IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TI GROUP AUTOMOTIVE SYSTEMS, (NORTH AMERICA), INC. Plaintiff,	)	
	)	C.A. No. 00-432-GMS
v.	)	
VDO NORTH AMERICA L.L.C. *et al.* Defendants.	)	

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MEMORANDUM OPINION

September 4, 2002
Wilmington, Delaware

SLEET, District Judge

I. INTRODUCTION

This action began as a declaratory judgment action initiated by VDO North America, L.L.C., on April 25, 2000 against TI Group Automotive Systems, NA, Inc. ("TI"). The action concerned VDO's alleged infringement of U.S. Patent No. 4,860,714 ("the '714 patent"), which relates to fuel pump assembly technology. The parties were realigned on March 7, 2001, thus making TI the plaintiff.

The court held a *Markman* hearing on November 6, 2001 and rendered its claim construction decision on December 3, 2001. On December 17, 2001, TI filed a motion for reconsideration of the claim construction. The court denied this request. Based on the court's claim construction, VDO sought leave to file a motion for summary judgment on non-infringement. Because the dispositive motion deadline had already passed, the court denied this request on February 6, 2002.

A jury trial was held between June 3 and June 11, 2002. During the course of the trial, VDO moved for judgment as a matter of law pursuant to Rule 50 of the Federal Rules of Civil Procedure at the close of TI's case-in-chief and again at the close of all evidence. 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 are not invalid; (3) VDO's infringement was willful; (4) the accused Saturn LS-18 fuel pump assemblies are not covered by a license; (5) TI is not entitled to lost profits damages with respect to any of the three accused platforms; and (6) TI is entitled to compensatory damages in the form of a reasonable royalty of 5%, or a total of $10,773,492.

Following the jury's verdict, both parties filed post-trial motions. Presently before the court is: (1) VDO's renewed motion for judgment as a matter of law, or alternatively, for a new trial

under Rule 59 of the Federal Rules of Civil Procedure; (2) TI's motion for prejudgment and post-judgment interest; (3) TI's motion to alter or amend the judgment, or for other related relief; (4) TI's motion for an injunction; and (5) TI's motion for enhanced damages, attorneys' fees, and expenses. The following is the court's decision on all pending post-trial motions.

II. STANDARD OF REVIEW

Under Rule 50 of the Federal Rules of Civil Procedure, a court should grant a motion for judgment as a matter of law only where "there is no legally sufficient basis for a jury to find for [the non-moving] party." Fed. R. Civ. P. 50. Thus, in order to prevail on a renewed motion for JMOL following a jury trial, the moving party "'must show that the jury's findings, presumed or express, are not supported by substantial evidence or, if they were, that the legal conclusions implied [by] the jury's verdict cannot in law be supported by those findings.'" *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1348 (Fed. Cir. 1998) (quoting *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893 (Fed. Cir. 1984). In order to determine whether a legally sufficient basis in fact exists, the trial court must consider all the evidence in a light most favorable to the non-movant, must draw reasonable inferences favorable to the non-movant, must not determine the credibility of witnesses, and must not substitute its choice for that of the jury. *See Odetics, Inc. v. Storage Tech. Corp*., 185 F.3d 1259, 1269 (Fed. Cir. 1999) (citations omitted). If, after this analysis, substantial evidence exists to support the jury's verdict, then the motion for JMOL must be denied. *See id.*

The essential question in deciding a motion for judgment as a matter of law is whether the evidence the jury could have believed in reaching its verdict was substantial enough to support its findings. *See Orthokinetics, Inc. v. Safety Travel Chairs, Inc*., 806 F.2d 1565, 1573 (Fed. Cir. 1986). Thus, the question is not what the court might have believed, but what the jury could have

reasonably determined. *See Dawn Equip. Co. v. Kentucky Farms, Inc.,* 40 F.3d 1009, 1014 (Fed. Cir. 1998) ("the inquiry is whether a reasonable jury, given the record before it viewed as a whole, could have arrived at the conclusion it did.").

