

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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WABCO HOLDINGS INC. & LAYDON COMPOSITES LTD.,  
Petitioner,

v.

TRANSTEX COMPOSITE INC.,  
Patent Owner.

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Case IPR2018-00737  
Patent 7,942,471 C1

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Before BART A. GERSTENBLITH, TIMOTHY J. GOODSON, and  
BRENT M. DOUGAL, *Administrative Patent Judges*.

DOUGAL, *Administrative Patent Judge*.

JUDGMENT  
Final Written Decision  
Determining All Challenged Claims Unpatentable  
35 U.S.C. § 318(a)

## I. INTRODUCTION

### A. Background

WABCO Holdings Inc. and Laydon Composites Ltd. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) to institute an *inter partes* review of claims 1–9, 19, and 20 (the “challenged claims”) of U.S. Patent 7,942,471 C1 (Ex. 1001, the “’471 patent”). See 35 U.S.C. § 311. Transtex Composite Inc. (“Patent Owner”) timely filed a Preliminary Response (Paper 6, “Prelim. Resp.”). Applying the standard set forth in 35 U.S.C. § 314(a), we instituted an *inter partes* review of all challenged claims. Paper 8 (“Dec.”).

Patent Owner filed a Response (Paper 11, “PO Resp.”), Petitioner filed a Reply (Paper 15, “Reply”), and Patent Owner filed a Sur-Reply (Paper 17, “Sur-Reply”). An oral hearing was held on July 18, 2019, and a copy of the transcript was entered into the record. Paper 29 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the patentability of the claims on which we instituted trial. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). Having reviewed the arguments of the parties and the supporting evidence, we determine that Petitioner has shown, by a preponderance of the evidence, that the challenged claims of the ’471 patent are unpatentable.

### B. Related Proceedings

The parties indicate that the ’471 patent is currently involved in *Transtex LLC and Transtex Composites Inc. v. WABCO Holdings Inc. and*

*Laydon Composites Ltd.*, No. 2:17-cv-12793-SJM (E.D. Mich.). Pet. 4; Paper 3, 2.

*C. The '471 Patent*

The '471 patent generally relates to aerodynamic skirts for trailers. Ex. 1001, Abstr. The '471 patent explains that skirts are attached to trailers “to reduce the aerodynamic air drag and improve fuel efficiency.” *Id.* at 1:23–24. However, road conditions can cause damage to the skirts, “reducing the efficiency of the skirts.” *Id.* at 1:39–40. Figure 2, reproduced below, illustrates “a road tractor and a road trailer with a skirt assembly.” *Id.* at 4:9–12.

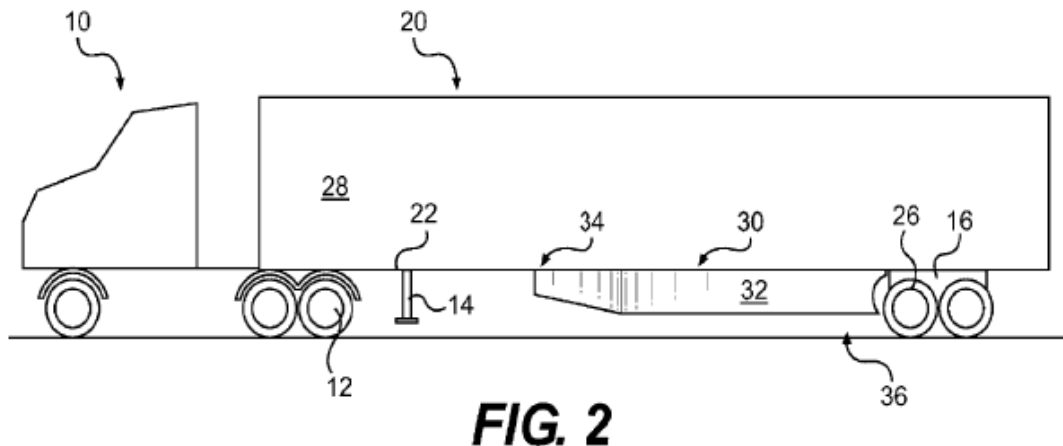


**FIG. 2**

Figure 2 shows a trailer 32 with a skirt panel 32. *Id.* at 4:46–50.

The '471 patent teaches that the skirt can be attached to the trailer through a number of resilient struts 42, as illustrated in Figure 4, reproduced below. *Id.* at 5:50–53.

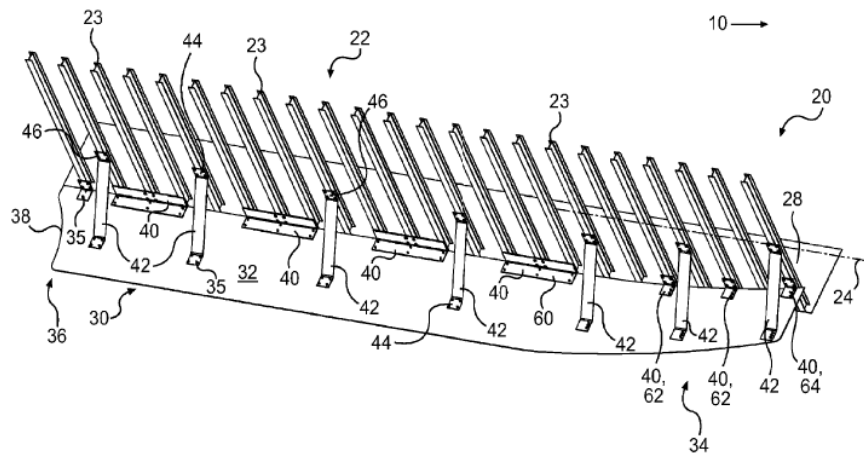


**FIG. 4**

Figure 4 shows the resilient struts 42 attaching the skirt 32 to the underside of the trailer 28. *Id.* at 4:14–15; *see also id.* at 5:48–53.

The '471 patent teaches that the struts can undergo deformation when a force is applied to the skirt, while returning to the original shape after the force is removed. *Id.* at 8:47–53, 9:6–9; *see also id.* at 9:47–53, Figs. 12–13.

