

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GENERAC POWER SYSTEMS, INC.,
Petitioner,

v.

CHAMPION POWER EQUIPMENT, INC.,
Patent Owner.

IPR2025-01457
Patent 11,143,145

**PATENT OWNER CHAMPION POWER EQUIPMENT, INC.'S
RESPONSE**

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GLOSSARY

Abbreviation	Term
'145 Patent	U.S. Patent No. 11,143,145
2015 Family	U.S. Patent Nos.: 10,393,034; 11,143,120; 10,221,780; 11,492,985; 10,697,398; 11,530,654; 11,840,970; 11,905,895; and 11,143,145 (collectively)
'398 Patent	U.S. Patent No. 10,697,398
Board	Patent Trial and Appeal Board
Patent Owner	Champion Power Equipment, Inc.
Petition	Petition for Inter Partes Review of U.S. Patent No. 11,143,145 (Paper 4)
Petitioner	Generac Power Systems, Inc.
POSITA	Person of Ordinary Skill in the Art
USPTO	United States Patent & Trademark Office

Pursuant to 37 C.F.R. §42.107, Patent Owner Champion Power Equipment, Inc. hereby submits its Response to the Petition filed by Petitioner Generac Power Systems, Inc. challenging Claims 1-16 (the “Challenged Claims”) of U.S. Patent No. 11,143,145.

I. INTRODUCTION

Petitioner’s proposed grounds are identified below:

Ground	Claims	Basis	Primary Reference	Secondary Reference(s)
1	1-7, 10	103	Workshop Manual	-
2	8-9	103	Workshop Manual	Matsushima, Olmr
3	1-10	103	Nakafushi	Matsushima, Olmr
4	1-10	103	Holzapfel	Matsushima, Olmr
5	11-16	103	Workshop Manual	Matsushima, Winberg
6	11-16	103	Nakafushi	Matsushima, Winberg
7	11, 13, 14	103	Holzapfel	
8	12, 15, 16	103	Holzapfel	Matsushima, Winberg

Petitioner has not established the Challenged Claims are obvious over the cited prior art.

II. OVERVIEW OF THE ’145 PATENT

The ’145 Patent was filed as U.S. Patent Application No. 16/946,438 on June 22, 2020, and is a member of a family directed to multi-fuel engine technology. EX1001, (21), (22). Specifically, the ’145 Patent is a continuation of U.S. Patent

Application No. 14/925,441, now U.S. Patent No. 10,697,398. *Id.*, (63); EX2133, ¶¶70-72.

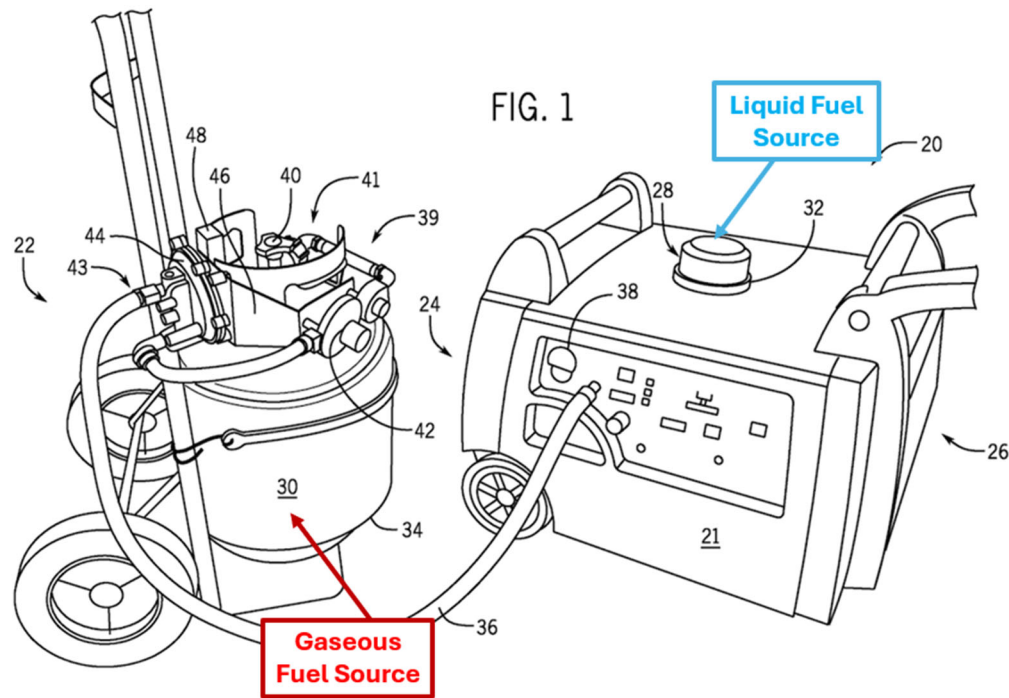
A. The Specification of the '145 Patent

The '145 Patent, titled “Batteryless Dual Fuel Engine with Liquid Fuel Cut-Off,” is directed to a liquid fuel cut-off attached to a carburetor to interrupt liquid fuel upon actuation of the switch from liquid fuel to gaseous fuel. EX1001, Abstract. Specifically, the '145 Patent describes “[a] dual fuel engine [that] includes an engine operable on a gaseous fuel and a liquid fuel and a switch to change operation of the engine between gaseous fuel and liquid fuel.” EX1001, Abstract; EX2133, ¶¶73-74.

The '145 Patent identifies certain advantages to dual-fuel generators, such as continued functionality when, “power outages in the utility grid result from severe weather.” EX1001, 1:33-38. However, the patent also warns that “a common problem with [dual fuel generators] is that the engine can experience overly rich air-fuel ratio when both fuels are simultaneously engaged during cross-over switching between the fuel sources.” EX1001, 1:60-65. An associated problem is that “a float bowl in the carburetor that must first fill or empty prior to changeover causes delay in cross-over switching between the fuel sources.” EX1001, 1:67-2:3; *see also id.*, 1:54-2:7; EX2133, ¶¶77-78.

Figure 1 of the '145 Patent, reproduced below for convenience, shows an example embodiment of the patented technology, which requires a carburetor that

can mix air and fuel and connect to both a gaseous fuel source and a liquid fuel source. The invention is directed at using such dual-fuel engines in portable electric generators. EX2133, ¶79.



EX1001, Fig. 1

The '145 Patent teaches that “mechanical fuel lockout switch 38 provides gasoline flow from gasoline tank 32 to the engine while preventing connection of an LPG supply line to fuel inlet 59 of the second fuel line.” EX1001, 5:46-51. The '145 Patent also distinguishes between liquid and gaseous fuel. For example, when describing “an exemplary embodiment of the invention, first fuel source 28 is a liquid fuel and second fuel source 30 is a gaseous fuel. The liquid fuel may be

gasoline and the gaseous fuel may be liquid petroleum gas (LPG).” EX1001, 4:11-14. EX2133, ¶75.

Figure 1 depicts “second fuel source 30” as an LPG tank with the fuel outlet (service valve 40) located at the top of the tank, in order to draw gaseous fuel from the second fuel source 30. Although “second fuel source 30” contains both liquid and gaseous LPG, the liquid LPG settles to the bottom of tank and cannot exit from the outlet located at the top of the tank. §V, *infra*; EX2133, ¶76.

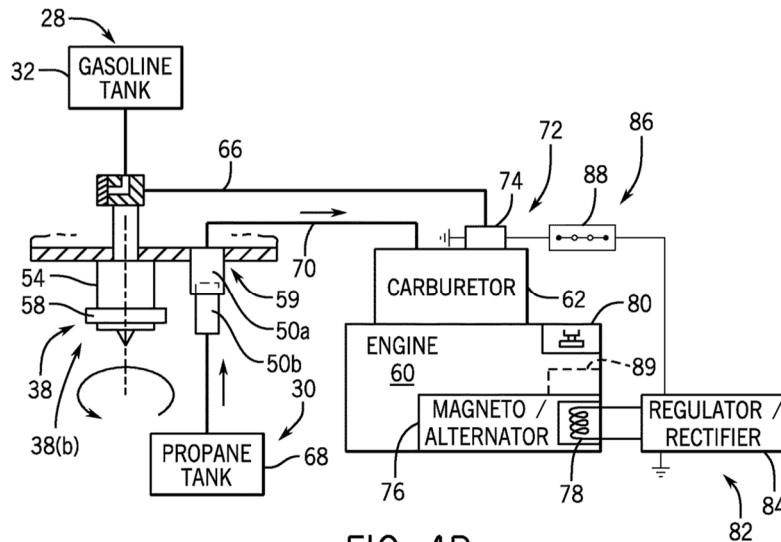
B. The Claims of the '145 Patent

Each independent claim recites a “dual fuel generator” separately comprising (1) “an engine operable on a gaseous fuel and a liquid fuel” and (2) “a carburetor attached to an intake of the engine to mix air and fuel and connect to a gaseous fuel source and a liquid fuel source.” EX1001, Cl. 1; EX2133, ¶¶81-82, 133-134. Thus, a POSITA would have understood Claim 1 to distinctly claim the state of the fuel (*i.e.*, gaseous or liquid) at two separate locations: the source of the fuel and the engine.¹

Specifically, the claims separately recite a *gaseous* fuel source, a *gaseous* fuel line coupling the gaseous fuel source to the carburetor, and an engine operable on

¹ Dependent Claim 2 further claims the state of the fuel at a third location: the fuel *line*. EX1001, Cl. 2; EX2133, ¶134 n.6.

gaseous fuel. Figure 4B of the '145 Patent (reproduced below) depicts a gaseous fuel source (Propane Tank 68), a gaseous fuel line (Second Fuel Line 70) and an engine operable on gaseous fuel (Engine 60). EX2133, ¶135.



EX1001, Fig. 4B

Likewise, the claims separately recite a *liquid* fuel source, a *liquid* fuel line coupling the liquid fuel source to the carburetor, and an engine operable on *liquid* fuel. Figure 4B of the '145 Patent (reproduced below) depicts a liquid fuel source (Gasoline Tank 32), a liquid fuel line (First Fuel Line 66) and an engine operable on liquid fuel (Engine 60). EX2133, ¶136.

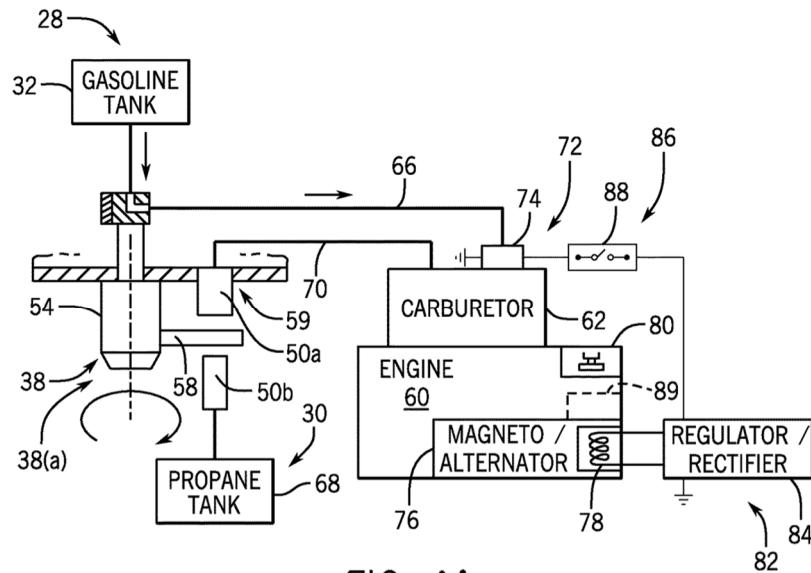


FIG. 4A

EX1001, Fig. 4A

Petitioner acknowledges one of the functions of a carburetor is the evaporation and atomization of liquid gasoline. EX1006, 7; EX2133, ¶137. In light of this teaching (*i.e.*, that liquid fuel is atomized and partially vaporized in the carburetor, further vaporized in the intake manifold, and completely vaporized in the cylinder), a POSITA would have understood that the “operable on” requirement of Claims 1 and 11 would have referred to the state of the fuel when it reaches the carburetor/engine. Therefore, a POSITA would have understood that an engine is “operable on” liquid fuel as claimed by the ’145 Patent liquid fuel even if the fuel is partially vaporized in the carburetor, intake manifold, or cylinder. EX2133, ¶138.

This is consistent with the prosecution history of the parent ’398 Patent. There, the examiner asserted that U.S. Patent Pub. No. 2007/0137591 (“Sugimoto”)

disclose an “engine operable on a gaseous fuel and a liquid fuel.” EX2137, 399; EX2133, ¶¶139-140.

In response, Patent Owner stated that Sugimoto actually discloses “[s]ince the first fuel gas is vaporized by the fuel pressure regulator 62, the first fuel gas and the second fuel gas are provided in a gaseous form to the carburetor 18b. As such, the Examiner has not shown that Sugimoto discloses an engine operable on a gaseous fuel and a liquid fuel.” EX2137, 373; EX2133, ¶141.

III. LEVEL OF ORDINARY SKILL IN THE ART

A POSITA would have a four-year degree in mechanical engineering or a closely related field and at least one year of experience designing, developing, servicing, or operating fuel-powered machinery. Additional education could substitute for professional experience and significant work experience—such as working with, servicing, or operating such machinery in the field—could substitute for formal education. EX2133, ¶110.

A POSITA, as described above, would understand the different mechanical components and functionality of fuel-powered machinery that are required to practice the claims of the ’145 Patent. EX2133, ¶111. Patent Owner’s proposed definition is based on the curriculum commonly taught to mechanical engineering students, which covers the subject matter of the claims of the ’145 Patent. EX2133, ¶112. For example, mechanical engineering students commonly study switches,

valves, and various mechanical assemblies. Therefore, mechanical engineering students would be able to practice most of the claimed features, as well as understand how those features would be combined and operate. EX2133, ¶113.

The '145 Patent also includes components involving delivery of liquid and/or gas to the engines. The detailed components of such systems, like carburetors comprising float bowls, are not usually taught at the undergraduate level. Therefore, Patent Owner's proposed definition includes the requirement of one year of experience designing, developing, servicing, or operating fuel-powered machinery, or in the alternative, substantial work experience in the field. EX2133, ¶114.

Meanwhile, Petitioner's proposed definition is unsupported, and relies solely on its expert's summary conclusions. Pet., 16. Specifically, Petitioner has failed to support its contention that three years of work experience in combustion engines is necessary. EX2133, ¶¶107-108. Regardless, the arguments advanced herein are not impacted based on which definition is applied. EX2133, ¶¶6-23, 115.

IV. CLAIM CONSTRUCTION

Claim terms are to be construed in accordance with the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*). But “[o]nly terms which are in controversy need to be construed, and then only to the extent necessary to resolve the controversy and material to the decision.” *Facebook, Inc. v. Sound View Innovations, LLC*, IPR2017-01005, Paper 13 at 6 (P.T.A.B. Sept. 1,

2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). For purposes of the arguments set forth in this Response, Patent Owner applies the plain and ordinary meaning of each claim limitation that is addressed. EX2133, ¶¶116-117.

V. BACKGROUND

Liquified petroleum gas is commonly referred to as “LPG” or “propane.” EX1001, 1:47-50. Propane “is derived from the refining of oil and gas and is compressible to a liquid form for storage.” *Id.*, see also EX2080 (U.S. Patent Pub. No. 2012/0104008), ¶[0003]; EX2133, ¶47.

Like virtually all forms of matter, LPG can exist in various states that have different properties. The terms “liquid propane” or “liquid LPG” are commonly used to describe LPG when present in a liquid state. EX2133, ¶45. Similarly, the terms “propane vapor” and “gaseous LPG” are commonly used to describe LPG in a gaseous state. EX2133, ¶49.

Prior to the priority date of the '145 Patent, the distinctions between gaseous and liquid LPG were well known in the art. EX2133, ¶50; EX2127, 43:1-12. Specifically, a propane system designed to use vapor cannot utilize propane in its liquid form and vice-versa. EX2133, ¶52; EX2127, 197:9-199:19; EX2081.B. This is also true for component parts of a system that utilizes liquid propane in some parts of the system and propane vapor in other parts. EX2133, ¶52. For example, the 2014

Edition of the NFPA 58 Liquefied Petroleum Gas Code explicitly teaches that vaporizers “shall be provided with automatic means to prevent the passage of liquid from the vaporizer to its vapor discharge piping.” EX2132, §5.21.2.3. This regulation exists to prevent the unintentional use of liquid LPG in a gaseous LPG system.

LPG “exists in a gaseous state at normal temperature and pressure but can be conveniently stored under pressure in a liquid state.” EX1001, 1:47-50. A POSITA would have understood that the propane storage disclosed by the ’145 Patent can be accomplished in large on-site tanks, or in portable cylinders. EX2133, ¶53; EX2127, 36:20-40:21; EX2081.C; EX2081.D.

A. Gaseous LPG Systems

LPG containers are often called “cylinders.” LPG cylinders have a wide variety of possible configurations. For example, consumer-focused cylinders are designed to supply gaseous LPG and are used to fuel gas grills, fire pits, and generators. EX2133, ¶56; EX2081.D.

As another example, U.S. Patent Pub. No. 2011/0100335A1 (“Parlatore”), (cited by Petitioner in related proceedings) describes a system configured to operate using gaseous LPG. EX2126, ¶[0014] (“The gas may be stored in a bottle or tank, such as LPG tank 102... An exemplary fuel system may use liquefied petroleum gas

(LPG or propane) which may be stored in a vapor gaseous state in LPG tank 102...”); EX2133, ¶57.