III. DISCUSSION

A. VDO's Renewed Motion for Judgment as a Matter of Law

VDO moves the court for judgment as a matter of law to reverse the jury's findings that the accused fuel pump assemblies literally infringe the '714 patent, and also infringe the '714 patent under the doctrine of equivalents. Literal infringement of a claim occurs when every limitation recited in a claim appears in the accused device, *i.e*. when "the properly construed claim reads on the accused device exactly." *KJC Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1358 (Fed. Cir. 2000). At trial, TI had the burden of proving literal infringement by a preponderance of the evidence. *See Southwall Technologies, Inc. v. Cardinal IG Co.,* 54 F.3d 1570, 1575 (Fed. Cir. 1995).

A device that does not literally infringe a claim may nonetheless infringe "if there is equivalence between those elements of the accused product and the claimed elements of the patented invention." *Warner-Jenkins Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997). Infringement under the doctrine of equivalents must be established on a limitation-by-limitation basis. *See id*. at 29 (stating that, "the doctrine of equivalents must be applied to the individual elements of the claim, not to the invention as a whole."). Moreover, the court is mindful that it must take a "special vigilance against allowing the concept of equivalents to eliminate completely" the individual elements of the patented invention. *Id*. at 40.

An element of an accused device is equivalent to an element of the patented invention if the

differences between them are insubstantial. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.,* 520 U.S. at 39; *Zelinski v. Brunswick Corp.*, 185 F.3d 1311, 1316-17 (Fed. Cir. 1999); *Dawn Equip. Co. v. Kentucky Farms Inc*., 140 F.3d 1009, 1014 (Fed. Cir. 1998). Alternatively, the accused product infringes under the doctrine of equivalents if the element in the accused device performs substantially the same function in substantially the same way to obtain the same result as the claim limitation. *See Warner-Jenkinson,* 520 U.S. *at* 39*; Zelinski v. Brunswick Corp.*, 185 F.3d at 1316-17; *Dawn Equip. Co. v. Kentucky Farms Inc.*, 140 F.3d at 1016. Whether the former, the "insubstantial differences" test, or the latter, the "triple identity" test is applied, the essential inquiry remains the same: "[d]oes the accused product or process contain elements identical or equivalent to each claimed element of the patented invention?" *Warner-Jenkinson,* 520 U.S. at 40.

A determination of infringement under the doctrine of equivalents is a factual matter normally reserved for a fact finder. *Sage Products, Inc. v. Devon Indus., Inc.*, 126 F.3d 1420, 1423 (Fed. Cir. 1997). Although infringement under the doctrine of equivalents is generally considered a question of fact, that does not in and of itself preclude directing judgment in favor of the accused infringer. There is a triable issue of fact only if the evidence is such that a reasonable jury could resolve the question in favor of the patentee. *Dawn Equip. Co. v. Kentucky Farms Inc*., 140 F.3d at 1017 (reversing district court and granting judgment for defendant where devices were not substantially the same) (citing *Warner-Jenkinson,* 520 U.S. 39, n.8)). Finally, just as with literal infringement, the patentee must prove by a preponderance of the evidence that each element of the patent, or its substantial equivalent, exists in the accused device. *See Lemelson v. United States*, 752 F.2d 1538, 1551 (Fed. Cir. 1985).

With this legal background in mind, the court will now consider the claims at issue in the

‘714 patent.

1. Independent Claim 2 of the ‘714 Patent

Because the parties dispute whether there is substantial evidence to support the jury’s verdict that the accused assemblies infringe Claim 2 of the ‘714 patent, the court will first set forth Claim 2 in its entirety and will then evaluate the evidence with regard to each disputed term. Claim 2 of the ‘714 patent reads as follows:

> 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 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.[1]

a. **“Fuel Reservoir**”

In the asserted claim, the fuel is entrained directly into the reservoir through an aperture

[1]Claims 2(a), (c) and (e) are not at issue. Thus, the court will only discuss the disputed portions of Claims 2(b), (d), and (f).

disposed adjacent to both the interior of the reservoir and the interior of the fuel tank. The fuel is then kept in the reservoir by way of the "check valve 22, which prevents fuel from passing out of the reservoir into the main tank through the . . . opening." The court has construed the term "reservoir" in Claim 2 to mean "the portion of the apparatus for pumping fuel in which fuel is collected and retained apart from the fuel in the fuel tank." It further recognized that the reservoir "does not include all things that can house fuel."

