

United States Court of Appeals for the Federal Circuit

02-1630, 03-1482

TI GROUP AUTOMOTIVE SYSTEMS (NORTH AMERICA), INC.
(now known as TI Group Automotive Systems, L.L.C.)

Plaintiff-Appellant,

v.

VDO NORTH AMERICA, L.L.C., MANNESMANN VDO AG,
SIEMENS VDO AUTOMOTIVE CORP.,
and SIEMENS VDO AUTOMOTIVE AG,

Defendants-Cross Appellants.

William J. Schramm, Reising, Ethington, Barnes, Kisselle, PC, of Troy, Michigan, argued for plaintiff-appellant. With him on the brief were Andrew M. Grove, Matthew J. Schmidt, and William H. Francis. Of counsel on the brief was Douglas E. Whitney, Morris, Nichols, Arsht & Tunnell, of Wilmington, Delaware.

Eric J. Lobenfeld, Clifford Chance US, LLP, of New York, New York, argued for defendants-cross appellants. With him on the brief were Drew M. Wintringham, III and Mark W. Rueh.

Appealed from: United States District Court for the District of Delaware

Judge Gregory M. Sleet

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Defendants-Cross Appellants.

DECIDED: June 30, 2004

Before NEWMAN, BRYSON, and LINN, Circuit Judges.

LINN, Circuit Judge.

TI Group Automotive Systems, L.L.C. (“TI Group”), appeals from a post-trial decision of the United States District Court for the District of Delaware, granting a motion for judgment as a matter of law (“JMOL”) that VDO North America, L.L.C., Mannesmann VDO AG, Siemens VDO Automotive Corp., and Siemens VDO Automotive AG (collectively “VDO” or “defendants”) do not infringe U.S. Patent No. 4,860,714 (“the ’714 patent”). TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C., No. 00-432-GMS (D. Del. Sept. 4, 2002) (“JMOL Infringement Opinion”). The defendants cross-appeal the district court’s denial of their motion for JMOL of invalidity of the ’714 patent. TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C., No. 00-432-GMS (D. Del. June 6, 2003) (“JMOL Invalidity Opinion”). Because we

affirm the district court's claim constructions of the disputed terms "reservoir" and "within," and further, because we conclude that the facts presented at trial are sufficient to support the district court's grant of judgment of non-infringement in VDO's favor, we affirm the district court's JMOL Infringement Opinion. However, because we reverse some of the district court's claim constructions, we vacate the district court's JMOL Invalidity Opinion and remand the invalidity issues to the district court for further proceedings in light of the claim constructions set forth in this opinion.

BACKGROUND

TI Group is an automotive supplier that makes fuel tanks, fuel pump assemblies, and complete fuel tank systems. TI Group has sold over thirty million fuel pump assemblies that embody the '714 patent, and has licensed the technology to other suppliers, including Delphi, a former subsidiary of General Motors. Beginning in the late 1990s, General Motors sought a second source for its "supply-side" pump assemblies because Delphi was having labor difficulties. Although TI Group submitted bids, General Motors awarded the contracts to VDO. The fuel pump assemblies supplied to General Motors by VDO were essentially drop-in replacements for the licensed Delphi assemblies.

A. The '714 Patent

TI Group owns the '714 patent which is directed to fuel pump assembly technology. The '714 patent is directed to an in-tank fuel assembly for fuel-injected engines. The assembly provides a constant and reliable supply of fuel even when the fuel in the fuel tank is low, or when the vehicle is navigating a sharp turn, traveling over a steep incline, or after the vehicle has been parked on an incline for an extended period of time. '714 patent, Abstract;

id. at col. 1, ll. 26-34. This constant supply prevents engine fuel starvation, a problem that can cause the engine to rattle, lurch, or stall.

