therefore renders obvious claim 8. *Id.*

9. Venrick 1939 in View of Frankoski 1998 Renders Obvious Claim 9

The only difference between claim 8 and claim 9 is that the shingle of claim 9 has only a single tab. Ex. 1003 (Bryson Decl.), at ¶ 467. Single tab shingles were well known, and were considered to be one of the basic types of shingle shape. Ex. 1005 (Cash 1995), at 1; Ex. 1003 (Bryson Decl.), at ¶ 467.

The person of ordinary skill would have been motivated to utilize the reinforcing layer disclosed in Venrick 1939 and Frankoski 1998 with all of the most common types of shingles such as laminated shingles, single tab shingles, and strip shingles in order to achieve the benefits of the reinforcing layer disclosed in these references. Ex. 1003 (Bryson Decl.), at ¶ 467. Venrick 1939 in view of Frankoski 1998 therefore renders obvious claim 9. *Id.*

C. Claims 1–9 Are Unpatentable Over Venrick 1939 in View of Kiik 2001

U.S. Patent Publication No. 2001/0055680 to Kiik (Kiik 2001) (Ex. 1018) is a printed patent publication that was filed on January 8, 1999 and published on December 27, 2001. Kiik 2001 is prior art to the claims under 35 U.S.C § 102(a).

1. Venrick 1939 in View of Kiik 2001 Renders Obvious Claim 1

As discussed above at § III.A.2 and § IV.A.1, Venrick 1939 discloses the basic asphalt shingle. Ex. 1003 (Bryson Decl.) ¶ 471. Kiik 2001 also discloses the basic asphalt shingle. *Id.* Venrick 1939 and Kiik 2001 therefore each disclose

elements (a)-(d) of claim 1. *Id.*

As discussed *supra*, at § III.A.3, Kiik 2001 (Ex. 1018) discloses a “backing material” made of, among other things, polyester fibers, nylon fibers, rayon fibers, acrylic fibers, polyolefin fibers, polypropylene fibers and recycled plastics fibers. *Id.* at [0004]; Ex. 1003 (Bryson Decl.), at ¶ 472.

The backing material in Kiik 2001 is “adhered to the face of the back of the shingle.” Ex. 1018 (Kiik 2001), at [0007]. The purpose of the backing material in Kiik 2001 is reinforcement, *i.e.*, to provide the shingle with “better tear strength,” “pass impact tests despite their light product weight,” and provide “increased nail holding ability and maintain structural integrity at elevated temperatures.” *Id.* at [0009]; Ex. 1003 (Bryson Decl.), at ¶ 473.

Kiik 2001 states that the backing layer “may provide partial or full coverage” of the rear surface of the shingle and “enables the shingles to demonstrate enhanced physical properties.” Ex. 1018 (Kiik 2001), at [0010]. Given that one of the purposes of the backing material is to improve “nail holding ability,” the person of ordinary skill would understand that the backing material of Kiik 2001 extends at least partially into the nailing zone and is generally longitudinal. Ex. 1003 (Bryson Decl.), at ¶ 474. The nail pull data in the reference confirms that the backing layer extends at least partially into the nailing zone. *Id.*

Venrick 1939, like other prior art such as Rohner 1989 and Sieling 1999,

discloses a reinforcing layer that is adhered to the rear exterior surface of the shingle as a second thickness layer. *See supra*, at § III.A.1; Ex. 1003 (Bryson Decl.), at ¶ 475. Given that the purpose of the backing material in Kiik 2001 is reinforcement, the person of ordinary skill would have found it obvious to modify the asphalt shingle disclosed in Venrick 1939 by using the backing material disclosed in Kiik 2001. *Id.* at ¶ 475.

Recognizing that the materials disclosed in Venrick 1939 are old, and that newer more state of the art materials have since been developed, the person of ordinary skill would have been motivated to make such a change with the understanding that the backing material disclosed in Kiik 2001 is lighter and just as strong (if not stronger) than the materials disclosed in Venrick 1939. Ex. 1003 (Bryson Decl.), at ¶¶ 476-477.

The person of ordinary skill would recognize that the backing material disclosed in Kiik 2001 is much thinner than the asphalt and granule coated mat material that would make up the shingle. *Id.* In fact, the exemplified backing material in Kiik 2001, which was made of polyester fiber, had a thickness on the order of 1/1000th of an inch. *Id.*; Ex. 1018 (Kiik 2001), at [Table 1].