At trial, TI's technical expert, Michael Leshner ("Leshner"), testified that the mixing tube of the accused fuel pump assemblies collects and retains fuel apart from the fuel in the fuel tank. *See* Transcript of Trial, ("Tr.") at 1128. Specifically, he opined that this was so because "once [fuel] goes in the opening [the inlet to the mixing tube], since it can't go back, it meets all of the tests for the definition of a reservoir. Once it goes in, it's collected and retained." *Id*. He also testified that, in his opinion, even the tubes leading up to and away from the engine collect and retain fuel, thus making them literally part of the reservoir. *See id*. at 1190-1191.

However, the court has already rejected TI's position. During the *Markman* phase, TI argued that the term "reservoir" should be construed to mean a unit, receptacle, or repository for things or articles. VDO proffered the construction ultimately adopted by the court verbatim. During the *Markman* hearing, TI argued that VDO's construction was too narrow, and that "a broader interpretation of this term is provided by intrinsic evidence." Specifically, TI argued that:

> Defendants' unduly narrow definition implicitly defines the boundaries of the reservoir to include the check valve and no portion of the reservoir outside the check valve. This is true because in Defendants' definition the reservoir is not the unit or receptacle itself, but merely the portion that "retains" fuel.

D.I. 84 at 8.

Thus, TI understood that, if the court accepted VDO's construction, the boundaries of the

reservoir of Claim 2 could not extend past the check valve. As this would necessarily put the accused mixing tube also outside the reservoir, the tube cannot be part of the reservoir itself. In light of this understanding, it is clear that TI's argument at trial, and in its Answering Brief, are nothing more than arguments about what the term *should* mean, notwithstanding what the court has already said it *does* mean.

To the extent that there was confusion regarding the court's *Markman* ruling at trial, the court directed TI to have its witness testify more consistently with the court's order. Specifically, the court stated that, "[the] definition [of reservoir] being that the can is the thing. The can is – it is not . . . the hoses and doodads and all the things that can house fuel that are the reservoir. It's the can." *Id*. at 437-438. There is thus no basis for TI's assertion that the can may be anything that can contain fuel and is attached to the can.

Moreover, no reasonable jury could have found that the accused mixing tube was part of the claimed reservoir because the mixing tube does not collect and retain fuel. TI admits that the fuel is not retained in the mixing tube when the jet pump is not operating and the assembly is subjected to certain conditions, such as when the vehicle is parked on an incline and there is no fuel from the tank in the area of the jet pump. In such situations, any fuel that may have been in the mixing tube leaks back into the fuel tank. TI does, however, contend that: (1) under operating conditions, the accused jet pump keeps fuel in the mixing tube, and (2) under most non-operating conditions, the mixing tube is submerged in fuel and thus collects and retains fuel. The court will discuss each argument in turn.

TI's principal argument is that the jet pump retains fuel in the mixing tube during operation. According to TI, because the jet pump forces fuel in one direction through the mixing tube, past the

check valve, and into what VDO submits is the reservoir, that the mixing tube collects and retains fuel. To bolster this argument, TI asserts that the mixing tube "is not one of the hoses and things that the [c]ourt specifically excluded from the definition of reservoir." Even assuming, *arguendo,* that the court were to accept this bare statement, TI ignores the fact that Leshner admitted that his opinion that the mixing tube was part of the reservoir was based on the same logic he used to opine that all the hoses leading up to, and away from, the engine are part of the reservoir. *See id*. at 1190-1191. Specifically, Leshner testified that the movement of fuel [through a tube or hose] is the process of collecting and retaining fuel. *See id*. at 1187. Because this logic would necessarily encompass hoses and tubes which the court has already made clear are not part of the reservoir, this basis for concluding that the mixing tube is part of the reservoir is untenable.