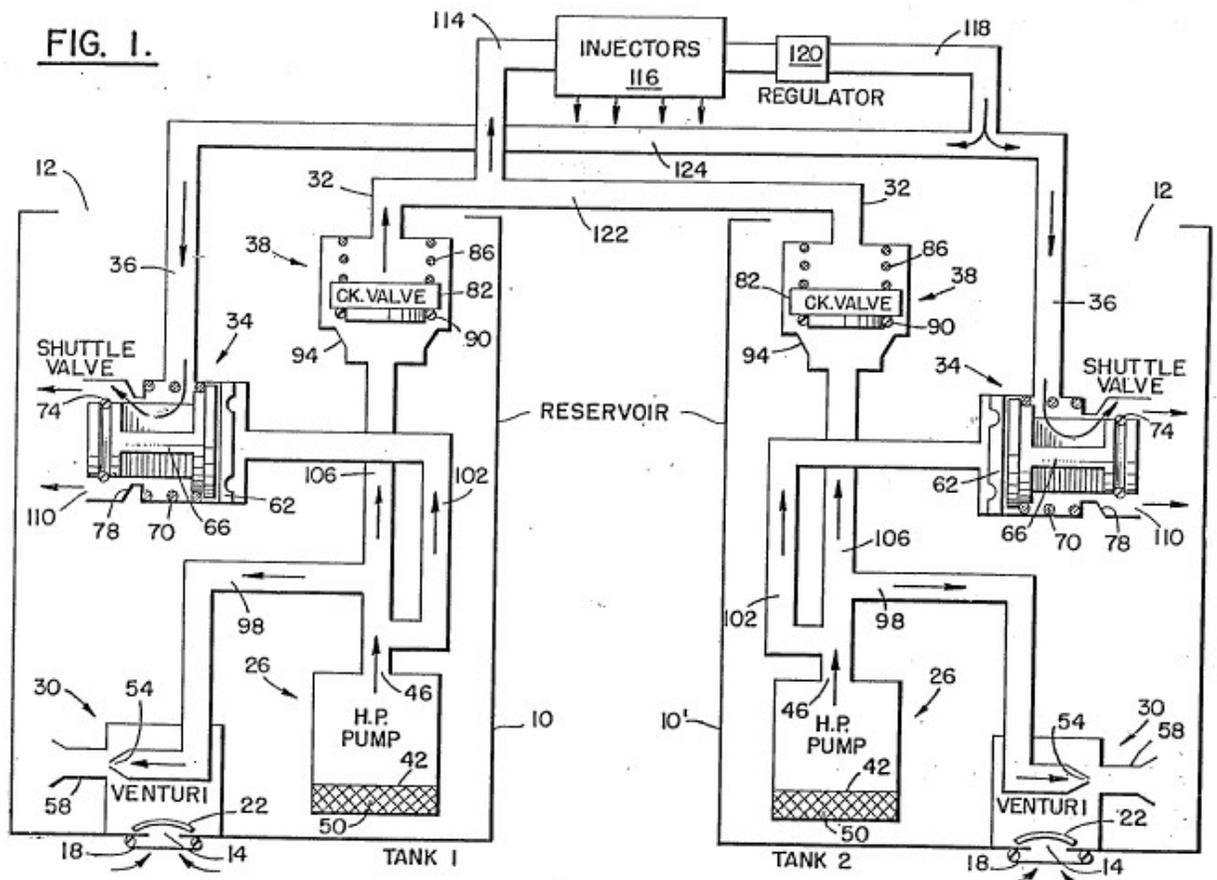


Figure 1 of the '714 patent illustrates an embodiment of the invention. Although Figure 1 illustrates a dual fuel tank arrangement, single tank arrangements are more common and offer the advantages of compactness and ease of repair or replacement. Id. at col. 4, ll. 21-26; id. at col. 6, ll. 11-38. The assembly includes a reservoir 10 having top and bottom openings 12 and 14. A high pressure pump 26 sits in reservoir 10 and pumps fuel to the engine's fuel injectors 116 by way of line 106. Jet pump 30, including nozzle 54 and venturi tube 58, supplies the reservoir with fuel by drawing fuel from the fuel tank via opening 14. Even when the fuel in the tank is low, the action of jet pump 30 will maintain a comparatively

high level of fuel in reservoir 10 and around inlet 42 to the high pressure pump 26. Preferred embodiments include check valve 22 that prevents fuel above the valve from leaking out when the unit is not operating. Check valve 22 does not retain fuel in the reservoir while the unit is operating, because it moves away from opening 14 by the action of jet pump 30, and further is not a necessary component for operation. Id. at col. 4, l. 39 - col. 5, l. 35.

Prior art fuel starvation prevention systems sent all of the output of a high pressure pump to the engine and used fuel returning from the engine to drive a jet pump that pumped fuel into a reservoir. These systems are known as “return-side” systems. Because the amount of fuel returning from the engine varied in such return-side systems, they were inefficient and unreliable. Id. at col. 1, ll. 25-29. The invention of the '714 patent is a “supply-side” system and provides advantages over return-side systems by supplying fuel to the jet pump directly from the high pressure pump. In the system described in the '714 patent, only part of the output from the high pressure pump is routed to the engine, while the other part is routed directly to the jet pump for an essentially constant supply of fuel to the jet pump that does not vary with engine demand. Id. at col. 2, ll. 3-8.