As in Venrick 1939 and other prior art such as Rohner 1989 and Sieling 1999 (*see supra* at § III.A.2), the person of ordinary skill would recognize that the backing material of Kiik 2001 could be attached to the rear exterior surface of the

shingle as a second thickness layer. Ex. 1003 (Bryson Decl.), at ¶ 478. To accomplish this, the person of ordinary skill would also understand that the backing material of Kiik 2001 could be adhered to the rear surface using, for example, a cement, such as that which is disclosed in Venrick 1939. *Id.*; Ex. 1013 (Venrick 1939), at 4, col. 1:32-37.

The person of ordinary skill would have reasonably expected the thin backing material of Kiik 2001 to function as reinforcing material given the data in the Kiik 2001 reference showing that the thin material improved the strength of the asphalt shingle and other prior art such as Venrick 1939, Olszyk 1974, and Frankoski 1999, which showed that thin material could be used as reinforcement material for asphalt shingles. Ex. 1003 (Bryson Decl.), at ¶ 479.

As discussed *supra* at § III.A.2 and § IV.A.1, Venrick 1939 shows that the reinforcing layer extends at least partially into the nailing zone. Such a configuration would be obvious given the purpose of increasing nail pull strength, as described in both Venrick 1939 and Kiik 2001. Ex. 1003 (Bryson Decl.), at ¶ 480. Venrick 1939 in view of Kiik 2001 therefore renders obvious claim 1. *Id.* at ¶ 471-80.

2. Venrick 1939 in View of Kiik 2001 Renders Obvious Claim 2

As discussed *supra* at § III.A.2 and § IV.A.1, Venrick 1939 discloses a reinforcement layer that is adhered to the rear surface of the shingle. Venrick 1939

in view of Kiik 2001 therefore renders obvious claim 2. Ex. 1003 (Bryson Decl.), at ¶ 481.

3. Venrick 1939 in View of Kiik 2001 Renders Obvious Claim 3

As discussed, Venrick 1939 discloses a reinforcement layer that at least partially overlaps with the longitudinal nailing zone of the shingle. *See supra*, at § III.A.2 and § IV.A.1. Nails applied through the fastening zone would therefore necessarily pass through the reinforcement layer. Ex. 1003 (Bryson Decl.), at ¶ 482. Venrick 1939 explicitly states that the “shingles are nailed preferably ... where the raised median strip is composed of a hard durable material.” Ex. 1013 (Venrick 1939), at 5, col. 1:51–56. Such a configuration would be obvious if one of the purposes of the reinforcing layer is increasing nail pull strength, as described in both Venrick 1939 and Kiik 2001. Ex. 1003 (Bryson Decl.), at ¶ 482. Indeed, the nail pull data in Kiik 2001 confirms that the backing layer of the reference extends at least partially into the nailing zone, and that nails pass through it. *Id.* Venrick 1939 in view of Kiik 2001 therefore renders obvious claim 3. *Id.*

4. Venrick 1939 in View of Kiik 2001 Renders Obvious Claim 4

Venrick 1939 discloses a reinforcement layer that is made of roofing tape. Ex. 1013 (Venrick 1939), at 4, col. 2:74-75; Ex. 1003 (Bryson Decl.), at ¶ 483. Roofing tape was understood to be made of, among other things, paper. *Id.* Kiik

2001 states that the backing material can be made of woven polyester mat, which the person of ordinary skill in the art would have recognized to encompass thin fabric material. *Id.*; Ex. 1018 (Kiik 2001), at [0006]. The person of ordinary skill would have known that many of these materials, including cotton and wool could be woven into thin fabric. Ex. 1003 (Bryson Decl.), at ¶ 483. In fact, Kiik 2002 also discloses a woven polyester mat as backing material which would be understood to be a thin fabric. *Id.* Venrick 1939 in view of Kiik 2001 renders obvious claim 4. *Id.*

5. Venrick 1939 in View of Kiik 2001 Renders Obvious Claim 5

As discussed at § IV.A.1, Venrick 1939 (Ex. 1013) contemplates that the reinforcement layer be applied to the shingle “after manufacture” and that the reinforcement layer be applied with cement. Ex. 1013 (Venrick 1939), at 4, col. 1:34–37; Ex. 1003 (Bryson Decl.), at ¶ 484. The person of ordinary skill would have found it obvious to use the backing material of Kiik 2001 in place of the reinforcement material described in Venrick 1939 and would have found it likewise obvious to adhere the backing material onto the rear exterior surface of the shingle using an adhesive such as cement. *Id.* Based on the specification, the person of ordinary skill would understand the “lower surface” of the shingle is the same thing as the rear surface. *Id.* Venrick 1939 in view of Kiik 2001 therefore renders obvious claim 5. *Id.*

