

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MWE INVESTMENTS, LLC,
HARBOR FREIGHT TOOLS USA, INC., and
GENERAC POWER SYSTEMS, INC.,
Petitioners

v.

CHAMPION POWER EQUIPMENT, INC.,
Patent Owner.

U.S. Patent No. 11,143,145

Title: BATTERYLESS DUAL FUEL ENGINE WITH LIQUID FUEL CUT-OFF

Inter Partes Review No. IPR2025-01457

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 11,143,145**

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LIST OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 11,143,155 (“145 Patent”)
1002	File History of U.S. Patent No. 11, 143,155 (“145 File History”)
1003	Declaration of Dr. Mahdi Shahbakhti
1004	JPS61283734A (Original) (“Nakafushi”)
1005	Certified Translation of JPS61283734A (“Nakafushi”)
1006	Small Engine Technology, Second Edition, Schuster, William A, (1999) (“Schuster”)
1007	U.S. Patent No. 5,301,644 (“Olmr”)
1008	U.S. Patent No 1,931,698 (“Holzapfel”)
1009	Kubota DF-972-E2 Workshop Manual (“Workshop Manual”)
1010	Declaration from Mr. James Strepek re Kubota Manuals
1011	Declaration from Mr. Scott Schlabach re Kubota Manuals
1012	U.S. Patent No. 5,161,496 (“Matsushima”)
1013	U.S. Patent No. 6,213,083 (“Winberg”)
1014	Champion’s Infringement Contentions with Respect to Petitioner Generac’s Model PM4500DF and GP7500E DF Generators
1015	U.S. Patent No. 3,718,000 (“Walker”)
1016	DuroMax XP4400EH Operator’s Manual (“DuroMax”)
1017	Declaration of David Raskin (dated May 7, 2025)

CHALLENGED CLAIMS

Claim Element	Claim Language
[1.0]	A dual fuel generator comprising:
[1.1]	an engine operable on a gaseous fuel and a liquid fuel;
[1.2]	an electrical power generator driven by the engine and comprising a charging coil;
[1.3]	a switch to change operation of the engine between gaseous fuel and liquid fuel;
[1.4]	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;
[1.5]	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; and
[1.6]	a voltage regulator coupled to the charging coil to receive power therefrom and that operates to provide a regulated voltage to the liquid fuel cut-off solenoid.
Claim 2	Claim Language
[2]	The dual fuel generator of claim 1 further comprising: a liquid fuel valve along a liquid fuel line coupling the liquid fuel source to the carburetor; and a gaseous fuel valve along a gaseous fuel line coupling the gaseous fuel source to the carburetor.
Claim 3	Claim Language
[3]	The dual fuel generator of claim 2, wherein each of the liquid fuel valve and the gaseous fuel valve comprises a mechanical valve.
Claim 4	Claim Language
[4]	The dual fuel generator of claim 2, wherein the liquid fuel cut-off solenoid is attached to the carburetor.
Claim 5	Claim Language
[5]	The dual fuel generator of claim 1, wherein the gaseous fuel is LPG and the liquid fuel is gasoline.

Claim 6	Claim Language
[6]	The dual fuel generator of claim 1, wherein the switch is an electro-mechanical switch connecting one fuel source to the carburetor and connected to the electrical power generator, and wherein the liquid fuel cut-off solenoid is connected to open and close a fuel path to the engine in response to reception of electrical power from the switch.
Claim 7	Claim Language
[7]	The dual fuel generator of claim 6, wherein the switch selectively powers the solenoid valve by controlling electrical connection between the solenoid valve and the electrical power generator.
Claim 8	Claim Language
[8]	The dual fuel generator of claim 1, wherein the liquid fuel cut-off solenoid is normally open to provide liquid fuel to the engine when the liquid fuel cut-off solenoid is unpowered.
Claim 9	Claim Language
[9]	The dual fuel generator of claim 8, wherein the dual fuel generator is a batteryless dual fuel generator and the engine is a pull-start engine, the batteryless dual fuel generator further comprising a pull-starter that drives the electrical power generator to power and close the liquid fuel cut-off solenoid while starting the engine on gaseous fuel.
Claim 10	Claim Language
[10]	The dual fuel generator of claim 1, wherein the electrical power generator comprises a magneto or an alternator.
Claim 11	Claim Language
[11.0]	A dual fuel generator comprising:
[11.1]	an engine operable on a gaseous fuel and a liquid fuel;
[11.2]	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; and

[11.3]	a manually actuated fuel shutoff coupled to the carburetor, the manually actuated fuel shutoff comprising: a first end in the carburetor that actuates to selectively allow or block a flow of fuel through the carburetor; and a second end external to the carburetor to actuate the first end.
Claim 12	Claim Language
[12]	The dual fuel generator of claim 11, wherein the engine is a pull start, batteryless engine.
Claim 13	Claim Language
[13]	The dual fuel generator of claim 11, wherein the gaseous fuel is LPG and the liquid fuel is gasoline.
Claim 14	Claim Language
[14]	The dual fuel generator of claim 11, wherein the manually actuated fuel shutoff comprises a rotating mechanical valve.
Claim 15	Claim Language
[15.0]	The dual fuel generator of claim 14 wherein the carburetor comprises:
[15.1]	a float bowl; a throat; and a fuel passage to provide fuel from the float bowl to the throat;
[15.2]	wherein the manually actuated fuel shutoff comprises a shaft extending into the carburetor through an aperture in the float bowl, the shaft being coupled to a valve tip in the float bowl that rotates to open and close the fuel passage.
Claim 16	Claim Language
[16]	The dual fuel generator of claim 15 wherein the valve tip rotates parallel to an inlet of the fuel passage between a first position permitting fuel flow into the inlet and a second position blocking fuel flow into the inlet.

I. STANDING AND RELIEF REQUESTED

MWE Investments, LLC, Harbor Freight Tools USA, Inc., and Generac Power Systems, Inc. (“Petitioners”) request *Inter Partes Review* (“IPR”) under 35 U.S.C. §§311–319 and 37 C.F.R. §42 of claims 1-16 of U.S. Patent No. 11,143,145 (“the ‘145 Patent”) based on the following grounds set forth.

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

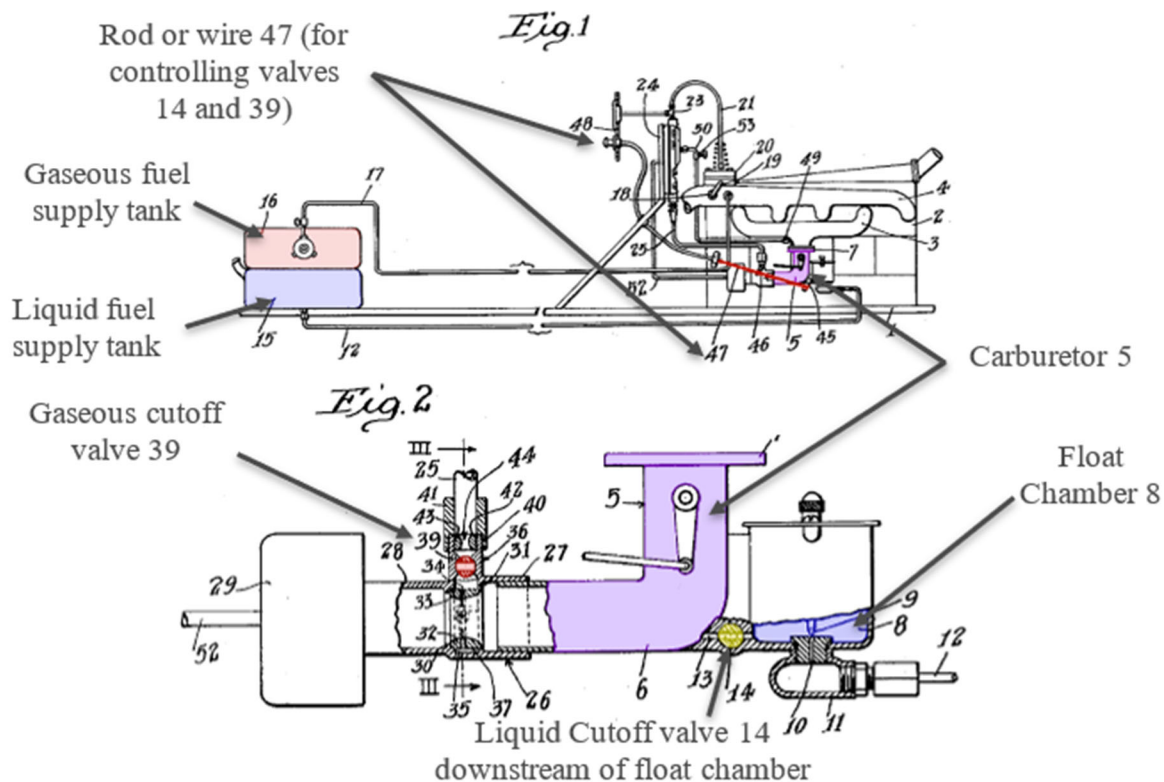
Petitioners certify that the ‘145 Patent is available for IPR.

As explained herein, this Petition establishes a reasonable likelihood that Petitioners will prevail in showing that at least one of the challenged claims is unpatentable. Petitioners respectfully request that this IPR be instituted, and that Claims 1–16 be canceled as unpatentable.

II. STATE OF THE ART

A. Dual Fuel Combustion Engines

Dual fuel engines running alternatively on liquid or gaseous fuels have been known for nearly 100 years. For example, U.S. Patent No. 1,931,698 (“Holzapfel”) was filed in 1931 and discloses “a fuel system embodying the supplying of liquid fuel and gaseous fuel to an engine in alternation at will.” Ex.1008, 1:1-42. A “rod or wire 47” controls both the liquid and gaseous valves, as seen in Holzapfel’s FIGS. 1 and 2 below:



Ex.1008, FIGS. 1–2 (Annotated).

B. Carburetors

A carburetor is a device that supplies an air-fuel mixture to a spark-ignition engine. The diagram below shows a carburetor's basic elements.

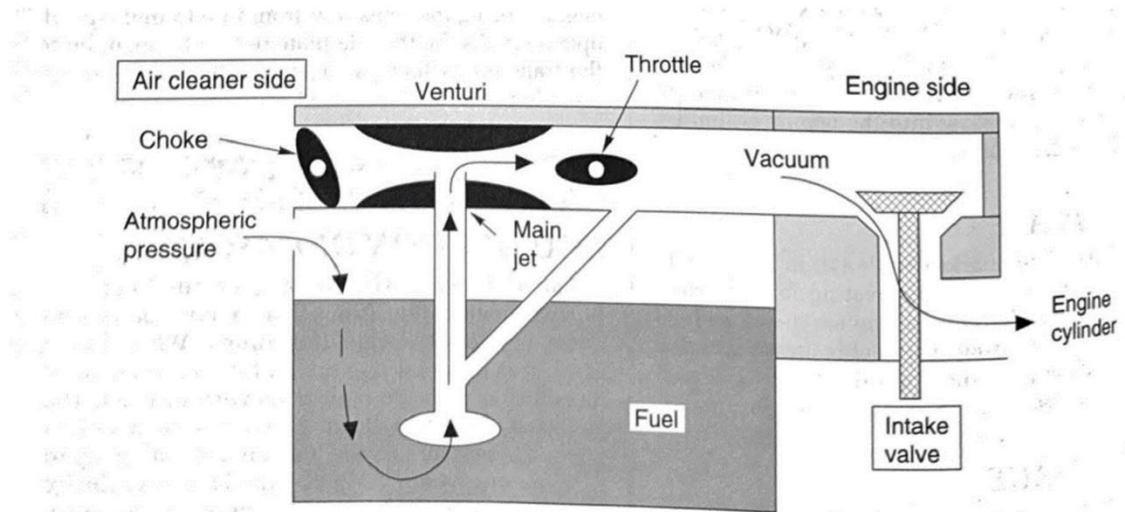


Fig. 4-7 Choke system. (Courtesy of William A. Schuster)

Ex.1006, 8.

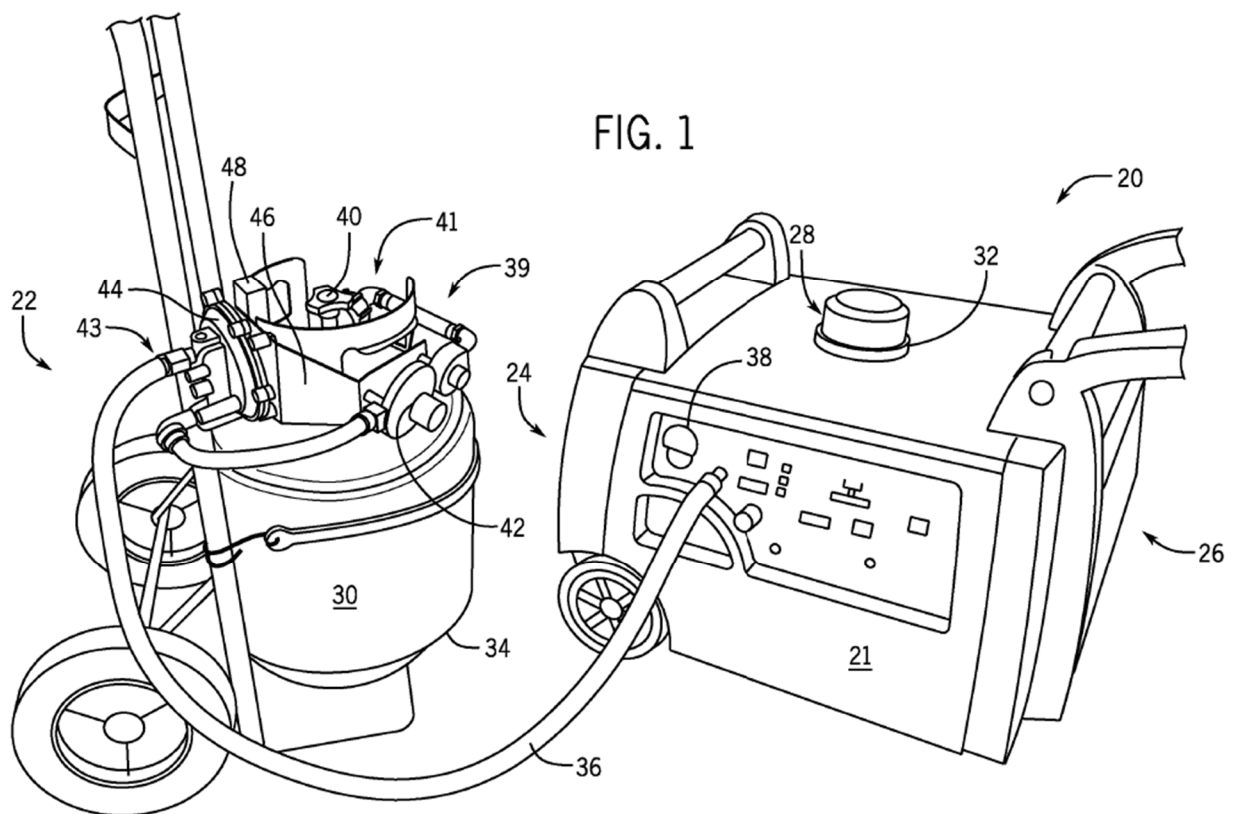
When air flows through the venturi, the velocity increases and pressure decreases through the narrow portion (the “Venturi effect”), which pulls fuel from the float bowl/chamber through the main jet and mixes it with air.

III. SUMMARY OF THE '145 PATENT

The application that became the ‘145 Patent was filed June 22, 2020, as a continuation of Application No. 14/925,441, filed October 28, 2015, now Patent

No. 10,697,398, which was a continuation-in-part of Application No. 14/738,060, filed June 12, 2015, now Patent No. 10,221,780 (the “780 Patent”).