Independent claim 2 is at issue in this appeal, and recites:

2. Apparatus for pumping fuel from a fuel tank to an engine comprising:
 - (a) a supply port for carrying fuel from the apparatus to the engine;
 - (b) a fuel reservoir which includes an opening for connecting the interior of the reservoir to the interior of the fuel tank;
 - (c) means for mounting the reservoir in the fuel tank so as to locate the opening of the reservoir in the region of the bottom of the fuel tank;
 - (d) pumping means for pumping fuel into the reservoir, said means being located within the reservoir in the region of the opening and including a nozzle and a venturi tube in alignment with the nozzle, the passage of fuel out of the nozzle and through the venturi tube causing fuel to be entrained through the opening into the interior of the reservoir;

- (e) a high pressure pump having an inlet connected to the interior of the reservoir and an output of high pressure fuel; and
- (f) means for routing a first portion of the output of high pressure fuel to the supply port and a second portion of the output of high pressure fuel to the pumping means whereby fuel is delivered to the engine from the reservoir through the supply port and fuel is entrained into the reservoir by means of the fuel passing through the pumping means.

Claims 7 and 8, dependent from claim 2, are also at issue. Claim 7 adds a baffle that separates the pumping means outlet from the inlet to the high pressure pump. Claim 8 requires the opening to be located at the bottom of the reservoir, and further, recites an arrangement where the flow of fuel in the reservoir exceeds the flow of fuel to the engine, creating a net flow of fuel from the bottom to the top of the reservoir.

B. The VDO Device

The accused VDO device is a single unit, supply-side jet pump assembly. During operation, fuel travels from an output on one side of the electric pump, through a jet tube, and to a jet pump comprising a nozzle and a mixing tube. Fuel from a second output on the other side of the electric pump travels to the engine. The mixing tube mixes fuel entrained from the fuel tank with the fuel being sprayed out of the nozzle. Fuel traveling through the mixing tube forces a valve open so that fuel from the jet pump is pushed into the reservoir, and keeps fuel above it from leaking out of the reservoir and back into the fuel tank where it would not be available to be pumped to the engine.

C. Procedural History

TI Group sent written notice of suspected infringement of the '714 patent to both VDO and General Motors. On April 25, 2000, VDO filed a declaratory judgment action against TI Group concerning VDO's alleged infringement of the '714 patent, seeking findings of both non-infringement and invalidity. The parties were subsequently realigned, and TI Group

asserted independent claim 2 and dependent claims 7 and 8 against the defendants. TI Group also alleged that VDO's infringement was willful. Upon realignment, VDO's invalidity assertions became essentially a counterclaim.

The district court held a Markman hearing on November 6, 2001, and rendered its claim construction opinion on December 3, 2001. TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C., No. 00-432-GMS (D. Del. Dec. 3, 2001) ("Markman Order"). TI Group timely filed for reconsideration of the claim constructions, but the request was denied.

A jury trial was held between June 3 and June 11, 2002. During the course of trial, VDO moved for judgment as a matter of law, at the appropriate times, on both non-infringement and invalidity grounds under Rule 50 of the Federal Rules of Civil Procedure. The court reserved judgment on these motions. On June 12, 2002, the jury returned a verdict finding that: (1) VDO infringed each of claims 2, 7, and 8, both literally and under the doctrine of equivalents; (2) claims 2, 7, and 8 were not invalid; (3) VDO's infringement was willful; (4) certain accused fuel pump assemblies were not covered by license; (5) TI Group is not entitled to lost profit damages; and (6) TI Group is entitled to compensatory damages in the form of a reasonable royalty of 5%, or \$10,773,492.

Both parties then filed post-trial motions. VDO renewed its JMOL motions, or in the alternative, requested a new trial under Rule 59 of the Federal Rules of Civil Procedure. TI Group filed motions seeking: (1) prejudgment and post-judgment interest; (2) to alter or amend the judgment; (3) injunctive relief; and (4) enhanced damages, attorneys' fees, and expenses. The district court granted VDO's JMOL motion for non-infringement, concluding that no reasonable juror could have found the '714 patent infringed. JMOL Infringement Opinion at 17-18. Based on its finding of non-infringement, the court specifically declined to

address VDO's arguments that the '714 patent was invalid, that the infringement was not willful, and that VDO had a license to produce certain fuel assemblies. Id. at 18 n.7. The district court also concluded that all of TI Group's post-trial motions were moot. Id. at 18.