Parlatore explicitly recognizes the benefits of propane vapor, stating that the LPG applications described therein “may be accomplished through the use of vapor fuel delivery rather than the delivery of liquid propane gas.” EX2126, ¶[0025]. Moreover, using propane vapor supplied directly from the source allows the system to avoid “issues pertaining to cooling and freezing, such as those known to affect the conversion of propane from liquid to gas.” *Id.*, ¶[0025]; EX2133, ¶58.

B. Liquid LPG Systems

Conversely, commercial or industrial cylinders supply liquid LPG to motorized commercial equipment (e.g., forklifts). EX2133, ¶59; EX2081.D-E. For example, “[p]ropane powered forklifts primarily use 33 pound [sic] cylinders as their fuel source and are equipped for liquid service. Because the cylinders are designed for liquid service, they have to be placed properly on the lift truck to operate correctly. Improper cylinder installation can result in loss of power and eventually complete loss of engine functionality.” EX2133, ¶60; EX2081.E.

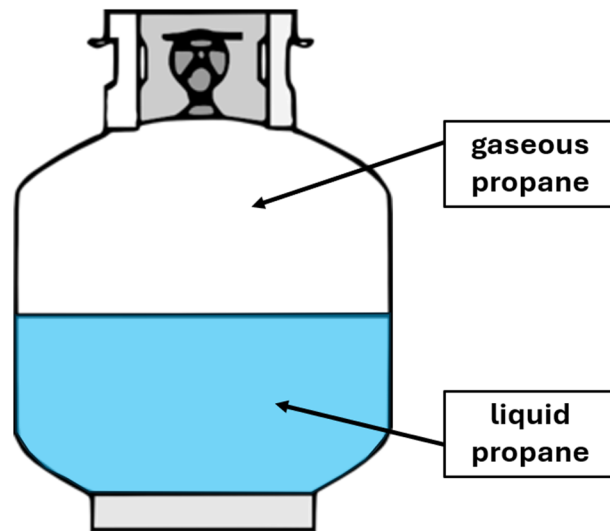
Petitioner’s Bernhardsson reference, which was cited in a related proceeding, provides another example of a system configured to operate using liquid LPG. EX2100, 2:58-68 (“The system 4 for supplying a gaseous fuel, e.g. LPG (Liquefied Petroleum Gas) or natural gas, includes a container 40 in which the gas assumes

liquid form under pressure... The container 40 is connected to a vaporizer 43 via a solenoid valve 42 and a pipe 41 ... and *gas supplied in liquid form to the vaporizer 43 is successively transformed into gas.*”) (emphasis added). Notably, Bernhardsson *does not* teach that its system is operable with a gaseous LPG source, and using gaseous LPG in the system disclosed by Bernhardsson would render Bernhardsson’s vaporizer 43 superfluous; EX2133, ¶61.

Other references provide examples of LPG vaporizers for use with liquid LPG. For example, the Kubota Workshop manual describes a vaporizer which includes both primary and secondary chambers. EX1009, 69. The primary and secondary chambers—acting together—vaporize liquid LPG into a gaseous state before the fuel enters the carburetor. EX2133, ¶62; EX1009, 70-71. Perhaps most critically, Petitioner’s Holzapfel reference discloses “an additional fuel supply system employing a normally gaseous fuel” but explicitly teaches that the system should be configured “so as to draw off the liquid *and not gas.*” EX1008, 2:8-15 (emphasis added); EX2133, ¶63.

C. LPG Storage and Distribution

Regardless of whether a LPG tank or cylinder is designed to supply liquid or gaseous LPG, the storage device contains LPG in both a liquid and gaseous state.² Liquid propane is more dense than gaseous propane, and therefore sinks to the bottom of the tank, as depicted below:



Schematic Representation of an LPG Tank

When the valve at the top of the LPG cylinder is opened, it causes the pressure within the cylinder to drop, which (1) causes the liquid LPG to boil and evaporate into a gas, and (2) releases the gaseous propane located near the valve. EX2133, ¶¶64-65; EX2127, 41:6-42:16.

² This is also true with respect to gasoline tanks, which contain liquid gasoline and gasoline vapor.

The different LPG use cases and storage configurations would have been known to a POSITA. For example, such differences are discussed on the Propane 101 Website: “bottles that are used in vapor service such as a barbeque grill or fish fryer cannot be replaced by a forklift propane cylinder, as LP Gas forklift cylinders use liquid propane for their specific engine fuel applications... LP Gas cylinders are not interchangeable with ASME bulk propane tanks or with other types of cylinders that are approved for specific LP Gas applications.” EX2133, ¶66; EX2081.F.

Of key importance to the understanding of the ’145 Patent’s claims, is the idea that propane vapor service and propane liquid service are completely different from one another. The vast majority of propane applications utilize propane vapor. These applications are not configured to operate on liquid LPG. EX2133, ¶67; EX2081.B. If liquid propane were injected into these systems it could result in fire or similar danger, which is why consumer propane cylinders should always be positioned upright with their valves at the top of the storage vessels. EX2133, ¶67; EX2127, 197:9-199:19; EX2132, §5.21.2.3.

VI. OVERVIEW OF THE PRIOR ART

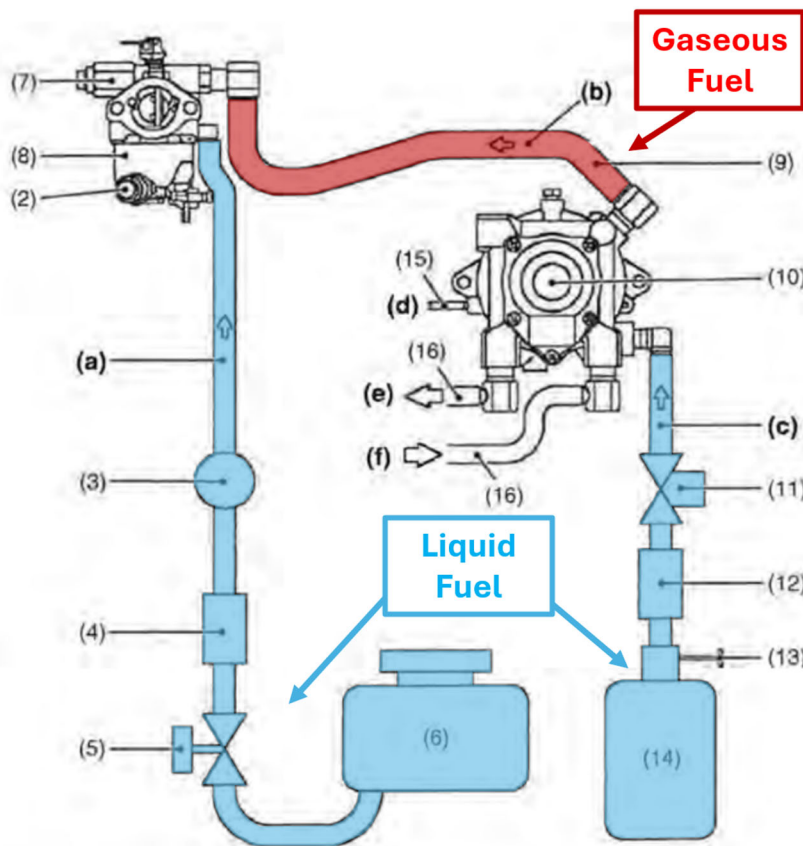
A. Kubota DF972-E2 Workshop Manual (“Workshop Manual”)

The Workshop Manual describes the Kubota DF972-E2 engine, which can run on two different types of fuel. EX1009. More specifically, the DF972-E2 engine

is a “Vertical, water cooled, 4-cycle Dual Fuel (Gasoline/LPG) engine. EX1009, 8; EX2133, ¶85.

The Workshop Manual’s engine is supplied by two different liquid fuel sources: gasoline and liquid LPG. The Workshop Manual teaches, “[f]or LPG fuel, the liquid fuel stored in the LPG tank (14) is sent to vaporizer (10) by pressure in the gaseous phase in the tank” and “[t]he liquid fuel is evaporated in [the] vaporizer.” EX1009, 65. The Workshop Manual explains that a “[v]aporizer is a device which converts the liquid fuel into the gaseous fuel” (*id.*, 69) and that, “[w]hen evaporating by primary chamber of vaporizer[,] liquid LPG needs the evaporation heat.” *Id.*, 64. “The coolant of the engine is made to circulate as a heat source to evaporate the LPG.” *Id.*, 69; EX2133, ¶87.

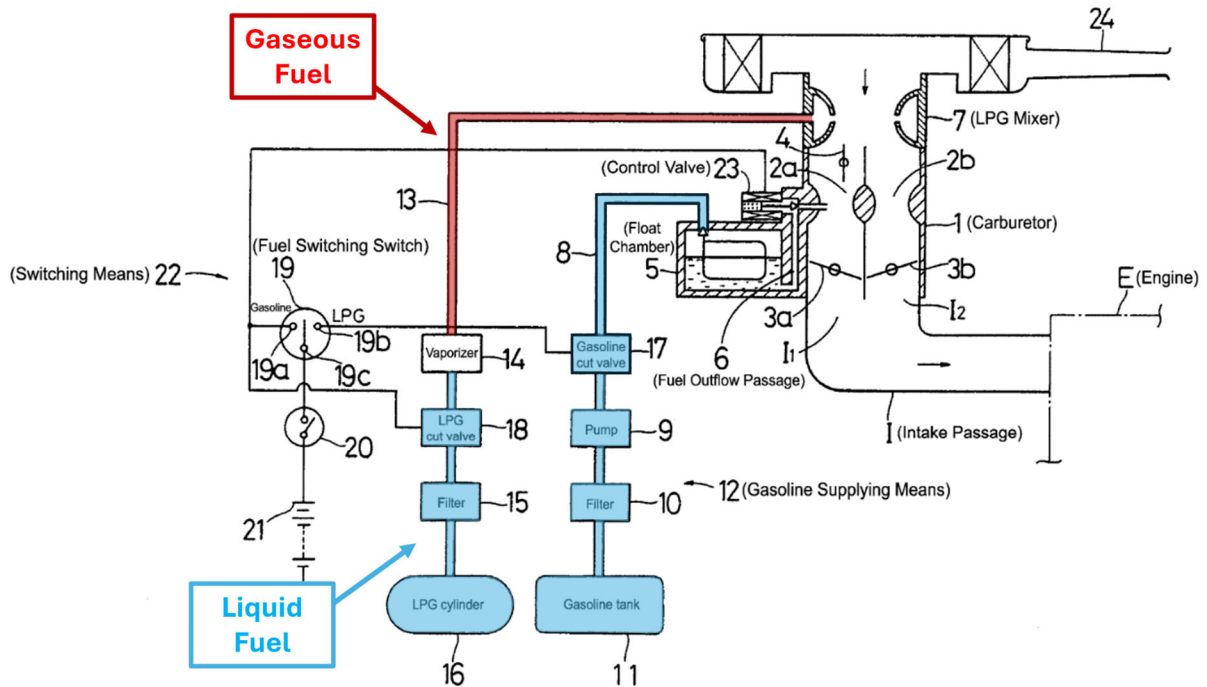
Liquid propane is transported to the vaporizer (10) via a liquid propane line (c). EX1009, 65. “Th[e] vaporizer installs the water jacket, throws the coolant of engine, heats primary chamber, promotes evaporation, and prevents valves being frozen.” A POSITA would have understood the Workshop Manual’s LPG tank (14) supplies liquid LPG, which is converted to a gaseous state only after passing through the vaporizer. EX2133, ¶¶88-93; EX1009, 65 (annotated).



B. JPS61283734A (“Nakafushi”)

The Petition states that “Nakafushi is directed to an engine configured to selectively use gasoline or LPG.” Pet., 21 (citing EX1005, Fig. 1). Nakafushi discloses “LPG bomb 16” which a POSITA would have understood comprises an on-site LPG tank. EX1005, ¶[0012]. Much like the Workshop Manual, Nakafushi’s LPG cylinder 16 is a source of liquid fuel that is subsequently vaporized by a vaporizer. Thus, at various points in the Nakafushi system, the LPG is either liquid or gaseous. EX2133, ¶¶96-97.

FIG. 1

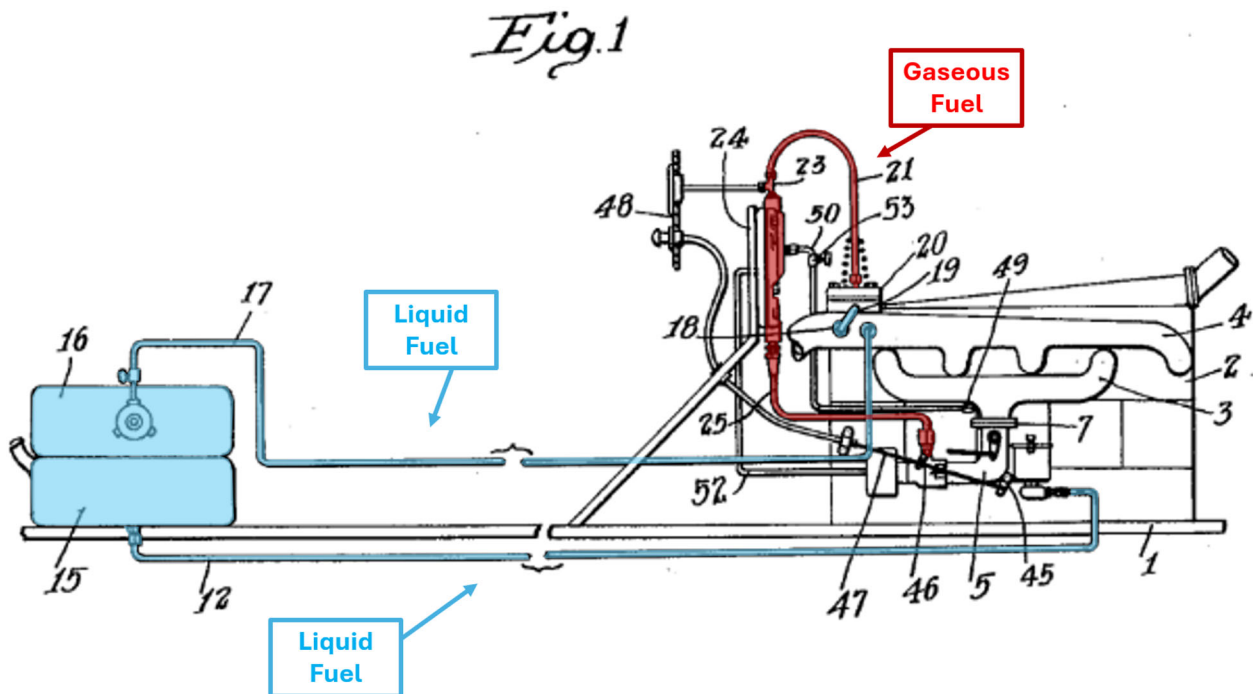


EX1005, Fig. 1

A POSITA would have understood that LPG bomb 16 supplies *liquid* LPG to filter 15, through LPG cut valve 18, and into vaporizer 14, which then converts the LPG into gaseous form. Ex. 1005, ¶[0012] (“LPG bomb 16 as an LPG supplying means by an LPG supplying passage 13 via a vaporizer 14 for vaporizing LPG”). The function of the vaporizer is to convert the liquid LPG into a gaseous state so it may be properly combusted by the engine. The vaporizer 14 is designed to receive the liquid LPG and heat the liquid to its boiling point. EX2133, ¶¶98-100.

C. U.S. Patent No 1,931,698 (“Holzapfel”)

Holzapfel was filed March 30, 1931 and discloses a fuel system for internal combustion automobile engines. EX1008. Specifically, Holzapfel “relates to fuel systems for internal combustion engines, and has particular reference to a fuel system embodying the supplying of liquid fuel and gaseous fuel to an engine in alternation at will.” EX1008, 1:1-5; EX2133, ¶¶103-104. With respect to the gaseous fuel system, Holzapfel explains “From tank 16 there extends a suitable gaseous fuel supply tube 17 extending to the bottom of the tank 16, *so as to draw off the liquid and not gas.*” EX1008, 2:8-15 (emphasis added); EX2133, ¶¶105-106; EX1008, Fig. 1 (annotated).



VII. ARGUMENT

The Challenged Claims are not obvious over the cited prior art.

A. The Workshop Manual Grounds: The '145 Patent is Not Obvious over the Workshop Manual, Alone or in Combination with Other References

The Petitioner has not established that the Challenged Claims are obvious over the Workshop Manual, alone or in combination with other references. EX2133, ¶119.

1. Independent Claims 1, 11

a. Element [1.0] & Element [11.0]

(1) The term “dual fuel generator” gives meaning to Claims 1 and 11 and properly defines the invention.

As an initial matter, the preambles of Claim 1 and Claim 11 are limiting. It is long settled that “terms appearing in a preamble may be deemed limitations of a claim when they ‘give meaning to the claim and properly define the invention.’” *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994); *see also Gerber Garment Tech., Inc. v. Lectra Sys., Inc.*, 916 F.2d 683, 688, 16 USPQ2d 1436, 1441 (Fed. Cir. 1990) (quoting *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 896, 221 USPQ 669, 675 (Fed. Cir. 1984), cert. denied, 469 U.S. 857, 83 L. Ed. 2d 120, 105 S. Ct. 187 (1984)).