The ‘145 Patent discloses embodiments of dual fuel engines/generators operable on liquid or gaseous fuels. Ex.1001, 1:17-20. The ‘145 Patent acknowledges that dual fuel generators typically run on liquid fuel (such as gasoline) and an alternative gaseous fuel (such as liquified petroleum gas (LPG) also known as propane). *Id.*, 1:39-55. FIG. 1 of the ‘145 Patent shows a perspective view of a generator 20 with such an engine:

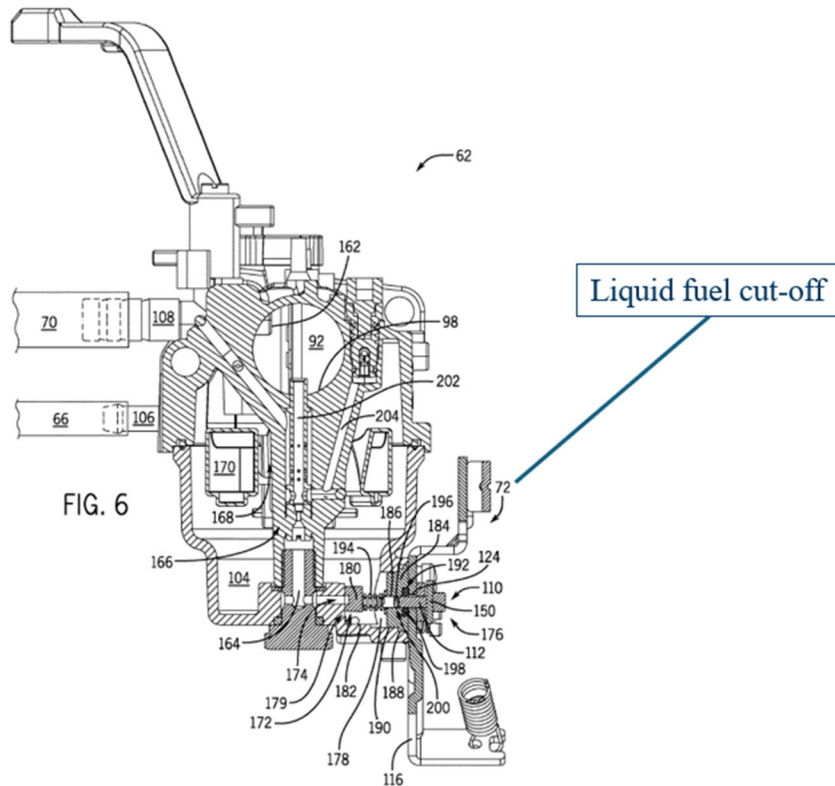


Ex.1001, FIG. 1.

As shown in FIG. 1, generator 20 includes gasoline tank 32 to hold a liquid fuel (gasoline), and generator 20 also is connected by way of LPG supply hose 36 to pressurized fuel container 34, which holds LPG. Ex.1001, 4:3-44; FIG. 1.

The '145 Patent states that switching fuel sources in conventional multi-fuel engines can cause overly rich air-fuel ratios and unstable operating conditions when both liquid and gaseous fuels are fed to the engine. *Id.*, 1:56-2:3. The '145 Patent purports to solve this problem by implementing a switch that powers cutoff solenoids for controlling liquid and gaseous fuel flow. *Id.*, 2:11-19.

The '145 Patent also couples a liquid fuel cut-off to the carburetor to prevent excess gasoline from passing to the engine, as depicted in FIG. 6:



Ex.1001, FIG. 6.

The '145 Patent discloses the liquid fuel cut-off can be manually operated or electrically operated such as by a solenoid. *Id.*, 8:33-44.

The '145 Patent discloses that the engine may be a pull-start engine with a recoil starter. *Id.*, 8:65-9:9. In this embodiment, during engine startup, the recoil starter cranks the engine, causing a magneto to supply electrical power to the solenoid of the liquid fuel cut-off. *Id.*

IV. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (hereinafter “POSA”) would “be aware of all the pertinent prior art” at the time of the alleged invention (*Custom Accessories, Inc. v. Jeffrey-Allan Indus.*, 807 F.2d 955, 963 (Fed. Cir. 1986)), including specialized knowledge applicable to various aspects of the claimed invention. *See, e.g., AVX Corp. v. Greatbatch, Ltd.*, IPR2014-00697, Paper 60 at 3 (P.T.A.B. Jan. 11, 2016). A POSA is also a person of ordinary creativity, not an automaton, and thus is able to make inferences from the art. *KSR Int’l Co. v. Teleflex*, 550 U.S. 398, 420-21 (2007).

For purposes of this Petition, a POSA as of June 12, 2015 (the filing date of the parent ’780 Patent and the earliest possible priority date of the ’145 Patent), would have at least a Bachelor of Science degree in mechanical engineering, physics, or related fields, and three years of work experience in combustion engines. Ex.1003, [0028]. Additional higher graduate education could substitute for work experience, and extensive experience/technical training could substitute for formal education. Ex.1003, [0028].

V. CLAIM CONSTRUCTION

The Board construes claims under the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. §42.100(b). Under this standard, claim terms should be given their plain and ordinary meaning as

understood by a person of ordinary skill in the art and the prosecution history. Petitioner has not identified any claim terms that need construction in order to address the issues raised by this petition, but Petitioner reserves the right to respond to any constructions offered by Patent Owner or the Board.

VI. OVERVIEW OF THE ASSERTED PRIOR ART

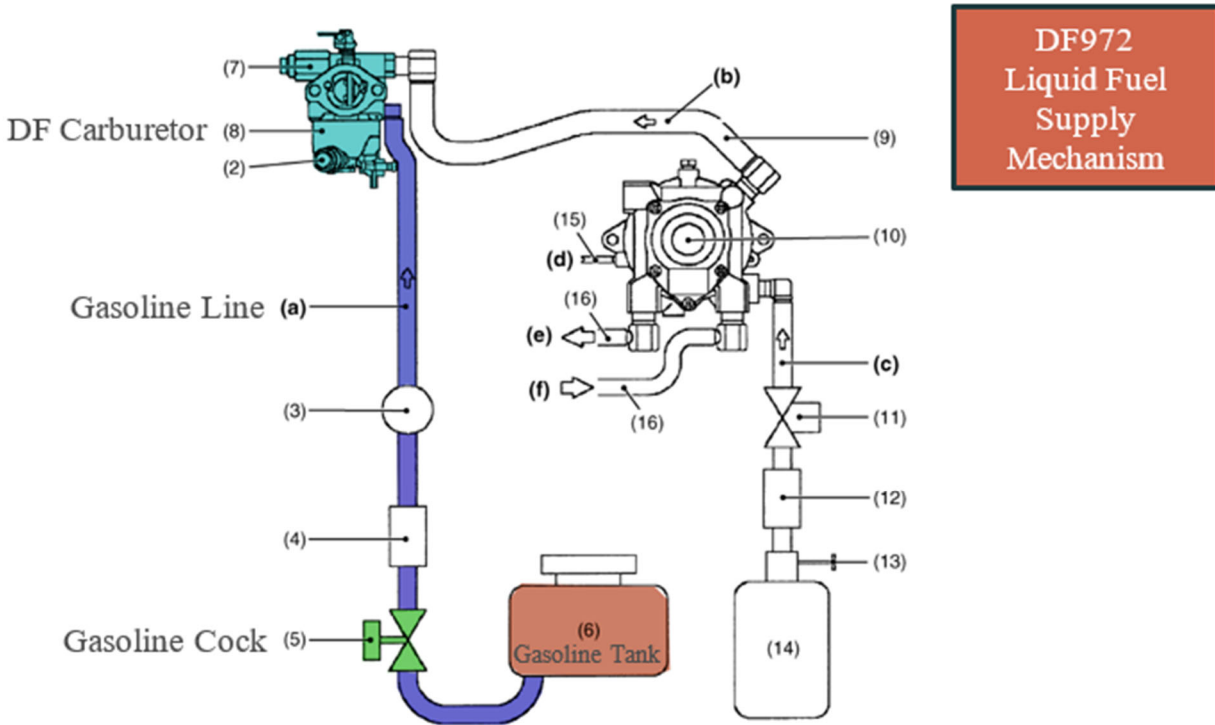
A. Kubota DF-972-E2 Workshop Manual (“Workshop Manual”)

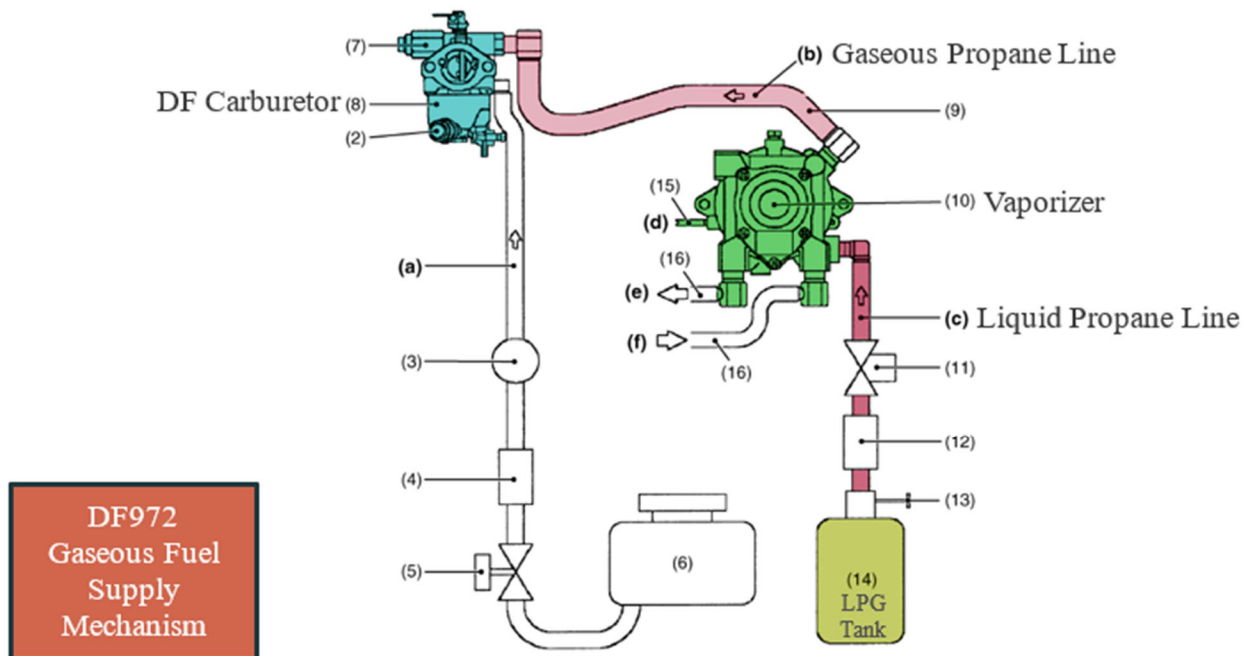
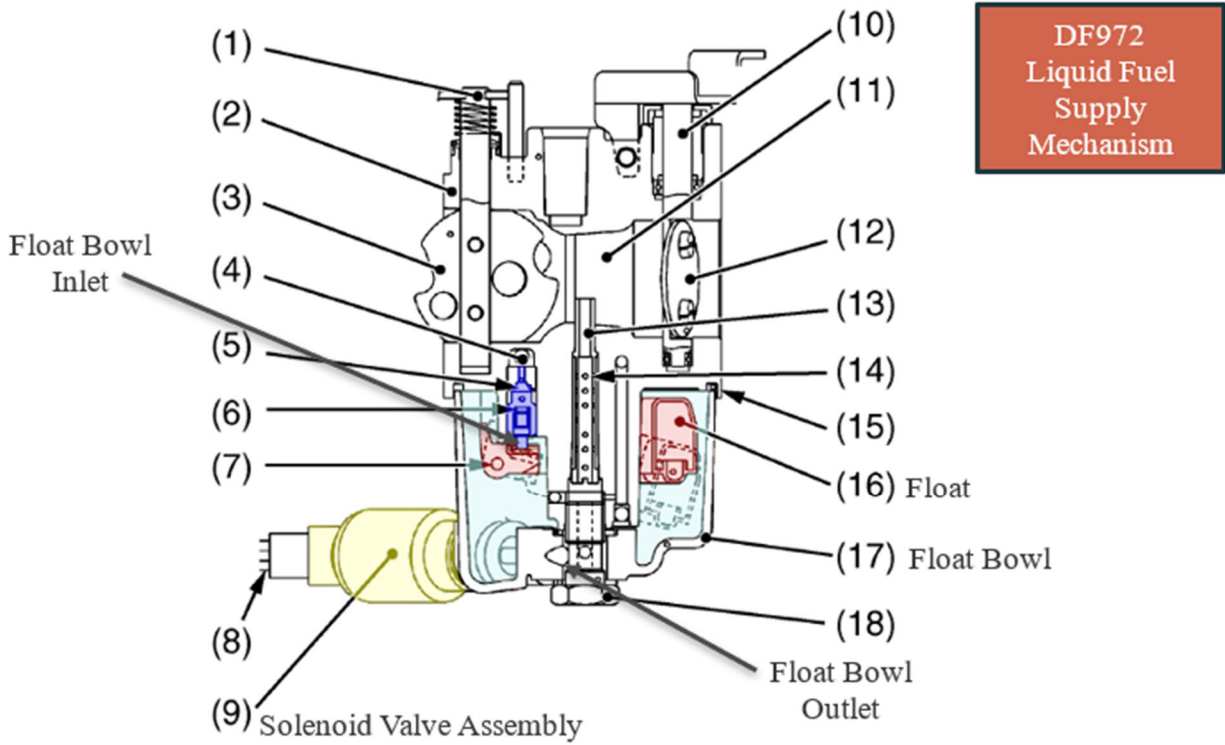
Workshop Manual was published/publicly available at least by June 2009 (Ex.1010, 4-10; Ex.1011, 4-14), before the earliest priority date of the ‘145 Patent (i.e., June 12, 2015).

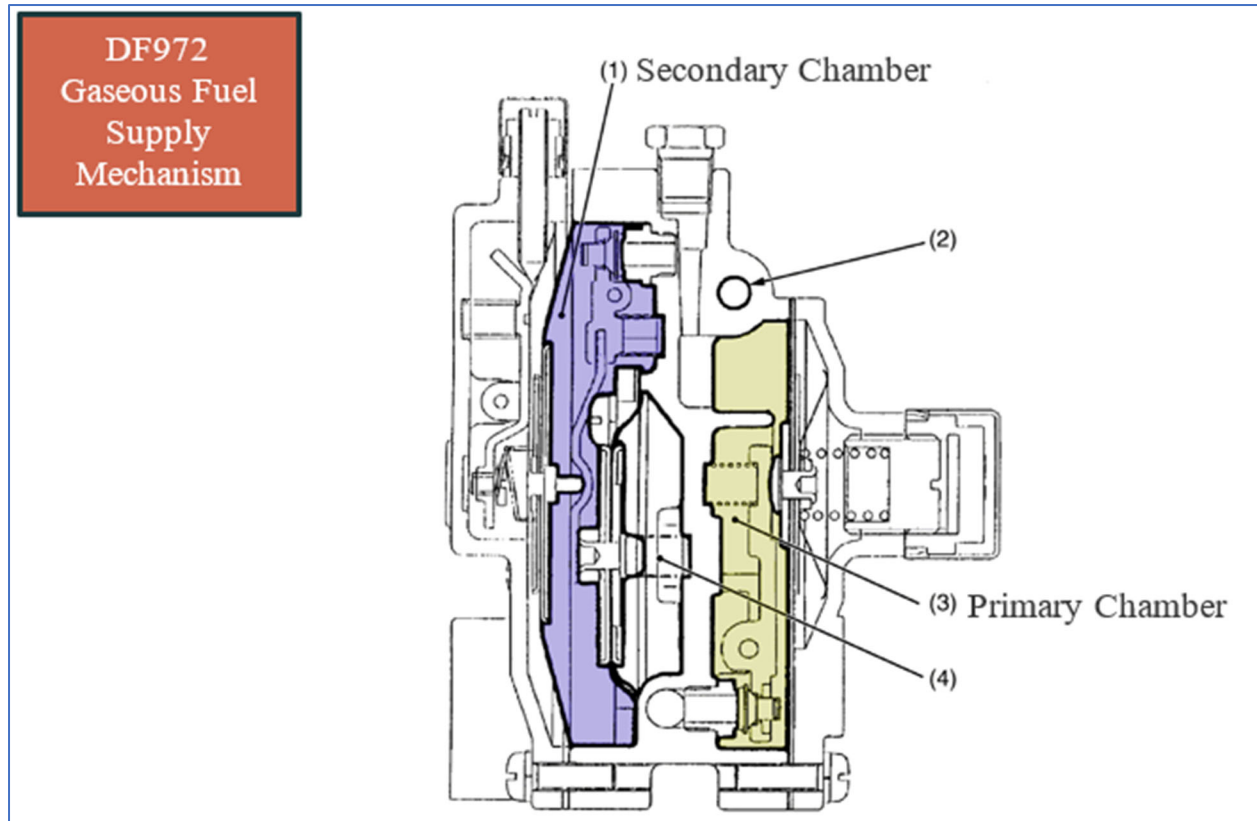
Workshop Manual is a non-confidential document that was publicly accessible to purchasers, end-users, and service personnel working on Kubota DF-972 engines, through their exercise of reasonable diligence (e.g., requesting a copy directly from Kubota, obtaining a copy from a Kubota service center, etc.). *Id.* Workshop Manual was created for dissemination to the interested public to provide instructions about how to safely assemble/disassemble, maintain, and service the DF-972 engine, and is prior art to the ‘145 Patent under 35 U.S.C. §102(a). *Weber, Inc. v. Provisur Technologies, Inc.*, 92 F.4th 1059, 1067–69 (Fed. Cir. 2024).