TI Group filed a timely appeal with this court, asserting errors in both the district court's claim constructions and its grant of VDO's JMOL motion of non-infringement. Because the district court did not resolve VDO's JMOL motion on invalidity, leaving open VDO's counterclaim, this court determined that it lacked jurisdiction over the appeal. TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C., No. 02-1630 (Fed. Cir. May 13, 2003) ("Dismissal Order"); see also 28 U.S.C. § 1295(a)(1) (2000) (giving this court jurisdiction over an "appeal from a final decision of a district court of the United States" if that court's jurisdiction was based, in whole or in part, on 28 U.S.C. § 1338 (emphasis added)); Cunningham v. Hamilton County, Ohio, 527 U.S. 198, 204 (1999) (defining a final judgment as one that "ends the litigation on the merits and leaves nothing for the court to do but execute judgment"). The district court then entertained VDO's invalidity counterclaim and issued a second opinion, denying VDO's JMOL motion on invalidity. JMOL Invalidity Opinion. TI Group moved for reinstatement of the appeal, in accordance with our Dismissal Order, and filed a renewed notice of appeal. VDO filed a notice of cross-appeal from the district court's JMOL decision on invalidity, docketed in this court as 03-1482. We reinstated TI Group's appeal, Docket No. 02-1630, pursuant to our Dismissal Order, and consolidated it with VDO's appeal, Docket No. 03-1482. TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C., No. 02-1630 (Fed. Cir. July 9, 2003). This court opinion addresses both appeals. We now have jurisdiction under 28 U.S.C. § 1295(a)(1).

ANALYSIS

A. Standard of Review

The grant or denial of a JMOL motion is a procedural issue not unique to patent law, reviewed under the law of the regional circuit in which the appeal from the district court would usually lie. Riverwood Int'l Corp. v. R.A. Jones & Co., Inc., 324 F.3d 1346, 1352 (Fed. Cir. 2003); BBA Nonwovens Simpsonville, Inc. v. Superior Nonwovens, LLC, 303 F.3d 1332, 1336 (Fed. Cir. 2002). JMOL is appropriate when “there is no legally sufficient evidentiary basis for a reasonable jury to find for that party on that issue.” Fed. R. Civ. P. 50(a)(1); see also Blanche Road Corp. v. Bensalem Township, 57 F.3d 253, 262 (3d Cir. 1995). “[J]udgment as a matter of law should be granted sparingly.” Johnson v. Campbell, 332 F.3d 199, 204 (3d Cir. 2003). However, it is appropriate where “the record is critically deficient of the minimum quantum of evidence” in support of the verdict. Gomez v. Allegheny Health Servs., Inc., 71 F.3d 1079, 1083 (3d Cir. 1995). “The question is not whether there is literally no evidence supporting the unsuccessful party, but whether there is evidence upon which a reasonable jury could have found its verdict.” Id.

Claim construction is a matter of law that we review de novo. Markman v. Westview Instruments, Inc., 52 F.3d 967, 970–71 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370 (1996); Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456 (Fed. Cir. 1998) (en banc). A determination of infringement, both literal and under the doctrine of equivalents, is a question of fact, reviewed for substantial evidence when tried to a jury. Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1323 (Fed. Cir. 2001). An invalidity determination based on anticipation is a question of fact, and is reviewed following a jury verdict for substantial evidence. Id. As to obviousness, “[t]his court reviews a jury’s conclusions on obviousness, a question of law, without deference, and the underlying findings of fact, whether explicit or

implicit within the verdict, for substantial evidence.” LNP Eng’g Plastics, Inc. v. Miller Waste Mills, Inc., 275 F.3d 1347, 1353 (Fed. Cir. 2001).

B. Claim Construction

The claim construction analysis begins with the words of the claim. See Vitronics Corp. v. Conceptor, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996). Absent an express intent to impart a novel meaning to a claim term, the words take on the ordinary and customary meaning attributed to them by those of ordinary skill in the art. Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc., 334 F.3d 1294, 1298 (Fed. Cir. 2003). To determine the ordinary and customary meaning of a claim term, we may review sources including the claims themselves, see Process Control Corp. v. HydReclaim Corp., 190 F.3d 1350, 1357 (Fed. Cir. 1999); dictionaries and treatises, Tex. Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1202 (Fed. Cir. 2002); and the written description, drawings, and prosecution history, see, e.g., DeMarini Sports, Inc. v. Worth, Inc., 239 F.3d 1314, 1324 (Fed. Cir. 2001).