Of the challenged claims, claims 1 and 19 are independent. Claims 2–9 depend from claim 1 and claim 20 depends from claim 19. Claims 1 and 19 were subject to reexamination. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. An aerodynamic skirt adapted to be substantially longitudinally mounted to a trailer, the aerodynamic skirt comprising:
  - (a) a skirt panel including a front portion and a rear portion, the front portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer in an aerodynamic configuration of the skirt, the front portion having a front height and the rear portion having a rear height, the front height being shorter than the rear height, the skirt panel being adapted to move away from the aerodynamic configuration of the

skirt when contacting a foreign object and to recover to the aerodynamic configuration of the skirt thereafter,

(b) the skirt panel being resiliently secured to the trailer with a plurality of resilient struts, each resilient strut comprising

(i) an intermediate portion;

(ii) a trailer connecting portion at a first end thereof, and

(iii) a skirt connecting portion at a second end thereof,

(iv) the resilient strut being adapted to sustain an elastic deformation when a load is applied thereon when the skirt panel moves away from the aerodynamic configuration of the skirt both proximally toward a center of the trailer and distally away from the center of the trailer; and to self-recover an original shape when the skirt panel returns to the aerodynamic configuration of the skirt when the load is removed.

Ex. 1001, 22 (Reexamination Certificate, 1:25–52).

#### *D. Instituted Grounds*

Petitioner contends that the challenged claims are unpatentable based on the following grounds (Pet. 7, 52–68):

| Reference(s)                     | Basis (35 U.S.C.)         | Claims      |
|----------------------------------|---------------------------|-------------|
| Layfield <sup>1</sup>            | §§ 102(a), (e)(1), (e)(2) | 1–9, 19, 20 |
| Layfield and Rinard <sup>2</sup> | § 103(a)                  | 1–9, 19, 20 |

As further support, Petitioner offers the Declaration of Paul A. Tres (Ex. 1010, “Tres Decl.”).

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<sup>1</sup> U.S. Patent 7,578,541 B2, issued Aug. 25, 2009 (Ex. 1004) (“Layfield”).

<sup>2</sup> U.S. Patent 5,280,990, issued Jan. 25, 1994 (Ex. 1006) (“Rinard”).

## II. ANALYSIS

### A. *Legal Standards for Anticipation*

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. Inc. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Moreover, “[b]ecause the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008). Whether a reference anticipates is assessed from the perspective of an ordinarily skilled artisan. *See Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003) (“‘[T]he dispositive question regarding anticipation [i]s whether *one skilled in the art* would reasonably understand or infer from the [prior art reference’s] teaching’ that every claim element was disclosed in that single reference.”).

### B. *Legal Standards for Obviousness*

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness under 35 U.S.C. § 103 that requires consideration of four factors: (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior art,” (3) the “differences between the prior art and the claims at issue,” and (4) “secondary considerations” of non-obviousness such as “commercial success, long-felt but unsolved needs, failure of others, etc.” *Id.* at 17–18.

Neither party has presented evidence or argument directed to secondary considerations. The other *Graham* factors are addressed below.

*C. Level of Ordinary Skill*

Petitioner states that a person of ordinary skill “would have been someone who had a bachelor’s degree in mechanics, aeronautics, materials, or a related field of study, or equivalent experience, and at least two years of experience in the development of components of vehicles, or an equivalent amount of relevant work or research experience.” Pet. 17 (citing Ex. 1010 (Tres Decl.) ¶¶ 47–49).

Patent Owner does not address or otherwise contest Petitioner’s definition of the level of ordinary skill. *See generally* PO Resp. We are persuaded, on the present record, that Petitioner’s proposal is consistent with the problems and solutions in the ’471 patent and prior art of record. *See, e.g., In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (“In determining this skill level, the court may consider various factors including type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” (citations and internal quotations omitted)). Accordingly, we adopt Petitioner’s proposed level of ordinary skill in the art.

*D. Claim Construction*

In an *inter partes* review filed before November 13, 2018, the Board interprets claims in an unexpired patent using the “broadest reasonable construction in light of the specification of the patent.”<sup>3</sup> 37 C.F.R.

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<sup>3</sup> The recent amendment to this rule does not apply here because the Petition

§ 42.100(b) (2017); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016).

Petitioner submits proposed constructions for the terms “resilient strut,” “adapted to,” and “self-recover” in claims 1 and 19. Pet. 18–22. Petitioner argues that “resilient strut” should be construed to mean “a strut that can flex or deform in response to a load being applied to it, and then return to its original position after the load is removed from the strut.” *Id.* at 18. Petitioner argues that “adapted to” should be construed to mean “any structure capable of performing the claimed function or intended use.” *Id.* at 22. Petitioner argues that “self-recover” should be construed to mean “that the resilient strut is capable of bending or elastically deforming under a load and then returning to its original position as a result of its resiliency.” *Id.*

Patent Owner disagrees with Petitioner’s constructions, but also argues that none of the terms need to be construed to resolve the dispute. PO Resp. 9–10, 12, 15; *see also* Sur-Reply 2–3. In Reply, Petitioner agrees that the terms “adapted to” and “self-recover” do not need to be construed. Reply 6. However, Petitioner argues that a controversy exists because the parties do not agree on the construction of “resilient strut” and that it should be resolved by the Board. Tr. 10:8–17.

Based on the full record, the parties agree that it is unnecessary to construe the terms “adapted to” and “self-recover.” As to the term “resilient

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was filed before November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018).

strut,” the parties’ claim construction dispute centers on whether the strut must be able to return to its original shape after “significant” deformation. *See* PO Resp. 10–11; Reply 3–6; Tr. 7:15–14:9, 39:17–44:8. We find that analysis of the instituted grounds does not turn on the degree of deformation from which the strut can recover, so it is unnecessary to expressly construe “resilient strut.”

For purposes of this decision, we need not provide an express construction for any terms or phrases as no controversy has been identified as to any of the claim terms. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that “only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

#### *E. Review of the Prior Art*

##### *1. Summary of Layfield*

Layfield is directed to a skirt fairing for the underside of a trailer to achieve “increased fuel efficiency and greater driving safety by deflecting and otherwise altering the airflow e.g., by creating laminar flow along the side and underneath the trailer of a tractor trailer rig or the like.” Ex. 1004, 1:6–12. Layfield explains that skirt panels 10 can be attached to the underside of the trailer through a number of support struts 58, as illustrated in Figure 7, reproduced below. *Id.* at 15:7–18.