Workshop Manual describes the Kubota DF-972-E2 engine—a dual fuel engine with an alternator to function as a generator that runs alternatively off of

gasoline or LPG. Ex.1009, 65. Workshop Manual discloses a carburetor through which gasoline and LPG are routed, as shown below:

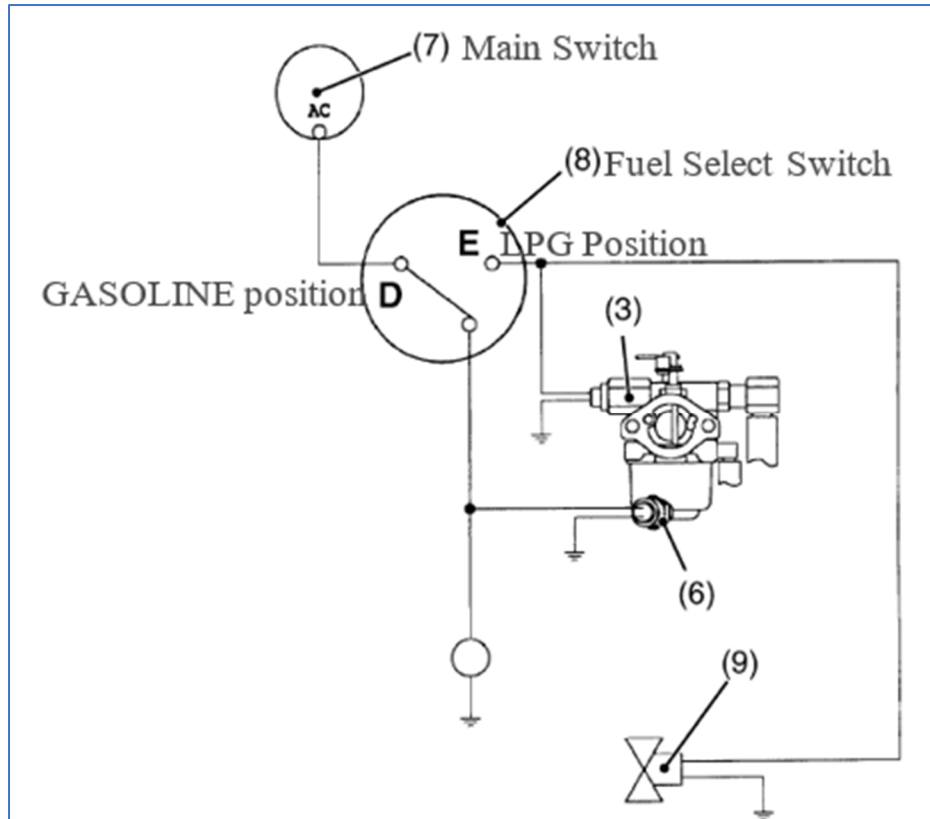






Id., 65, 67, 69 (annotated); Ex.1003, [0062].

Workshop Manual teaches a fuel select switch that controls whether a gasoline cut off solenoid (located downstream of the float bowl) allows gasoline to pass through the carburetor, or whether an LPG cut off solenoid allows LPG to pass through the carburetor, to power the engine/generator, shown below:



Ex.1009, 68 (annotated); Ex.1003, [0063].

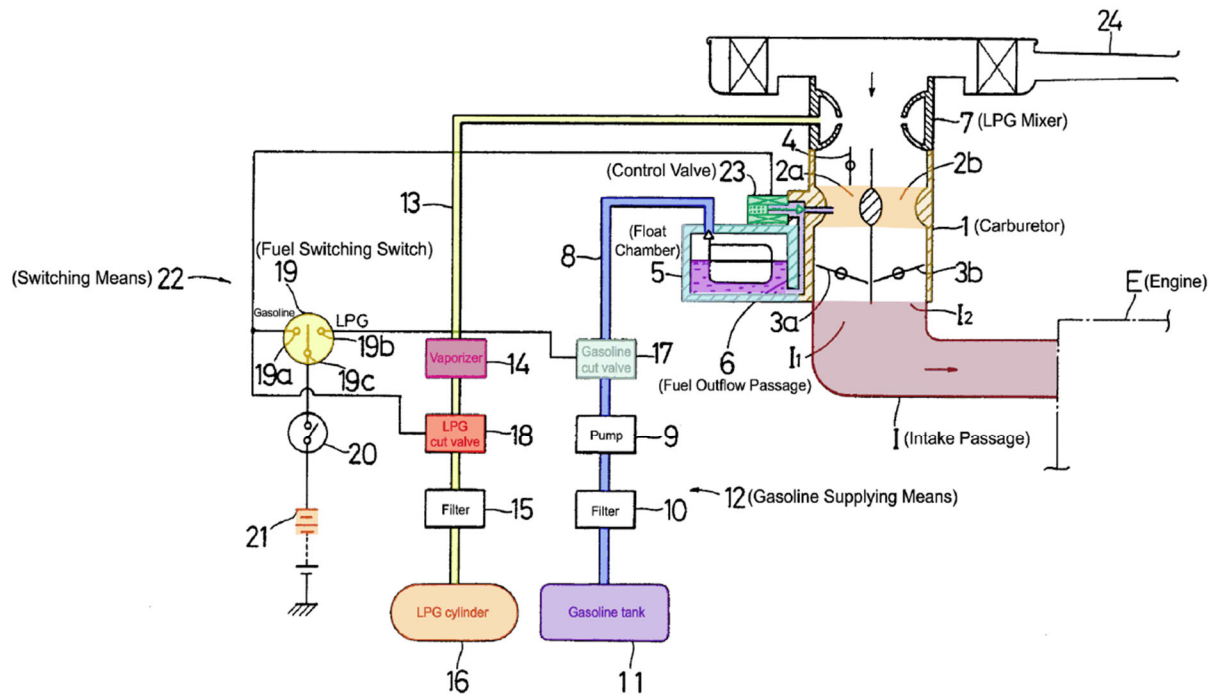
B. JPS61283734A (“Nakafushi”)

Nakafushi (Ex.1004 (original); Ex.1005 (certified translation)) was filed in 1985 and published in 1986. Nakafushi is prior art under §102(a).

Nakafushi is directed to an engine configured to selectively use gasoline or LPG as fuel. Ex.1005, [0001]. Nakafushi notes that when engine operation is switched from gasoline to LPG, a residual amount of gasoline remains in the float chamber (i.e., float bowl) and gets mixed with the LPG, resulting in over-rich air-to-fuel ratio. *Id.*, [0003]-[0004]. Also, because the residual gasoline is drained from the float chamber, when the engine is switched back to gasoline, gasoline delivery

is delayed until the level of gasoline in the float chamber recovers. *Id.*, [0004]. During this delay, the air-to-fuel ratio becomes over-lean. *Id.* Nakafushi solves these problems by including a control valve 23 downstream of the float chamber to prevent it from being emptied of gasoline when switching to LPG operation. *Id.*, [0006]-[0008], FIG. 1.

Nakafushi discloses a carburetor 1 having venturi portions 2a and 2b and an intake passage I, as seen below:

FIG. 1

Id., [0010], FIG. 1 (annotated).

Gasoline is stored in tank 11 and pumped to float chamber 5 through gasoline supply passage 8, which is opened and closed by gasoline cut valve 17.

Ex.1005, [0012]-[0013]. Gasoline in the float chamber 5 is sucked into the venturi portions 2a and 2b through a fuel outflow passage 6. *Id.*, [0010]. Control valve 23 opens and closes the fuel outflow passage 6, thus controlling gasoline flow from the float chamber 5 to the intake passage I. *Id.*, [0014].

LPG is stored in cylinder 16 and travels to LPG mixer 7 in the carburetor through LPG supply passage 13, which is opened and closed with LPG cut valve 18. *Id.*, [0011]-[0013].

Nakafushi discloses a fuel switching switch 19 that controls which fuel is fed to the engine. *Id.*, [0013]-[0014]. When switch 19 is set to the gasoline side contact 19a: (1) LPG cut valve 18 closes to block the LPG supply; (2) gasoline cut valve 17 opens to allow gasoline flow through passage 8 to the carburetor float chamber; and (3) control valve 23 opens to allow gasoline flow from the float chamber to the intake. *Id.*

Conversely, when the switch 19 is set to the LPG side contact 19b: (1) gasoline cut valve 17 and control valve 23 are closed to block the flow of gasoline; and (2) LPG cut valve 18 is opened, allowing LPG to flow through passage 13 to the carburetor mixer 7. *Id.*

Closing control valve 23, which is downstream of the float chamber, prevents residual gasoline from exiting the float chamber when switching to LPG operation. *Id.*, [0014], FIG. 1. Because gasoline is not drained from the float

chamber, that gasoline is more readily available to fuel the engine upon switching back to gasoline operation. *Id.*

Thus, some 30 years earlier than the '145 Patent, Nakafushi addressed the alleged “problems” identified by the '145 Patent, and disclosed the same solution. Ex.1003, [0072].

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

Holzapfel issued in 1933. Ex.1008. It is prior art under §102(a).

Holzapfel discloses “a fuel system embodying the supplying of liquid fuel and gaseous fuel to an engine in alternation at will.” Ex.1008, 1:1-5.

A “rod or wire 47” controls the levers 45 and 46 for the gaseous and liquid valves. Ex.1008, 1:100-106, 2:86-123, FIGS. 1-2. The liquid valve 14 is a rotary valve located in the fuel passage between the float bowl in the intake. *Id.*

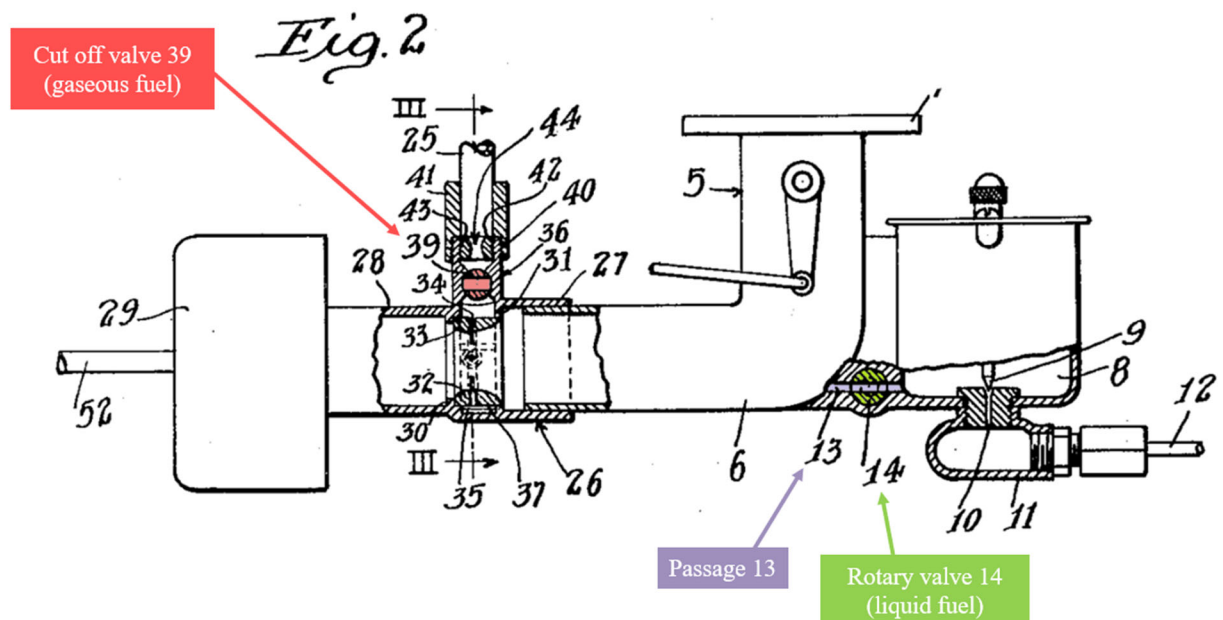
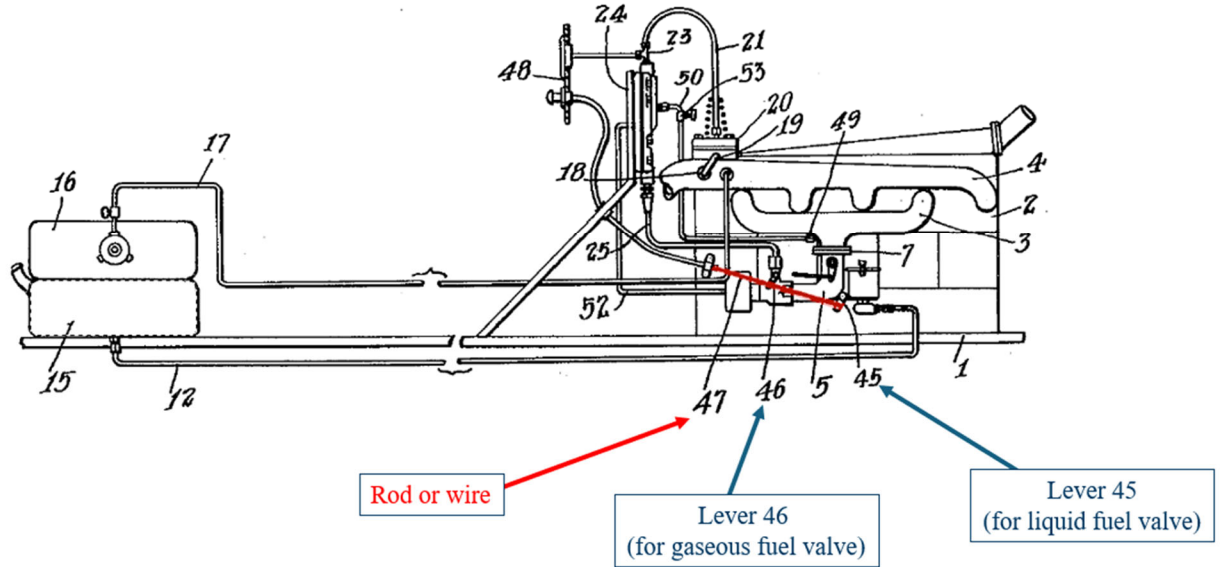


Fig.1

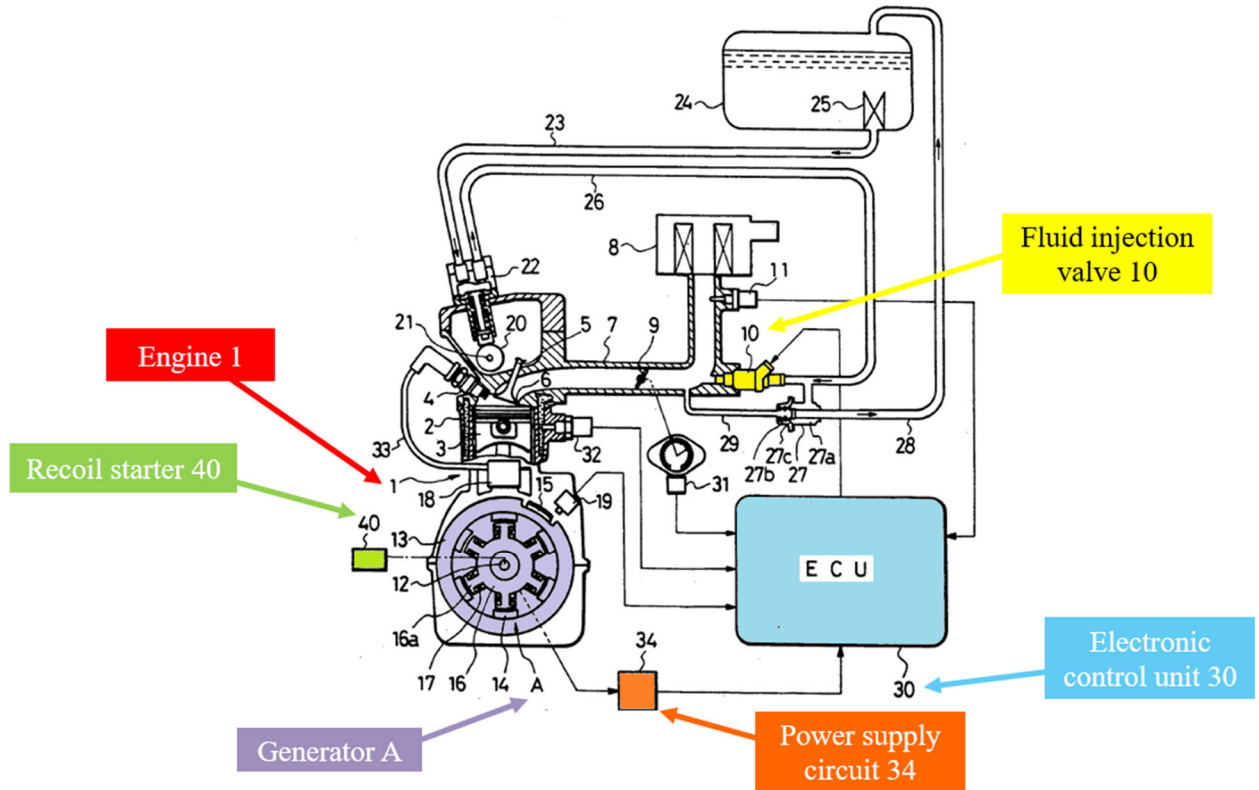


Ex.1008, FIGS. 1-2 (annotated).