TI Group argues that the district court erred in construing several of the claim terms at issue in the asserted claims. Specifically, TI Group alleges that each of the claim terms on appeal was given a narrow definition, when in fact, TI Group should have been afforded a broad construction based on the ordinary and customary meaning of the term, as supported by the written description of the '714 patent. VDO argues that the district court correctly construed each of the terms at issue and that TI Group is not entitled to the broad definitions for which it argues. We address each of the disputed claim constructions, agreeing with the district court’s determinations of some and disagreeing with others.

1. Fuel Reservoir

TI Group first argues that the district court's construction of the term "fuel reservoir" is too narrow and is not consistent with the written description of the patent. In particular, the district court construed the term to mean "the portion of the apparatus for pumping fuel in which fuel is collected and retained apart from fuel in the fuel tank." Markman Order at 1. TI Group argues that this definition unnecessarily imports the limitation of retaining fuel apart from the fuel in the fuel tank and is inconsistent with both the term's ordinary and customary meaning and the term's usage in the written description. Instead, TI Group urges that we adopt the broadest dictionary definition as the ordinary and customary meaning of the term "reservoir"—"any receptacle for fluids." 13 The Oxford English Dictionary 703-04 (2d ed. 1989). VDO argues, in response, that the correct construction of "reservoir" is one of the more narrow definitions provided in the dictionary: "a part of some apparatus in which fluid or liquid is contained," id., or "a part of an apparatus in which a liquid is held," Webster's Third New International Dictionary 1931 (1986) ("Webster's").

The dictionary entries for "reservoir" in both The Oxford English Dictionary and Webster's have several definitions that are facially relevant to the claimed invention. Each of the definitions implicates some sort of containment of liquid. Even the definition urged by TI Group, i.e., "any receptacle for fluids," requires that the fluid be retained apart or contained. See 13 The Oxford English Dictionary 320 (2d ed. 1989) (defining "receptacle" as "that which receives and holds a thing; . . . a containing vessel, place, or space" (emphases added)). Thus, TI Group's argument that the district court's construction is unduly narrow is not persuasive. The notion of retaining or containing liquid in the receptacle is a common theme in each of the dictionary definitions. As the district court correctly observed, in the context of

this invention, the fuel in the reservoir is contained, or held apart, from the fuel in the fuel tank.

The written description fully supports the ordinary meaning of the term “reservoir” identified by the district court, and there is no indication that TI Group disclaimed or disavowed meaning or acted as its own lexicographer in giving the term another meaning. We therefore affirm the district court’s definition of the term “reservoir” as meaning “the portion of the apparatus for pumping fuel in which fuel is collected and retained apart from fuel in the fuel tank.”

2. Pumping Means

TI Group next argues that the district court erroneously construed the term “pumping means” as a means-plus-function limitation under 35 U.S.C. § 112, paragraph 6, resulting in a more narrow definition than called for by the written description. TI Group argues that the district court should not have analyzed the limitation under § 112, paragraph 6, because the limitation specified any necessary structure required. See Cole v. Kimberly-Clark Corp., 102 F.3d 524, 530-31 (Fed. Cir. 1996) (noting that, in order to invoke § 112, paragraph 6, “the alleged means-plus-function claim element must not recite a definite structure which performs the described function”). VDO argues that the phrase “pumping means” clearly gives rise to a presumption that § 112, paragraph 6 applies and that TI Group has not rebutted the presumption, because the structure recited does not perform the stated function.

The claim limitation at issue recites not only a pumping means, but its structure (“including a nozzle and a venturi tube in alignment with the nozzle”), location (“being located within the reservoir in the region of the opening”), and operation (“the passage of fuel out of the nozzle and through the venturi tube causing fuel to be entrained through the opening into

the interior of the reservoir”). While the use of the word “means” gives rise to a presumption that § 112, paragraph 6 applies, the presumption is overcome by the recitation of the structure needed to perform the recited function. The written description informs and fully supports the structure recited in the claims: “Jet pump 30 includes nozzle 54 and venturi tube 58.” ’714 patent, col. 4, ll. 61-66.

The district court’s construction, urged before this court by VDO, concludes that the pumping means must also include check valve 22, connecting tube 164, and jet block 144. Markman Order at 2. This construction, however, includes elements that are not necessary for performing the recited function. There is no indication in the patent that the function found by the district court, namely “to pump fuel into the reservoir,” id. at 1, requires anything other than the structure recited in the claim. Therefore, the proper construction of the “pumping means” limitation in claim 2 is “a pump including a nozzle and a venturi tube in alignment with the nozzle.”