TI's second argument, that under most non-operating conditions, "[f]uel in the mixing tube is bounded by plastic walls on all sides except for the opening," also ignores that "the 'reservoir' does not include all things that can house fuel." Moreover, as VDO recognizes, under non-operating conditions, the mixing tube is essentially "a straw submerged in a cup of liquid." To continue briefly with that analogy, there is nothing keeping the liquid in the straw, and if one lifts the straw out of the cup, or even holds the cup at an angle, the liquid will leave the straw. Likewise, there is nothing keeping the fuel in the mixing tube. Indeed, during the trial, Leshner himself testified that if one were to lift the assembly out of the fuel tank, any fuel that may have been in the mixing tube would "dribbl[e] out" into the fuel tank, while the fuel in the reservoir would stay in the reservoir. *See id*. at 495-496, 1179-1181, 1186-1187. Because there is no dispute that fuel may leak out of the mixing tube and back into the fuel tank, the jury's finding that the mixing tube was part of the reservoir is clearly in contravention of the court's claim construction.

Accordingly, no reasonable jury could have found that the term 'reservoir', as construed by the court, included VDO's mixing tube.

b. "Pumping Means"

The court construed the "pumping means" of Claim 2 as a means-plus-function limitation, requiring a "connecting tube 164, jet pump 30 formed in jet block 144 and associated check valve 22," or the structural equivalent. VDO does not dispute that the accused assemblies have a flapper valve that keeps fuel in the reservoir, like the associated check valve 22. However, VDO maintains that the accused flapper valve is not *associated* with the accused jet pump.

It is clear that both the VDO and the TI systems utilize the action of a jet pump to a certain extent. However, the "pumping means" of Claim 2 must be contained within the reservoir. The action of the jet pump of the "pumping means" entrains fuel *directly* into the reservoir. To keep the fuel in the reservoir, there is an associated check valve 22 in the opening of the reservoir. The associated check valve 22 is lifted during operation of the jet pump because of the low pressure region created around the opening to the reservoir. The fuel being sprayed out of the jet nozzle simply returns to the reservoir, along with the fuel that has already been entrained into the reservoir. The check valve 22 of the patented fuel pump assembly is associated with the "pumping means" in that it opens and closes by the low pressure region created by the jet pump. Finally, because the "pumping means" is inside the reservoir, that opening allows fuel to be entrained directly into the interior of the reservoir.

In contrast to the fuel pump assembly of Claim 2, the jet pump of the accused fuel pump assemblies is outside of the reservoir. Fuel is entrained into the jet pump's mixing tube. The mixing tube mixes entrained fuel with the fuel being sprayed out of the jet nozzle. It is only then that the

pressure of the combined fuel pushes through a flapper valve at the end of the mixing tube, ultimately flowing into the reservoir. There is no check valve at the inlet of the mixing tube, *i.e.*, at the opening by the low pressure region created by the jet pump. Accordingly, no reasonable jury could have found literal infringement of this claim term.

Furthermore, the court concludes that no reasonable jury could have found infringement under the doctrine of equivalents. During the trial, the only evidence TI presented with respect to the differences between the flapper valve and the check valve 22 was the following testimony from Leshner:

> The thing that has been referred to as the flapper valve or the check valve or the one-way valve, it's the corresponding structure to check valve 22 in the patent. It closes when the pump is off. It opens when the pump is turned on. It does the same thing. So it has – yes, it has an associated check valve corresponding to check valve 22.

Tr. at 1139.

Leshner failed to discuss the fact that the flapper valve does not keep fuel from leaving the mixing tube, which, according to TI, is part of the reservoir. However, the patent clearly states that the associated check valve 22 keeps fuel in the reservoir. Moreover, the court has already determined that, under its claim construction, the mixing tube cannot be considered part of the reservoir. Thus, as Leshner failed to discuss the purposes behind the flapper valve and check valve 22, his bald assertion is insufficient to establish equivalence. *See Dawn Equip. Co. v. Kentucky Farms, Inc.*, 140 F.3d 1009, 1017 (Fed. Cir. 1998).

c. "said [pumping] means being located within the reservoir"

In its claim construction, the court construed the above disputed term to require that the "pumping means components [be] located inside the reservoir."