D. U.S. Patent No. 5,161,496 (“Matsushima”)

Matsushima issued in 1992. Ex.1012. It is prior art under §102(a).

Matsushima discloses an internal combustion engine and generator equipped with no battery that is started using a manual recoil starter 40:



Ex.1012, FIG. 1 (annotated), 1:38-2:2, 3:53-66, 4:43-6.

During engine startup, the generator supplies voltage to an electronic control unit (ECU) 30, as well as fuel pump 22, spark plug 4, and fuel injection valve 10. *Id.*, 5:1-48. Power supply circuit 34 rectifies, smooths, and stabilizes output voltage from the generator. *Id.*, 4:43-46.

E. U.S. Patent No. 5,301,644 (“Olmr”)

Olmr issued in 1994. Ex.1007. Olmr is prior art under §102(a).

Olmr teaches locating a solenoid valve within the float bowl 30 of the carburetor. Ex.1007, 1:33-48, 2:30-42, FIG. 2. Specifically, solenoid valve 42

“provide[s] a mechanism for cutting off the supply of fuel to an internal combustion engine when the engine is being stopped,” as seen in Olmr’s FIG. 2:

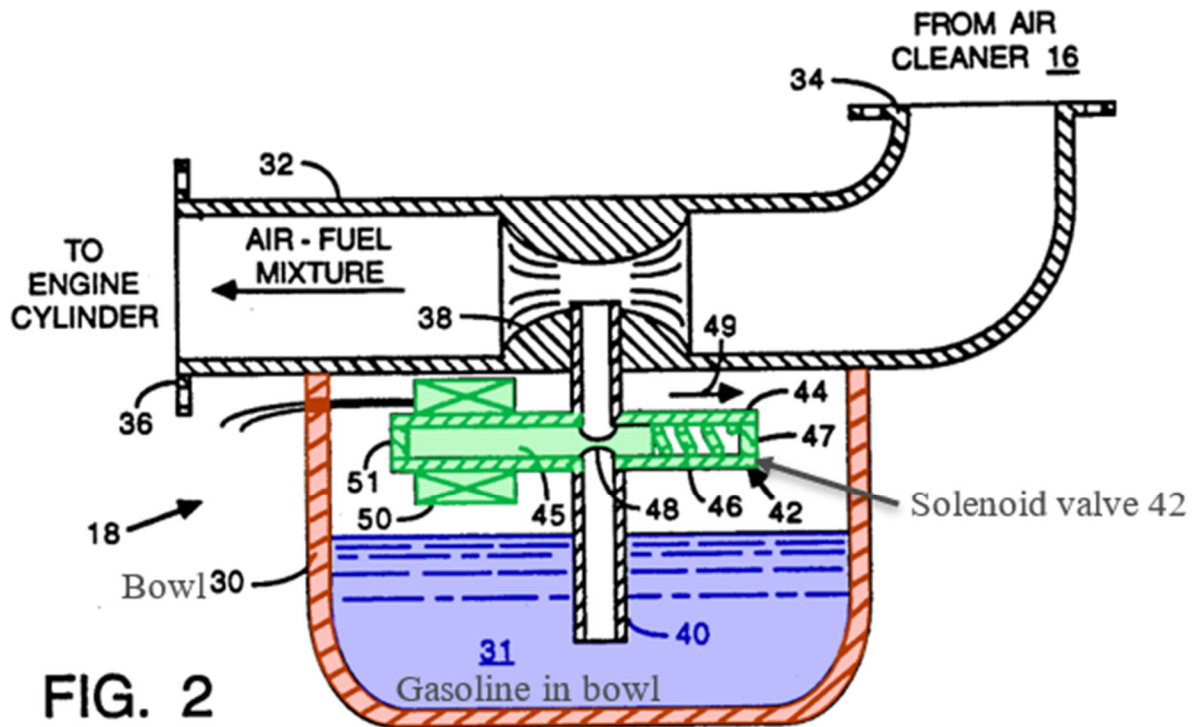


FIG. 2

Id., 1:33-37, FIG. 2 (annotated); Ex.1003, [0080].

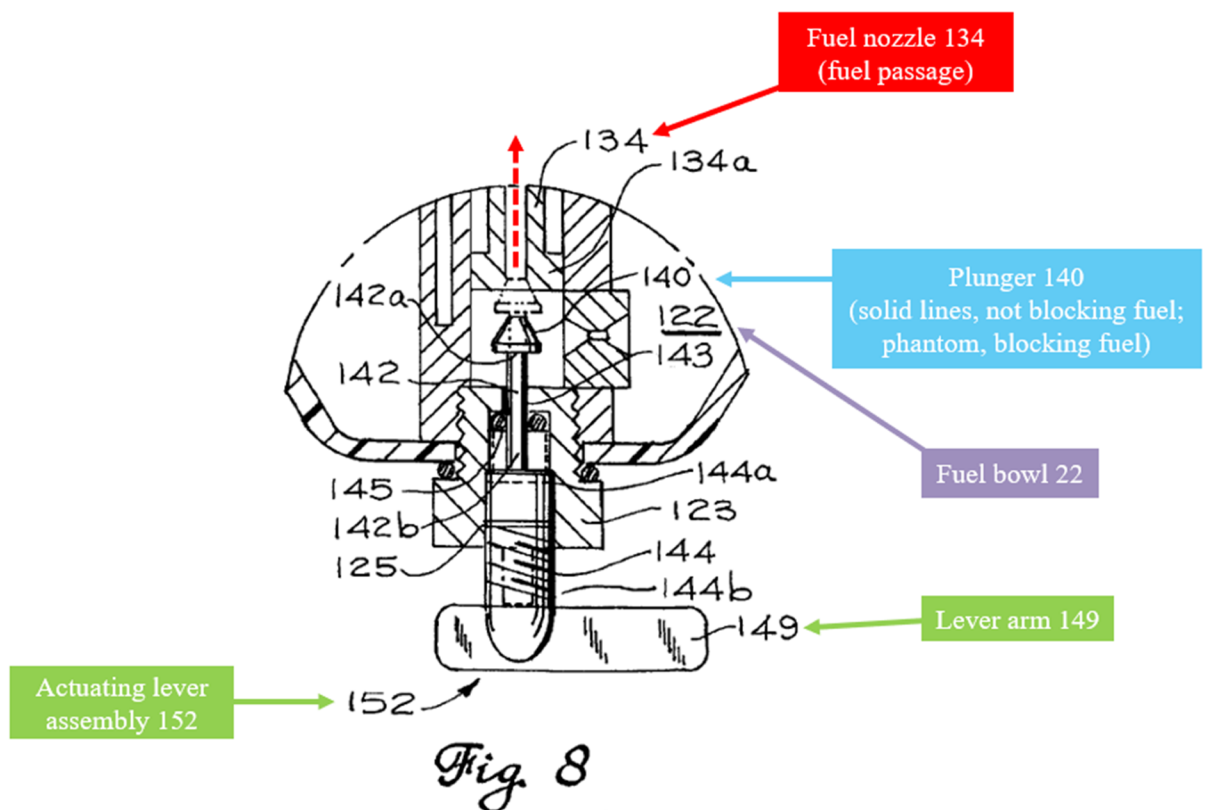
F. U.S. Patent No. 6,213,083 (“Winberg”)

Winberg issued in 2001. Ex.1013. It is prior art under §102(a).

Winberg discloses a fuel shutoff system in the float bowl of an engine. Ex.1013, Abstract, FIGS. 1-8, 3:61-4:33, 5:34-6:16, 7:31-55, 7:65-8:52. The fuel shutoff includes a blocking member or plunger 40/140 that blocks and unblocks the flow of fuel from the float bowl to the fuel passage in fuel nozzle 34/134, thus

blocking the flow of fuel from the float bowl to the throat. *Id.*, FIGS. 1-8, 5:34-6:16, 7:31-55, 7:65-8:52.

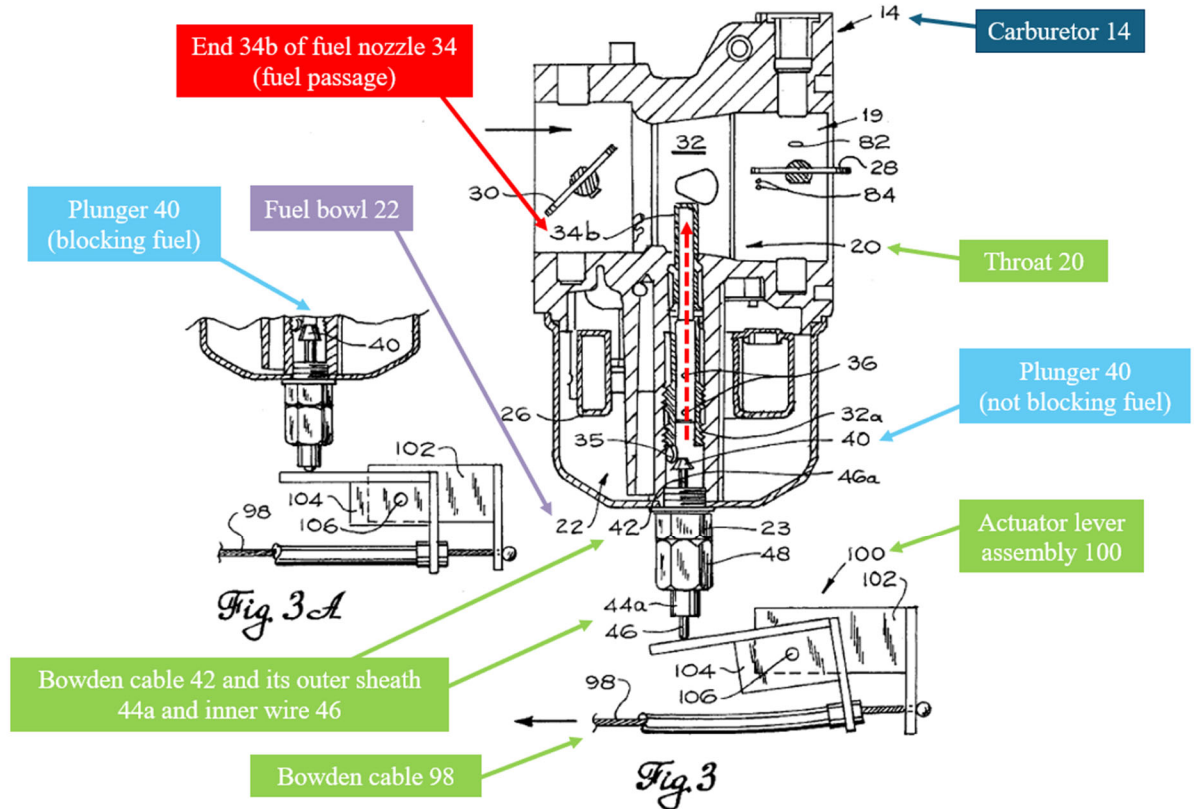
In the embodiment of FIG. 8, the fuel shutoff actuates by rotating a connecting member 142 using a lever arm 149 attached to a lever assembly 152, which moves plunger 140 between a blocking position and a non-blocking position:



Id., FIG. 8, 7:65-8:52.

In the embodiment of FIGS. 3/3A, the fuel shutoff actuates by attaching a Bowden cable 42 to the plunger 40 at one end and to a moveable member 104 of an actuator lever assembly 100 at the other end. *Id.*, 7:31-55. The moveable

member 104 pivots about pivot point 106 between a run and stop position by actuation of another Bowden cable 98. *Id.*



Id., FIGS. 3-3A (annotated), 3:61-4:33, 5:34-6:16, 7:31-55.

G. DuroMax XP4400EH Operator's Manual ("DuroMax")

DuroMax was published/publicly available at least by November 1, 2012. Ex.1017, ¶¶18-19. DuroMax is prior art under 35 U.S.C. §102(a). DuroMax discloses a dual fuel generator that runs alternatively on gasoline or LPG.

H. U.S. Patent No. 3,178,000 ("Walker")

Walker issued in 1973. Ex.1015. It is prior art under §102(a).

Walker discloses a dual fuel engine using gasoline and LPG. Ex.1013, Abstract.

VII. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Claims 1-5 and 10 are Rendered Obvious by Workshop Manual.

1. Claim 1

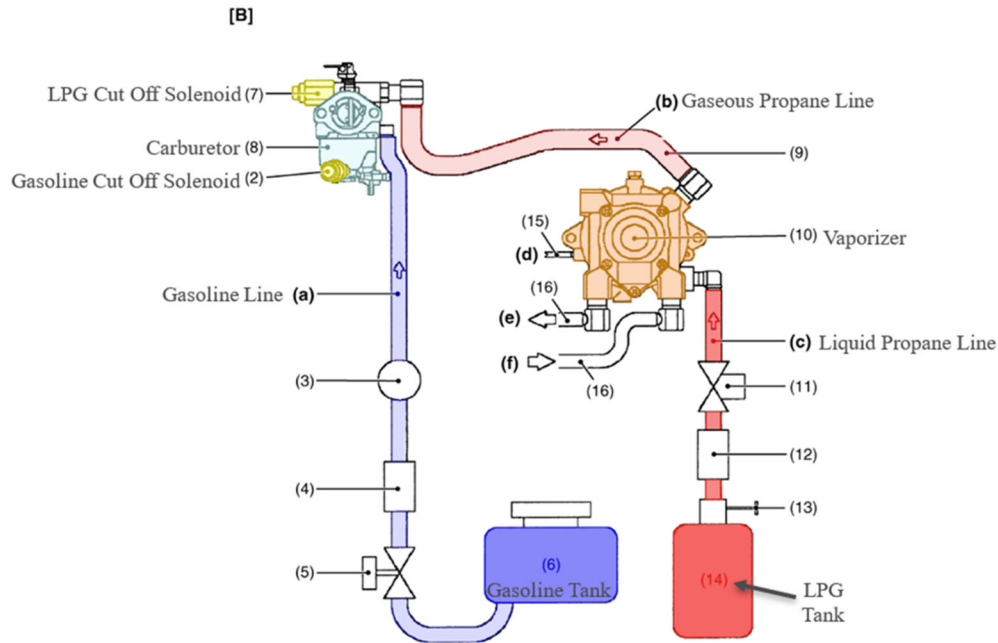
a. Element [1.0]

Workshop Manual teaches a dual fuel engine. Ex.1009, 65. It would have been obvious to a POSA to have implemented Workshop Manual's dual fuel engine in a generator, as dual fuel generators were well known as of the earliest priority date of the '145 Patent. Ex.1016; Ex.1003, [0088].

b. Element [1.1]

Element [1.1] recites “an engine operable on a gaseous fuel and a liquid fuel.”