In light of our conclusion that § 112, paragraph 6, is not invoked, we need not, and do not, address TI Group’s alternative arguments about structure corresponding to “pumping means,” including its arguments regarding check valve 22 and connecting tube 164.

3. Within

TI Group next argues that the district court’s definition of the term “within” is also unnecessarily narrow. The district court construed “within” to mean that “the pumping means components are located inside the reservoir.” Markman Order at 2. TI Group argues that this construction is more narrow than the ordinary and customary meaning of the term “within,” and is not consistent with the written description. VDO argues that the narrower construction is appropriate in light of the dictionary definitions and written description.

Again, both parties offer competing dictionary definitions in support of their argument. TI Group urges us to adopt the definition “in the limits of, not outside or beyond,” 20 The Oxford English Dictionary 456-58 (2d ed. 1989), or “in the limits or compass of; not beyond,” Webster’s at 2627. VDO points instead to the definitions reciting “in the inner part or interior of,” 20 The Oxford English Dictionary 456-58 (2d ed. 1989), or “on the inside or on the inner side,” Webster’s at 2627. Because all of the offered definitions are facially relevant, we rely on the written description to “point away from the improper meanings and toward the proper meanings.” Renishaw, 158 F.3d at 1250.

TI Group argues that the written description does not require the pumping means to be located within the reservoir, and further argues that, if the patentee had wished to draw such a distinction, the language for doing so was available. TI Group argues that because the patentee used the allegedly broader term “within,” rather than “inside” or “on the interior,” the full breadth should be afforded to the scope of the limitation. VDO argues in response: (1) that the structures illustrated in the drawings of the written description show the pumping means located inside of the reservoir; (2) that TI Group’s argument “ignores the primary (and most relevant) definition of ‘within’”; and (3) that statements made by TI Group during prosecution of a Japanese counterpart application confirm that the patentee intended “within” to mean “inside.”

With respect to VDO’s first argument, regarding the drawings being limited to the construction it urges, we have held that “the mere fact that the patent drawings depict a particular embodiment of the patent does not operate to limit the claims to that specific configuration.” Anchor Wall Sys. v. Rockwood Retaining Walls, Inc., 340 F.3d 1298, 1306-07 (Fed. Cir. 2003) (citing Hockerson-Halberstadt, Inc. v. Avia Group Int’l, Inc., 222 F.3d 951,

956 (Fed. Cir. 2000)). The drawings, without more, are insufficient to cabin the scope of the ordinary and customary meaning of the term “within” in this case. As to VDO’s second argument, regarding the “primary definition” of “within,” we again reiterate that a patentee is entitled to a definition that encompasses all consistent meanings. Brookhill-Wilk, 334 F.3d at 1300. Finally, with respect to VDO’s argument regarding statements made during foreign prosecution, we decline to comment, given our conclusion below, and note only that “the varying legal and procedural requirements for obtaining patent protection in foreign countries might render consideration of certain types of representations inappropriate” for consideration in a claim construction analysis of a United States counterpart. Caterpillar Tractor Co. v. Berco, S.p.A., 714 F.2d 1110, 1116 (Fed. Cir. 1983).

Although VDO’s arguments in favor of the district court’s construction are not persuasive, we nonetheless conclude that the district court’s construction of “within” was correct because the dictionary definitions TI Group urges us to adopt are not so different from those urged by VDO and adopted by the district court. TI Group’s definition is “within the limits of, not outside or beyond.” VDO’s definition is “on the inside.” Certainly, in ordinary and customary usage, what is not outside is on the inside. Thus, we affirm the district court’s construction of the term “within” as meaning “inside.”

4. Routing Means

TI Group argues that the district court made two errors in construing the claim limitation “means for routing a first portion of the output of high pressure fuel to the supply port and a second portion of the output of high pressure fuel to the pumping means,” also referred to as the “routing means limitation.” The district court construed this limitation by first determining that the function is “to route the fuel to jet pump 30 and through check valve 38

to the injectors.” Markman Order at 2. The district court then determined that the structure that performed this function encompasses “main housing 140, check valve 38, supply nozzle 134, and the associated structure leading to jet pump 30.” Id. TI Group asserts the district court erred by considering only one preferred embodiment when determining the scope of the term. TI Group contends that the district court’s construction of “routing means” considered only the embodiment of Figures 2-9 and disregarded the embodiment shown in Figure 1, particularly the structure for routing fuel consisting of supply lines 98 and 106. See ’714 patent, col. 5, ll. 23-26; id. at Fig. 1. TI Group also contends that the district court included unnecessary structure in its construction of the routing means limitation. In particular, TI Group asserts that the inclusion of check valve 38 as part of the structure for the routing means was an error, because the check valve hinders the flow of fuel instead of routing it. VDO counters that Figure 1 is not an appropriate embodiment to consider when analyzing the structure that performs routing, because it is merely a schematic diagram. VDO also argues that the additional structures included by the district court in its determination of the structure of the “routing means” are required by the written description. Finally, VDO argues that TI Group’s argument that check valve 38 does not “route” is incorrect.