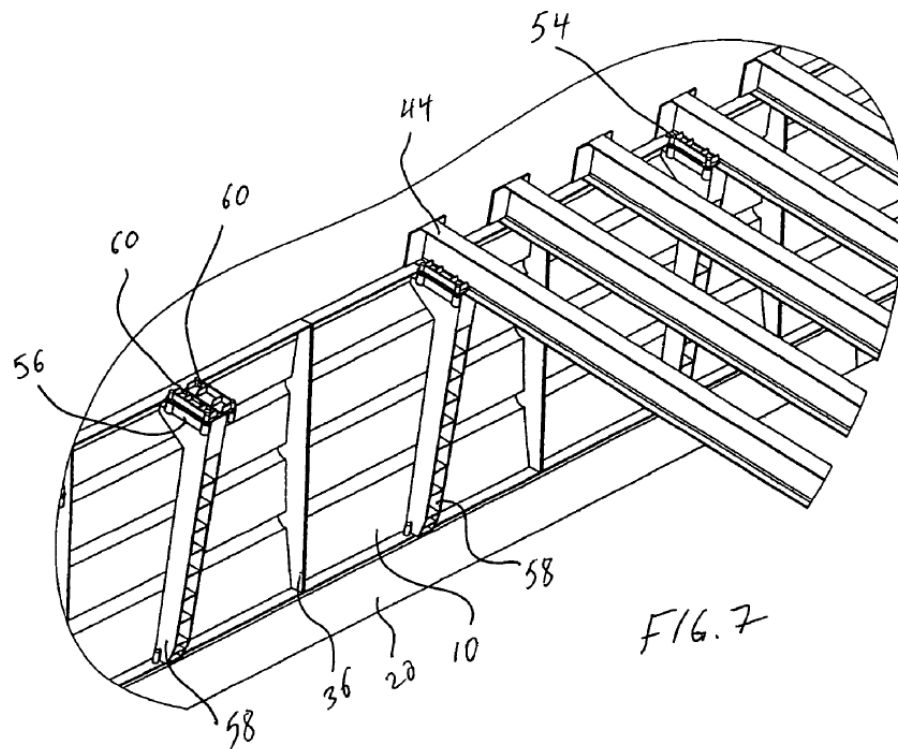
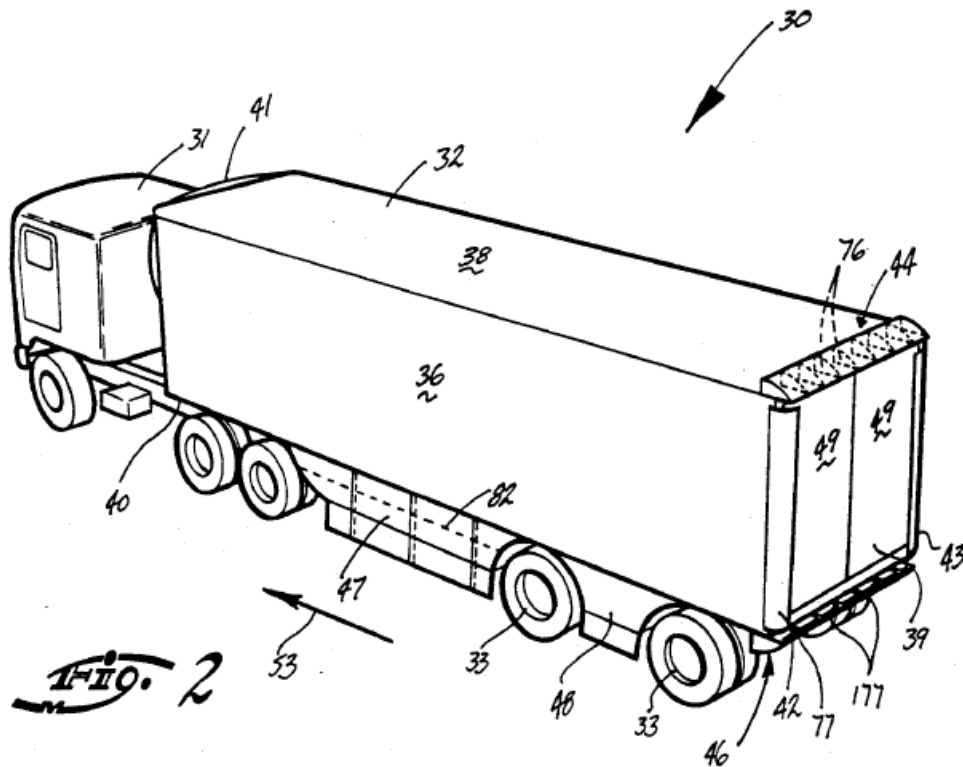


Figure 7 shows how a support strut 58 connects a skirt panel 10 to an I-beam 44, which is part of a tractor-trailer rig. *Id.*

## 2. Summary of Rinard

Rinard is directed to a vehicle drag reduction system, including top and bottom scoops to direct airflow. Ex. 1006, Abstr. The “scoops are fabricated from a resilient material to allow compression against a loading dock structure.” *Id.* Figure 2, reproduced below, illustrates a semi-trailer with a vehicle drag reduction system. *Id.* at 6:62–64.



The vehicle drag reduction system as shown on the semi-trailer of Figure 2 includes a rear traverse upper air scoop 44 and a rear traverse lower air scoop 46. *Id.* at 7:66–8:4.

Rinard explains that the air scoops, including vertical support elements 76, can be made “from a resilient material.” *Id.* at 10:43–48. This allows the air scoop “to resume its illustrated configuration upon removal of contact” with another structure, such as a loading dock. *Id.* at 10:48–50.

#### *F. Anticipation by Layfield*

Petitioner asserts that claims 1–9, 19, and 20 are anticipated by Layfield. Pet. 7, 30–52. Patent Owner opposes. PO Resp. 38–52. For the reasons discussed below, we determine that Petitioner has not established that Layfield anticipates any of the challenged claims.

Petitioner asserts that Layfield teaches an aerodynamic skirt mounted to a trailer. Pet. 31 (citing, e.g., Ex. 1004, 16:11–23, Fig. 13).<sup>4</sup> Petitioner further asserts that the skirt has front and rear portions as required by claim 1. *Id.* at 32–33 (citing, e.g., Ex. 1004, 16:11–31, Fig. 13). Petitioner asserts that Layfield teaches flexible skirt panels that will “move away from the aerodynamic configuration of the skirt when contacting a foreign object and . . . recover to the aerodynamic configuration of the skirt thereafter” as required by claim 1. *Id.* at 34 (citing Ex. 1010 ¶¶ 82–85); *see also id.* (citing Ex. 1004, 12:62–13:10).

Petitioner also asserts that Layfield teaches resilient struts as required by the claim. *Id.* at 35–37. Petitioner cites Layfield’s Figure 7, reproduced above, as well as Figure 10 showing struts 58. *Id.* at 35, 37.