Workshop Manual teaches that the DF-972 engine uses both “[g]asoline fuel” (a liquid fuel) and “LPG fuel” (a gaseous fuel) *Id.*, 65. The figure below discloses the DF-972 fuel system:



Ex.1009, p.65. (Annotated)

Workshop Manual discloses operation on LPG. Ex.1009, 1, 8, 30, 64-69, 84. While tank (14) contains LPG in both liquid and vapor form, Workshop Manual explains “[t]he liquid fuel is evaporated in vaporizer and is sent to the DF [dual fuel] carburetor (8) as a gaseous fuel.” *Id.*, 65, 69 (describing the vaporizer operation).

As confirmed by the ’145 Patent, gasoline is liquid fuel and LPG is a gaseous fuel. Ex.1001, 4:9-14. Accordingly, a POSA would have understood that Workshop Manual teaches [1.1]. Ex.1003, [0092].

c. Element [1.2]

Element [1.2] recites “an electrical power generator driven by the engine and comprising a charging coil.”

Workshop Manual's dual fuel engine includes "a rotating magnet type generator" (i.e., an alternator). Ex.1009, 77. The alternator is driven by the engine (belt and pulley system). *Id.*, 33. The alternator comprises a charging coil. *Id.*, 132. Workshop Manual specifies that the alternator outputs 150W at 12V. *Id.*, 8. Thus, Workshop Manual discloses an electrical power generator, powered by operation of the DF-972 engine, and comprising a charging coil. Accordingly, a POSA would have understood that Workshop Manual teaches [1.2]. Ex.1003, [0094].

d. Element [1.3]

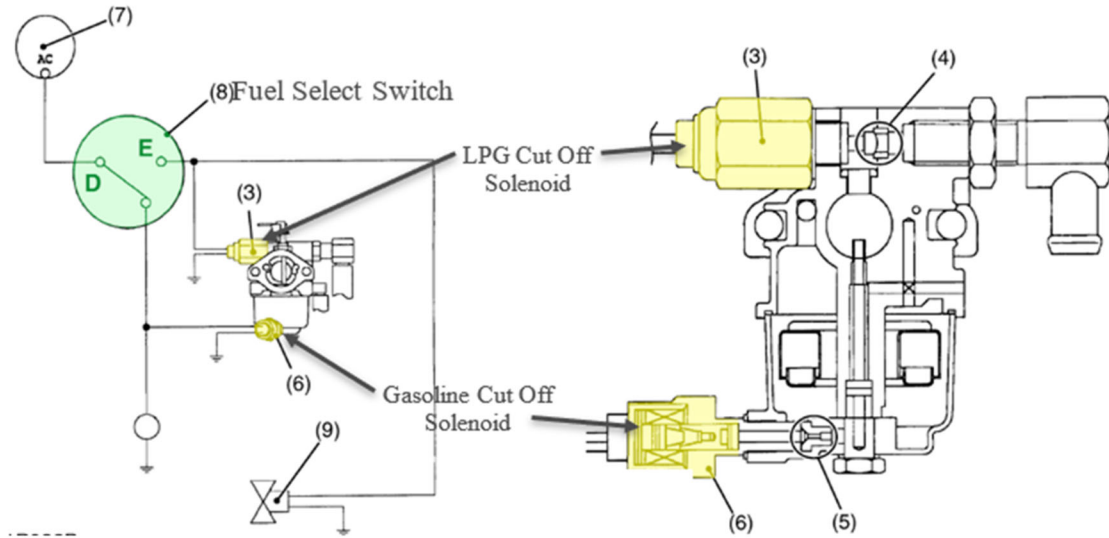
Element [1.3] recites "a switch to change operation of the engine between gaseous fuel and liquid fuel."

Workshop Manual discloses a switch (i.e., "Fuel Select Switch") that changes operation of the engine between gaseous fuel and liquid fuel:

With the fuel select switch (8) in the "GASOLINE" position "D" ..., the battery current flows to the gasoline cut off solenoid (6). Therefore gasoline fuel in the float chamber flows to the mixing chamber. When the fuel select switch (8) is turned to the "LPG" position "E," the battery current stops to the gasoline cut off solenoid... [t]hen, the gasoline fuel flow is shut.

Ex.1009, 68.

This switch is also shown in Workshop Manual figures:



Id. (annotated).

Accordingly, a POSA would have understood that Workshop Manual teaches [1.3]. Ex.1003, [0098].

e. Element [1.4]

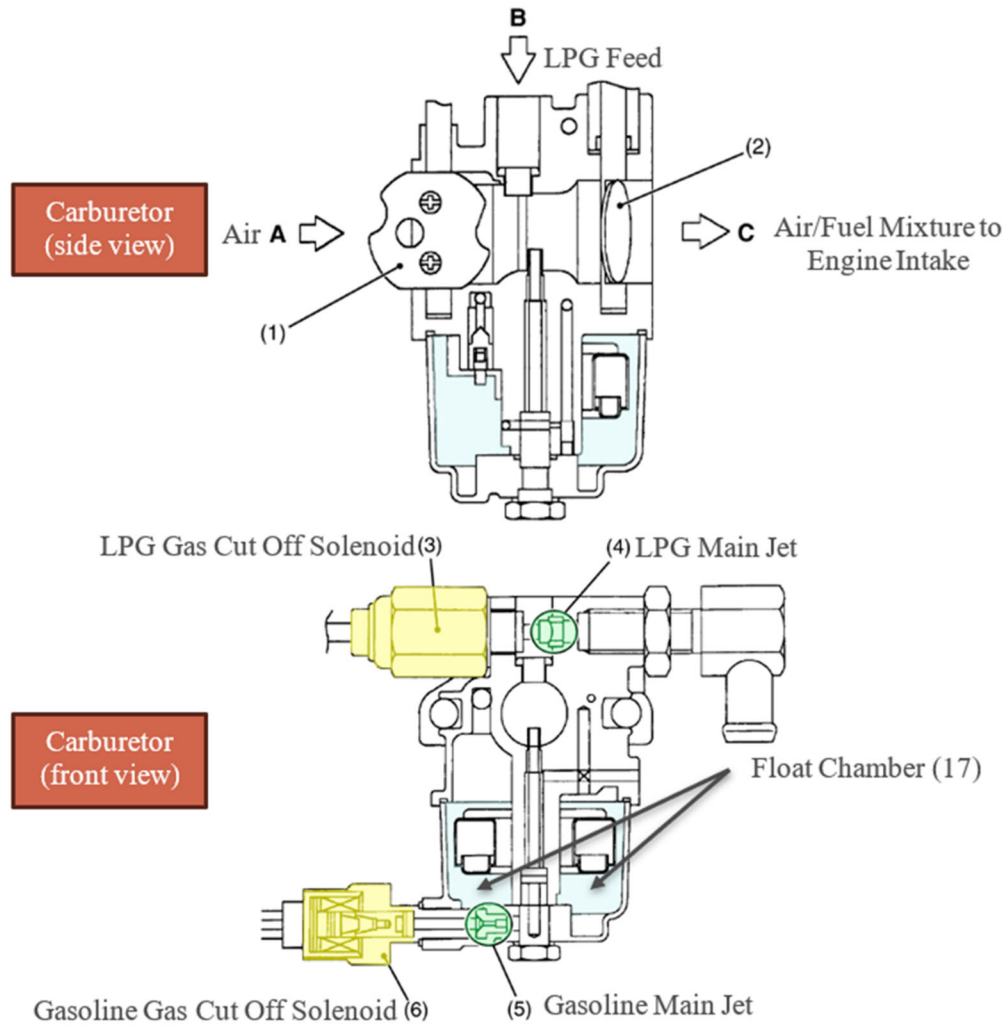
Element [1.4] recites “a carburetor attached to an intake of the engine to mix air and fuel and connect to a gaseous fuel source and a liquid fuel source.”

Workshop Manual discloses a carburetor that mixes air and fuel:

The mixer meters both fuel and air, and procedures [sic: produces] an air/fuel mixture that has the proper ratio as required by the engine. When the engine starts, the LPG furl [sic: fuel] flows out from main jet (4) to venture a constant amount and is mixed with air quantity corresponding to the opening of the throttle valve (1) and is supplied to the cylinder.

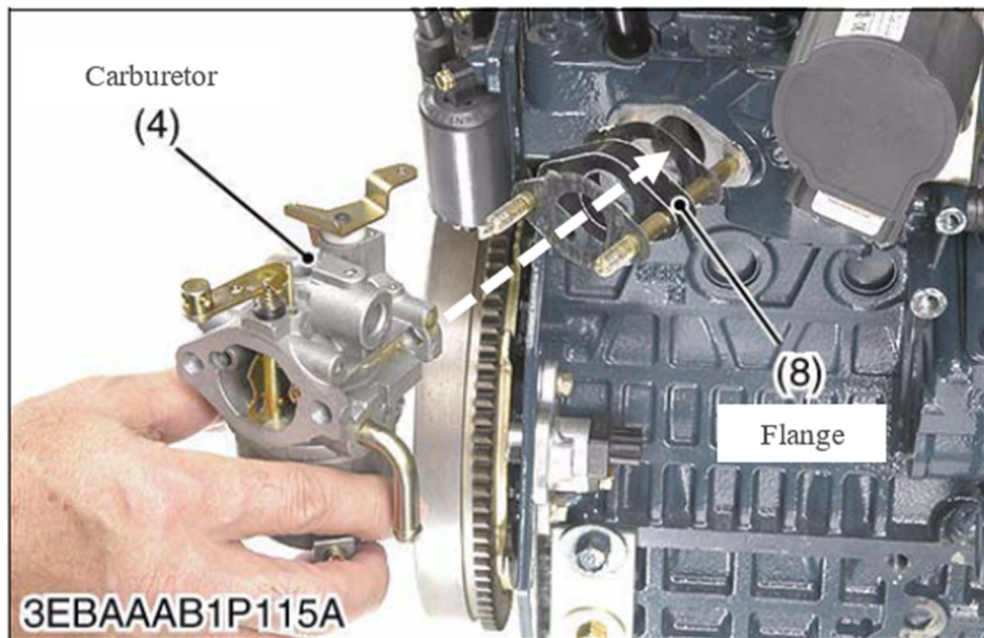
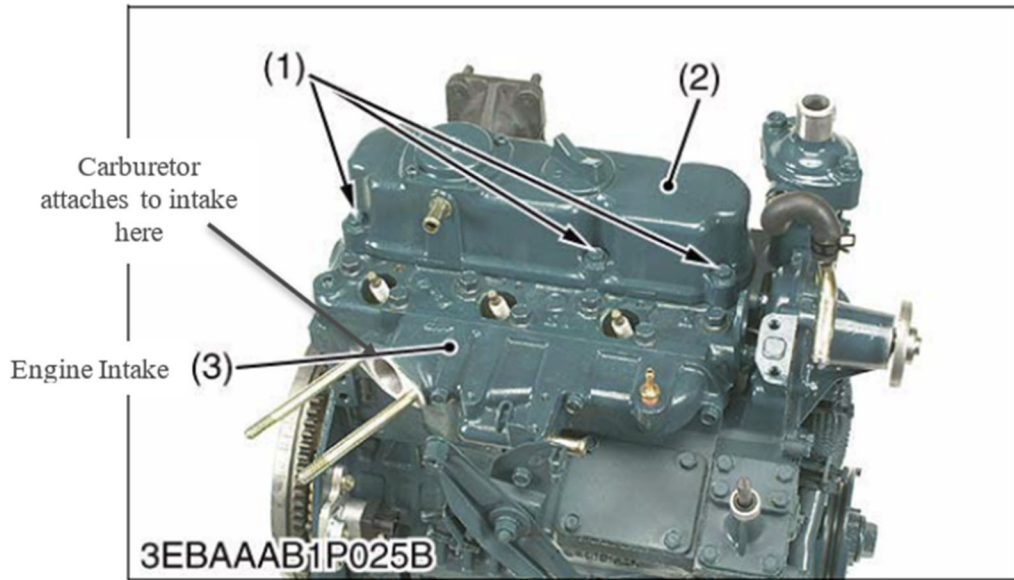
Ex.1009, 68.

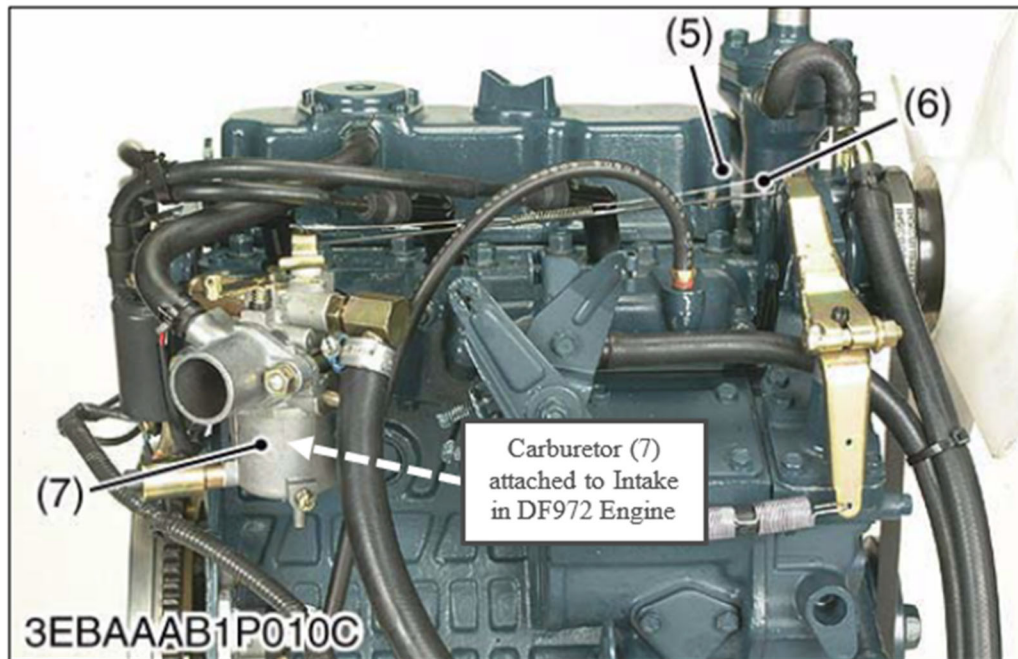
Workshop Manual figures illustrate the carburetor operation:



Id. (annotated); Ex.1003, [00101].