Neither party disputes that “routing means” is a means-plus-function limitation, subject to interpretation under § 112, paragraph 6. Further, neither party disputes the district court’s correct conclusion that the function of the “routing means” is “to route the fuel to jet pump 30 and through check valve 38 to the injectors.” Markman Order at 2. The sole dispute is over the structure corresponding to this function. TI Group correctly notes that, generally, “[w]hen multiple embodiments in the specification correspond to the claimed function, proper application of § 112, [paragraph 6] reads the claim element to embrace each of those

embodiments.” Micro Chem., Inc. v. Great Plains Chem. Co., 194 F.3d 1250, 1258 (Fed. Cir. 1999) (citing Serrano v. Telular Corp., 111 F.3d 1578, 1583 (Fed. Cir. 1997)). Although VDO attempts to argue that Figure 1 is not a separate embodiment but is instead a schematic representation of the same embodiment illustrated in Figures 2-9, it fails to find support for that position in the written description. According to the patent, Figure 1 is a schematic diagram representing the disclosed invention, see '714 patent, col. 4, ll. 29-31, and Figures 2-9 illustrate “a particularly preferred construction” for the invention, see id. at col. 6, ll. 62-64. A fair reading of the written description is that Figure 1 is a generalized representation of the invention and that Figures 2-9 depict a specific, and preferred, embodiment. Nothing in the written description indicates otherwise. VDO’s other arguments have been carefully considered and are not persuasive. Therefore, we conclude that the structure in the '714 patent corresponding to the “routing means” claim limitation includes, in one embodiment, the main housing 140, the connecting tube 164, the nozzle 134, and the hose 130, and in another representation, lines 98 and 106.

5. Opening for Connecting

TI Group next contends that the district court’s definition of the term “an opening for connecting the interior of the reservoir to the interior of the fuel tank” is unduly narrow. The district court concluded that the phrase means “an aperture disposed adjacent to both the interior of the reservoir and the interior of the fuel tank, allowing fuel from the fuel tank to be entrained directly into the reservoir.” Markman Order at 2. TI Group argues that this construction simply ignores the ordinary and customary meanings of the words and is inconsistent with the written description. VDO contends that the district court’s construction is

proper, based on the meanings of the terms and based on the notion that without the additional requirements, the claim limitation would be meaningless. We agree with TI Group.

The parties do not disagree about the general meanings of the terms at issue. An “opening” is “a gap, hole, or passage; an aperture.” 10 The Oxford English Dictionary 845 (2d ed. 1989). To “connect” is “to join, fasten, or link together usually by means of something intervening.” Webster’s at 480. Thus, the ordinary and customary meaning of the limitation requires only that there be a hole, passage, or aperture for joining or linking the interior of the reservoir to the exterior of the reservoir. Nothing in the ordinary and customary meaning of the term, nor in the written description, requires that the aperture be “disposed adjacent to both the interior of the reservoir and the interior of the fuel tank.” VDO’s other arguments have no merit. The correct construction of “an opening for connecting the interior of the reservoir to the interior of the fuel tank” requires only that the interior of the reservoir and the interior of the fuel tank be joined or linked by a hole, passage, or aperture.

6. Opening at the Bottom

Finally, TI Group argues that dependent claim 8, reciting that the opening for connecting, defined above, is “at the bottom of the reservoir” was construed too narrowly by the district court. The district court determined that the opening must be “in the bottom surface of the reservoir.” Markman Order at 2. TI Group argues that this construction is more narrow than the ordinary and customary meaning of the term “bottom” and is inconsistent with the written description. VDO counters that the district court’s construction is consistent with every drawing in the patent. As we have already discussed, the fact that the drawings are limited to a particular embodiment does not similarly limit the scope of the claims. Anchor, 340 F.3d at 1306-07. Rather, TI Group is entitled to the full breadth of claim

scope supported by the words of the claims and the written description. VDO's argument again focuses on a single, narrow dictionary definition, when many equally apt, and broader, definitions are also provided. The written description does not restrict the ordinary and customary meaning of "bottom" in any respect. Therefore, we conclude that the "bottom" of the reservoir means "the lower or lowest part," Webster's at 259, of the reservoir, and is not restricted only to the bottom surface thereof.