6. Venrick 1939 in View of Kiik 2001 Renders Obvious Claim 6

As discussed, the person of ordinary skill would understand this claim to require that the reinforcement layer is exposed and uncovered prior to application of the shingle on the roof. *See supra*, at § IV.A.6. As discussed, the person of ordinary skill would have found it obvious to use the backing material of Kiik 2001 in place of the reinforcement material described in Venrick 1939 and would have found it likewise obvious to adhere the backing material onto the exterior surface of the shingle using an adhesive such as cement, which would have necessarily resulted in the backing material being exposed and uncovered prior to application of the shingle to the roof. Ex. 1003 (Bryson Decl.), at ¶ 485. Venrick 1939 in view of Kiik 2001 therefore renders obvious claim 6. *Id.*

7. Venrick 1939 in View of Kiik 2001 Renders Obvious Claim 7

For the same reasons that Venrick 1939 in view of Kiik 2001 renders obvious the subject matter of claims 1–6, the combination of these references also renders obvious claim 7. *Id.* at ¶¶ 486-88.

8. Venrick 1939 in View of Kiik 2001 Renders Obvious Claim 8

As discussed, Venrick 1939 discloses shingles that meet the requirements of this claim. *See supra*, at § III.A.1 and § IV.A.1. Kiik 2001 also states that the “backing material may be applied to various types of roofing products.” Ex. 1018

(Kiik 2001), at [0016]. The person of ordinary skill would understand that such roof products could include asphalt shingles, such as the standard strip shingle, which was known to have a headlap region, a number of tabs, and a nailing zone located just above the tabs. *See* Ex. 1009 (ARMA Manual 1997), at Fig. 10; Ex. 1003 (Bryson Decl.), at ¶ 489. A shingle having the described features is also shown in Fig. 1 of the '046 patent (Ex. 1001), which the patent describes as “prior art.” Venrick 1939 in view of Kiik 2001 therefore renders obvious claim 8. Ex. 1003 (Bryson Decl.), at ¶ 489.

9. Venrick 1939 in View of Kiik 2001 Renders Obvious Claim 9

The only difference between claim 8 and claim 9 is that the shingle of claim 9 has only a single tab. Ex. 1003 (Bryson Decl.), at ¶ 491. Single tab shingles were well known, and were considered to be one of the basic types of shingle shape. Ex. 1005 (Cash 1995), at 1; Ex. 1003 (Bryson Decl.), at ¶ 491-93.

The person of ordinary skill would have been motivated to utilize the reinforcing layer disclosed in Venrick 1939 and Kiik 2001 with all of the most common types of shingles such as laminated shingles, single tab shingles, and strip shingles in order to achieve the benefits of the reinforcing layer disclosed in these references. *Id.* Venrick 1939 in view of Kiik 2001 therefore renders obvious claim 9. *Id.*

D. Secondary Considerations Do Not Weigh In Favor of Nonobviousness

To the extent that the Patent Owner argues that the commercial success of Petitioner's products bear on the question of the obviousness of the claims of the '046 patent, Petitioner responds as follows:

First, secondary considerations only apply in an obviousness analysis, but Venrick 1939 anticipates claims 1-8 of the '046 patent.

Second, Petitioner's products do not have a nexus to the claims of the '046 patent because the products fall outside the scope of the claims. Ex. 1003 (Bryson Decl.), at ¶ 948. Among other reasons, the claims require that the "second reinforcement thickness layer" be attached to the "first thickness layer," *i.e.*, the layer comprising the base mat coated with asphalt and granules. But any reinforcement layer on Petitioner's products is attached directly to the asphalt as opposed to being attached to the "first thickness layer." *Id.* at ¶ 949.

Even if Petitioner's products were covered by the claims of the '046 patent (and they are not), their commercial success is not attributable to the subject matter of the claims. A variety of different factors drive the decision to purchase a particular shingle. *Id.* at ¶ 950. These factors include cost, color, shape, ease of installation, warranty, and dollars spent marketing the product. To the extent consumers purchase Petitioner's products, those sales would be driven by all of these factors. *Id.*

In fact, the primary reason why consumers purchase Petitioner’s product is because it is an asphalt shingle. *Id.* at ¶ 951. The basic asphalt shingle, however, has been known for decades. Even if it is alleged that Petitioner’s products include a “reinforcement second thickness layer” that meets all the limitations of the claims, this feature was known for decades. *Id.* Thus, any commercial success enjoyed by Petitioner’s products are not relevant to the nonobviousness of the claims of the ’046 patent. *Gnosis S.P.A. v. South Alabama Med. Sci. Found.*, IPR2013-00116, Paper No. 68, at 32-42 (PTAB June 20, 2014) (“[A] showing of nexus ... involves establishing that novel elements in the claim, not prior-art elements, account for the objective evidence put forward to show nonobviousness.”). Ultimately, the Patent Owner bears the burden of proving secondary considerations. If Patent Owner sets forth evidence, Petitioner reserves the right to respond with additional evidence and argument.