The very first substantive sentence of the '145 Patent emphasizes that “Embodiments of the invention relate generally to *dual fuel generators*, and more

particularly, to an apparatus and method for delivering liquid fuel or gaseous fuel to a *dual fuel generator*.” EX1001, 1:17-20 (emphasis added). In fact, the ’145 Patent describes the structure of the claimed generator: “Dual fuel generator 30 includes a dual fuel internal combustion engine 34 within housing 36 at one end 38, operatively connected to an alternator 40 also enclosed in housing 36 at another end 42 by conventional means.” EX1001, 4:5-9. Thus, a POSITA would have understood the inventors of the ’145 Patent were working on the particular problem of improved *generators*, not on general improvements in conventional engines. The term “dual fuel generator” in the preambles of Claims 1 and 11 connotes structural limitations above and beyond those specified in the body of the claims. EX2133, ¶120.

As further evidence, Petitioner’s expert (Dr. Shahbakhti) expressly looked to the preamble to give meaning to other claim limitations. For example, when asked “[w]hat does it mean for an engine to be operable on a gaseous fuel” (Element [1.1]), Dr. Shahbakhti confirmed that the preamble guided his understanding of the element:

Q. With respect to Element 1.1, do you understand the claim to be referring to the state of the fuel at a particular point in the system?

A. I would say because this one is connected to Element 1, which is a dual-fuel generator. That means that generator being able to run with gaseous fuel, and the same generator being able to run with liquid fuel.

Q. So the fact that Element 1.0 says a dual-fuel generator guides your understanding of what Element 1.1 means?

A. The way I read it, because it says, "A dual-fuel generator comprising:" So that means that dual-fuel generator then is trying to describe that dual-fuel generator.

EX2136, 120:1-121:24; EX1001, Cl. 1. As such, a POSITA would have understood the term "dual fuel generator" gives meaning to Claims 1 and 11 and properly defines the invention. EX2133, ¶¶121-122.

(2) The Workshop Manual does not disclose or otherwise render obvious "a dual fuel generator."

The Workshop Manual does not disclose or otherwise render obvious a dual fuel generator. Petitioner's obviousness "analysis" is based on a single conclusory sentence alleging it would have been obvious to implement the Workshop Manual's engines in a generator because "dual fuel generators were well known as of the earliest priority date of the '145 Patent." Pet., 30 (citing EX1016; EX1003, [0088]); EX2133, ¶¶123-125.³

³ Dr. Shahbakhti's declaration repeats the Petition verbatim without any additional analysis. EX1003, ¶[0088]; *see also* Pet., 98; EX1003, ¶[0279]. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (P.T.A.B. August 24, 2022) (precedential) (expert testimony that "merely repeats, *verbatim*, the conclusory

Petitioner’s purported “analysis” is deficient for several reasons. First, the mere fact that dual fuel generators were allegedly well known says nothing about whether a POSITA would have been motivated to implement the specific prior art engine at issue here with another specific prior art generator. In particular, neither Petitioner nor its expert provide any analysis regarding how (or why) the Workshop Manual’s prior art engine would have been implemented in a generator. EX2133, ¶126. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“[I]t can be important to identify a reason that would have prompted a [POSITA] to combine the elements in the way the claimed new invention does” and “this analysis should be made explicit.”); *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008) (“[K]nowledge of a problem and motivation to solve it are entirely different from motivation to combine *particular references*...”); *Google LLC v. Sonos, Inc.*, No. 2023-1259, 2024 U.S. App. LEXIS 12394, at *5 (Fed. Cir. May 23, 2024) (“generic or conclusory analysis is insufficient when it bears no relation to any specific combination of prior art elements *from specific references* and doesn’t explain why a skilled artisan would have combined them in the way the claimed invention does.”)

assertion for which it is offered to support ... is conclusory and unsupported, adds little to the conclusory assertion for which it is offered to support, and is entitled to little weight.”).

(cleaned up) (emphasis added). The Petition’s conclusory recitation that dual fuel generators were well known in the art is insufficient to show that a POSITA would have been motivated to make the proposed implementation. *In re Magnum Oil Tools Int’l, Ltd.*

Second, Petitioner’s sole support for the statement that “dual fuel generators were well known” is a single generic reference to EX1016 (the operator’s manual for a single, specific DuroMax generator). Petitioner does not cite any portion of the operator’s manual that allegedly supports its proposition that similar generators were “well known.” And, it is unclear from the Petition whether Petitioner proposed implementing the Workshop Manual’s dual fuel engine in a generic, hypothetical “dual fuel generator,” or specifically combining it with the DuroMax XP4400EH generator described in EX1016. EX2133, ¶127.

If Petitioner intends the latter, the Petition is utterly devoid of any analysis or explanation indicating how or why a POSITA would have been motivated to replace the engine already present in the DuroMax XP4400EH generator with each of the identified prior art engines, or any analysis indicating that a POSITA would have had a reasonable expectation of success in doing so. EX2133, ¶128.

If, however, Petitioner merely intends to reference a generic, hypothetical dual fuel generator, the Petition is nothing more than an attempt to side-step the motivation to combine and reasonable expectation of success requirements of an

obviousness analysis, and is explicitly precluded by the Director’s July 31, 2025 Memorandum addressing Enforcement and Non-Waiver of 37 C.F.R. §42.104(b)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews, which held “that applicant admitted prior art (AAPA), expert testimony, common sense, and other evidence that is not ‘prior art consisting of patents or printed publications’ (collectively, ‘general knowledge’) may not be used to supply a missing claim limitation.” 37 C.F.R. §42.104(b) (4). In either event, Petitioner has failed to show that the ’145 Patent is invalid. 37 C.F.R. §42.104(b) (4); EX2133, ¶¶129-130.

b. Element [1.4] & Element [11.2]

As discussed above, a POSITA would have understood Claims 1 and 11 distinctly claimed the state of the fuel (*i.e.*, gaseous or liquid) at two separate locations: the source of the fuel and the engine. *See* §II.B, *supra*; EX2133, ¶¶133-142. “[W]here a claim lists elements separately, the clear implication of the claim language is that those elements are distinct components of the patented invention.” *Regeneron Pharm., Inc. v. Mylan Pharm. Inc.*, 130 F.4th 1372, 1379 (Fed. Cir. 2025) (citing *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010)); *see also Kyocera Senco Indus. Tools Inc. v. Int’l Trade Comm’n*, 22 F.4th 1369, 1382 (Fed. Cir. 2022) (“The asserted claims list those elements separately” and “there is, therefore, a presumption that those components are

distinct.”); *Schindler Elevator Corp. v. Otis Elevator Co.*, 593 F.3d 1275, 1282 (Fed. Cir. 2010).

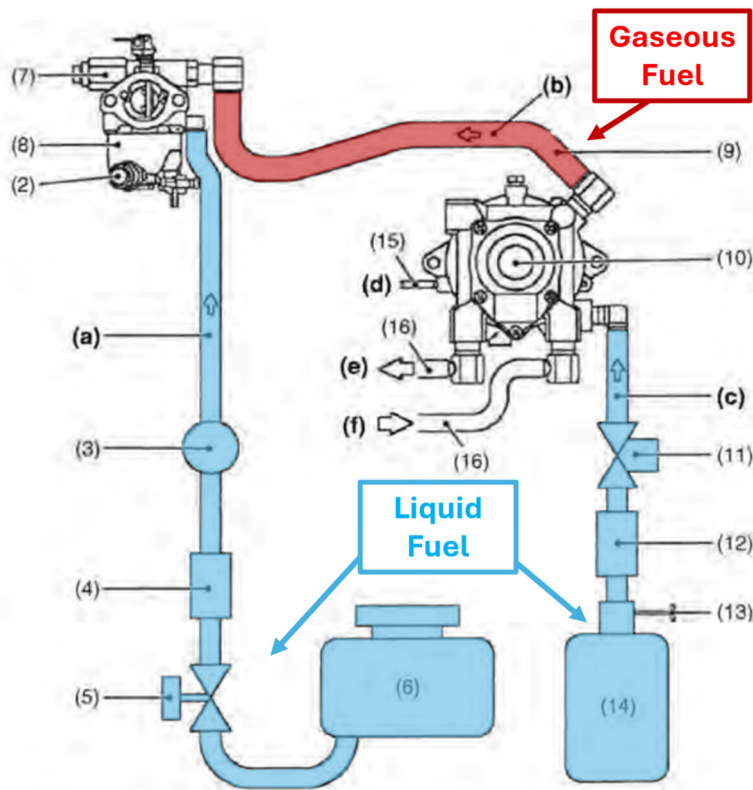
The Workshop Manual does not disclose or otherwise render obvious “a carburetor attached to an intake of the engine to mix air and fuel and connect to a gaseous fuel source and a liquid fuel source.” Specifically, the Workshop Manual does not disclose a “gaseous fuel source.” EX2133, ¶¶131-132.

As discussed above, the Workshop Manual describes a dual fuel engine that draws fuel from two different liquid sources: Gasoline Tank (6) and LPG Tank (14). *See* §VI.A, above; EX2133, ¶143.

The Petition does not explicitly identify the alleged “gaseous fuel source” in its analysis of Element [1.4]. [Pet., 33-38.] And, Petitioner’s analysis of Element [11.2] merely incorporates its Element [1.4] analysis by reference. [Pet., 98.] This alone is fatal. 37 C.F.R. §42.104(b)(5) (the Board may exclude evidence “where a party has failed to state its relevance or to identify specific portions of the evidence that support the challenge.”); *Netflix, Inc. v. DivX, LLC*, 84 F.4th 1371, 1377 (Fed. Cir. 2023) (“the Board should also not have to decode a petition to locate additional arguments beyond the ones clearly made. A petitioner may not rely on a vague, generic, and/or meandering petition and later fault the Board for failing to understand what the petition really meant.”); EX2133, ¶144.

Instead, Petitioner’s purported “analysis” is limited to two conclusory sentences, which generally refer to—but do not identify—the alleged gaseous fuel source. Pet., 37-38; EX2133, ¶¶145-146. Elsewhere, Petitioner addresses Claim 2, which recites “a gaseous fuel line coupling the gaseous fuel source to the carburetor.” There, Petitioner states that “Workshop Manual teaches an LPG fuel line coupling LPG Tank (14) to DF Carburetor (8).” Pet., 42. Thus, to the extent that the Petition identifies the claimed “gaseous fuel source,” Petitioner’s use of the term “LPG tank” in place of the claimed “gaseous fuel source” indicates that Petitioner intended to map the Workshop Manual’s “LPG Tank (14)” to the claimed “gaseous fuel source.” EX2133, ¶147; 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377.

Contrary to Petitioner’s representations (but consistent with Petitioner’s annotations), LPG is liquid fuel when leaving the fuel source, and only becomes gaseous fuel after reaching the vaporizer, as depicted by the below annotated figure:



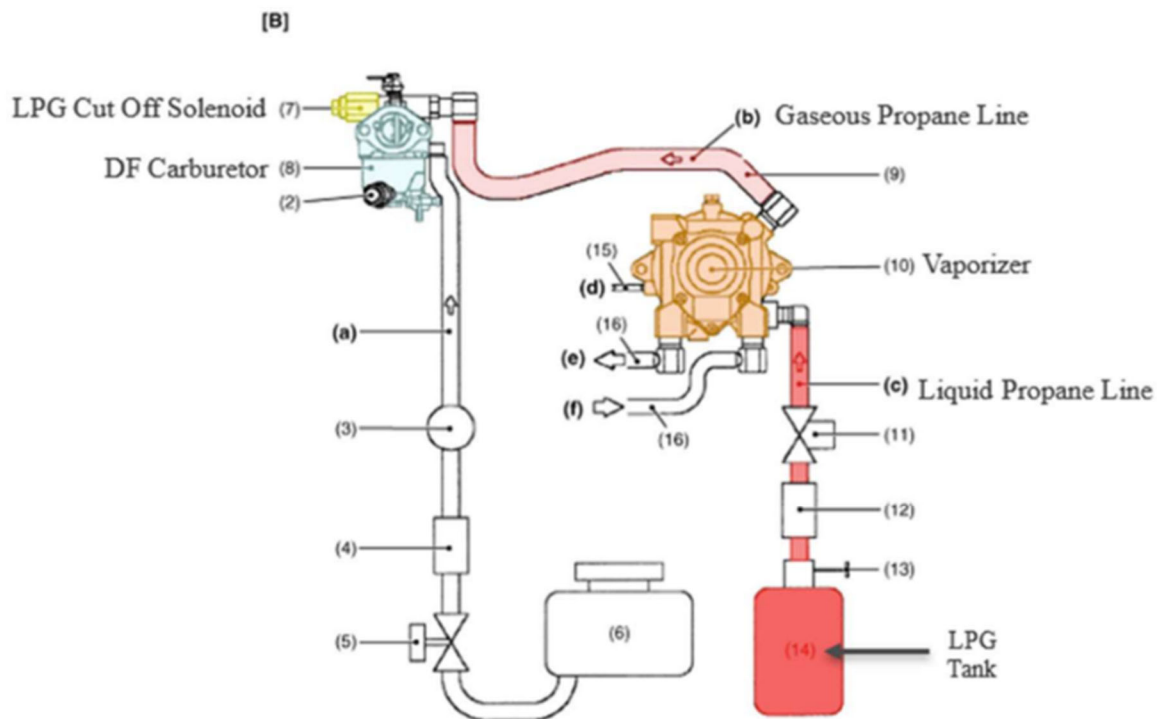
EX1009, 65 (annotated)

Specifically, the Workshop Manual explicitly teaches that LPG Tank (14) is a source of *liquid* fuel, not *gaseous* fuel. EX1009, 65 (“For LPG fuel, *the liquid fuel stored in the LPG tank (14) is sent to vaporizer (10)*”) (emphasis added); see also *id.* at 69; 64; EX2133, ¶148. The presence of the vaporizer actually precludes LPG Tank (14) from being considered a “gaseous fuel source.” For example, if an LPG tank was used improperly such that LPG vapor exited the tank and was sent to the vaporizer, the vaporizer would not function properly to generate an appropriately rich fluid flow into the carburetor. In such a case, the engine would die. As such, a POSITA would have viewed both the Gasoline Tank (6) and LPG Tank (14) as liquid

fuel sources, which supply liquid fuels that are subsequently vaporized. EX2133, ¶¶151-154; §II.B, *supra*.

2. Claim 2

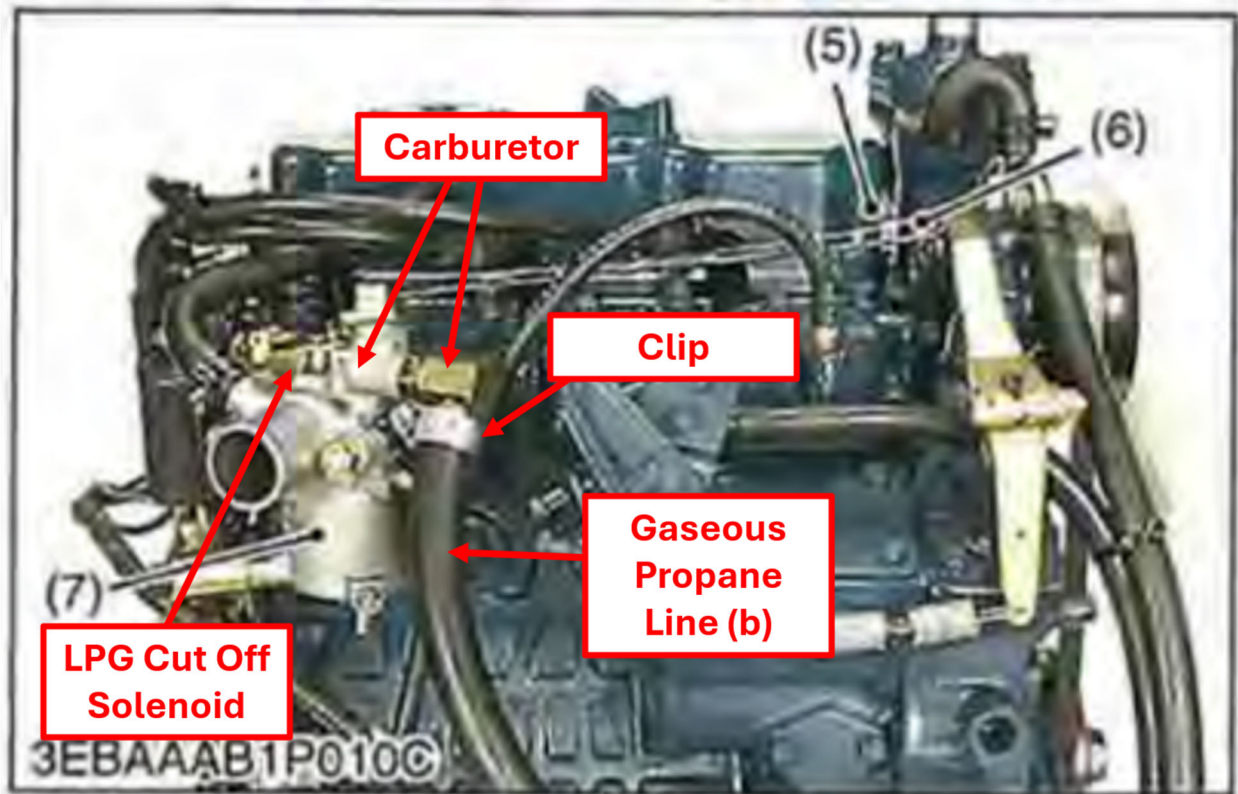
The Workshop Manual does not disclose or otherwise render obvious Claim 2. Once again, Petitioner does not explicitly identify the claimed “gaseous fuel line.” Pet., 42-46. Instead, Petitioner refers generally to an “LPG fuel line.” Pet., 43, 44. But, by Petitioner’s own admission, the Workshop Manual does not have a single “LPG fuel line,” but rather separate “Liquid Propane Line (c)” and “Gaseous Propane Line (b).” Pet., 44; EX2133, ¶¶157-158. Petitioner’s failure to identify the claimed fuel line with particularity is fatal. 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377.