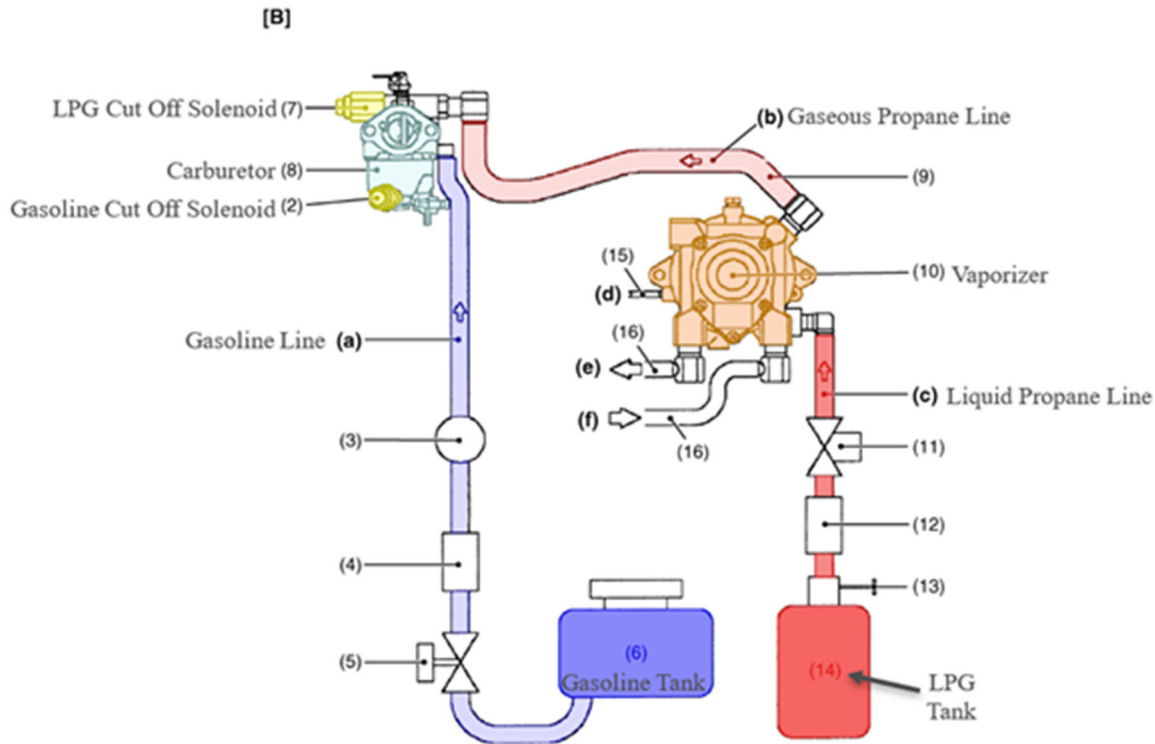
Workshop Manual shows the carburetor is attached to the engine intake:





Ex.1009, 115, 119 (annotated); Ex.1003, [0102].

Workshop Manual also discloses that the carburetor connects to the gaseous fuel source (LPG) and a liquid fuel source (gasoline):



Ex.1009, 65 (annotated); Ex.1003, [0103].

A POSA would have understood that Workshop Manual teaches a carburetor attached to the engine that mixes air and fuel, that thereby connects the gaseous fuel source and the liquid fuel source, as recited in Element [1.4]. Ex.1003, [0104].

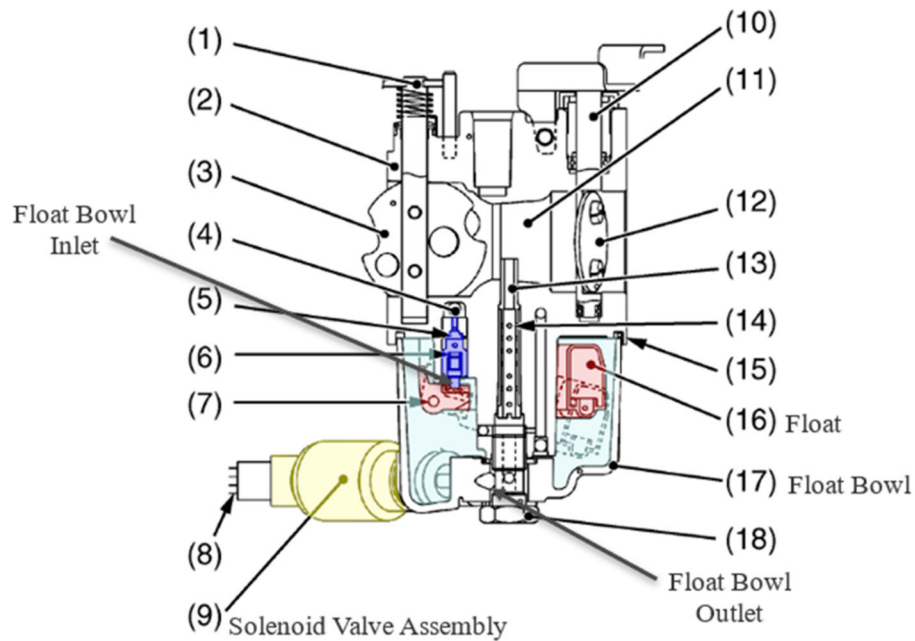
f. Element [1.5]

Element [1.5] recites “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.”

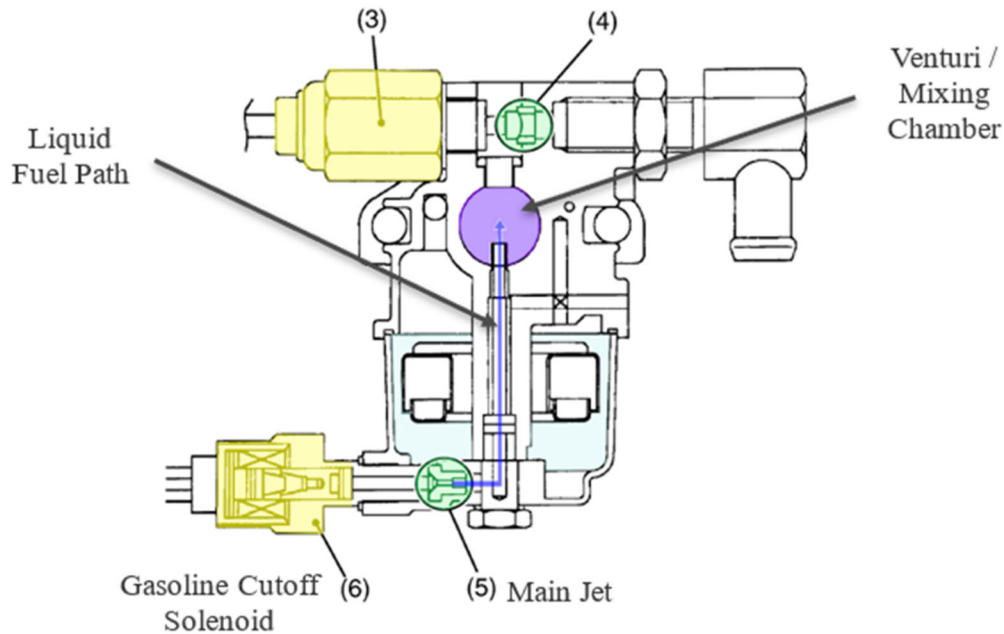
Workshop Manual discloses Gasoline Cut Off Solenoid (Ex.1009, 65), which is a “liquid fuel cut-off solenoid.” Ex.1003, [0106]. The fuel select switch changes operation of the engine between gaseous fuel and liquid fuel which results

in the liquid fuel cut off solenoid interrupting liquid fuel. Ex.1009, 65, 68.

§VII.A.1.e, *supra*. “When the fuel select switch (8) is turned to the ‘LPG’ position ‘E,’ the battery current stops to the gasoline cut off solenoid...[t]hen, **the gasoline fuel flow is shut.**” (emphasis added). *Id.*, 68.



Id., 67 (annotated).



Id., 68 (annotated).

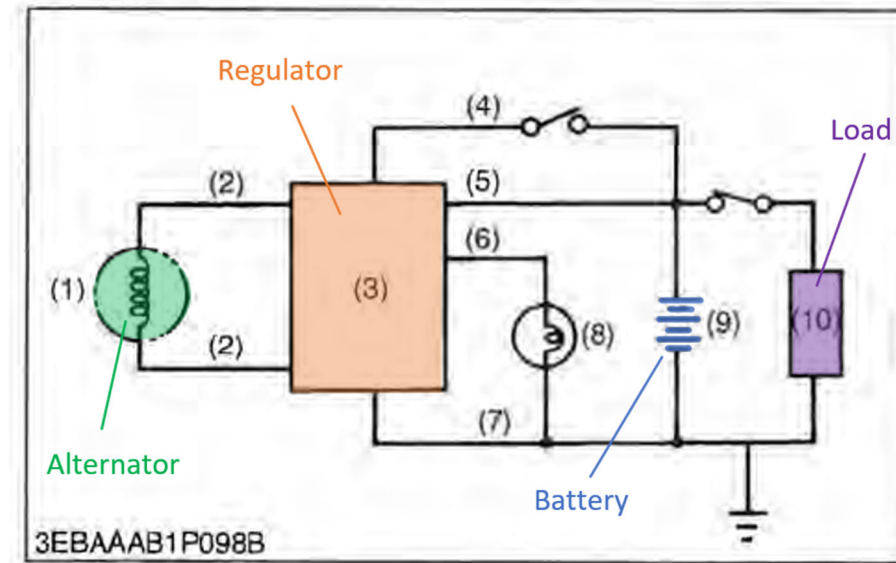
Accordingly, a POSA would have understood that Workshop Manual teaches [1.5]. Ex.1003, [0107].

g. Element [1.6]

Element [1.6] recites “a voltage regulator coupled to the charging coil to receive power therefrom and that operates to provide a regulated voltage to the liquid fuel cut-off solenoid.”

Workshop Manual teaches that the DF-972 engine includes an electrical power generator (i.e., a “rotating magnet type generator”). §VII.A.1.c, *supra*. This rotating magnet type generator is an alternator. Ex.1009, 77.

Workshop Manual discloses that the alternator is coupled to a voltage regulator:



Id., 77 (annotated); Ex.1003, [0110].

Workshop Manual teaches the “regulator converts AC into DC which flows through the power consuming circuits [e.g., load (10)] and the battery, and also charges the battery.” Ex.1009, 77.

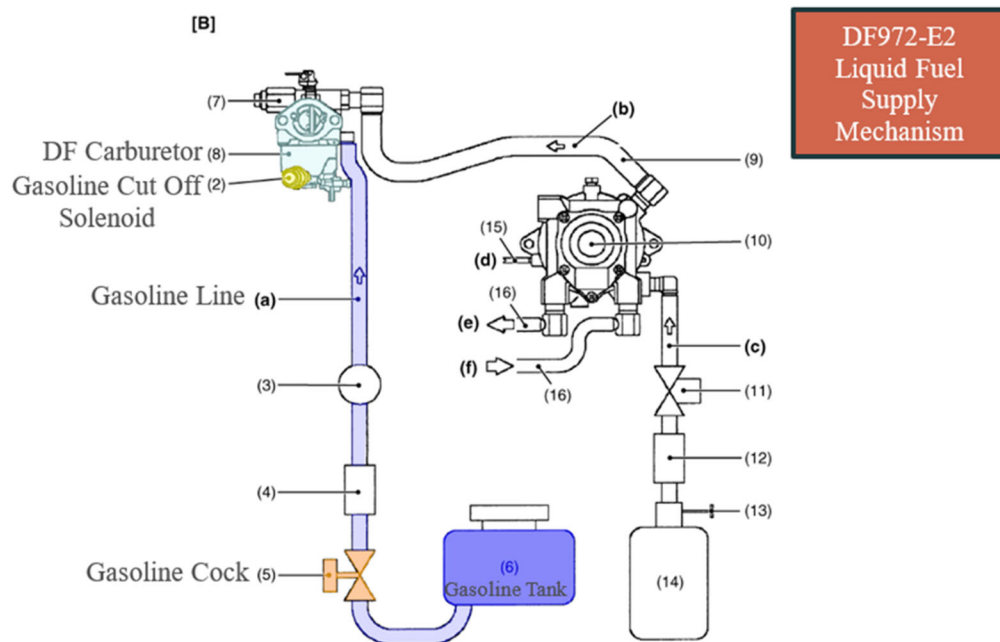
The liquid fuel cut off solenoid is powered by the rotating magnet type generator because operation of the solenoid depends on current flow generated by the rotating magnet type generator. §VII.A.1.f, *supra*. The voltage regulator provides a regulated voltage to the liquid fuel cut off solenoid because the rotating magnet type generator generates AC, which is converted to DC by the regulator,

which is then used to power the solenoid. Accordingly, a POSA would have understood that Workshop Manual teaches [1.6]. Ex.1003, [0112].

2. Claim 2

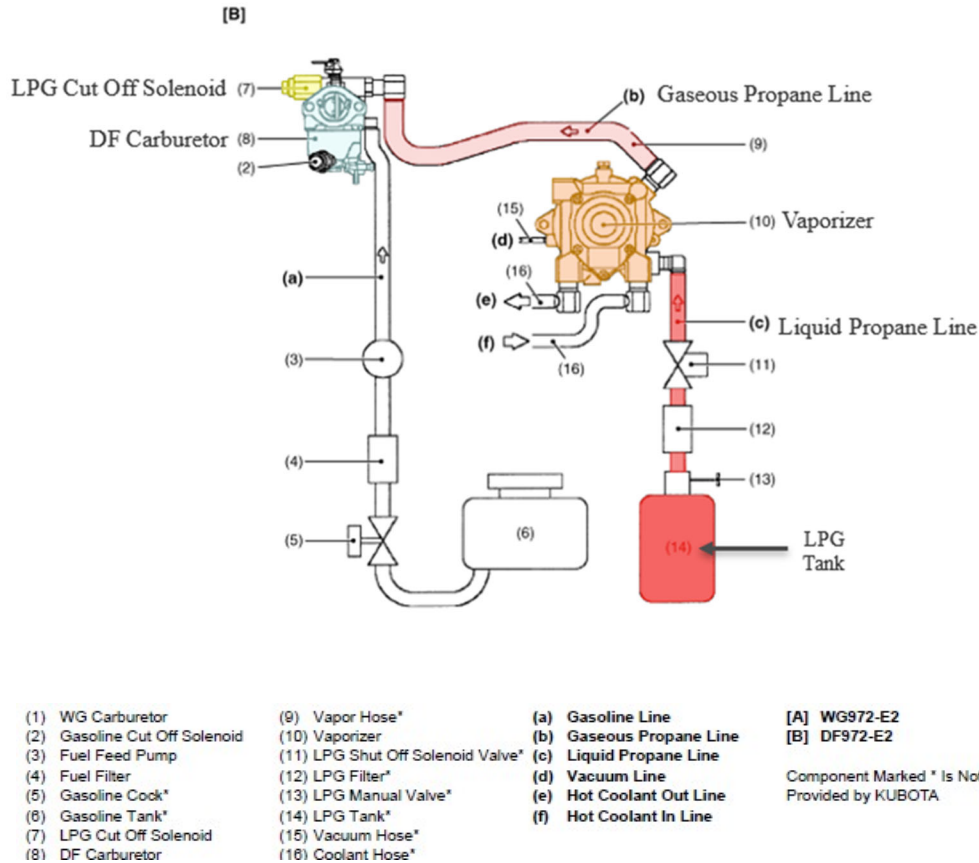
Claim 2 depends from claim 1 and recites “a liquid fuel valve along a liquid fuel line coupling the liquid fuel source to the carburetor; and a gaseous fuel valve along a gaseous fuel line coupling the gaseous fuel source to the carburetor.”

Workshop Manual discloses a liquid fuel valve (Gasoline Cock (5)) along a liquid fuel line (Gasoline Line (a)). Ex.1009, 65. The Gasoline Cock is positioned on the Gasoline Line coupling the gasoline tank to the carburetor:



Ex.1009, 65 (annotated).

Workshop Manual teaches an LPG fuel line coupling LPG Tank (14) to DF Carburetor (8), as illustrated below:



Ex.1009, 65 (annotated).

Workshop Manual describes the LPG fuel line:

For 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 through the LPG filter (12) and LPG shut off solenoid valve (11).