Petitioner asserts that Layfield’s “struts 58 are elastically flexible so that they will bend or deform when the skirt panel moves away from an aerodynamic configuration under the impact of an object striking the skirt panel” and that “[w]hen the load is removed, the struts 58 can return to their original position.” *Id.* at 38.

We now look to specific claim limitations that are in dispute.

#### *1. The Skirt Panel Being Adapted to Move*

Independent claims 1 and 19 require “the skirt panel being adapted to move away from the aerodynamic configuration of the skirt when contacting a foreign object and to recover to the aerodynamic configuration of the skirt thereafter.” Petitioner asserts that this limitation is taught by Layfield based

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<sup>4</sup> Petitioner’s analysis with respect to independent claim 19 largely mirrors Petitioner’s analysis of claim 1. *Compare* Pet. 30–41, *with id.* at 49–52.

on, among other things, Layfield's teaching that "[t]he panels are sufficiently rigid to be substantially self-supporting from an attachment to the tractor-trailer rig, while retaining sufficient flexibility to bend when the rig maneuvers over objects, e.g. curbs, railway tracks, below grade loading docks, etc." Pet. 34 (quoting Ex. 1004, 12:67–13:4).

Patent Owner argues that Layfield's skirt panels 10 are not flexible and therefore they cannot move away from the aerodynamic configuration of the skirt and then recover. PO Resp. 41–42. Rather, only the lower panel component 20 is flexible. *Id.* Patent Owner further argues that the skirt panels 10 are not flexible because they include various reinforcements, such as flanged edges, trusses 36, and ribbing. *Id.* at 42–43.

Though we agree that Layfield primarily discusses lower panel component 20 as providing the flexibility for going over road objects (*see, e.g.*, Ex. 1004, 17:1–10), Layfield is not as limited as argued by Patent Owner. Rather, Layfield expressly teaches that the skirt panels are flexible. For example, Layfield refers to the skirt panels as "relatively-flexible side panels" and "semi-flexible side panels." *Id.* at 5:52, 12:64. Further, Layfield teaches an embodiment where "the injection molding method produces a skirt panel with 'the ability to offer greater flexing of the panel as it passes over road objects (e.g., curbs, rail road tracks and below grade loading docks) due to live hinges and/or notches in panel ribs.'" Pet. 34 (quoting Ex. 1004, 18:21–32). Layfield teaches that this same embodiment includes support struts and an extruded flexible lower panel component. Ex. 1004, 18:40, 49–50. Thus, even with a reinforcing support strut and a flexible lower panel, Layfield explicitly teaches flexibility of the skirt panel.

Patent Owner also identifies a number of features in Layfield that Patent Owner argues require rigidity in the skirt panel system. *See* PO Resp. 40–43; Sur-Reply 3–4. These features include the interconnected nature of the skirt panels, reinforced lateral edges, ribbing, and trusses 36. PO Resp. 40–43. These arguments, however, do not overcome Layfield’s express teaching of a flexible skirt panel, as discussed above.

We further find unconvincing Patent Owner’s argument that statements in Layfield’s prosecution history—that the skirt panel does not move, as compared to the hinged movement of the prior art—mean that Layfield does not teach flexible skirt panels. *See* PO Resp. 44 n.12; Sur-Reply 4–6. In particular, the statements referred to were drawing a distinction between Layfield’s skirt panel and hinged movement shown in a prior art reference cited during Layfield’s prosecution. The statements do not address directly whether Layfield’s skirt panel teaches the movement recited by claims 1 and 19. Thus, this argument also does not overcome Layfield’s express teaching of a flexible skirt panel.

In view of the above, we find Petitioner has shown by a preponderance of the evidence that Layfield teaches a flexible skirt panel such that the “skirt panel [is] adapted to move away from the aerodynamic configuration of the skirt when contacting a foreign object and to recover to the aerodynamic configuration of the skirt thereafter” as required by independent claims 1 and 19.

## 2. *Resilient Strut*

Independent claims 1 and 19 require the skirt panel to be “resiliently secured to the trailer with a plurality of resilient struts.” Claim 1 further states:

the resilient strut being adapted to sustain an elastic deformation when a load is applied thereon when the skirt panel moves away from the aerodynamic configuration of the skirt both proximally toward a center of the trailer and distally away from the center of the trailer; and to self-recover an original shape when the skirt panel returns to the aerodynamic configuration of the skirt when the load is removed.

Claim 19 includes a substantially similar limitation. Ex. 1001, 12:46–51.

Petitioner asserts that Layfield’s struts are resilient because they are made of “thermoplastic materials, such as ABS, HMW polyethylene, PP and TPO<sup>5</sup>, [which] were well known by one skilled in the art to be resilient materials.” Pet. 36 (citing Ex. 1010 ¶ 87 (Mr. Tres making an identical statement)); *see also* Ex. 1004, 18:40–43 (teaching that the struts can be made of the above-listed materials).

Petitioner further asserts that “[t]he Layfield struts 58 can sustain an elastic deformation up to the point of plastic deformation.” Pet. 36. Petitioner also asserts that “[a] person skilled in the art . . . would have understood that the disclosed materials in Layfield would have provided different amounts of elastic deformation, depending on the amount of flexibility desired.” *Id.* at 39. Petitioner argues that ABS could provide a

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<sup>5</sup> Acrylonitrile butadiene styrene (ABS), high molecular weight polyethylene (HMW polyethylene), polypropylene (PP) and thermoplastic olefin (TPO). Pet. 25–26.

more rigid strut and TPO or HMW polyethylene could provide greater elasticity and resiliency. *Id.* (citing Ex. 1010 ¶ 109 (Mr. Tres making identical statements)).

Although Layfield mentions “relatively-flexible side panels” (Ex. 1004, 5:52) and focuses on providing flexible lower panel components (*see, e.g.*, Ex. 1004, 17:1–10) as discussed above, Layfield does not contain any teaching concerning the flexibility of the struts (*see generally* Ex. 1004). Nor does Layfield include any discussion concerning the desirability of strut flexibility. *See generally id.* The closest Layfield comes to discussing flexibility of the struts, is by frequently referring to the struts as “support struts” (*see, e.g., id.* at 18:40) and discussing the use of a “bracket means,” which is on the struts, to “rigidly secure” the skirt panels to the trailer (*id.* at 6:48–49). Further, Layfield’s detailed discussion of the embodiment of support strut 58 of Figure 10, reproduced below, highlights the bracing and reinforcement features.