Pet., 44 (annotations in original).

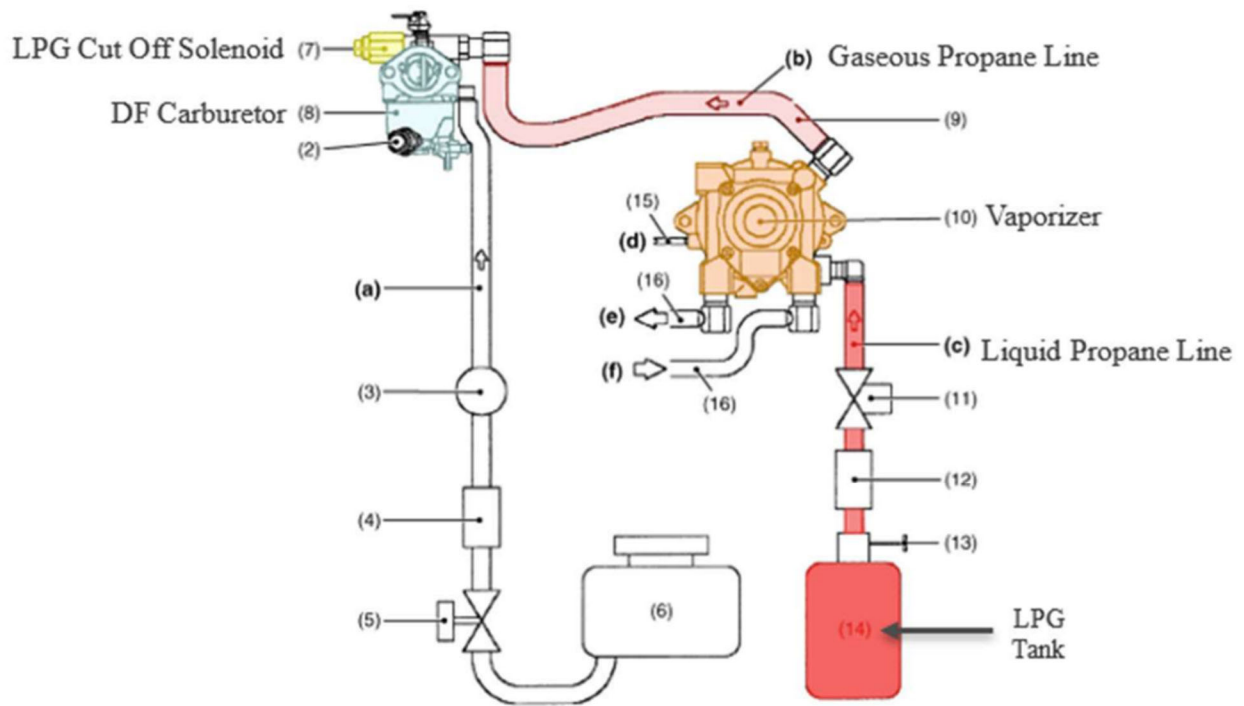
Petitioner identifies three distinct valves as the alleged “gaseous fuel valve along a gaseous fuel line.” Pet., 44 (“LPG Manual Valve (13), LPG Shut Off Solenoid Valve (11), and LPG Cut Off Solenoid (7) all are positioned on the LPG fuel line”). However, LPG Manual Valve (13) and LPG Shut Off Solenoid Valve (11) are clearly located along a *liquid* fuel line, and thus cannot be the claimed “gaseous fuel valve along a gaseous fuel line.” EX1009, 65 (“For LPG fuel, *the liquid fuel stored in the LPG tank (14) is sent to vaporizer (10)*”) (emphasis added); *see also* EX2136, 130:9-136:1 (“selecting the right type of the solenoid valve that is covering the gaseous fuel versus the liquid fuel, it’s an important factor”). EX2133, ¶159.

In fact, the *only* gaseous fuel line disclosed by the Workshop Manual is “Gaseous Propane Line (b),” which consists of a black fuel line, and is depicted attaching to the carburetor (metallic) upstream of the LPG Cut Off Solenoid (7). EX1009, 115; EX2133, ¶160.



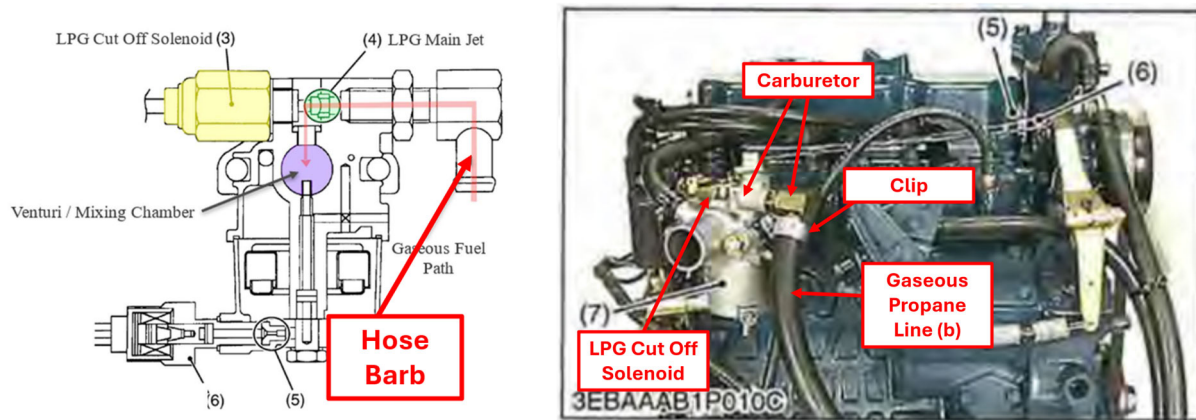
EX1009, 115 (annotated).

Petitioner's annotations (reproduced below) provide further clarity regarding the relationship between Gaseous Propane Line (b) and the LPG Cut Off Solenoid:



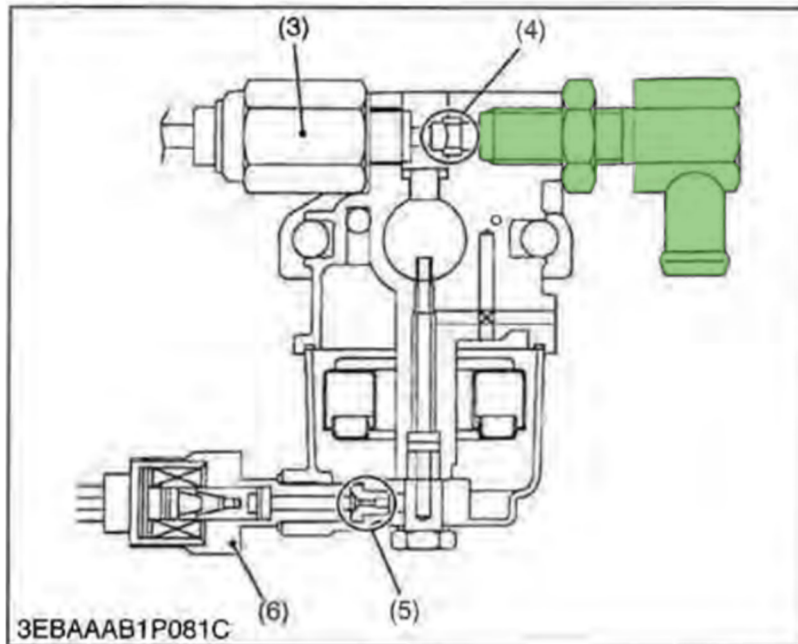
Pet., 31 (annotations in original)

Petitioner's annotations make clear that LPG Cut Off Solenoid (7) is not located *along* Gaseous Propane Line (b). Specifically, Gaseous Propane Line (b) is attached to the hose barb depicted at the top right of the below diagram (below, left), and secured with a silver clip (below, right). In a related proceeding regarding the parent '398 Patent, Petitioner's expert (Dr. Morse) testified this was a common way to secure a fuel line. EX2127, 109:11-110:8; EX2133, ¶¶161-162.



Pet., 45 (annotated) (left); EX1009, 115 (annotated) (right).

Petitioner identifies the LPG Cut Off Solenoid as being located on the “gaseous fuel *path*,” which (while true) is irrelevant when analyzing specific claim limitations requiring the valve be located along the gaseous fuel *line*. Based on Petitioner’s annotated figure, LPG Cut Off Solenoid (3) is located *after* Gaseous Propane Line (b), with several intervening components (green) that gaseous fuel passes through located between LPG Cut Off Solenoid (3) and Gaseous Propane Line (b). EX2133, ¶163.



EX1009, 68 (annotated)

Conversely, Petitioner explicitly identified the Workshop Manual’s “Gasoline Cock (5)” and “Gasoline Line (a)” as the “liquid fuel valve along a liquid fuel line.” Pet., 42; EX2133, ¶¶164-166. Unlike LPG Cut Off Solenoid (7), Gasoline Cock (5) is clearly positioned *along* the alleged liquid fuel line, which continues both upstream and downstream of the alleged fuel valve. Here, LPG Cut Off Solenoid (7) is located entirely downstream of Gaseous Propane Line (b), with other intervening components positioned between Gaseous Propane Line (b) and LPG Cut Off Solenoid (7). EX2133, ¶¶167-168.

3. Claim 3

The Workshop Manual does not disclose or otherwise render obvious Claim 3. As discussed above, Petitioner identifies three distinct valves as the claimed

“gaseous fuel valve.” §VII.A.2, above. However, LPG Manual Valve (13) and LPG Shut Off Solenoid Valve (11) are clearly located along a *liquid* fuel line, and thus cannot be the claimed “gaseous fuel valve along a gaseous fuel line.” EX1009, 65 (“For LPG fuel, *the liquid fuel stored in the LPG tank (14) is sent to vaporizer (10)*”) (emphasis added); §VII.A.1.b, above; EX2133, ¶¶169-171.

LPG Cut Off Solenoid (7), meanwhile, is not a “mechanical valve.” *Compare* Pet., 46 (“Gasoline Cock (5) ... is a mechanical valve”) *with* Pet., 47 (“LPG Cut Off Solenoid (7) ... mechanically interrupts the flow of LPG from the LPG fuel source to the carburetor.”). But, the mere fact that a device “mechanically interrupts” a flow does not make it a mechanical valve. EX2136, 107:14-108:18 (distinguishing between electrical, mechanical, and electro-mechanical systems, and noting that electro-mechanical systems have “an electrical component and a mechanical component”); *see also id.* at 49:11-50:8. In fact, had Patent Owner intended to claim an electro-mechanical valve, it would have done so. EX1001, Cl. 6 (“wherein the switch is an *electro-mechanical switch*”) (emphasis added); EX2133, ¶¶172-173.

To try and fill this gap in its analysis, Petitioner argues that “a [POSITA] would have understood that a mechanical valve *can* substitute for LPG Cut Off Solenoid.” Pet., 47 (emphasis added). Importantly, the Petitioner does not identify the mechanical valve which would have allegedly been substituted, nor provide any basis that a POSITA *would* have used *that* valve in place of LPG Cut Off Solenoid

(7) specifically. Petitioner’s conclusory analysis is impermissible hindsight. *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (“a party’s expert ‘succumbed to hindsight bias in her obviousness analysis’ where such analysis ‘primarily consisted of conclusory references to her belief that one of ordinary skill in the art could combine these references, not that they would have been motivated to do so.’”); *see also* Memorandum addressing Enforcement and Non-Waiver of 37 C.F.R. §42.104(b)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews; EX2133, ¶¶174-175.

4. Claim 6

The Workshop Manual, alone or in combination with Matsushima, does not disclose or otherwise render obvious Claim 6. As an initial matter, Petitioner’s invalidity challenge is unclear. For example, Petitioner initially asserts that Claim 6 is obvious over the Workshop Manual alone. Pet., 10 (addressing Claim 6 with respect to Ground 1). However, Petitioner later argues that “a [POSITA] would have understood that the combination of Workshop Manual and Matsushima teaches claim 6.” Pet., 51-52. Petitioner’s failure to clearly articulate its invalidity challenge is fatal. 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377; EX2133, ¶¶176-177.

Petitioner maps the claimed “switch” to the Workshop Manual’s “Fuel Select Switch.” Pet., 32-34. The Workshop Manual confirms that the claimed “switch” is connected to the Workshop Manual’s battery. EX1009, 68. Thus, the Workshop

Manual does not disclose a switch that is “connected to the electrical power generator.” EX2133, ¶¶178.

However, Petitioner does not argue that it would have been obvious for a POSITA to have modified the Workshop Manual’s engine to connect the claimed “switch” to a generator. Specifically, Petitioner does not (1) identify where in the prior art it is disclosed that the claimed “switch” is connected to a generator, (2) identify a motivation to combine the Workshop Manual with any prior art reference disclosing the claimed “switch” connected to a generator, or (3) assert that a POSITA would have had a reasonable expectation of success in making the claimed modification. At most, Petitioner asserts that Matsushima’s fluid injection valve 10 is connected to its generator. EX2133, ¶179.

However, asserting that the Workshop Manual’s fuel select switch allegedly *could* be connected to a generator is not the same as asserting that a POSITA *would* have been motivated to do so. *InTouch Techs.*, 751 F.3d at 1352. Moreover, the mere fact that Matsushima allegedly discloses that a different component is connected to its generator is not the same as disclosure of the claimed structure, and Petitioner cannot rely on expert testimony to supply the missing limitation. Memorandum addressing Enforcement and Non-Waiver of 37 C.F.R. §42.104(b)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews; EX2133, ¶¶180-181.

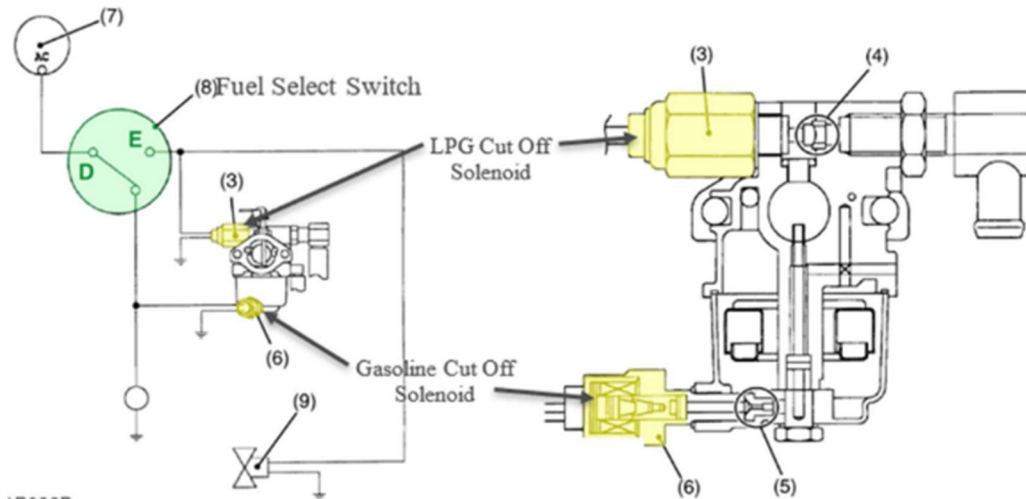
5. Claim 8

The Workshop Manual (alone or in view of Matsushima and/or Olmr) does not disclose or otherwise render obvious Claim 8. Petitioner identifies the Workshop Manual's Gasoline Cut Off Solenoid as the claimed "liquid fuel cut-off" and acknowledges that the "liquid fuel cut-off" is normally closed. Pet., 32 (when "battery current stops to the gasoline cut off solenoid ... [t]hen, the gasoline flow is shut"). Therefore, the Workshop Manual alone does not disclose this limitation. EX2133, ¶¶182-183.

Instead, Petitioner argues that it "would have been obvious to a [POSITA] to use Olmr's solenoid valve 42 in place of Workshop Manual's liquid fuel cut-off solenoid. Pet., 51. However, Petitioner does not even attempt to articulate a motivation to replace the Workshop Manual's normally closed liquid fuel cut-off solenoid with Olmr's normally open solenoid, but instead argues that "the decision to configure a solenoid as normally open or normally closed is mere design choice." Pet., 53; EX2133, ¶184.

A POSITA would not have been motivated to replace the Workshop Manual's normally closed solenoid with Olmr's normally open solenoid. As Petitioner previously acknowledged, the Workshop Manual discloses a fuel select switch (8) which determines whether current flows to the gasoline cut off solenoid (6) or the LPG cut off solenoid (3). EX1009, 68; *see also* Pet., 32-33; EX2133, ¶¶185-186.