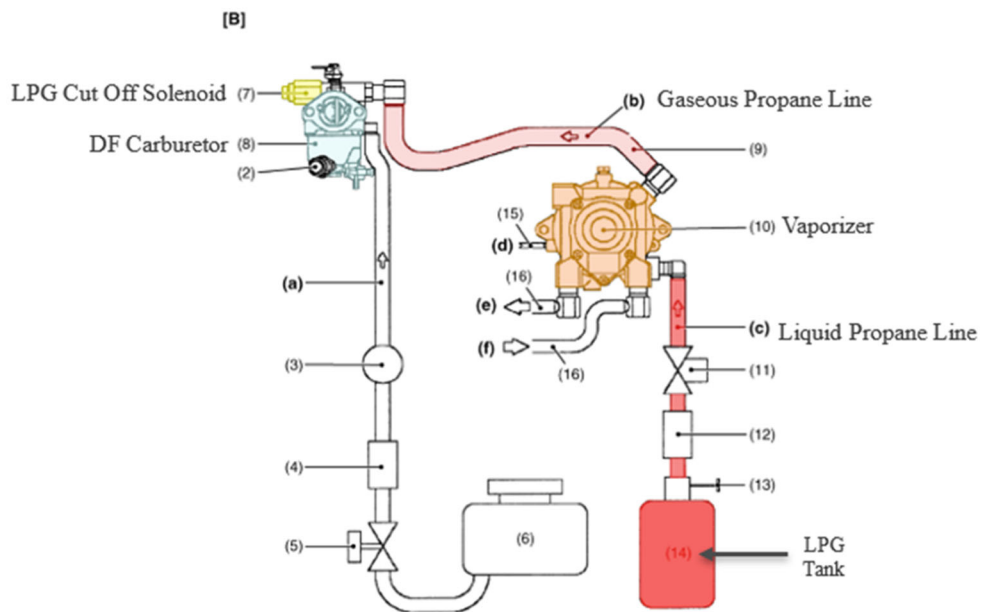
The liquid fuel is evaporated in vaporizer and is sent to the DF carburetor (8) as a gaseous fuel of gas pressure near the atmospheric pressure. The DF carburetor (8) mixes the gas and air is supplied in the cylinder.

Ex.1009, 65.

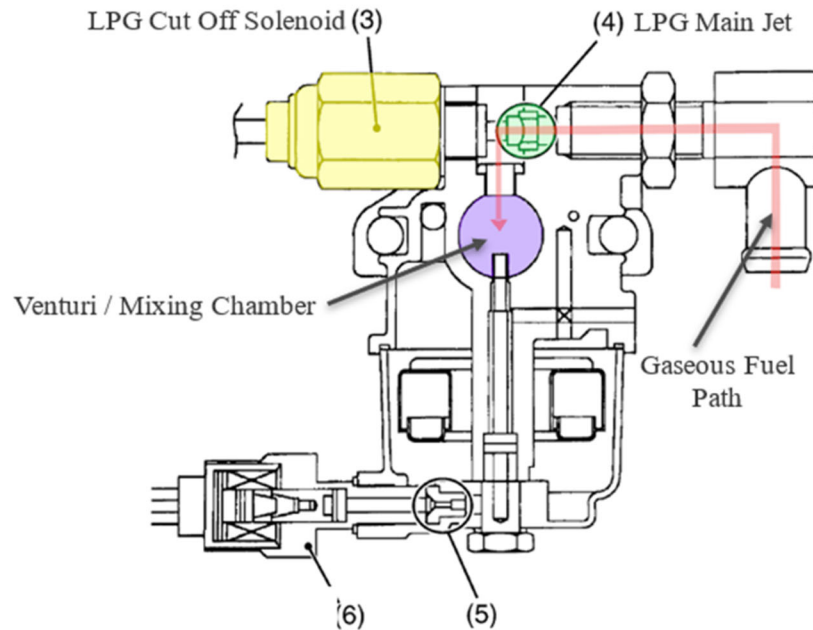
Workshop Manual discloses three structures, each of which teaches “a gaseous fuel valve.” Workshop Manual discloses LPG Manual Valve (13), which is a gaseous fuel valve positioned on the LPG fuel line. *Id.*; Ex.1003, [0117]. Workshop Manual also discloses LPG Cut Off Solenoid and LPG Shut Off

Solenoid Valve, each of which is a gaseous fuel valve positioned on the LPG fuel line. Ex.1009, 65, 68; Ex.1003, [0117].

As shown below, LPG Manual Valve (13), LPG Shut Off Solenoid Valve (11), and LPG Cut Off Solenoid (7) all are positioned on the LPG fuel line coupling the LPG tank to the carburetor:

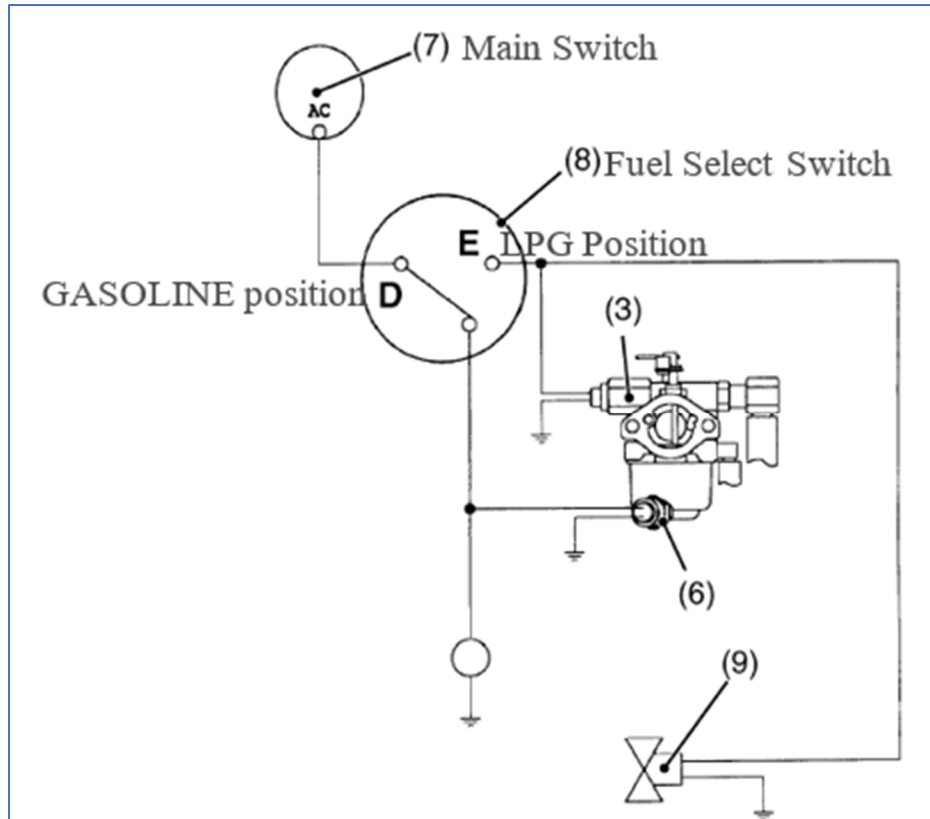


Ex.1009, 65 (annotated).



Ex.1009, 68 (annotated).

LPG Cut Off Solenoid and LPG Shut Off Solenoid Valve each opens and closes the LPG fuel line coupling the LPG tank to the carburetor. Ex.1009, 65, 68. (“When the fuel select switch (8) is turned to the “LPG” position “E”, the battery current...flows to the LPG cut off solenoid (3) and LPG shut off solenoid valve (9). Then...LPG fuel flows to the mixing chamber.”). Ex.1009, 68.



Id.

Accordingly, a POSA would have understood that Workshop Manual teaches claim 2. Ex.1003, [0120].

3. Claim 3

Claim 3 depends from Claim 2 and recites “wherein each of the liquid fuel valve and the gaseous fuel valve comprises a mechanical valve.”

Workshop Manual discloses a liquid fuel valve, Gasoline Cock (5), which is a mechanical valve. §VII.A.2, *supra*; Ex.1003, [0122].

Workshop Manual discloses LPG Manual Valve (13), which is a mechanical valve. §VII.A.2, *supra*; Ex.1003, [0123].

Workshop Manual also discloses LPG Cut Off Solenoid (7) and LPG Shut Off Solenoid Valve (11), each of which mechanically interrupts the flow of LPG from the LPG fuel source to the carburetor.

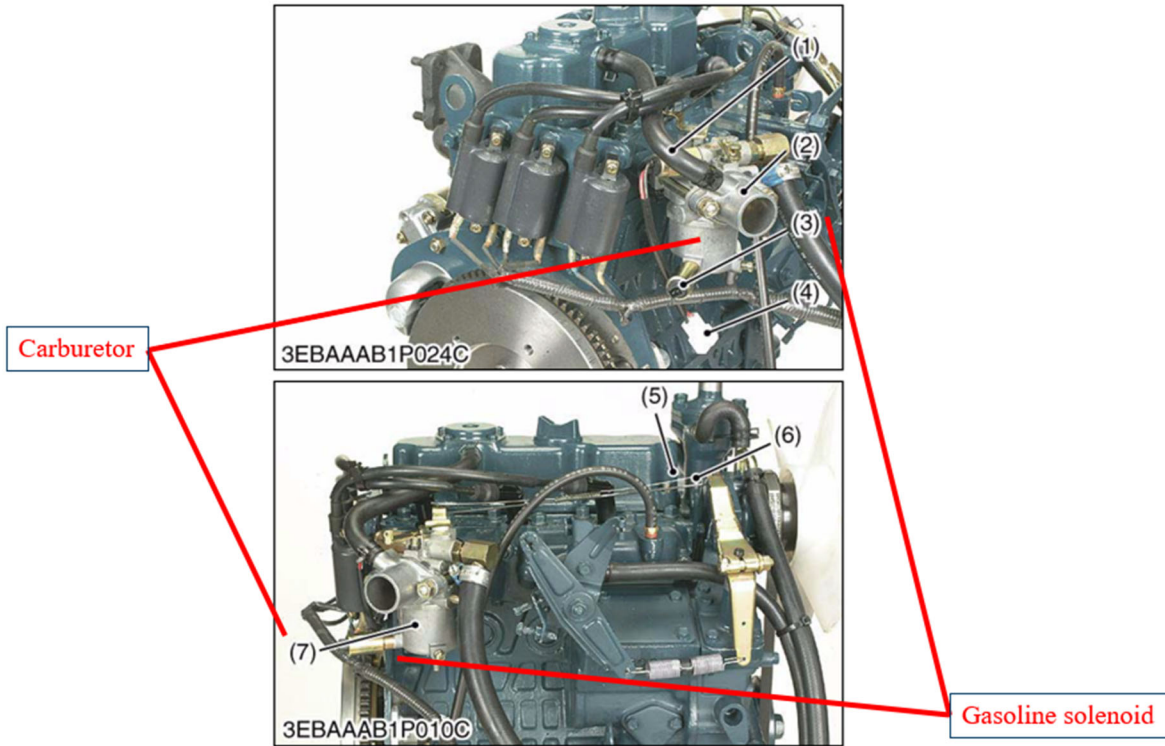
To the extent LPG Cut Off Solenoid and/or LPG Shut Off Solenoid Valve is not considered a mechanical valve, a POSA would have understood that a mechanical valve can substitute for LPG Cut Off Solenoid and/or LPG Shut Off Solenoid Valve, and would have had a reasonable expectation of success in doing so. A POSA would have understood that a mechanical valve and a solenoid valve both will function to mechanically interrupt the flow of LPG. A POSA would have understood that a mechanical valve is less prone to malfunction (e.g., avoids solenoid coil failure), is less costly, and does not rely on electrical power to function in fuel flow applications, and can be substituted for solenoid valves in such applications. Ex.1003, [0124].

Accordingly, a POSA would have understood that Workshop Manual teaches claim 3. Ex.1003, [0125].

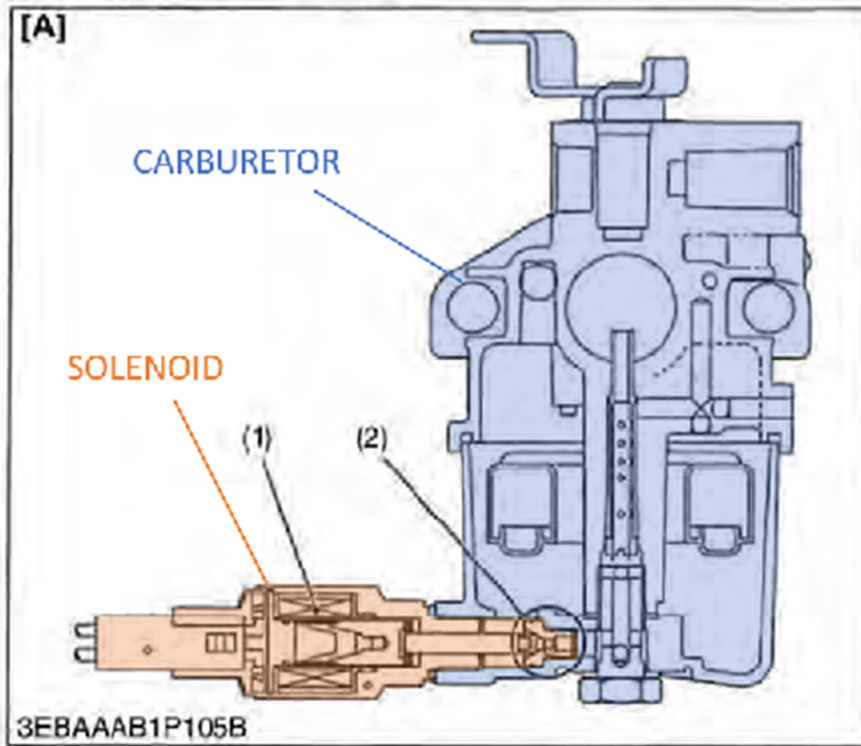
4. Claim 4

Claim 4 depends from Claim 2 and recites “wherein the liquid fuel cut-off is attached to the carburetor.”

Workshop Manual discloses the liquid fuel cut-off (Gasoline Cut Off Solenoid) is attached to the carburetor:



[3] SOLENOID



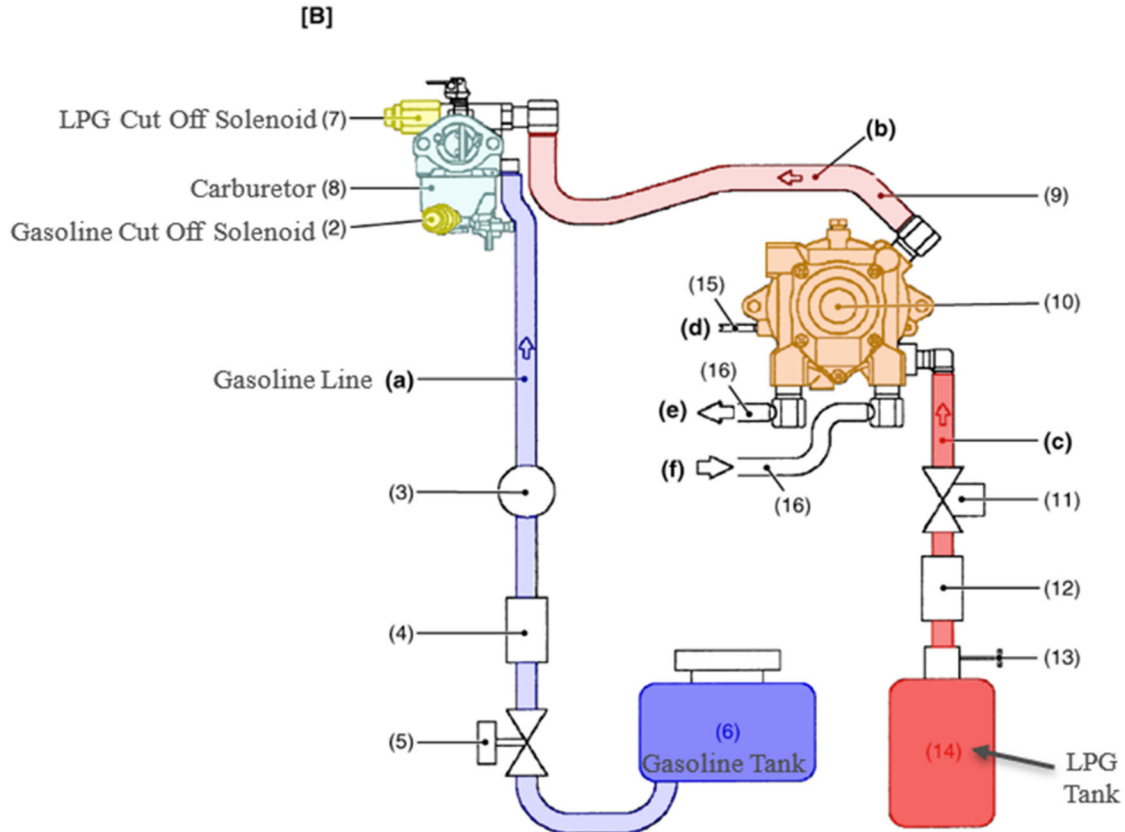
Ex.1009, 80, 115 (annotated); Ex.1003, [0127].