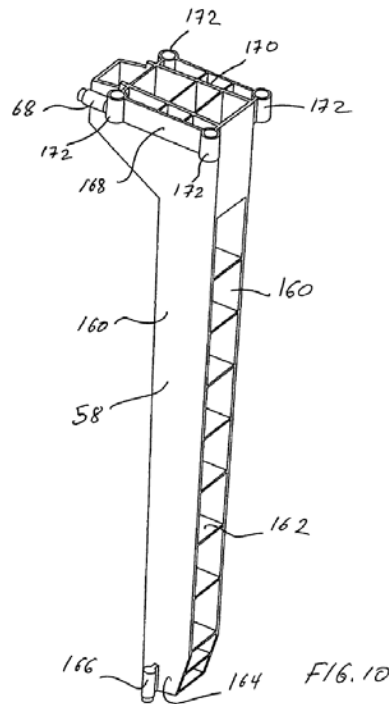


Figure 10, above, shows the construction detail of a support strut 58.

Ex. 1004, 15:45.

The strut includes “a pair of spaced-apart vertical members 160, which are braced by horizontal cross-members 162” and “reinforcing rectangular lattice 170.” *Id.* at 15:46–54. Thus, Patent Owner correctly states that “Layfield does not expressly teach that the ‘support struts 58’ are ‘resilient.’” PO Resp. 46 (citing Ex. 2015 (“Micklow Decl.”) ¶¶ 159–160).

We reiterate that Petitioner’s first challenge based on Layfield is one of anticipation. Pet. 30. Thus, Petitioner must show that resilient struts are “either expressly or inherently described, in” Layfield. *Verdegaal Bros. Inc.*, 814 F.2d at 631; *see also* PO Resp. 46. At oral argument, Petitioner argued that Layfield’s struts “operate in no other way than to achieve a plastic deformation” and so it wasn’t clear to Petitioner’s counsel whether “it’s inherently disclosed versus expressly disclosed.” Tr. 24:8–10; *see also*

*id.* at 23:12–24:15 (discussing express versus inherent disclosure). This argument, that Layfield’s struts “operate in no other way than to achieve a plastic deformation” relies on an inherency theory, as opposed to express disclosure. As there are no express teachings in Layfield that the struts are flexible or otherwise resilient, Petitioner must show that this feature is inherent. “Inherent anticipation requires that the missing descriptive material is necessarily present, not merely probably or possibly present, in the prior art.” *Trintec Indus., Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 1295 (Fed. Cir. 2002) (internal quotations and citations omitted); *see also* PO Resp. 46. Notably, Petitioner’s Reply does not expressly respond to Patent Owner’s argument that resilient struts are not necessarily present (i.e., inherent) in Layfield. *See generally* Reply. Nevertheless, we review to determine whether Petitioner has shown sufficiently that Layfield’s struts are inherently resilient and otherwise resiliently adapted as required by claims 1 and 19.

Petitioner, Patent Owner, and both parties’ experts all agree that the material selection and the construction of a strut dictate whether the strut is resilient and capable of elastic deformation. Pet. 38; PO Resp. 46; Ex. 1010 (Tres Decl.) ¶ 89; Ex. 2015 (Micklow Decl.) ¶ 170. Thus, the statement by Patent Owner’s expert—that “a material can be resilient in one design or shape or not resilient in another”—is consistent with both parties’ evidence. Ex. 2015 ¶ 171 (also highlighting the difference in resiliency between a pipe and a thin sheet of the same material). Thus, we find that material selection alone is insufficient to establish that Layfield’s struts are inherently resilient. This finding contradicts Petitioner’s initial argument that because Layfield’s

example “thermoplastic materials . . . were well known by one skilled in the art to be resilient materials, the struts 58 are ‘resilient struts.’” Pet. 36. This finding also contradicts Petitioner’s argument that thermoplastic materials are more resilient than aluminum (which the Examiner considered a resilient material) and thus Layfield’s struts are resilient struts. Reply 18–19.

We note that the purpose of Layfield’s support strut 58 is to secure the side panel or skirt panel to the trailer. Ex. 1004, 15:23–43. This purpose constrains both material selection and the construction of the strut (e.g., thickness). Petitioner provides no credible evidence that a particular material disclosed by Layfield and a strut constructed with that material, for the stated purpose of the strut, would necessarily (i.e., inherently) result in a resilient strut. Rather, Petitioner addresses the material and the construction separately, without adequate attention to the need to consider both aspects. See Pet. 38–40; Reply 17–18; *see also, e.g.*, Ex. 1010 (Tres Decl.) ¶ 112 (discussing thermoplastic polymers and strut construction without considering any particular material); *see also* Ex. 2015 (Micklow Decl.) ¶¶ 162–165, 176–192 (disagreeing with Petitioner’s expert concerning the relative resiliency verses rigidity of the strut construction).

Though Petitioner makes the statement “[a] person skilled in the art . . . would have understood that the disclosed materials in Layfield would have provided different amounts of elastic deformation, depending on the amount of flexibility desired,” Petitioner provides no reason why Layfield or one of ordinary skill in the art would have desired flexibility in the strut or why the strut would have necessarily been flexible. Pet. 39.

Petitioner's expert testifies that "one skilled in the art would have understood that the Layfield strut 58 is . . . constructed to be flexible in order to accommodate the flexure of the Layfield panel." Ex. 1010 (Tres Decl.) ¶ 88. However, neither Petitioner nor Petitioner's expert provides evidence that flexible struts are necessary to accommodate the flexure of the Layfield panel. For example, no evidence is provided that flexible struts are necessary to accommodate the type of flexure of the panel discussed in Layfield, i.e., flexing "as it passes over road objects (e.g., curbs, rail road tracks and below grade loading docks)." Ex. 1004, 18:21–32. Further, neither Petitioner nor Petitioner's expert addresses why the material selection and live hinges and/or notches in panel ribs in the skirt panel as taught by Layfield are insufficient to allow such flexure without also requiring the struts to be resilient. *See id.* at 18:21–32.

Further, Petitioner's video evidence (Ex. 1018<sup>6</sup>) of a movable skirt panel does not show that the teachings in Layfield necessarily result in a resilient strut. Petitioner asserts that the video shows "what one skilled in the art would have understood from Layfield itself." Pet. 40. However, we afford this evidence little weight for a number of reasons.

First, the video does not show the strut or the bending of a strut. *See* Ex. 1018. In fact, the only feature shown is a skirt panel attached to a trailer.

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<sup>6</sup> In our Institution Decision, we misunderstood Petitioner as representing that the testing was performed by Mr. Tres. Dec. 12–13. Based on the full record developed during trial, it appears that Mr. Tres did not perform the testing.