Petitioner's annotations of the pertinent Workshop Manual figures are reproduced below:



Pet., 33 (citing EX1009, 68)

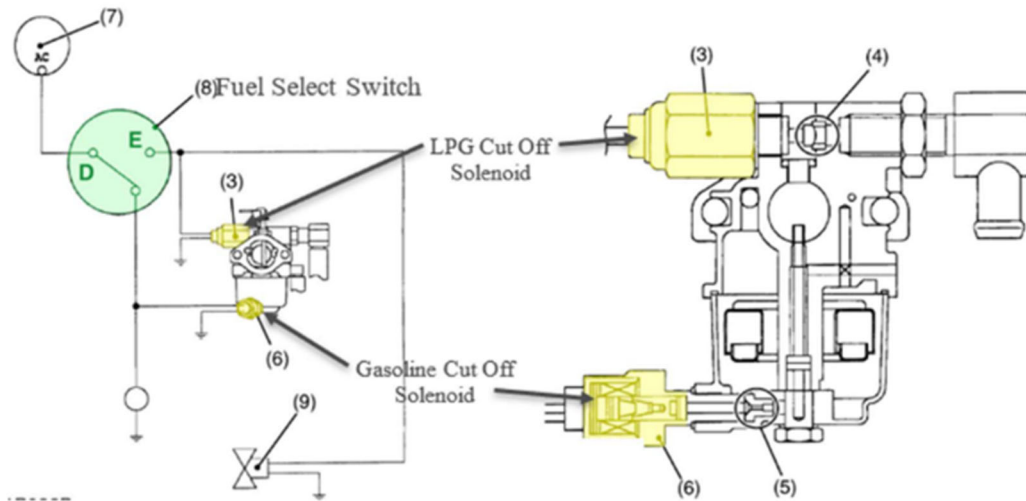
Given the overall structure and layout of the Workshop Manual's switching system, replacing the Gasoline Cut Off Solenoid with a normally-open solenoid (as allegedly suggested by Olmr) would render the resulting device inoperable. EX2133, ¶¶187-188.

The Workshop Manual teaches that “[w]hen the main switch (7) turned to the ‘OFF’ position, the battery current stops to the both of solenoids.” EX1009, 68. Under Petitioner's proposed combination, turning the main switch to “off” would result in *stopping* current to the (now) normally-open Gaseous Cut Off Solenoid, resulting in the solenoid opening and allowing gasoline to flow into the carburetor. This is precisely the opposite of the desired result (*i.e.*, no fuel reaches the carburetor

when the switch is “off”). EX2133, ¶189. Petitioner does not even attempt to address this deficiency.

Moreover, the Workshop Manual’s inoperable “Off” switch is not the only issue caused by Petitioner’s proposed combination. The Workshop Manual’s “Fuel Select Switch” operates by directing current *either* to the LPG Cut Off Solenoid *or* the Gasoline Cut Off Solenoid, both of which are normally closed in the configuration disclosed by the Workshop Manual. EX1009, 68. Petitioner’s proposed combination suggests replacing the Workshop Manual’s Gasoline Cut Off Solenoid with a normally open solenoid. Pet., 53. However, this also renders the DF972 Engine inoperable. EX2133, ¶190.

Fuel Select Switch (8) functions by providing current either to Gasoline Cut Off Solenoid (6) or LPG Cut Off Solenoid (3) (but not both simultaneously). Due to the normally-closed configuration disclosed by the Workshop Manual, the *powered* solenoid is the only open solenoid, and turning off main switch (7) removes power from both solenoids and prevents any fuel flow into the carburetor. EX2133, ¶191. Petitioner’s annotations of this configuration are reproduced below:



Pet., 33 (citing EX1009, 68)

Under Petitioner’s proposed modification, the Gaseous Cut Off Solenoid would be normally open, and the LPG Cut Off Solenoid would be normally closed. Thus, when the Fuel Select Switch (8) is in Position “D” (“Gasoline”), current is provided to the normally open Gasoline Cut Off Solenoid (meaning the solenoid is closed), but current is not provided to the normally closed LPG Cut Off Solenoid (meaning the solenoid is also closed). EX2133, ¶192.

Conversely, when the Fuel Select Switch (8) is in Position “E” (“LPG”), current is provided to the normally closed LPG Cut Off Solenoid (meaning the solenoid is open), but current is not provided to the normally open Gasoline Cut Off Solenoid (meaning the solenoid is also open). EX2133, ¶193.

The impact of Fuel Select Switch (8) on the alleged Gaseous Cut Off Solenoid and LPG Cut Off Solenoid under Petitioner’s proposed modification in view of Olmr is represented in the table below:

	Powered Solenoid	Gasoline Cut Off Solenoid Position	LPG Cut Off Solenoid Position
Switch Position “D” (“GASOLINE”)	Gasoline Cut Off Solenoid	Closed	Closed
Switch Position “E” (“LPG”)	LPG Cut Off Solenoid	Open	Open

Under Petitioner’s proposed configuration, the Workshop Manual’s engine either receives both fuels simultaneously when in Switch Position “D” (resulting in problematic engine “flooding”) (EX1001, 8:29-40), or receives no fuel at all when in Switch Position “E”. Neither outcome is desirable. Once again, Petitioner does not identify any explanation regarding how this problem would have been resolved. EX2133, ¶¶194-195.

6. Claim 9

The Workshop Manual (alone or in view of Matsushima) does not disclose or otherwise render obvious Claim 9. Petitioner acknowledges that the Workshop Manual’s DF972 engine has a battery start (as opposed to a pull start) and argues that it “would have been obvious to a [POSITA] to incorporate Matsushima’s pull-start to supply electrical power in Workshop Manual’s engine.” Pet., 54. Specifically, Petitioner argues for replacing the battery start with a pull start. Pet.,

55. However, the Petition lacks motivation to replace the battery start with a pull start, and has not established a reasonable expectation of success in the proposed combination. EX2133, ¶¶196-199.

First, Petitioner argues that “[i]ncorporating a pull-start into Workshop Manual’s dual fuel engine and removing the battery would improve reliability in cold or remote applications and reduce cost and weight of the generator.” Pet., 55; EX2133, ¶200. However, Petitioner’s arguments are conclusory, and there is no evidentiary support that replacing the Workshop Manual’s battery start system with a pull start would improve its reliability in cold or remote applications, or otherwise reduce costs. Moreover, given the Workshop Manual relies on powered solenoid valves for many applications, it is unclear how removing the battery (which is used to power those valves) would reduce costs, much less result in a functional device. EX2133, ¶201. Simply put, Petitioner’s argument is “generic and bears no relation to any specific combination of prior art elements.” *ActiveVideo Networks, Inc. v. Verizon Comm’ns., Inc.*, 694 F.3d 1312, 1328 (Fed. Cir. 2012); *see also In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) (“[P]etitioner cannot employ mere conclusory statements. [It] must instead articulate specific reasoning, based on evidence of record.”).

Second, Petitioner argues that “Workshop Manual and Matsushima both relate to the same class of small spark-ignition engines.” Pet., 55. However,

Petitioner does not provide any support for its implication that Matsushima and the Workshop Manual belong “to the same class of small spark-ignition engines.” Pet., 55; EX2133, ¶¶202-203.

Matsushima teaches that its “invention relates to ... an electronically-controlled fuel injection system of this kind which is adapted for use in *small-sized engines equipped with no battery*.” EX1012, 1:6-11 (emphasis added). EX2133, ¶203. U.S. Patent No. 3,465,740 (cited by Matsushima as an appropriate “known type” of recoil starter) provides further guidance, referring “particularly to rewind type pull-rope starters for small internal combustions engines such as those commonly employed to power lawn mowers, garden tractors, snow blowers and the like.” EX1012, 4:63-68; EX2128 (U.S. Patent No. 3,465,740), 1:36-40; *see also* EX2129 (U.S. Patent No. 5,197,910) at 1:8-17 (referring to engines with “a relatively small displacement and low power” that “can have a displacement of about ten cubic centimeters”); EX2130 (U.S. Patent No. 4,707,017) at 5:7-18 (referring to motorcycle engines over 170 cubic centimeters as “relatively large”). EX2133, ¶¶203-205. These exemplary engines fall squarely into Dr. Shahbakhti’s definition of a “small” engine (*i.e.*, less than 500 cc). EX1003, ¶[0006]; *see also* EX1003, 497; EX2136, 20:11-21:15; EX2133, ¶¶203-205.

Conversely, the Workshop Manual discloses a 962cc engine, which Petitioner’s expert in a related proceeding (Dr. Morse) testified “would be a large

engine” “[i]f you use it on a lawn mower.” EX1009, 8; EX2127, 130:9-131:15; EX2133, ¶204. The Workshop Manual also discloses a water-cooled engine. EX1009, 8.

A POSITA would have understood that the typical engine contemplated by Matsushima would have been significantly smaller than the Workshop Manual. Likewise, because the Workshop Manual discloses a water-cooled engine, Petitioner’s proposed pull start would have needed to turn the water pump in addition to the engine itself, significantly increasing the difficulty of pull-starting the DF972 engine. As such, a POSITA would have understood that the Workshop Manual’s 962cc engine would have been substantially more difficult to start with a pull-starter than the smaller engines contemplated by Matsushima. EX2133, ¶¶205-206; *see also Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008) (“[K]nowledge of a problem and motivation to solve it are entirely different from motivation to combine *particular references*...”).

Petitioner’s conclusory analysis of the purported motivation to combine the Workshop Manual and Matsushima is particularly deficient Petitioners’ experts’ deposition testimony. For example, Dr. Shahbakhti testified that “Engine performance will always be affected by the type of the design and how variable are adjusted for the performance of that engine,” that “there are so many metrics in terms of the design that will have an impact on the engine performance,” that “there are

many, many metrics that have -- and will have an impact on the performance of the engine,” and “there are so many types of engines and for different applications, and also depending on their designs, you will have the choices of the parts that you can vary in order to affect the performance.” EX2136, 14:11-16:8; EX2133, ¶207.

Likewise, in a related proceeding regarding the parent '398 Patent, Petitioner's expert Dr. Morse repeatedly emphasized that the particular characteristics of an engine are incredibly relevant when analyzing the operation of said engine. EX2127 (Morse Depo. Tr.) at 50:17-51:8 (agreeing that “the decision of how to configure the transfer piping and all the associated equipment is dictated by the specific application”); 67:2-9 (“[t]he specific problems that could arise [from drawing liquid propane instead of gaseous propane] would depend on the specific engine being evaluate and the specific configuration”); 121:6-15 (increased fuel pressure may or “may not be an advantage in all cases, depending on how you’ve configured everything”); 122:15-123:3 (“the particular mass flow rate of fuel is dictated by the specific configuration of the engine” and “the fluid properties of the fuel and the configuration of the tank where the fuel is stored and the configuration of the fuel line from the tank to the engine”); 176:4-13 (“certainly the working fluid is something that is taken into account when designing a piping system”). In light of Petitioners' experts' repeated emphasis on specific engine characteristics and applications, Petitioners' conclusory assertion of a motivation to combine based on

allegedly belonging to “the same class of small spark-ignition engines” is particularly deficient. EX2133, ¶¶208-209. *In re Magnum*, 829 F.3d at 1380 (“[P]etitioner cannot employ mere conclusory statements. [It] must instead articulate specific reasoning, based on evidence of record.”).

Finally, Petitioner’s analysis of a reasonable expectation of success is deficient, at least because it does not account for the difficulties in adding a pull start to a large, water-cooled engine that does not have a manual choke or any mechanism to prime the engine. For example, Petitioner has not introduced any evidence to establish that an operator would physically be able to start a 962cc water-cooled engine. It would be, at minimum, very difficult to pull start the large, water-cooled engine presented in the Workshop Manual. EX2133, ¶¶210-211.

B. The Nakafushi Grounds: The ’145 Patent is Not Obvious over Nakafushi, Alone or in Combination with Other References

Petitioner has not established that the Challenged Claims are obvious over Nakafushi, alone or in combination with other references. EX2133, ¶212.

1. Independent Claims 1, 11

a. Elements [1.0] & [11.0]

The term “dual fuel generator” gives meaning to Claims 1 and 11 and properly defines the invention. §VII.A.1.a(1); EX2136, 120:1-121:24 (testifying that Element [1.1] “is connected to Element 1, which is a dual-fuel generator.”); EX2133, ¶213.

Nakafushi, alone or in combination with Matsushima, does not disclose or otherwise render obvious a dual fuel generator. Petitioner’s obviousness “analysis” is based on a single conclusory sentence alleging it would have been generally obvious to implement a dual fuel engine in a generator because “dual fuel generators were well known as of the earliest priority date of the ‘145 Patent.” Pet., 56 (citing EX1016; EX1003, [0154]); EX2133, ¶¶214-216.⁴

Once again, Petitioner’s purported “analysis” is deficient for several reasons. First, Petitioner does not even establish which engine (Nakafushi’s or Matsushima’s) is allegedly being implemented in a dual fuel generator. 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377; EX2133, ¶¶217.

Second, like with the Workshop Manual, the mere fact that dual fuel generators were allegedly well known says nothing about whether a POSITA would have been motivated to implement the specific prior art engines at issue here in a specific generator. §VII.A.1.a(2). The Petition’s conclusory recitation that dual fuel generators were well known in the art is insufficient to show that a POSITA would

⁴ Dr. Shahbakhti’s declaration repeats the Petition verbatim without any additional analysis. EX1003, ¶[0154]; *see also* Pet., 113; EX1003, ¶[0307]. *Xerox Corp.*, IPR2022-00624, Paper 9 at 15 (P.T.A.B. August 24, 2022) (precedential).

have been motivated to make the proposed implementation. *In re Magnum Oil*, 829 F.3d at 1380 (Fed. Cir. 2016); EX2133, ¶¶218.

Third, it is unclear from the Petition whether Petitioner proposed implementing the alleged prior art dual fuel engines in a generic, hypothetical “dual fuel generator,” or specifically combining each engine with the DuroMax XP4400EH generator described in EX1016. Both approaches are deficient for the same reasons as discussed with respect to the Workshop Manual. §VII.A.1.a(2); EX2133, ¶¶219-220.

b. Elements [1.4] & [11.2]

Nakafushi does not disclose “a carburetor attached to an intake of the engine to mix air and fuel and connect to a gaseous fuel source and a liquid fuel source.” Specifically, Nakafushi does not disclose a “gaseous fuel source.” EX2133, ¶¶221-222.

As discussed above, a POSITA would have understood Claims 1 and 11 distinctly claimed the state of the fuel (*i.e.*, gaseous or liquid) at two separate locations: the *source* of the fuel and the *engine*. See §§II.B, VII.A.1, *supra*; EX2133, ¶¶133-142; *see also Regeneron Pharm.*, 130 F.4th at 1379; *Kyocera*, 22 F.4th at 1382; *Schindler Elevator*, 593 F.3d at 1282. Nakafushi does not disclose at least a *gaseous* fuel source.

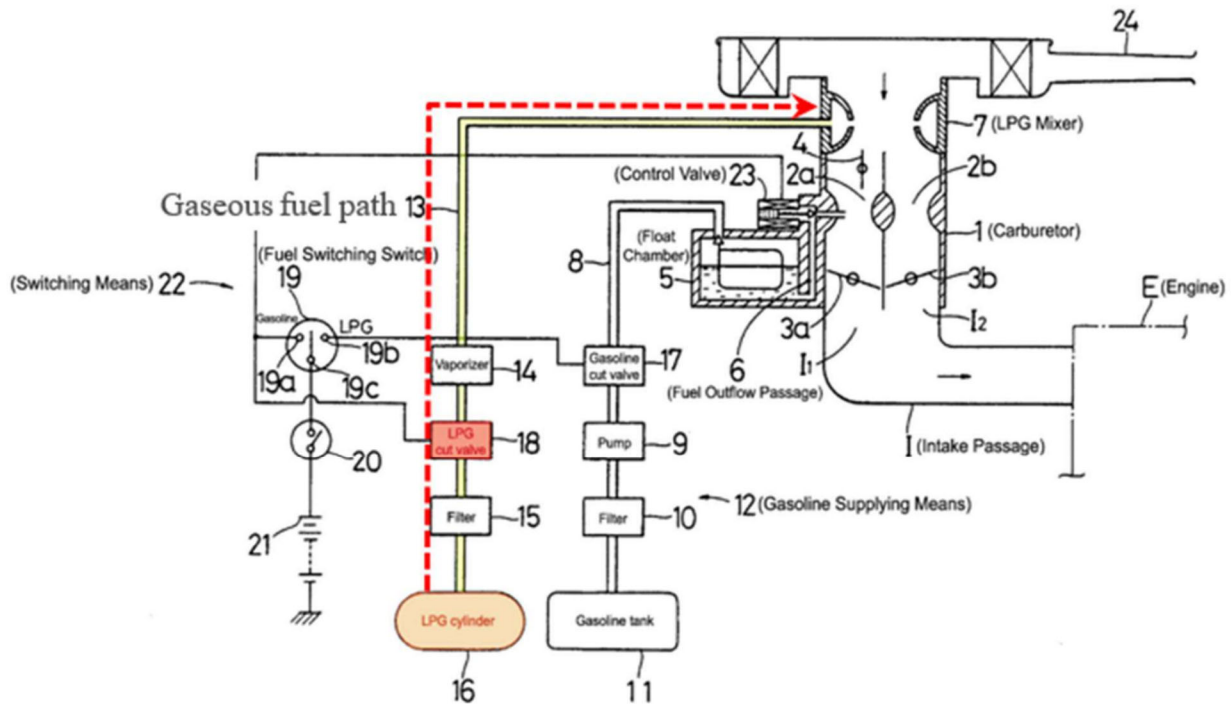
Nakafushi describes a dual fuel engine that draws fuel from two different sources of liquid fuel: Gasoline Tank 11 and LPG Cylinder 16. *See* §VI.B, above; EX2133, ¶224.