C. JMOL Grant on Non-Infringement

Having addressed TI Group's claim construction arguments, we now turn to its contention that the district court's JMOL of non-infringement was improperly granted. "[W]hen we determine on appeal, as a matter of law, that a trial judge has misinterpreted a patent claim, we independently construe the claim to determine its correct meaning, and then determine if the facts presented at trial can support the appealed judgment." Exxon Chem. Patents, Inc. v. Lubrizol Corp., 64 F.3d 1553, 1560 (Fed. Cir. 1995). Infringement requires the patentee to show that the accused device contains or performs each limitation of the asserted claims, Mas-Hamilton Group v. LaGard, Inc., 156 F.3d 1206, 1211 (Fed. Cir. 1998), or an equivalent of each limitation not satisfied literally, Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17 (1997). Although the jury found infringement under the district court's claim constructions, the district court determined that no reasonable juror could have concluded that VDO's device infringed. We have affirmed the district court's claim constructions with respect to the terms "reservoir" and "within." Rather than citing specific evidence of record to support the jury's verdict of infringement, TI Group largely rests its arguments in favor of reversing the district court's grant of JMOL on the district court's claim construction errors.

Claim 2 refers to “an opening for connecting the interior of the reservoir to the interior of the fuel tank.” The pumping means is then characterized as “causing fuel to be entrained through the opening into the interior of the reservoir,” and is described as being “located within the reservoir in the region of the opening.” Claim 8 then describes fuel that “enters the reservoir through the opening.” From the use of these phrases in the patent, it is fair to infer that the opening separates the reservoir from the fuel tank and that in order to be “within the reservoir,” the pumping means must be inboard of the opening—i.e., it must be on the reservoir side of the opening that divides the fuel tank from the reservoir. As the district court pointed out, the pumping means in VDO’s accused device is outboard of the opening—i.e., it is on the fuel tank side of the opening that divides the fuel tank from the reservoir. It is therefore not “located within the reservoir” as that term is used in the patent. Because a finding of infringement requires that all limitations be found in the accused device, we affirm the district court’s determination that no reasonable juror could have concluded that VDO’s device infringed. Thus, we affirm the judgment of non-infringement in favor of VDO.

D. JMOL Denial on Invalidity

On cross-appeal, VDO argues that the district court erred in denying its motion for JMOL of invalidity based on obviousness and in upholding the jury’s verdict that the ’714 patent is not invalid. JMOL Invalidity Opinion at 3-4. In particular, VDO argues that if TI Group’s claim constructions are adopted, the ’714 patent is anticipated by at least U.S. Patent No. 2,953,156 and German Patent Application No. 2 849 461 A1, neither of which was before the U.S. Patent and Trademark Office during the prosecution of the ’714 patent. TI Group argues in response that substantial evidence in the record supports the jury’s verdict

finding the '714 patent not invalid, that VDO has not rebutted this evidence, and that VDO failed to present a case of obviousness before the district court.

Our validity analysis is a two-step procedure: “The first step involves the proper interpretation of the claims. The second step involves determining whether the limitations of the claims as properly interpreted are met by the prior art.” Beachcombers, Int’l, Inc. v. WildeWood Creative Prods., Inc., 31 F.3d 1154, 1160 (Fed. Cir. 1994). We have determined the proper interpretation of the claims, see Section B, supra, thus leaving for review whether a reasonable juror, in performing the second step of the analysis, could have found less than clear and convincing evidence of invalidity under the new claim constructions. Because the jury could only have compared the prior art to the erroneously narrowly construed claims, we vacate the district court’s JMOL Invalidity Opinion and remand the invalidity question to the district court for further proceedings consistent with this opinion.

CONCLUSION

Because we affirm some of the district court’s claim constructions, and because as to those limitations TI Group points to no evidence supporting the jury’s finding of infringement, we affirm the district court’s grant of VDO’s JMOL motion with respect to infringement. However, because we have broadened a number of the district court’s claim constructions, thus affecting the invalidity analysis, we vacate the district court’s denial of VDO’s JMOL motion with respect to invalidity and remand that issue for further proceedings consistent with this opinion.

AFFIRMED-IN-PART, VACATED-IN-PART, AND REMANDED

COSTS

No costs.