VDO asserts that, even assuming *arguendo* that the accused fuel pump assemblies have the claimed "pumping means," no reasonable jury could have determined that they were "located inside the reservoir." Specifically, VDO argues that, each of the components Leshner identified as part of the accused "pumping means" is plainly *outside* the reservoir, as construed by the court. The court must agree.

The jet pump of the accused assemblies is indisputably outside the reservoir because it is located at the opposite end of the mixing tube from the flapper valve.[2] Likewise, the accused jet block, which Leshner identified as "the plastic that holds the nozzle in alignment with the mixing tube," is also clearly outside the reservoir. Additionally, with respect to the "connecting tube," Leshner testified that virtually all of the accused "connecting tube" in the VDO assemblies is outside the reservoir. *See* Tr. at 510. Indeed, Leshner's opinion that the accused "connecting tube" is inside the reservoir is based solely on his opinion that two small portions of the tube are allegedly inside the reservoir. *See id*.

The first portion of the tube at issue that TI contends is inside, is, at most "1 millimeter or 2 millimeters . . . below the top portion" of the reservoir, where the tube connects to one of the outlets of the high pressure pump. The portion of the tube inside the reservoir is thus *de minimus* and cannot meet the claim limitation that the tube itself be "inside" the reservoir. The second portion is the connection to the jet nozzle, which, together with the mixing tube, make up the jet pump. As the court has already determined that the jet pump, including the jet nozzle, is not part of the reservoir, the fact that the connecting tube may enter the jet pump is irrelevant. Accordingly,

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[2]Although TI offers statements from VDO's engineers which refer to the jet pump as being "inside the reservoir" and "inside the swirl pot," these statements are irrelevant for purposes of this inquiry as they were made prior to the court's claim construction.

there cannot be literal infringement of this claim term.[3]

With regard to the doctrine of equivalents, it is clear that the all-limitations rule precludes a finding of substantial equivalence between "outside" and "inside," as such a finding would vitiate the "inside" limitation. *See Moore U.S.A., Inc. v. Standard Register, Co.*, 229 F.3d 1091 (fed. Cir. 2000), *cert. denied*, 532 U.S. 1008 (2001) (stating that, "minority" could not be the substantial equivalent of "majority," because if that were the case, a claim limitation requiring a "majority" would "hardly be necessary."). Thus, the court concludes, as a matter of law, that no reasonably jury could have found infringement of this term under the doctrine of equivalents.

d. "opening for connecting the interior of the reservoir to the interior of the fuel tank . . ."

The court construed this limitation to mean "an aperture disposed adjacent to both the interior of the reservoir and the interior of the fuel tank, allowing fuel to be entrained directly into the reservoir."

At trial, TI pointed to the inlet of the mixing tube as the claimed "opening." *See* Tr. at 374, 1172. However, this inlet is not "adjacent to the interior of the reservoir." Rather, fuel entering the accused "opening" must travel through the mixing tube before entering the reservoir. Indeed, Leshner himself admitted that, if the reservoir starts at the flapper valve, then the inlet to the mixing tube is not adjacent to the interior of the reservoir. *See id*. at 1171. Because under the court's claim construction, the reservoir must start at the flapper valve, there can be no literal infringement.

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[3]In its Answering Brief, TI asserts that, because the connecting tube is actually clipped to the outside of the can inside a groove, and the groove "juts into the interior space of the reservoir where the fuel is held," the connecting tube is also inside the reservoir. Because "inside" cannot mean "outside," which includes being clipped to the outside, the court finds this argument untenable.

Furthermore, for the reasons the court discussed in Section III.A.1.c., *supra*, there can be no infringement under the doctrine of equivalents. Claim 2 explicitly requires that the "opening" of the claim "connect[] the interior of the reservoir to the interior of the fuel tank." Thus, equating the inlet identified by TI with the "opening" of Claim 2 would impermissibly vitiate the limitation.

e. "causing fuel to be entrained through the opening into the interior of the reservoir . . ."

The court has construed Claim 2 to mean that the "pumping means" cause fuel to be "drawn through the opening into the interior of the reservoir."