The Petition does not explicitly identify the alleged “gaseous fuel source” in its analysis of Element [1.4]. Pet., 60-62. And, Petitioner’s analysis of Element [11.2] merely incorporates its Element [1.4] analysis by reference. Pet., 113. This alone is fatal. 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377; EX2133, ¶¶225.

Instead, Petitioner’s purported “analysis” is limited to two conclusory sentences. First, Petitioner states that a POSITA “would have recognized Nakafushi’s disclosure of a dual fuel engine that mixed air with the gaseous fuel (i.e., LPG) or liquid fuel (i.e., gasoline) in the carburetor.” Pet., 61-62. But, identifying the gaseous fuel is not the same as identifying the alleged gaseous fuel *source*. Second, Petitioner restates the claim language. Pet., 62. Neither statement identifies the alleged gaseous fuel source. EX2133, ¶¶226-227.

Elsewhere, Petitioner addresses Claim 2, which recites “a gaseous fuel line coupling the gaseous fuel source to the carburetor.” There, Petitioner states “FIG. 1 shows LPG cut valve 18 positioned on the LPG supplying passage 13, which begins at the LPG cylinder 16, leading to vaporizer 14, which in turn is connected to carburetor 1.” Pet., 69; EX2133, ¶228. Petitioner’s corresponding annotations are reproduced below:

FIG. 1

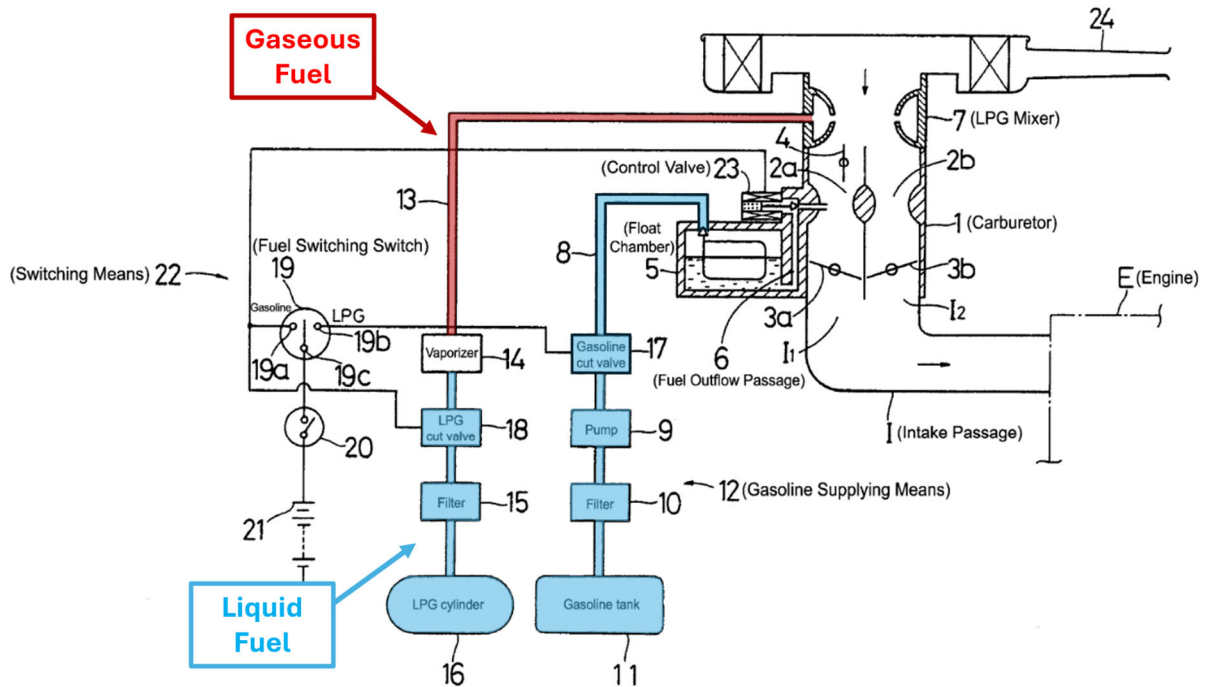


Pet., 70 (annotations in original).

Petitioner’s statement that “LPG supplying passage 13 ... begins at the LPG cylinder 16” indicates that Petitioner intended to map Nakafushi’s “LPG cylinder 16” to the claimed “gaseous fuel source.” EX2133, ¶229; 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377.

However, LPG is liquid fuel when leaving the fuel source, and only becomes gaseous fuel after reaching the vaporizer, as depicted by the below annotated figure:

FIG. 1



EX1005, Fig. 1 (annotated)

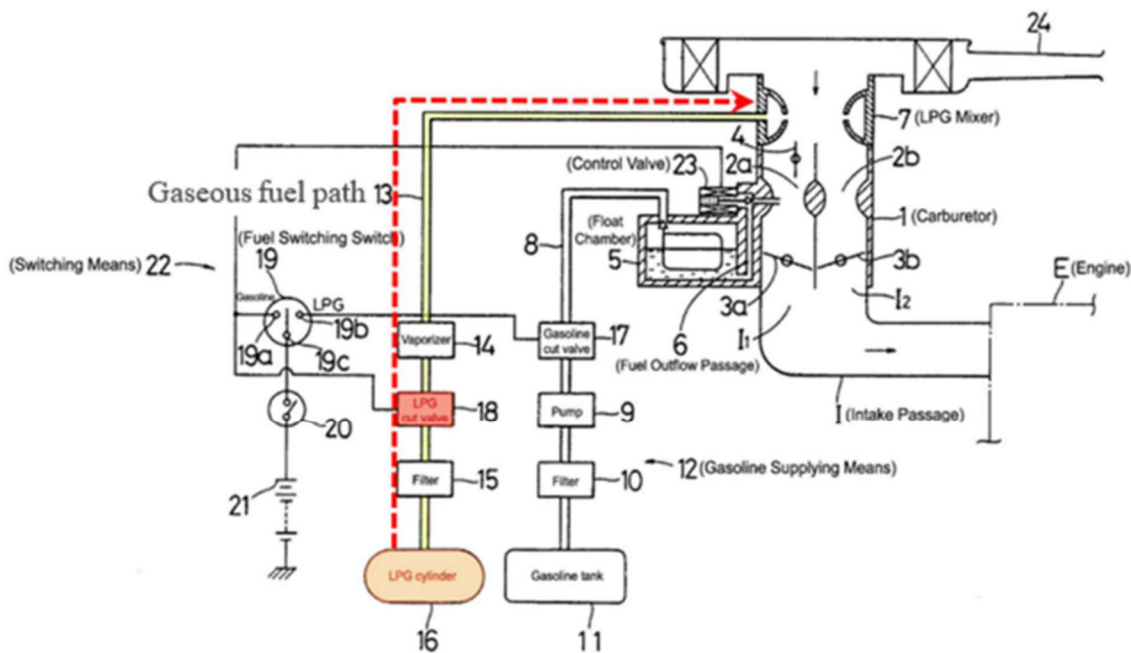
Specifically, liquid LPG is vaporized into a gaseous state by the vaporizer, and then passed through the carburetor. EX2133, ¶¶230-233. The presence of the vaporizer actually precludes LPG Cylinder 16 from being considered a “gaseous fuel source.” For example, if an LPG cylinder was used improperly such that LPG vapor exited the LPG tank and was sent to the vaporizer, then the vaporizer could not function properly to generate an appropriately rich fluid flow into the carburetor. In such a case, the engine would die. As such, a POSITA would have viewed both the Gasoline Tank 11 and LPG Cylinder 16 as liquid fuel sources, which supply liquid

fuel that is subsequently converted into a gaseous state. §II.B, *supra*; EX2133, ¶¶234-235.

2. Claim 2

Nakafushi does not disclose or otherwise render obvious Claim 2. Specifically, Nakafushi does not disclose “a gaseous fuel valve along a gaseous fuel line coupling the gaseous fuel source to the carburetor.” Petitioner identifies “LPG supplying passage 13” as the alleged “gaseous fuel line.” Pet., 69-70. Petitioner likewise identifies Nakafushi’s “LPG cut valve 18” as the alleged “gaseous fuel valve along a gaseous fuel line.” Pet., 69-70. EX2133, ¶¶238-240.

FIG. 1

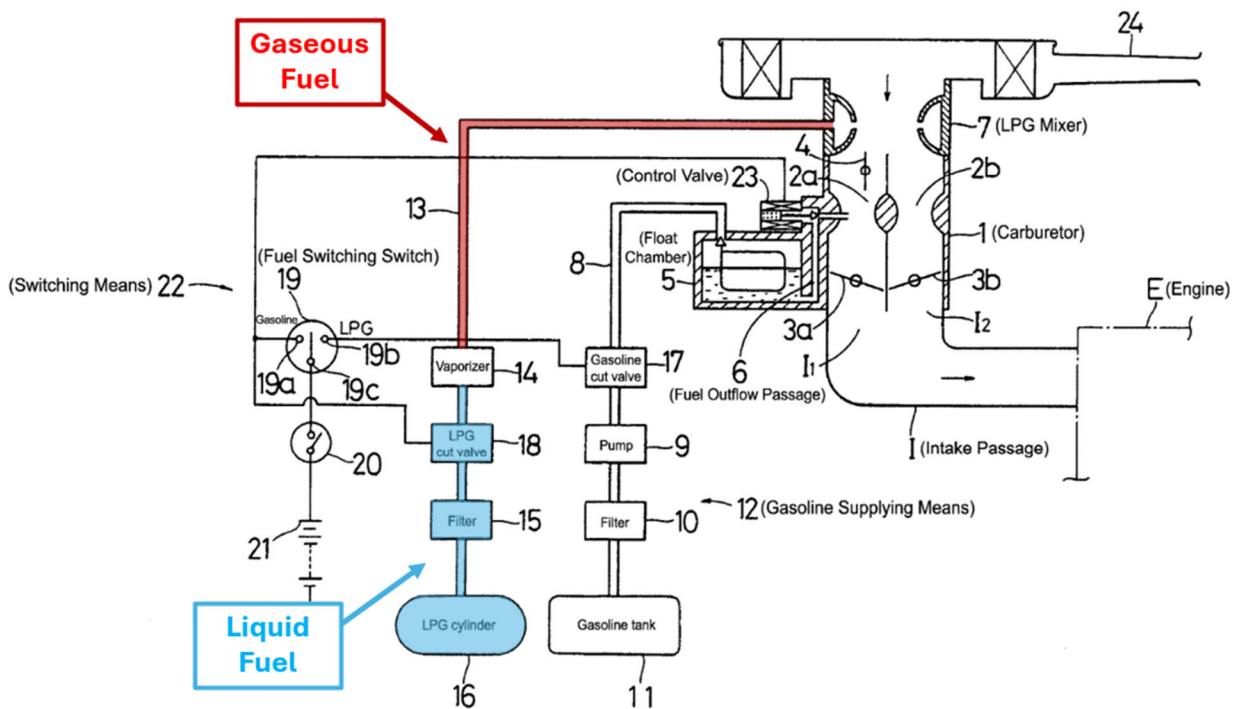


Pet., 70 (annotations in original).

Petitioner asserts that “LPG cut valve 18 [is] positioned on the LPG supplying passage 13.” Pet., 69. However, LPG cut valve 18 is not a *gaseous* fuel valve located *along* a gaseous fuel line. [EX2136, 130:9-136:1 (“selecting the right type of the solenoid valve that is covering the gaseous fuel versus the liquid fuel, it’s an important factor”).] As depicted in the annotated figure, below, LPG cut valve 18 is located between LPG cylinder 16 and vaporizer 14, and is therefore a *liquid* fuel valve located along a *liquid* fuel line (blue) and not a gaseous fuel line (red). EX2133, ¶¶241-242.⁵

⁵ Petitioner’s expert also testified that Nakafushi’s Fig. 1 “needs more details in particular saying that -- because there is no disclosure saying that these parallel lines, what exactly -- if they are representing the pipes between them, that disclosure is not in the patent.” EX2136, 39:13-45:8. Based on Dr. Shahbakhti’s testimony, it is unclear whether Nakafushi’s LPG cut valve 18 is located along “a line” at all. However, it is indisputable that any line which may (or may not) be connected to LPG cut valve 18 is necessarily a *liquid* fuel line and not a *gaseous* fuel line.

FIG. 1



EX1005, Fig. 1 (annotated)

3. Claim 3

Nakafushi does not disclose or otherwise render obvious Claim 3. Petitioner identifies Nakafushi's LPG cut valve 18 as the claimed "gaseous fuel valve." §VII.B.2. However, LPG cut valve 18 is not a "mechanical valve," and Petitioner does not even appear to argue it is. Pet., 71 ("Nakafushi discloses a gaseous fuel valve (LPG cut valve 18), which mechanically interrupts the flow of LPG to the carburetor."). The mere fact that a device "mechanically interrupts" a flow does not make it a mechanical valve. EX2136, 107:14-108:18 (distinguishing between electrical, mechanical, and electro-mechanical systems, and noting that electro-

mechanical systems have “an electrical component and a mechanical component”); *see also id.* at 49:11-50:8. In fact, had Patent Owner intended to claim an electro-mechanical valve, it would have done so. EX1001, Cl. 6 (“wherein the switch is an *electro-mechanical switch*”) (emphasis added); EX2133, ¶¶243-245.

To try and fill this gap in its analysis, Petitioner once again argues that “a [POSITA] would have understood that a mechanical valve can substitute for LPG cut valve 18.” Pet., 71. Importantly, Petitioner does not provide any support for assertion, but merely incorporates its analysis with respect to the Workshop Manual by reference. Pet., 71, (citing §VII.A.3); EX2133, ¶246.

But, the Workshop Manual is a different reference (with a different valve), and Petitioner has failed to provide any analysis as to (1) which mechanical valve would have allegedly been substituted, or (2) why a POSITA would have used that valve in place of LPG cut valve 18 specifically (regardless of whether or not such a substitution was possible). *Innogenetics*, 512 F.3d at 1373; *see also Google*, 2024 U.S. App. LEXIS 12394, at *5. Moreover, Petitioner’s analysis is deficient for the same reasons as discussed with respect to the Workshop Manul. §VII.A.3; *InTouch Techs.*, 751 F.3d at 1352; *see also* Memorandum addressing Enforcement and Non-Waiver of 37 C.F.R. §42.104(b)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews; EX2133, ¶¶247-249.

4. Claim 6

Nakafushi, alone or in combination with Matsushima, does not disclose or otherwise render obvious Claim 6. Petitioner maps the claimed “switch” to Nakafushi’s “fuel switching switch 19.” Pet., 73-74. Nakafushi confirms that the claimed “switch” is connected to the Workshop Manual’s battery. Pet., 73 (citing EX1005, [0013]) (“Nakafushi’s fuel selecting switch 19 is connected to battery 21”). Thus, Nakafushi does not disclose a switch that is “connected to the electrical power generator.” EX2133, ¶¶250-251.

However, Petitioner does not argue that it would have been obvious for a POSITA to have modified Nakafushi’s engine to connect the claimed “switch” to a generator. Specifically, Petitioner does not identify (1) where the prior art allegedly discloses the claimed “switch” connected to a generator, (2) a motivation to combine Nakafushi with any prior art reference allegedly disclosing the claimed “switch” connected to a generator, or (3) a reasonable expectation of success in the proposed modification. EX2133, ¶252.

At best, Petitioner asserts that Matsushima’s fluid injection valve 10 is connected to its generator. But, asserting that the Workshop Manual’s fuel select switch allegedly *could* be connected to a generator is not the same as asserting that a POSITA *would* have been motivated to do so. Pet., 73 (“A [POSITA] would have understood that the fuel selecting switch *could* be connected to the generator in the

absence of the battery”) (emphasis added). EX2133, ¶¶252-253; *InTouch Techs.*, 751 F.3d at 1352.

Moreover, the mere fact that Matsushima allegedly discloses that a different component is connected to its generator is not the same as disclosure of the claimed structure. Memorandum addressing Enforcement and Non-Waiver of 37 C.F.R. §42.104(b)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews; EX2133, ¶¶254.

5. Claim 8

Nakafushi (alone or in view of Matsushima and/or Olmr) does not disclose or otherwise render obvious Claim 8. Petitioner separately identifies Nakafushi’s gasoline cut valve 17 and control valve 23 as the claimed “liquid fuel cutoff solenoid.” Pet., 75. According to Petitioner, “[g]asoline cut valve 17 of Nakafushi is normally open” and “[c]ontrol valve 23 of Nakafushi is normally closed.” Pet., 75. As such, neither structure alone “is normally open to provide liquid fuel to the engine when the liquid fuel cut-off solenoid is unpowered” as required by Claim 8. EX2133, ¶¶255-256.