*Id.* Thus, it is unknown whether the skirt panel is attached to the trailer by one strut, multiple struts, or additional features.

Second, Petitioner does not clearly identify how the tested system precisely corresponds to the teachings of Layfield. For example, Patent Owner raises a number of issues with the struts and panels in the video to which Petitioner provides no response. For example, Patent Owner argues that each embodiment of Layfield uses trusses 36 to “interconnect each skirt panel and reinforce the panel assembly,” while it is asserted that the skirt panels in the video do not have trusses and are not interconnected. PO Resp. 29–30. Petitioner argues that the skirt panels in the video are made according to the teachings of Layfield and did include “integral vertical lateral side edges as the connecting mechanism for adjacent panels.” Reply 21–22 (citing Ex. 1018; Ex. 2024; Ex. 1004, 18:36–39; Ex. 1010 (Tres Decl.) ¶¶ 67–68; Ex. 1050 ¶ 30). However, other than stating that the skirt panels have connecting mechanisms, Petitioner does not address the fact that the panels are not interconnected according to the teachings of Layfield, as Patent Owner correctly pointed out. *See generally id.* at 21–23.

Patent Owner also argues that the struts in the video “have different shapes and connect to the skirt panel and trailer in different ways” than the Layfield struts. PO Resp. 32. In response, Petitioner asserts that the struts are “made according to Layfield,” but does not specifically respond to all of the differences identified by Patent Owner. *See* Reply 21–23. For example, Petitioner does not address Patent Owner’s statement that the purportedly

tested strut is a different shape<sup>7</sup> than that taught by Layfield or that the strut attaches to the trailer in a different manner. *See generally id.* at 21–23. At oral hearing, Petitioner stated that the tested strut is operationally the same as the embodiments of Layfield, but admits that there are some structural differences to the illustrated embodiments in Layfield. Tr. 26:14–20. Thus, even if we were to agree with all of Petitioner’s arguments in response, Patent Owner has raised a number of issues with how the strut and skirt panel in the video correspond to the teachings of Layfield that are not sufficiently addressed by Petitioner. We further note that one of the named inventors on the Layfield patent, states that the video (Ex. 1018) was made around two and half years after the filing of the Layfield patent. Ex. 2022 ¶¶ 13–14. We also note that the video appears to be internal testing that was done by the inventors (i.e., Petitioner) in their internal development process. In light of the evidence presented, we find that there are differences between Layfield’s skirt panel system and the skirt panel system used in the video.

Third, Petitioner does not identify how the tested device corresponds to the claims of the ’471 patent. *See generally* Pet. 40; Reply 21–22. For example, claim 1 of the ’471 patent requires that the skirt panel be secured to the trailer with a plurality of struts, which cannot be verified from the video, and which Mr. Tres does not discuss. Mr. Tres says “struts” were tested, but provides no additional information as to whether multiple struts secured the skirt to the trailer, or if multiple single strut configurations were tested. Further, the skirt panel in the video is inconsistent with the requirements of

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<sup>7</sup> The shape of the strut is a different point from how the strut is constructed which Petitioner does address. Reply 23.

the independent claims. Sur-Reply 17–20. The claimed skirt panel is required to essentially extend from the front portion to the rear portion of the trailer with different heights. Petitioner relies on multiple connected side panels in Layfield to teach the claimed skirt panel. Pet. 31–33. However, the video shows a side panel that is not connected and that is spaced away from an adjacent side panel. Ex. 1018; PO Resp. 29–30. It is unclear how the allegedly tested strut would perform under different circumstances.

For all of these reasons, we find Petitioner has not shown by a preponderance of the evidence that Layfield teaches, expressly or inherently, a skirt panel “resiliently secured to the trailer with a plurality of resilient struts” or the further limitations concerning how the resilient struts are adapted as required by claims 1 and 19. For these same reasons, Petitioner has not shown by a preponderance of the evidence that Layfield teaches all of the features of dependent claims 2–9 and 20.

*G. Obviousness over Layfield and Rinard*

Petitioner asserts that claims 1–9, 19, and 20 would have been obvious over Layfield in view of Rinard. Pet. 7, 52–68. Patent Owner opposes. PO Resp. 52–60. Generally, Petitioner relies on the teachings of Layfield as discussed above, however, Petitioner also relies on Rinard to suggest the use of a resilient material for the skirt panel and struts. Pet. 54–55, 57–61. For the reasons discussed below, we find that Petitioner has made a persuasive showing that the combination of Layfield and Rinard suggests each limitation of claims 1–9, 19, and 20. We additionally find that Petitioner has demonstrated sufficiently that one of ordinary skill in the art would have had reason with rational underpinning to combine the teachings

of the references in the manner proposed by Petitioner with a reasonable expectation of success. Pet. 7, 52–68; Ex. 1010 (Tres Decl.) ¶¶ 142–188; Ex. 1050 ¶¶ 3–37.

*1. Undisputed Limitations of Claims 1 and 19*

It is undisputed that Layfield teaches the following of claim 1, and the similar aspects of claim 19:

1. An aerodynamic skirt adapted to be substantially longitudinally mounted to a trailer, the aerodynamic skirt comprising:

(a) a skirt panel including a front portion and a rear portion, the front portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer in an aerodynamic configuration of the skirt, the front portion having a front height and the rear portion having a rear height, the front height being shorter than the rear height . . . ,

(b) the skirt panel being [] secured to the trailer with a plurality of [] struts, each [] strut comprising

- (i) an intermediate portion;
- (ii) a trailer connecting portion at a first end thereof, and
- (iii) a skirt connecting portion at a second end thereof.

*See generally* PO Resp.; Sur-Reply.

We find that Layfield teaches an aerodynamic skirt mounted to a trailer as required by independent claims 1 and 19. Ex. 1004, 16:11–23, Fig. 13; *see also* Pet. 31, 56, 66. We find that Layfield teaches limitation (a) of claim 1 above, and the similar limitation of claim 19. This is because Layfield teaches a skirt with a front portion at the forward portion of the trailer and a rear portion at the rear portion of the trailer in an aerodynamic configuration. Ex. 1004, 16:11–31, Fig. 13; *see also* Pet 32–33, 56, 66. This is also because Layfield teaches the front portion having a height that is

shorter than the height of the rear portion. Ex. 1004, 16:11–31, Fig. 13; *see also* Pet. 33, 57, 67.

We find that Layfield teaches limitation (b) of claim 1 above, and the similar limitation of claim 19. This is because Layfield teaches a strut that is connected to a skirt panel at one end and connected to a trailer at a second end with an intermediate portion therebetween. Ex. 1004, 9:51–58; 15:5–54, 18:40–43, Figs. 7–10; *see also* Pet. 35–37, 59–60, 67–68. In this manner, the strut connects the skirt panel to the trailer.