V. CONCLUSION

For the foregoing reasons, the Petitioner respectfully requests that Trial be instituted and that claims 1–9 of the ’046 patent be canceled.

Dated: August 29, 2014

Respectfully Submitted,

/Jeffrey P. Kushan/
Jeffrey P. Kushan
Registration No. 43,401
Sidley Austin LLP
1501 K Street NW
Washington, DC 20005

PETITION FOR INTER PARTES REVIEW

OF U.S. PATENT NO. 7,781,046

Attachment A:

Proof of Service of the Petition

CERTIFICATE OF SERVICE

I hereby certify that on this 29th day of August 2014, a copy of this
PETITION FOR INTER PARTIES REVIEW has been served in its entirety by
Federal Express on the following counsel of record for patent owner:

John F. McNutty
Paul & Paul
2000 Market Street
Suite 2900
Philadelphia, PA 19103
Tel: (215) 658-4900

Kristen Healy Cramer
WOMBLE CARLYLE SANDRIDGE RICE
222 Delaware Avenue
Suite 1501
Wilmington, DE 19801
Tel: (302) 252-4320
Fax: (302) 777-4224

Dated: August 29, 2014

Respectfully submitted,

/Jeffrey P. Kushan/
Jeffrey P. Kushan
Reg. No. 43,401
Attorney for Petitioner

PETITION FOR INTER PARTES REVIEW

OF U.S. PATENT NO. 7,781,046

Attachment B:

List of Evidence and Exhibits Relied Upon in Petition

Appendix B

Exhibit #	Reference Name
1001	U.S. Patent No. 7,781,046
1002	U.S. Patent No. 7,781,046 File Wrapper (U.S. Application No. 12/422,506) (filed April 13, 2009)
1003	Declaration of Michael L. Bryson
1004	Curriculum Vitae of Michael L. Bryson
1005	Cash, <i>Asphalt Roofing Shingles</i> , Proc. 11 th Conf. Roofing Tech. 1-9 (Sept. 21–22, 1995)
1006	U.S. Patent No. 3,998,685
1007	Noone et al., <i>Asphalt-Shingles – A Century of Success and Improvement</i> , Proc. 11 th Conf. Roofing Tech. 23-33 (Apr. 22–23, 1993)
1008	U.S. Patent No. 2,099,131
1009	<i>ARMA Residential Roofing Manual</i> (1997)
1010	U.S. Patent No. 5,822,943
1011	U.S. Patent No. 6,145,265
1012	U.S. Patent No. 2,197,972
1013	U.S. Patent No. 2,161,440
1014	U.S. Patent No. 3,813,280
1015	U.S. Patent No. 4,875,321
1016	U.S. Patent No. 5,860,263
1017	U.S. Patent No. 6,228,785
1018	U.S. Patent Publication No. 2001/0055680
1019	U.S. Patent No. 6,341,462

Exhibit #	Reference Name
1020	U.S. Patent No. 5,577,361
1021	U.S. Patent No. 6,397,556
1022	U.S. Patent No. 5,571,596
1023	U.S. Application No. 11/421,893 (filed on June 2, 2006)
1024	U.S. Application No. 10/871,911 (filed on June 18, 2004)
1025	U.S. Application No. 10/288,747 (filed on November 6, 2002)
1026	U.S. Patent No. 6,758,019
1027	U.S. Patent No. 7,118,794
1028	U.S. Patent No. 7,537,820
1029	U.S. Application No. 12,857,868 (filed on August 17, 2010)
1030	U.S. Application No. 13/291,234 (filed on November 8, 2011)
1031	U.S. Application No. 13/462,159 (filed on May 2, 2012)
1032	U.S. Application No. 13/788,029 (filed on March 7, 2013)
1033	U.S. Application No. 13/855,820 (filed on April 3, 2013)
1034	U.S. Patent No. 8,173,243
1035	U.S. Patent No. 8,383,228
1036	U.S. Patent No. 8,409,689
1037	U.S. Patent No. 8,592,025
1038	U.S. Patent No. 8,615,968
1039	The American Heritage Dictionary of the English Language, 4th Ed. (2000), pp. 21, 583, 1472

Exhibit #	Reference Name
1040	U.S. Patent No. 1,524,090
1041	U.S. Patent No. 5,052,162
1042	U.S. Patent No. 3,921,358
1043	Consumer Reports Rating the Supermarkets – Shingles and siding , pp. 26-30 (Aug. 1997)
1044	ASTM, Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules (D 3462-02) (published March 2002), pp. 161-165
1045	Complaint, <i>CertainTeed Corp. v. Owens Corning</i> , Civ. A. No. 1:14-cv-00510-SLR (D. Del.)