First, Petitioner concedes Nakafushi’s control valve 23 is normally closed. Instead, Petitioner argues a POSITA “would have been motivated to use Olmr’s normally-open solenoid rather than a normally-closed solenoid based on the express teachings of Olmr.” Pet., 75 (citing §VII.B.1). However, Petitioner’s analysis in

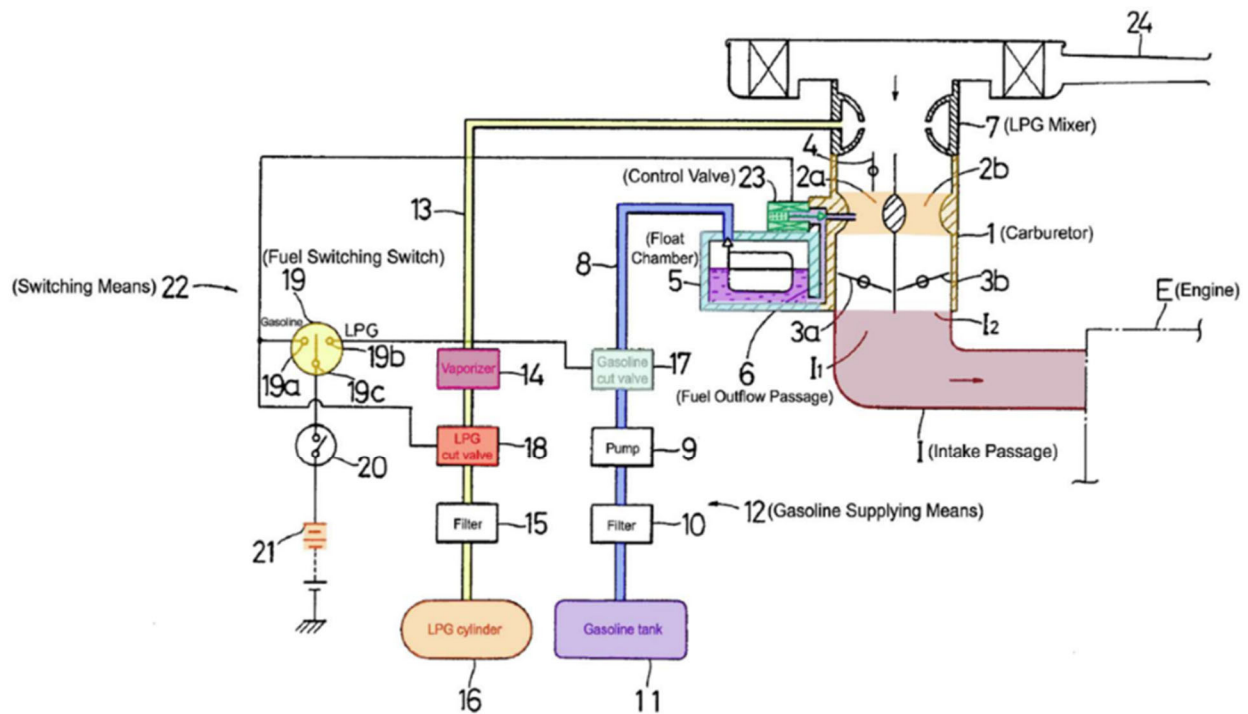
§VII.B.1 does not address Olmr *at all*. See Pet., 52 (“a [POSITA] would have understood that the combination of the Workshop Manual and Matsushima teaches claim 6”). Petitioner’s failure to identify the claimed structures in the prior art is fatal to its analysis. 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377; EX2133, ¶257.

Presumably, Petitioner intended to incorporate its prior assertion that a POSITA would have been motivated to replace the Workshop Manual’s Gasoline Cut Off Solenoid with Olmr’s solenoid valve 42. Pet., §VII.B.3. However, Petitioner has not established that any alleged motivation to combine the Workshop Manual and Olmr is equally applicable to Nakafushi and Olmr. EX2133, ¶¶258; *KSR*, 550 U.S. at 418; *Innogenetics*, 512 F.3d at 1373.

For example, Petitioner does not address the differences between the power systems disclosed by the Workshop Manual and Nakafushi. Compare EX2127, 104:7-13 (testifying that Nakafushi’s “gasoline cut valve 17 and the LPG cut valve 18 are both normally open”) with *id.*, 143:5-15 (testifying that the Workshop Manual’s “valve 6” and “valve 3” are normally closed”); see also *id.*, 102:12-103:3 (referring to Nakafushi’s power system as “a little trickier than I first thought”). Petitioner’s proposed motivation to “use Olmr’s solenoid valve 42 as Nakafushi’s control valve 23” is also deficient for at least the same reasons set forth with respect to the Workshop Manual. See §VII.A.5, above; EX2133, ¶259.

Second, replacing Nakafushi's gasoline cut valve 17 (which Petitioner asserts is already normally open) with Olmr's normally open solenoid valve 42 does not result in a solenoid that "is normally open to provide liquid fuel to the engine when the liquid fuel cut-off solenoid is unpowered." Petitioner acknowledges that Nakafushi's control valve 23 (which is located between gasoline cut valve 17 and the engine) is normally closed. Pet., 75. Petitioner's annotations depicting Nakafushi's fuel system are reproduced below. EX2133, ¶¶260-261.

FIG. 1



Pet., 22 (citing EX1005, Fig. 1).

Because of the relative placement of gasoline cut valve 17 and control valve 23, a POSITA would have understood that as long as control valve 23 is normally

closed, liquid fuel could not be provided “to the engine when the liquid fuel cut-off solenoid is unpowered,” regardless of any modifications made to Nakafushi’s gasoline cut valve 17. A normally open gasoline cut valve 17 would have allowed fuel flow to the *float bowl* when gasoline cut valve 17 is unpowered, but it would have had no impact on fuel flow *to the engine*. EX2133, ¶262.

Petitioner does not attempt to address this deficiency. Presumably, Petitioner will argue its conclusory assertion that the proposed combination “would have involved a simple substitution and a rewiring of Nakafushi’s switch” is sufficient. However, Petitioner does not explain what the proposed “rewiring” entails. In fact, generically asserting that a POSITA would have been able to “rewire” the prior art to match the configuration disclosed by the challenged patent—without any explicit disclosure of the “rewired” configuration—is the very definition of hindsight. EX2133, ¶¶263-264.

C. The Holzapfel Grounds: The ’145 Patent is Not Obvious over Holzapfel, Alone or in Combination with Other References

Petitioner has not established that the Challenged Claims are obvious over Holzapfel, alone or in combination with other references. EX2133, 265

1. Independent Claims 1, 11

a. Elements [1.0] & [11.0]

The term “dual fuel generator” gives meaning to Claims 1 and 11 and properly defines the invention. §VII.A.1.a(1); EX2136, 120:1-121:24 (testifying that Element

[1.1] (“an engine operable on a gaseous fuel and a liquid fuel”) “is connected to Element 1, which is a dual-fuel generator.”). EX2133, ¶266.

Holzapfel, alone or in combination with Matsushima, does not disclose or otherwise render obvious a dual fuel generator. Petitioner’s obviousness “analysis” is based on a single conclusory sentence alleging it would have been generally obvious to implement a dual fuel engine in a generator because “dual fuel generators were well known as of the earliest priority date of the ‘145 Patent.” Pet., 79 (citing EX1016; EX1003, [0219]).⁶ Once again, Petitioner’s purported “analysis” is deficient for several reasons. First, Petitioner does not even establish which engine (Holzapfel’s or Matsushima’s) is allegedly being implemented in a dual fuel generator. 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377; EX2133, ¶¶267-270.

Second, like with the Workshop Manual, the mere fact that dual fuel generators were allegedly well known says nothing about whether a POSITA would have been motivated to implement the specific prior art engines at issue here in a specific generator. §VII.A.1.a(2). The Petition’s conclusory recitation that dual fuel

⁶ Dr. Shahbakhti’s declaration repeats the Petition verbatim without any additional analysis. EX1003, ¶[0219]; *see also* Pet., 116; EX1003, ¶[0333]. *Xerox Corp.*, IPR2022-00624, Paper 9 at 15 (P.T.A.B. August 24, 2022) (precedential).

generators were well known in the art is insufficient to show a POSITA would have been motivated to make the proposed implementation. EX2133, ¶¶271.

Third, it is unclear from the Petition whether Petitioner proposed implementing the alleged prior art dual fuel engines in a generic, hypothetical “dual fuel generator,” or specifically combining each engine with the DuroMax XP4400EH generator described in EX1016. Both approaches are deficient for the same reasons as discussed with respect to the Workshop Manual. §VII.A.1.a(2); EX2133, ¶¶272-273.

b. Element [1.2]

Holzapfel, alone or in combination with Matsushima, does not disclose or otherwise render obvious “an electrical power generator.” In fact, other than Petitioner’s expert’s understanding that the disclosure of Holzapfel implies use of (undisclosed) electrical spark plugs, Holzapfel does not disclose an electrical system at all. EX2136, 153:19-155:8; EX2133, ¶¶274-275.

Once again, Petitioner’s analysis of this element is unclear. Notably, Petitioner’s sole cite is to Matsushima, but Petitioner provides no analysis of how or why a POSITA would have been motivated to combine Holzapfel and Matsushima, nor any explicit analysis that a POSITA would have had a reasonable expectation of success in the combination. In fact, Petitioner does not even explain which feature(s) it is proposing a POSITA would have combined from each engine. EX2133, ¶276; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“[I]t can be important to

identify a reason that would have prompted a [POSITA] to combine the elements in the way the claimed new invention does” and “this analysis should be made explicit.”).

Petitioner points to nothing in either reference that suggests a combination. Rather, Petitioner relies entirely on the conclusory statement that a POSITA “would have been motivated to combine Holzapfel and Matsushima, and would have had a reasonable expectation of success in combining Holzapfel and Matsushima, because both relate to internal combustion engines.” Pet., 78-79. Petitioner does not provide any analysis regarding how or why a POSITA would have been motivated to implement an “electrical power generator” as disclosed by Matsushima in the Holzapfel engine. EX2133, ¶¶277-278.

c. Elements [1.4] & [11.2]

Holzapfel does not disclose “gaseous fuel source.” As discussed above, a POSITA would have understood Claims 1 and 11 distinctly claimed the state of the fuel (*i.e.*, gaseous or liquid) at two separate locations: the *source* of the fuel and the *engine*. See §§II.B, VII.A.1, *supra*; EX2133, ¶¶133-132; *see also Regeneron Pharm.*, 130 F.4th at 1379; *Kyocera*, 22 F.4th at 1382; *Schindler Elevator*, 593 F.3d at 1282. Holzapfel does not disclose a *gaseous* fuel source. EX2133, ¶¶279-280.

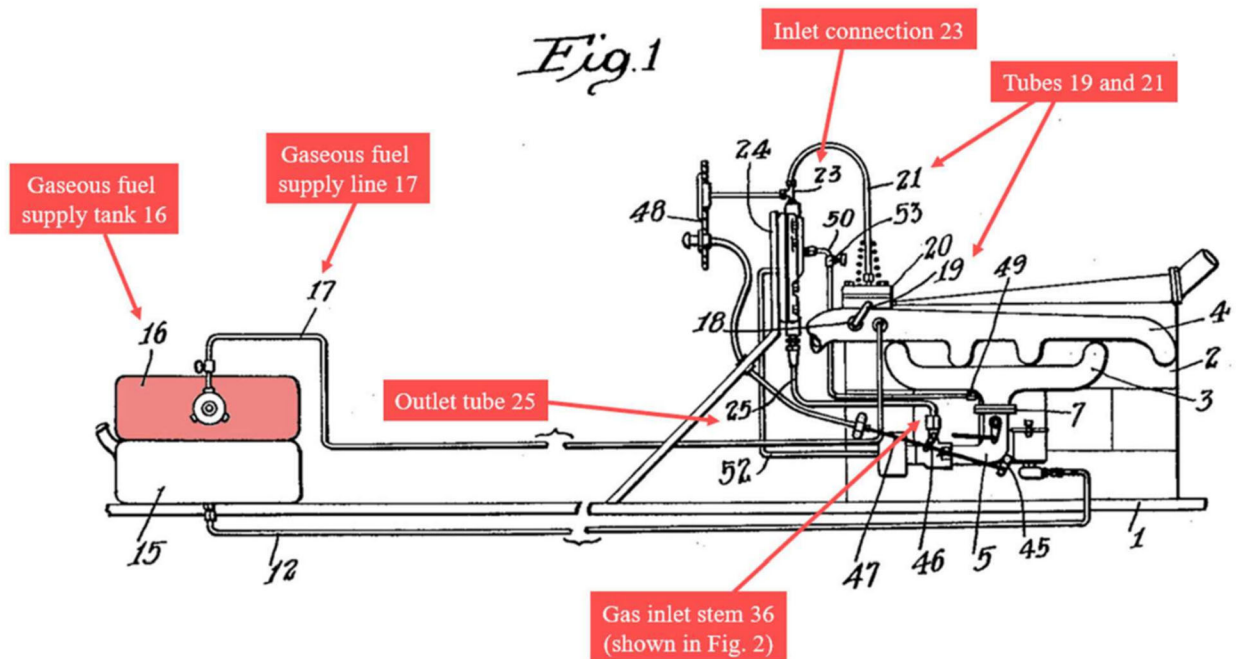
The Petition does not explicitly identify the alleged “gaseous fuel source” in its analysis of Element [1.4]. Pet., 82-84. And, Petitioner’s analysis of Element

[11.2] merely incorporates its Element [1.4] analysis by reference. Pet., 116. This alone is fatal. 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377; EX2133, ¶282.

Instead, Petitioner’s purported “analysis” is limited to a single conclusory sentence paraphrasing the claim language, which *does not* identify the alleged gaseous fuel source. Pet., 84. Petitioner also includes two annotated figures, which (once again) do not explicitly identify the claimed gaseous fuel source. Pet., 82, 83; EX2133, ¶¶283-284.

Elsewhere, Petitioner addresses Claim 2, which recites “a gaseous fuel valve along a gaseous fuel line coupling the gaseous fuel source to the carburetor.” There, Petitioner states “cut off valve 39 is positioned on the gaseous fuel line, which begins at gaseous fuel supply tank 16,⁷ leading to gas inlet stem 39, which in turn is connected to carburetor 5 via tube 6.” Pet., 91; EX2133, ¶285. Petitioner’s annotations of the same are reproduced below:

⁷ Holzapfel refers to numeral 16 as “fuel supply tank 16.” EX1008, 2:8-12. Petitioner added the modifier “gaseous.”

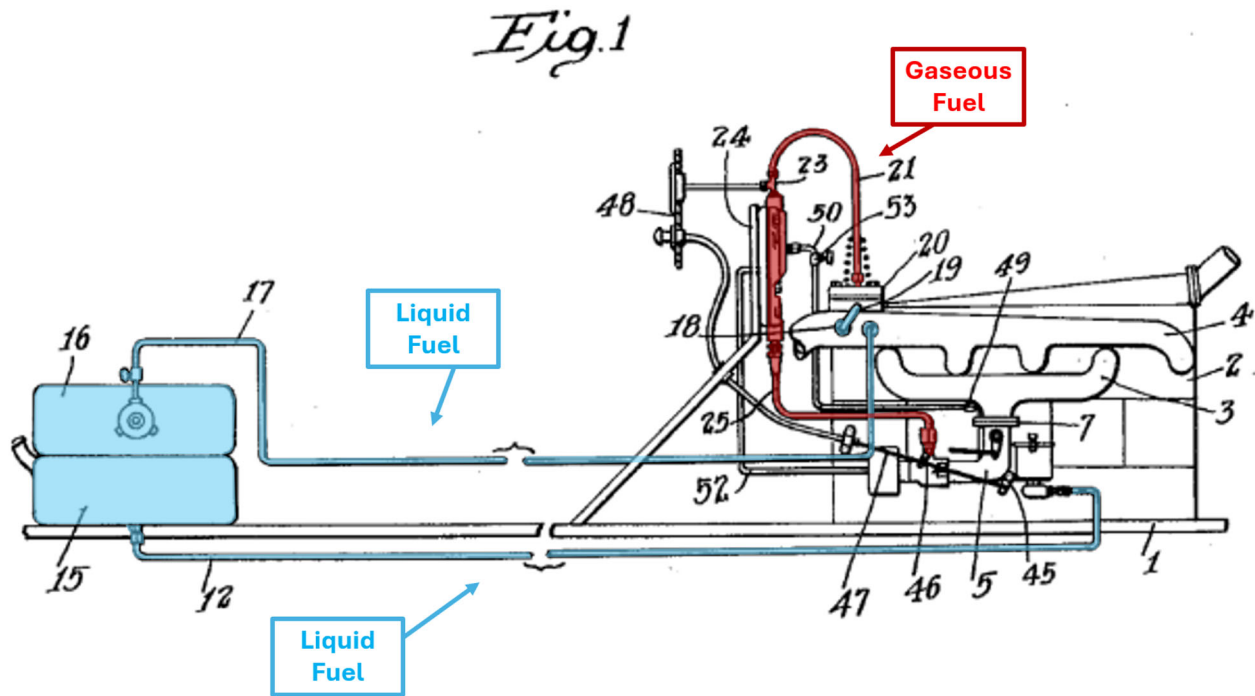


Pet., 90 (annotations in original).

Thus, to the extent the Petition identifies the claimed “gaseous fuel source,” a POSITA would have understood Petitioner intended to refer to Holzapfel’s fuel supply tank 16 as the claimed “gaseous fuel source.” EX2133, ¶286.

As discussed above, Holzapfel describes a dual fuel engine that draws fuel from two different sources: main liquid supply tank 15 and fuel supply tank 16. *See* §VI.C, above. However, Holzapfel explicitly teaches that “From tank 16 there extends a suitable gaseous fuel supply tube 17 extending to the bottom of the tank 16, so as to draw off the liquid *and not gas*.” EX1008, 2:12-16 (emphasis added). Furthermore, Holzapfel teaches that this fuel remains in the liquid state until it “changes to a gas on the release of pressure.” EX1008, 2:125. As shown below, a

POSITA would have understood pressure was not released on this fuel until it entered the heat exchanger 20 and the pressure reducing valve 24. EX2133, ¶¶287-288.