We agree with and adopt Petitioner’s contentions and the underlying evidence cited in support regarding the undisputed limitations of claims 1 and 19 and are persuaded that Petitioner establishes that Layfield teaches these limitations by a preponderance of the evidence. Pet. 7, 52–61, 65–68; Ex. 1010 (Tres Decl.) ¶¶ 142–164, 181–187.

## *2. The Skirt Panel Being Adapted to Move*

Independent claims 1 and 19 require “the skirt panel being adapted to move away from the aerodynamic configuration of the skirt when contacting a foreign object and to recover to the aerodynamic configuration of the skirt thereafter.”

We need not review Petitioner’s reasoning for using Rinard to suggest a resilient skirt panel as we have already determined above (*see supra* § II.F.1) that this limitation is taught by Layfield and Petitioner argues that both Layfield and Rinard teach or suggest this feature. *See* Pet. 57. Thus, for the reasons expressed above, we determine that Petitioner has shown by a preponderance of the evidence that Layfield teaches a flexible skirt panel such that the “skirt panel [is] adapted to move away from the aerodynamic

configuration of the skirt when contacting a foreign object and to recover to the aerodynamic configuration of the skirt thereafter” as required by independent claims 1 and 19. *See supra* § II.F.1.

### 3. Resilient Strut

As noted above, independent claims 1 and 19 require the skirt panel to be “resiliently secured to the trailer with a plurality of resilient struts.”

Claim 1 further requires:

(iv) the resilient strut being adapted to sustain an elastic deformation when a load is applied thereon when the skirt panel moves away from the aerodynamic configuration of the skirt both proximally toward a center of the trailer and distally away from the center of the trailer; and to self-recover an original shape when the skirt panel returns to the aerodynamic configuration of the skirt when the load is removed.

Claim 19 includes a substantially similar limitation.

Petitioner asserts that these limitations are suggested by Rinard based on the resilient vertical support elements 76, which secure air scoop 44 to the trailer. Pet. 59 (citing Ex. 1006, 10:20–64; Figs. 10–11). Petitioner cites Rinard as teaching “that the vertical support elements 76 are made from a resilient material ‘so that they may collapse when then [sic] rear surface 39 of the trailer 32 is brought into contact with other external structure, such as a loading dock’” and that they then return to their initial configuration when the contact is removed. *Id.* at 60–61 (quoting Ex. 1006, 10:43–50).

Petitioner argues that:

A skilled artisan would have recognized the benefit of constructing the Layfield struts 58 from a “resilient material” as taught by Rinard so that the Layfield struts 58 may deform either inwardly or outwardly in response to a load being applied against them when encountering an external structure and to return to

their original position supporting the panels in an aerodynamic configuration once the load is removed.

Pet. 54 (citing Ex. 1010 (Tres Decl.) ¶¶ 147–150); *see also id.* at 54–55, 59, 61 (where Petitioner makes similar arguments).

Patent Owner argues that Rinard’s “‘arcuate element 72’ and ‘vertical support elements 76’[] are designed only to compress in one direction—toward the trailer. There is no design reason for why vertical support elements 76, which hold the air scoop in place unless compressed, would be capable of being pulled away from the trailer.” PO Resp. 55 (internal citations omitted). Thus, Patent Owner argues that “nothing in Rinard teaches or suggests movement in two directions” and “any resulting modified struts could not move ‘distally away from the center of the trailer’ as recited” in the independent claims. *Id.*

Patent Owner’s initial part of this argument—based on the alleged lack of a design reason—fails because it is directed to Rinard alone, where Petitioner’s position is based on the combination of Layfield and Rinard. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (explaining that obviousness must be considered in light of “what the combined teachings of the references would have suggested to those of ordinary skill in the art”) (citations omitted). Petitioner is not arguing that there is a “design reason” to modify Rinard so that the vertical support elements 76 can be pulled away from the trailer. Rather, Petitioner argues that Layfield’s struts, when modified based on the teachings of Rinard, would allow movement both towards and away from the center of the trailer. *See* Pet. 61.

Further, it is not clear why “any resulting modified struts could not move ‘distally away from the center of the trailer,’” as further argued by Patent Owner. PO Resp. 55. Patent Owner may be correct that Rinard’s arcuate element 72 and the supports 76 may not be able to move away from the trailer. *Id.* However, it does not follow that Layfield’s modified strut would have the same issue. As discussed previously, and admitted by both parties, resiliency is based on both the material selection and the construction. Pet. 38; PO Resp. 46; Ex. 1010 (Tres Decl.) ¶ 89; Ex. 2015 (Micklow Decl.) ¶ 170. Layfield’s struts have a different construction than Rinard’s arcuate element 72 and supports 76. We find Petitioner’s argument convincing that one of skill in the art would have modified Layfield’s struts in both material selection and construction as necessary to exhibit resilience as taught by Rinard. Pet. 59 (citing Ex. 1010 (Tres Decl.) ¶ 160).

Patent Owner also argues that there would be no reasonable expectation of success because Rinard’s arcuate element 72 and supports 76 cannot move away from the trailer. PO Resp. 60. We find this argument unconvincing as it is directed to Rinard alone, rather than the combination of Layfield and Rinard. Further, Patent Owner provides no reasoning why Layfield’s modified strut would have the same issue. Rather, we agree with Petitioner that Rinard “provides an obvious solution” to “the problem of aerodynamic fairings mounted to trailers encountering external objects that can damage the aerodynamic performance of the fairing,” and that “[a]pplying this solution to the Layfield struts would yield the predictable result of allowing the Layfield struts 58 to absorb greater impacts without

having to be repaired or replaced.” Reply 25–26 (citing Ex. 1010<sup>8</sup> ¶¶ 143–144). As discussed previously, and admitted by both parties, resiliency is based on both the material selection and the construction.