VDO argues that, because of the structural differences between the "pumping means" of Claim 2 and the jet pump of the accused fuel pump assemblies, fuel is pushed from the jet pump's mixing tube into the reservoir in the accused fuel pump assemblies. It is not entrained, or drawn, as required by the '714 patent and the court's claim construction. TI does not dispute that fuel is not entrained into the reservoir. Rather, Leshner testified that fuel is entrained into the mixing tube. *See id*. at 1140. Moreover, the court has construed "opening" to require entrainment directly into the interior of the reservoir. Thus, because the reservoir, as a matter of law, cannot include the mixing tube of the accused assemblies, no reasonable jury could find that fuel is "entrained through the opening into the interior of the reservoir," let alone directly into the interior of the reservoir.

Furthermore, as with the "inside the reservoir" limitation, the accused "pumping means" cannot be equivalent to the "pumping means" of Claim 2, without vitiating the requirement that the fuel be entrained directly into the interior of the reservoir. Accordingly, there can be no infringement under the doctrine of equivalents.

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 . . ."

The court construed the "means for routing" limitation as a means-plus-function limitation pursuant to 35 U.S.C. § 112, ¶ 6. According to the court's claim construction, the recited function in the "means for routing . . ." limitation is to "route 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." Additionally, the court held that the corresponding structure in the patent specification comprises "main housing 140, check valve 38, supply nozzle 134 and the associated structure leading to jet pump 30."

VDO maintains that its fuel pump assemblies do not perform the recited function of the "means for routing" limitation. It further asserts that is assemblies do not have a main housing 140 and check valve 38, which route two portions of a single output of high pressure fuel to two separate locations. Instead, VDO argues that the high pressure pump of its accused fuel pump assemblies has two separate outputs, and thus does not need a "means for routing." TI responds that the accused fuel pump assemblies have a single output of high pressure fuel inside the high pressure pump, somewhere between the bottom of the high pressure pump and the top of the high pressure pump. TI additionally argues that the plastic cap at the top of the pump is the main housing 140, which then separates a single output.

TI's position relies on dissecting a single component, namely the high pressure pump, into separate components to satisfy other claim limitations. According to its reading of Claim 2, the interior of the high pressure pump is also the output of the high pressure pump, and the top of the high pressure pump is the main housing 140. However, this argument must fail for two reasons. It must first fail because a "high pressure pump having . . . an output" is specifically recited in

subpart (e) of Claim 2, and the "means for routing . . ." is a distinct structure recited in subpart (f). VDO's assemblies do not have these separate structures. Second, according to TI's understanding, any supply-side fuel pump assembly necessarily has the claimed means for routing because it would have a high pressure pump which simultaneously pumps fuel to the engine and to a jet pump. Based on TI's interpretation, the "means for routing . . ." limitation would be rendered redundant and superfluous. This would be in direct contravention to the Federal Circuit authority that, "[a]ll the limitations of a claim must be considered meaningful." *Unique Concepts, Inc. v. Brown*, 939 F.2d 1558, 1562 (Fed. Cir. 1991).

The court also notes that TI's arguments are effectively an end-run around the court's rejection of TI's position at the *Markman* hearing that the "means for routing" is broad enough to include any "lines, tubes or hoses that permit fuel flow as described." It is clear that the VDO assemblies simply have a high pressure pump with two outputs, which respectively lead to, in TI's words, two separate "line, tubes or hoses." Applying the court's claim construction to this term then, it is clear that no literal infringement exists.

With regard to infringement under the doctrine of equivalence, TI has presented no evidence that any structure of the accused fuel pump assemblies is equivalent to the specific structural and functional limitations of the "means for routing" limitation. Moreover, there can be no equivalence as such a finding would vitiate the entire "means for routing . . ." limitation.[4]

2. Dependent Claim 7: "baffle"

[4]VDO argues that, notwithstanding the lack of evidence on the doctrine of equivalents, TI is precluded from arguing the doctrine of equivalents due to prosecution history estoppel. However, as the court has concluded that there is no equivalents, it need not reach this issue.

Claim 7 depends from Claim 2. In its entirety, Claim 7 reads: "[t]he apparatus of claim 2 wherein the outlet from the pumping means is separated from the inlet to the high pressure pump by a baffle." The court construed the disputed term "baffle" to mean a "structure for isolating fuel leaving the pumping means from the region of the inlet to the high pressure pump."