EX1008, Fig. 1 (annotated)

Holzapfel explicitly teaches fuel supply tank 16 does not supply gaseous fuel. A POSITA would have considered a fuel source to be a gaseous fuel source only if it provided gaseous fuel. Conversely, fuel supply tank 16 provides *liquid* fuel, and is therefore not a gaseous fuel source. See §VII.A.1, above; EX2133, ¶289.

d. Element [1.5]

Holzapfel, alone or in combination with Olmr, does not disclose or otherwise render obvious “a liquid fuel cut-off solenoid to interrupt liquid fuel flow to the engine upon actuation of the switch from liquid fuel to gaseous fuel.” EX2133, ¶290.

Petitioner asserts a POSITA “would have found it obvious to use a solenoid, such as that disclosed by Olmr, in place of Holzapfel’s valve 14.” Pet., 85. Petitioner’s analysis is riddled with hindsight. Holzapfel discloses “a fuel system in which a gaseous fuel supply shall be auxiliary to the liquid fuel supply now commonly employed in connection with automobiles and similar vehicles.” EX1008, 1:24-28. Specifically, Holzapfel is designed to function with *automobile engines in the 1930s*. EX1008. Petitioner did not provide any argument or evidence supporting the conclusion that implementation of a complex, electrically-actuated solenoid valve would have been beneficial for an automobile engine (and corresponding fuel system) designed for 1930s automobiles. EX2133, ¶¶291-292.

As discussed above, Holzapfel does not disclose a power system sufficient to operate a solenoid valve. In fact, other than Petitioner’s expert’s understanding that the disclosure of Holzapfel implies use of (undisclosed) electrical spark plugs, Holzapfel does not disclose an electrical system at all. EX2136, 153:19-155:8; EX2133, ¶293.

Petitioner's explicit hindsight is emphasized by its purported "reasonable expectation of success" analysis. There, Petitioner explains Olmr's solenoid could have been implemented in Holzapfel's engine, so long as a POSITA also replaced Holzapfel's combination of rod/wire 47 and lever 45 with Olmr's control circuit 52 and switch 82. Pet., 87. And, according to Petitioner, the result of this wide-spread modification to Holzapfel modeled after the Challenged Claims is a solenoid valve that "accomplish[es] the same liquid fuel cutoff function [already] described in Holzapfel." Pet., 86; EX2133, ¶294.

Moreover, Holzapfel expressly teaches that its "rod or wire 47 ... extends to a point of convenient access to the operator of the vehicle such as, for example, the dashboard 48." EX1008, 2:100-107. Rod or wire 47 exists to allow an operator to change fuel sources while operating an automobile. By replacing it with a control circuit and switch, Petitioner either (1) inhibits the operation of Holzapfel's engine in its proposed use case, or (2) requires further modifications to Holzapfel's automobile, to allow an operator to manually actuate Olmr's solenoid while operating the vehicle. Notably, Petitioner did not address either concern. EX2133, ¶¶295-296.

Holzapfel's rod or wire 47 also actuates valve 39, which "may be operated to either open the inlet passage 36 to the passage of gas therethrough, or to close the same so that gas cannot pass therethrough." EX1008, 2:86-90. Petitioner, however,

does not suggest that a POSITA would have been motivated to replace valve 39 with a solenoid. Pet., 85 (proposing replacing “Holzapfel’s valve 14” with a solenoid but not referencing valve 39). Thus, under Petitioner’s proposed combination, once rod or wire 47 is removed an operator would have had no mechanism to actuate valve 39, and therefore would have had no mechanism to either allow or prevent operation on the disclosed normally gaseous fuel. EX2133, ¶297.

Petitioner’s motivation to combine analysis is equally deficient and steeped in hindsight. First, Petitioner does not articulate any reasons a POSITA *would* have been motivated to implement Olmr’s solenoid (and supporting electrical circuitry) in Holzapfel’s engine. Instead, Petitioner merely explains that solenoid valves (1) “provide fast response times and precise control in fuel flow applications” and (2) “*can be substituted* for mechanical valves in such applications.” Pet., 86 (emphasis added). But, asserting a POSITA *could* have made a substitution is not the same as asserting they *would* have been motivated to do so. EX2133, ¶298; *InTouch Techs.*, 751 F.3d at 1352.

Petitioner has not established the alleged benefit of “fast response times and precise control” associated with implementing electrically actuated solenoid valves in Holzapfel’s engine is worth the risk of increased complexity and potential failures, particularly where there is no indication “fast response times and precise control”

actually provide *any* benefit to Holzapfel’s 1930s automobile engine (and corresponding fuel system). EX2133, ¶¶298-299.

Second, Petitioner’s assertion that “Holzapfel and Olmr both relate to engines and both seek to prevent the flow of gasoline from the float bowl to the engine intake” has no bearing on whether a POSITA would have been motivated to implement the precise configuration proposed by Petitioner. *Innogenetic*, 512 F.3d at 1373. Simply put, Petitioner does not provide any analysis regarding how or why a POSITA would have been motivated to implement Olmr’s “solenoid valve” and corresponding electrical systems in the Holzapfel engine. EX2133, ¶¶300-301.

e. Element [1.6]

Holzapfel, alone or in combination with Matsushima, does not disclose or otherwise render obvious “a voltage regulator.” In fact, other than Petitioner’s expert’s understanding that the disclosure of Holzapfel implies use of (undisclosed) electrical spark plugs, Holzapfel does not disclose an electrical system at all. EX2136, 153:19-155:8. EX2133, ¶¶302-303.

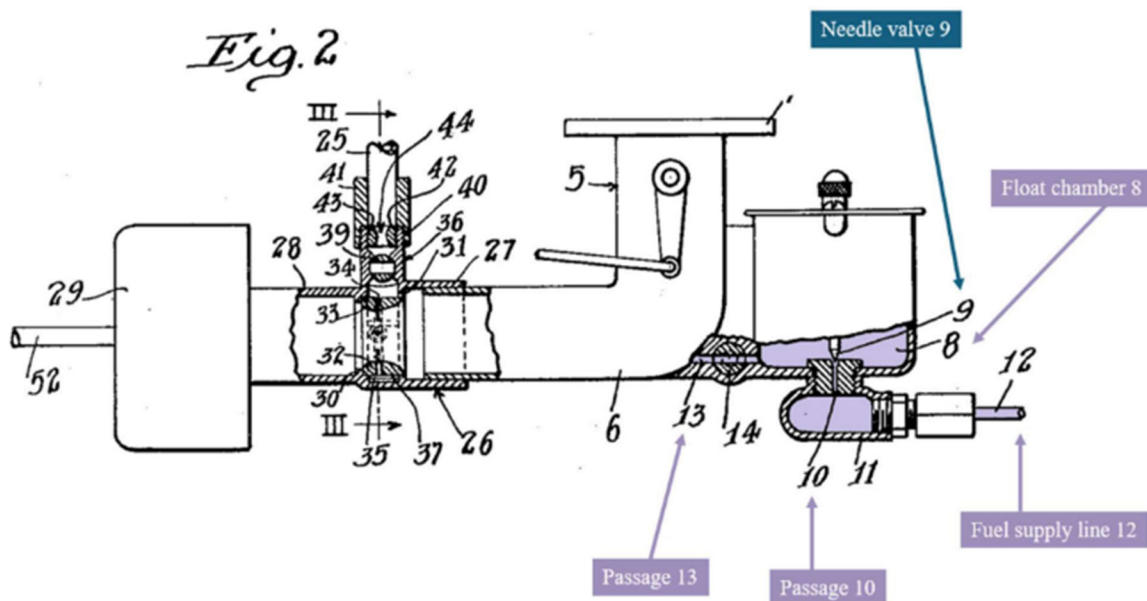
Once again, Petitioner’s analysis of this element is unclear. Again, Petitioner’s sole cite is to Matsushima, but Petitioner provides no new motivation to combine analysis. As such, Petitioner’s analysis is deficient for the same reasons set forth with respect to Element [1.2]. §VII.C.1.b. Petitioner does not provide any analysis regarding how or why a POSITA would have been motivated to implement a

“voltage regulator” as disclosed by Matsushima in the Holzapfel engine. EX2133, ¶¶304-305.

2. Claim 2

Holzapfel does not disclose or otherwise render obvious Claim 2. Specifically, Holzapfel does not disclose “a liquid fuel valve along a liquid fuel line coupling the liquid fuel source to the carburetor.”

Petitioner identifies “Fuel supply line 12” as the alleged “liquid fuel line.” Pet., 88-89. Petitioner likewise identifies Holzapfel’s “needle valve 9” as the alleged “liquid fuel valve along a liquid fuel line.” Pet., 88-89; EX2133, ¶¶308-311.



Pet., 89 (annotations in original).

Petitioner’s annotations make clear that needle valve 9 is not located *along* Fuel supply line 12. Specifically, Holzapfel discloses an intervening inlet connection

11 and passage 10 between fuel supply line 12 and needle valve 9. EX2133, ¶¶312-313.

3. Claim 6

Holzapfel, alone or in view of Matsushima and/or Olmr does not disclose or otherwise render obvious Claim 6. Petitioner's purported analysis of Claim 6 is just a combination of its conclusory and unsupported assertion that a POSITA would have been motivated to combine Holzapfel's engine with Matsushima's (§VII.C.1.b), coupled with its hindsight assertion that a POSITA would have been motivated to implement Olmr's solenoid and corresponding electrical system into Holzapfel's 1930s automobile engine (§VII.C.1.d), and is deficient for the same reasons. EX2133, ¶¶314-315.

4. Claim 8

Holzapfel, alone or in view of Matsushima and/or Olmr does not disclose or otherwise render obvious Claim 8. EX2133, ¶316.

First, Petitioner has not established that a POSITA would have been motivated to replace Holzapfel's valve 14 (and corresponding switching system) with Olmr's solenoid valve 42, nor that a POSITA would have had a reasonable expectation of success in the proposed combination. §VII.C.1.d; *In re Magnum*, 829 F.3d at 1380; EX2133, ¶317.

Second, Petitioner's relies on the conclusory assertion that "A [POSITA] would have been motivated to use Olmr's normally open solenoid and would have had a reasonable expectation of success in doing so based on the teachings of Olmr." Pet., 95 (citing §VII.B.1). However, Petitioner's analysis in §VII.B.1 does not address Olmr *at all*. See Pet., 52 ("a [POSITA] would have understood that the combination of the Workshop Manual and Matsushima teaches claim 6"). Petitioner's failure to identify the claimed structures in the prior art is fatal to its analysis. 37 C.F.R. §42.104(b)(5); *Netflix*, 84 F.4th at 1377; EX2133, ¶318.

Presumably, Petitioner intended to incorporate its prior assertion that a POSITA would have been motivated to replace the Workshop Manual's Gasoline Cut Off Solenoid with Olmr's solenoid valve 42. Pet., §VII.B.3. However, Petitioner has not established that any alleged motivation to combine the Workshop Manual and Olmr is equally applicable to Holzapfel and Olmr. For example, Petitioner does not address the fact that Holzapfel *does not have a power system*. EX2136, 153:19-155:8. Regardless, Petitioner's proposed motivation to "use Olmr's solenoid valve 42 in place of Holzapfel's valve 14" is also deficient for the same reasons set forth with respect to the Workshop Manual. See §VII.A.5, *supra*; EX2133, ¶¶319-320.

Finally, Petitioner's analysis is deficient at least because it does not account for problems created by Petitioner's proposed combination. If Holzapfel's valve 14 is replaced with Olmr's normally-open solenoid, then valve 14 will be open in the

event the valve loses power, allowing gasoline to flow to the engine. However, Holzapfel also discloses a separate normally gaseous fuel system, which is controlled independently of Olmr's normally open solenoid. If power to Olmr's normally open solenoid fails while Holzapfel's engine is operating on normally gaseous fuel, the engine will be flooded with gasoline, resulting in an overly-rich fuel. EX2133, ¶¶321-322.

5. Claim 9

Holzapfel (alone or in view of Matsushima and/or Olmr) does not disclose or otherwise render obvious Claim 9. Petitioner asserts it “would have been obvious to a [POSITA] to incorporate Matsushima's pull-start to supply electrical power in Holzapfel's engine.” Pet., 96. Confusingly, Holzapfel's engine does not actually need electrical power. In fact, other than Petitioner's expert's understanding that the disclosure of Holzapfel implies use of (undisclosed) electrical spark plugs, Holzapfel does not disclose an electrical system at all. EX2136, 153:19-155:8; EX2133, ¶¶323-325.

Petitioner asserts Matsushima's pull-starter assembly is needed “to drive a generator to power and close Holzapfel's valve 14 (a solenoid when combined with Olmr) while starting the engine on gaseous fuel).” Pet., 96. But, as discussed above, Petitioner's decision to replace Holzapfel's mechanical, manually actuated valve 14 with Olmr's solenoid is itself grounded in hindsight. §VII.C.1.d. Now, to solve a

problem caused by its modifications, Petitioner again modifies Holzapfel's 1930s automobile engine—using the '145 Patent as a guide—to add an unnecessary pull-start. EX2133, ¶326.

However, the Petition lacks sufficient motivation to implement a pull start. Specifically, Petitioner makes two statements regarding the alleged motivation for replacing Holzapfel's starter with Matsushima's recoil starter.⁸ First, Petitioner argues that “[i]ncorporating a pull-start into Holzapfel's dual fuel engine would improve reliability in cold or remote applications and reduce cost.” Pet., 97. EX2133, ¶¶327-328.

Moreover, Petitioner's arguments are conclusory, and there is no evidentiary support in either the Petition or Dr. Shahbakhti's declaration that implementing Matsushima's pull-start system in Holzapfel's engine would improve its reliability in cold or remote applications, or otherwise reduce costs. In fact, the best way to

⁸ Confusingly, both of Petitioner's proposed motivations to combine Matsushima's pull-start with Holzapfel are nearly verbatim to Petitioner's proposed motivations regarding replacing the Workshop Manual's battery with Matsushima's pull start, despite the fact that (1) they are different references, and (2) the proposed combination involves different modifications. *Compare* Pet., 97 *with* Pet., 55. *Innogenetics*, 512 F.3d at 1373.

improve reliability in cold/remote applications and reduce costs is to remove the electrically-powered solenoid (and corresponding generator) entirely, as taught by Holzapfel. EX2133, ¶329.

Second, Petitioner argues that “Holzapfel and Matsushima both relate to the same class of small spark-ignition engines.” Pet., 97. However, Petitioner does not provide any support for its implication that Matsushima and Holzapfel belong “to the same class of small spark-ignition engines.” Pet., 97; EX2133, ¶¶330-331.

Matsushima teaches that its “invention relates to a fuel injection system for an internal combustion engine for supplying fuel to an intake system thereof, and more particularly to an electronically-controlled fuel injection system of this kind which is adapted for use in *small-sized engines equipped with no battery*.” EX1012, 1:6-11 (emphasis added). U.S. Patent No. 3,465,740 (cited by Matsushima as an appropriate “known type” of recoil starter) provides further guidance, referring “particularly to rewind type pull-rope starters for small internal combustions engines such as those commonly employed to power lawn mowers, garden tractors, snow blowers and the like.” EX1012, 4:63-68; *see also* EX2128 (U.S. Patent No. 3,465,740), 1:36-40; EX2133, ¶331.

However, Petitioner’s expert Dr. Mahdi Shahbakhti explicitly defined small engines as engines having a displacement of less than 0.5 liters (500 cc). EX1003, ¶[0006]; *see also* EX1003, 497; EX2136, 20:11-21:15. Holzapfel, meanwhile,

discloses an *automobile* engine. Petitioner has identified no evidence that a POSITA would have understood that a 1930s automobile engine would have been less than 0.5 liters. Even a very small automobile often has a displacement of at least one liter, and many automobiles utilize substantially larger engines. EX2133, ¶332.

As such, a POSITA would have understood an automobile engine would have been substantially more difficult to start with a pull-starter than the smaller engines contemplated by Matsushima. Petitioner’s conclusory analysis of the purported motivation to combine Holzapfel and Matsushima is particularly deficient in light of Petitioners’ experts’ repeated emphasis on specific engine characteristics and applications. §VII.A.6, *supra*. Likewise, Petitioner’s conclusory assertion of a motivation to combine based on allegedly belonging to “the same class of small spark-ignition engines” is unfounded, especially where Petitioner provided no evidence that the engines in question actually belong to the “same class.” EX2133, ¶¶333-336.

Finally, Petitioner’s analysis of a reasonable expectation of success is deficient, at least because it does not account for the difficulties in adding a pull start to an automobile engine. For example, Petitioner has not introduced any evidence to establish that an operator would physically be able to start Holzapfel’s engine using a pull start. EX2133, ¶337.

VIII. CONCLUSION

For at least the reasons discussed above, the Petition fails to establish that the Challenged Claims are invalid.

Dated: June 9, 2026

Respectfully submitted,

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CERTIFICATE OF SERVICE

In accordance with 37 C.F.R. §42.6(e), the undersigned certifies that on June 9, 2026, a complete and entire copy of the foregoing Patent Owner Champion Power Equipment, Inc.'s Response, including the exhibits relied upon, was served on counsel of record for Petitioner, as follows:

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), the undersigned certifies that the foregoing Patent Owner Champion Power Equipment, Inc.'s Response, excluding the portions exempted under 37 C.F.R. §42.24(b), contains 13,896 words according to Microsoft Word's word count feature.

Dated: June 9, 2026

Respectfully submitted,

By: /Joseph W. Staley/

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Counsel for Patent Owner