Patent Owner also argues that Petitioner’s “proposed combination would ‘change the basic principles under which [Layfield] was designed to operate’ and would ‘render [Layfield] inoperable for its intended purpose.’” PO Resp. 56 (quoting *Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 Fed. App’x. 755, 758 (Fed. Cir. 2015)). This is because, Patent Owner argues, “an inescapable feature of Layfield as professed by Petitioner Laydon is that the interconnected skirt panels 10 are “fixed” and “do[] not move.” *Id.* at 57 (quoting Ex. 2016 ¶¶ 144–145). Thus, Patent Owner continues, any change to allow the skirt panels to move, including the use of resilient struts would “contradict the basic principles under which Layfield was designed to operate.” *Id.*

As previously stated, during Layfield’s prosecution, the applicant argued that the skirt panel does not move in a hinged manner, this does not mean that Layfield does not teach flexible skirt panels that are able to move. *See supra* § II.F.1; *see also* Reply 10–13. Layfield expressly teaches a flexible skirt panel as discussed above. *See supra* § II.F.1. Therefore, we do not agree with Patent Owner that the use of resilient struts would “contradict the basic principles under which Layfield was designed to operate.”

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<sup>8</sup> Petitioner cites to Exhibit 1003 rather than Exhibit 1010 (Tres Decl.). Petitioner’s citation appears to be a typographical error because Exhibit 1003 is a portion of the ’471 patent’s file history. Paragraphs 143 and 144 of Mr. Tres’ Declaration, on the other hand, are directed to the same issue argued by Petitioner.

Patent Owner also argues that because “Layfield already describes employing ‘flexible lower panel 20’ to allow flexing when impacting a road object,” there would be “no motivation to further modify Layfield to accomplish that same objective.” PO Resp. 57–58. Patent Owner provides citations to a number of cases for the proposition that motivation is lacking for a modification that merely supplies a feature that is already present. *Id.* at 58. However, we are not persuaded that Petitioner’s proposed modification merely supplies a feature that is already present. As noted above, Layfield teaches both “relatively-flexible side panels” (Ex. 1004, 5:52) and flexible lower panel components (*see, e.g.*, Ex. 1004, 17:1–10), but does not teach flexible or resilient struts. *See supra* §§ II.F.1–2. Petitioner argues that it would have been obvious, based on Rinard, “to construct the Layfield strut from a resilient material such that the strut has the capability of sustaining an elastic deformation when a load is applied against it and returning to its original shape after the load is removed as a result of its resiliency.” Pet. 59 (citing Ex. 1010 (Tres Decl.) ¶ 160). Thus, the objective of using resilient struts is not the same as the objective of employing a flexible lower panel.

Patent Owner next argues that a person of ordinary skill in the art would “not look to the vertical supports of the air scoops of Rinard given its separate fundamental teaching that the trailer skirt should be rigid.” PO Resp. 59. We agree that had Layfield taught a rigid trailer skirt, as argued by Patent Owner and rejected previously, there might be little reason to look to Rinard’s air scoops to modify the struts. However, that is not the correct starting point; Layfield expressly teaches a semi-flexible side (skirt) panel.

*See, e.g.*, Ex. 1004, 5:52, 12:64, 18:21–32; *see also supra* § II.F.1. We determine that Petitioner has shown that one of skill in the art would have had a reason with rational underpinning to look to other similar types of trailer components that are also flexible to make further improvements to Layfield’s design. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (“[I]f 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.”).

In view of the above, we find Petitioner has shown by a preponderance of the evidence that Layfield teaches a resilient strut and the related claimed aspects of a resilient strut as required by independent claims 1 and 19. We additionally find that Petitioner has demonstrated sufficiently that one of ordinary skill in the art would have had reason with rational underpinning to combine the teachings of Rinard and Layfield in the manner proposed by Petitioner with a reasonable expectation of success.

#### *4. Conclusion for Claims 1 and 19*

For the reasons discussed above, we find that Petitioner has shown by a preponderance of the evidence that the combination of Layfield and Rinard suggests each limitation of claims 1 and 19. We additionally find that Petitioner has demonstrated sufficiently that one of ordinary skill in the art would have had reason with rational underpinning to combine the teachings of the references in the manner proposed by Petitioner with a reasonable expectation of success. Pet. 7, 52–61, 65–68; Ex. 1010 (Tres Decl.) ¶¶ 142–164, 181–187; Ex. 1050 ¶¶ 3–37.

*5. Claims 2–9 and 20*

Patent Owner relies on its arguments over independent claims 1 and 19 for the patentability of dependent claims 2–9 and 20. PO Resp. 52–53. Patent Owner does not separately address any of the dependent claims. See PO Resp. 52–60.

We have reviewed Petitioner’s arguments and supporting evidence regarding these claims and determine that Petitioner has shown by a preponderance of the evidence that the combination of Layfield and Rinard suggests each limitation of claims 2–9 and 20. We additionally find that Petitioner has demonstrated sufficiently that one of ordinary skill in the art would have had reason with rational underpinning to combine the teachings of the references in the manner proposed by Petitioner with a reasonable expectation of success. Pet. 7, 61–65, 68; Ex. 1010 (Tres Decl.) ¶¶ 165–180, 188.

III. REPLY EVIDENCE AND ARGUMENT

We previously authorized Patent Owner to identify allegedly improper new evidence and arguments in Petitioner’s Reply. Paper 19. Patent Owner filed an Identification of Petitioner’s Improper New Reply Evidence and Argument (Paper 22) arguing that Exhibits 1044 and 1047 exceed the proper scope of a reply, and that portions of Exhibit 1045 and portions of the Reply itself are improper. Paper 22, 1. Petitioner filed a Response (Paper 24) identifying the portions of the Patent Owner’s Response to which Petitioner was responding. Paper 24, 2.

In making our determinations herein, we do not rely on any aspects of Exhibits 1044, 1045, or 1047. We also do not rely on the complained of portion of the Reply. Thus, we determine that the issue is moot.

#### IV. CONCLUSION<sup>9</sup>

Based on the full record developed during trial, we conclude that Petitioner has shown by a preponderance of the evidence that claims 1–9, 19, and 20 of the '471 patent are unpatentable under 35 U.S.C. § 103.

In summary:

| <b>Claims</b>          | <b>Basis</b>              | <b>Reference(s)</b> | <b>Claims Shown Unpatentable</b> | <b>Claims Not Shown Unpatentable</b> |
|------------------------|---------------------------|---------------------|----------------------------------|--------------------------------------|
| 1–9, 19, 20            | §§ 102(a), (e)(1), (e)(2) | Layfield            |                                  | 1–9, 19, 20                          |
| 1–9, 19, 20            | § 103(a)                  | Layfield and Rinard | 1–9, 19, 20                      |                                      |
| <b>Overall Outcome</b> |                           |                     | 1–9, 19, 20                      |                                      |

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<sup>9</sup> Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

V. ORDER

For the reasons given, it is

ORDERED that claims 1–9, 19, and 20 of U.S. Patent 7,942,471 C1 are unpatentable under 35 U.S.C. § 103; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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