In TI's case-in-chief, Leshner's testimony with respect to Claim 7 consisted solely of identifying five different structures, each of which he simply argued "deflected" fuel.[5] TI's rebuttal case focused on only one of the structures originally identified by Leshner, namely the ring at the bottom of the high pressure pump. However, the inlet ring is located above where fuel enters the reservoir in the accused assemblies and above where the fuel enters the high pressure pump. The ring's purpose is to connect the filter to the inlet of the high pressure pump. *See* Tr. at 1158. Indeed, Leshner testified that the filter is where the fuel enters the high pressure pump. *See id*. at 1159. Because the fuel enters through the filter, and the ring is above the filter, the ring cannot possibly isolate fuel.

For essentially the same reasons that there is no literal infringement, there can be no infringement under the doctrine of equivalents. There is simply no structure in the accused fuel pump assemblies that isolates turbulent fuel from the inlet to the high pressure pump.[6] Because the accused fuel pump assemblies entrain fuel outside of the reservoir, there is no need to worry about

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[5]To avoid possible juror confusion, the court instructed the jury that "deflecting is not the same as isolating." Jury Instructions, § 3.1.1, ¶ 7.

[6]The '714 patent explicitly recites the function of the baffle: "[a]s shown in FIG. 9, jet block 144 includes baffles 172 whereby the fuel leaving the jet pump is isolated from the region of the opening 154 which receives inlet 42 to high pressure pump 26 . . . the inlet to the high pressure pump sits in a relatively calm pool of fuel and is uneffected by the turbulence and, in some cases, frothing which results from the operation of the jet pump when entraining air."

turbulence at the region of the inlet to the high pressure fuel pump. Thus, there is no structure, because none is needed, that performs the function of the baffle in Claim 7.

3. Dependant Claim 8: "opening at the bottom of the reservoir."

Claim 8 also depends from Claim 2. In relevant part, Claim 8 requires that the "opening is located at the bottom of the reservoir." The court construed this limitation to mean that "the opening [of Claim 2] is formed in the bottom surface of the reservoir." Thus, not only must the "opening" of Claim 8 be an "aperture connecting the interior of the reservoir to the interior of the fuel tank," it must also be "formed in the bottom surface of the reservoir."

As the court discussed above in Section III.A.1., the accused fuel pump assemblies do not have an "aperture connecting the interior of the reservoir to the interior of the fuel tank." Because the accused fuel pump assemblies do not have this "opening," it follows that the accused assemblies do not have an "opening that is "located in the bottom of the reservoir." Furthermore, the inlet to the mixing tube, which TI contends is the "opening" of Claim 2, is clearly not "formed in the bottom surface of the reservoir." Rather, it is formed in the wall of a structure, *i.e*, the mixing tube, which is located outside of the reservoir.

Finally, there can be no equivalence with respect to Claim 8 for all the reasons that there can be no equivalence with respect to the "opening" limitation of Claim 2. If there is no "opening," it cannot be in the bottom surface of the reservoir.

Accordingly, because the court has found that no reasonable jury could have found literal infringement, or infringement under the doctrine of equivalents, it will grant VDO's renewed motion

for judgment notwithstanding the verdict.[7]

B. TI's Post-Trial Motions

TI's post-trial motions are all premised on the jury's verdict being upheld. However, because the court has concluded that the jury's infringement verdict was incorrect as a matter of law, these motions are now rendered moot. Accordingly, the court will not address them.

V. CONCLUSION

Applying the court's claim construction order, no reasonable jury could have found that VDO's accused assemblies literally infringed the '714 patent, nor could a reasonable jury have found infringement under the doctrine of equivalents. The court will issue an order in conjunction with this opinion.

[7]VDO also contends that, in the event that the court concludes that a reasonable jury could have found infringement, the court should also find that: (1) the patent was invalid for obviousness, (2) the infringement was not willful, and (3) VDO had a license to produce the accused Saturn LS-18 fuel pump assemblies. However, as the court has determined that VDO's accused fuel pump assemblies did not infringe the '714 patent, the court need not address these issues.