Accordingly, a POSA would have understood that Workshop Manual teaches claim 4. Ex.1003, [0128].

5. Claim 5

Claim 5 depends from Claim 1 and recites “wherein the gaseous fuel is LPG and the liquid fuel is gasoline.”

Workshop Manual’s dual fuel engine operates on gasoline and LPG:



Ex.1009, 65 (annotated); §VII.A.1.b, *supra*; Ex.1003, [0130].

Accordingly, a POSA would have understood that Workshop Manual teaches claim 3. Ex.1003, [0131].

6. Claim 10

Claim 10 depends from Claim 1 and recites “wherein the electrical power generator comprises a magneto or an alternator.”

Workshop Manual teaches that the DF-972 engine includes an electrical power generator (i.e. a “rotating magnet type generator”). §VII.A.1.c, *supra*. This rotating magnet type generator is an alternator. Ex.1009, 77. Accordingly, a POSA would have understood that Workshop Manual teaches claim 10. Ex.1003, [0133].

B. Ground 2: Claims 6-9 are Rendered Obvious by the Combination of Workshop Manual, Matsushima, and Olmr.

1. Claim 6

Claim 6 depends from Claim 1 and recites “wherein the switch is an electro-mechanical switch connecting one fuel source to the carburetor and connected to the electrical power generator, and wherein the liquid fuel cut-off solenoid is connected to open and close a fuel path to the engine in response to reception of electrical power from the switch.”

Workshop Manual’s fuel select switch changes operation of the engine between gaseous fuel and liquid fuel. §VII.A.1.d, *supra*. The fuel select switch is user actuatable and uses a mechanical part to control the flow of electrical current, making it an electro-mechanical switch. Because operation of fuel select switch dictates which fuel is supplied to the carburetor, it connects one fuel source to the carburetor. Ex.1003, [0137].

Workshop Manual’s fuel select switch is connected to the electric power generator via the battery. Ex.1009, 68. A POSA would have understood that the fuel select switch could be connected to the generator in the absence of the battery (to power the solenoids), just as Matsushima’s components (such as its fluid injection valve 10) are connected to its generator. Ex.1012, FIG. 1, 5:1-48; Ex.1003, [0138].

Liquid fuel cut off solenoid opens and closes the liquid fuel path upon actuation of the fuel select switch. §VII.A.A.1.f, *supra*. The fuel select switch also selectively powers the liquid fuel cut off solenoid via current flow. §VII.A.A.1.d, *supra*. Thus, the fuel select switch dictates whether the liquid fuel cut off solenoid opens or closes a fuel path to the engine in response to reception of electrical power from the switch. Ex.1003, [0139].

Accordingly, a POSA would have understood that the combination of Workshop Manual and Matsushima teaches claim 6. Ex.1003, [0140].

2. Claim 7

Claim 7 depends from Claim 6 and recites “wherein the switch selectively powers the solenoid valve by controlling electrical connection between the solenoid valve and the electrical power generator.”

The liquid fuel cut off solenoid opens and closes a fuel path in response to reception of current due to the positioning of the fuel select switch. §VII.B.1, *supra*. A POSA would have understood that the combination of Workshop Manual and Matsushima teaches claim 7. Ex.1003, [0142].

3. Claim 8

Workshop Manual teaches all limitations of claim 1. §VII.A.1, *supra*. Claim 8 depends from claim 1 and recites: “wherein the liquid fuel cut-off solenoid

is normally open to provide liquid fuel to the engine when the liquid fuel cut-off solenoid is unpowered.”

Workshop Manual discloses a liquid fuel cut-off solenoid. §VII.A.1.f, *supra*. It would have been obvious to a POSA to use Olmr’s solenoid valve 42 in place of Workshop Manual’s liquid fuel cut-off solenoid. Olmr’s solenoid valve is normally open (Ex.1007, 3:43-52), and the decision to configure a solenoid as normally open or normally closed is mere design choice. Ex.1003, [0145].

A POSA 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:

Electricity is not required to hold the valve in this position during engine starting and normal running. This is a key feature since many small gasoline engines do not utilize a battery or other source of power for starting. Thus upon commencement of engine operation, a source of electricity is not required as solenoid valve is in the normally open position. In addition, should the valve control circuit fail, the spool valve plunger 45 will fail in the normally open position allowing continued operation of the engine.

Ex.1007, 3:43-52.

Accordingly, a POSA would have understood that the combination of Workshop Manual and Olmr teaches claim 8. Ex.1003, [0147].

4. Claim 9

Claim 9 depends from claim 8 and recites: “wherein the dual fuel generator is a batteryless dual fuel generator and the engine is a pull-start engine, the batteryless dual fuel generator further comprising a pull-starter that drives the electrical power generator to power and close the liquid fuel cut-off solenoid while starting the engine on gaseous fuel.”

Matsushima discloses a batteryless engine including a pull-start (recoil starter 40). Ex.1012, 1:6-11 (“adapted for use in...engines with no battery”), 4:63-5:21.

It would have been obvious to a POSA to incorporate Matsushima’s pull-start to supply electrical power in Workshop Manual’s engine. Matsushima’s pull-starter drives an electrical power generator to power various components while starting its engine (including its fuel pump, spark plug, and fuel injection valve). Ex.1012, Abstract, 5:1-48; Ex.1003, [0150]. Incorporating Matsushima’s pull-starter assembly with Workshop Manual’s engine would similarly allow the pull-starter assembly to drive a generator to power and close Workshop Manual’s liquid fuel cut-off solenoid while starting the engine on gaseous fuel. *Id.*

A POSA would have been motivated to incorporate Matsushima's pull-starter and would have had a reasonable expectation of success. Workshop Manual and Matsushima both relate to the same class of small spark-ignition engines that are offered with either battery-dependent electric start or battery-independent recoil (pull) start. Ex.1003, [0151]. Incorporating 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. Ex.1003, [0151].

A POSA would have reasonably expected success in adopting Matsushima's recoil mechanism for use in Workshop Manual's dual fuel engine. A POSA would have found it straightforward to mount Matsushima's recoil mechanism on Workshop Manual's engine with only routine mechanical adaptation. Ex.1003, [0152]. As of the earliest priority date of the '145 Patent, the use of recoil starters was common on small engines. Ex.1003, [0152]. Accordingly, a POSA would have understood that the combination of Workshop Manual and Matsushima teaches claim 9. Ex.1003, [0152].

C. Ground 3: Claims 1-10 are Rendered Obvious by the Combination of Nakafushi, Matsushima, and Olmr.

1. Motivation to Combine Nakafushi and Matsushima and Reasonable Expectation of Success.

Nakafushi and Matsushima both relate to internal combustion engines. §§VI.B, VI.D, *supra*. Internal combustion engines, including internal combustion engines operable on propane or gasoline, were well known as of the earliest priority date of the ‘145 Patent. §II.A, *supra*; Ex.1003, [0153]. The use of internal combustion engines in a generator, including internal combustion engines operable on propane or gasoline, also was well known as of the earliest priority date of the ‘145 Patent. Ex.1016; Ex.1003, [0153]. A POSA would have been motivated to combine Nakafushi and Matsushima, and would have had a reasonable expectation of success in combining Nakafushi and Matsushima, because both relate to internal combustion engines, and such engines were well known as of the earliest priority date of the ‘145 Patent. Ex.1003, [0153].

2. Claim 1

a. Element [1.0]

Nakafushi and Matsushima disclose a dual fuel engines. It would have been obvious to a POSA to have implemented a dual fuel engine in a generator, as dual fuel generators were well known as of the earliest priority date of the ‘145 Patent. Ex.1016; Ex.1003, [0154].

b. Element [1.1]

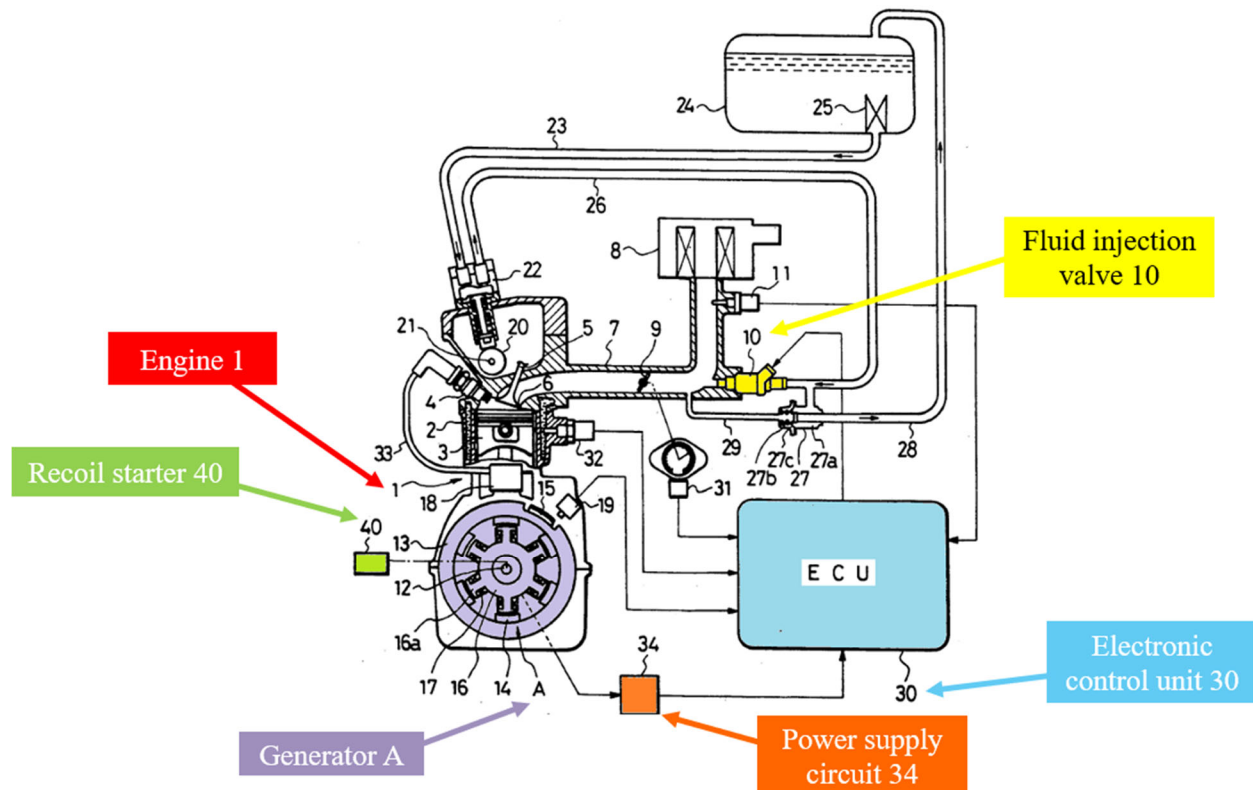
Element [1.1] recites “an engine operable on a gaseous fuel and a liquid fuel.”

Nakafushi’s engine uses gasoline (a “liquid fuel”) and LPG (a “gaseous fuel”) as fuel. Ex.1005, [0001].

c. Element [1.2]

Element [1.2] recites “an electrical power generator driven by the engine and comprising a charging coil.”

Matsushima discloses “AC generator A,” shown in FIG. 1 below:



Ex.1012, FIG. 1 (annotated), 3:53-66.

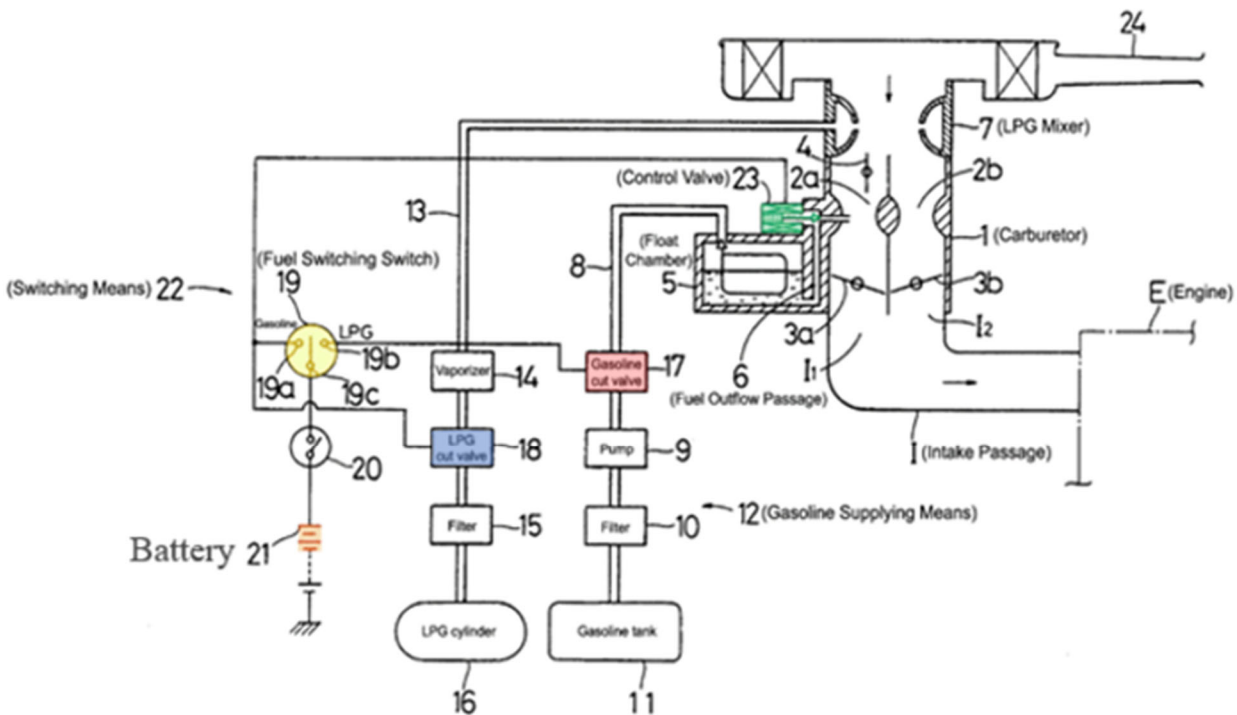
Generator A comprises flywheel 13 as a rotor having six first magnets 14 mounted on the inner peripheral surface of flywheel 13, and stator core 16 having six projections 16a and windings 17 wound around the respective projections 16a. Ex.1012, 3:53-66. The first magnets 14, the stator core 16, and the windings 17 of the generator A form a power supply unit. *Id.* Flywheel 13 is rigidly fixed to the crankshaft 12 of engine 1. *Id.* Flywheel 13 is rotated with the rotation of crankshaft 12, generating a voltage across the windings by rotation of flywheel 13. Ex.1012, 5:13-18. Accordingly, a POSA would have understood that generator A is “an electrical power generator driven by the engine and comprising a charging coil” as recited in [1.2]. Ex.1003, [0159].

d. Element [1.3]

Element [1.3] recites “a switch to change operation of the engine between gaseous fuel and liquid fuel.”

Nakafushi discloses “fuel switching switch 19” that changes operation of the engine between gaseous fuel and liquid fuel. Ex.1005, [0013]. Specifically, the switch 19 has a “gasoline-side contact point 19a and an LPG side contact point 19b,” and Nakafushi teaches that “the control valve 23 is connected to the gasoline contact point 19a of the fuel switching switch 19” and that gasoline cut valve 17 and LPG cut valve 18 are “connected to a gasoline-side contact point 19a and an

LPG side contact point 19b of [switch 19], respectively.” *Id.*, [0013]-[0014]. These elements are highlighted in FIG. 1 below:

FIG. 1

Id., FIG. 1 (annotated); Ex.1003, [0161].

Nakafushi discloses that when switch 19 is switched to the gasoline contact point 19a side, a cut signal is sent to the LPG cut valve 18 and simultaneously, control valve 23 receives a signal to open. Ex.1005, [0013]-[0014]. In contrast, when fuel switch 19 is switched to the LPG contact point 19b side, the reverse occurs where a cut signal is sent to the gasoline cut valve 17 to stop gasoline flow while the LPG valve 18 is opened. *Id.* Thus, movement of switch 19 allows for simultaneous operation of control valves 17, 18, and 23, which in turn changes

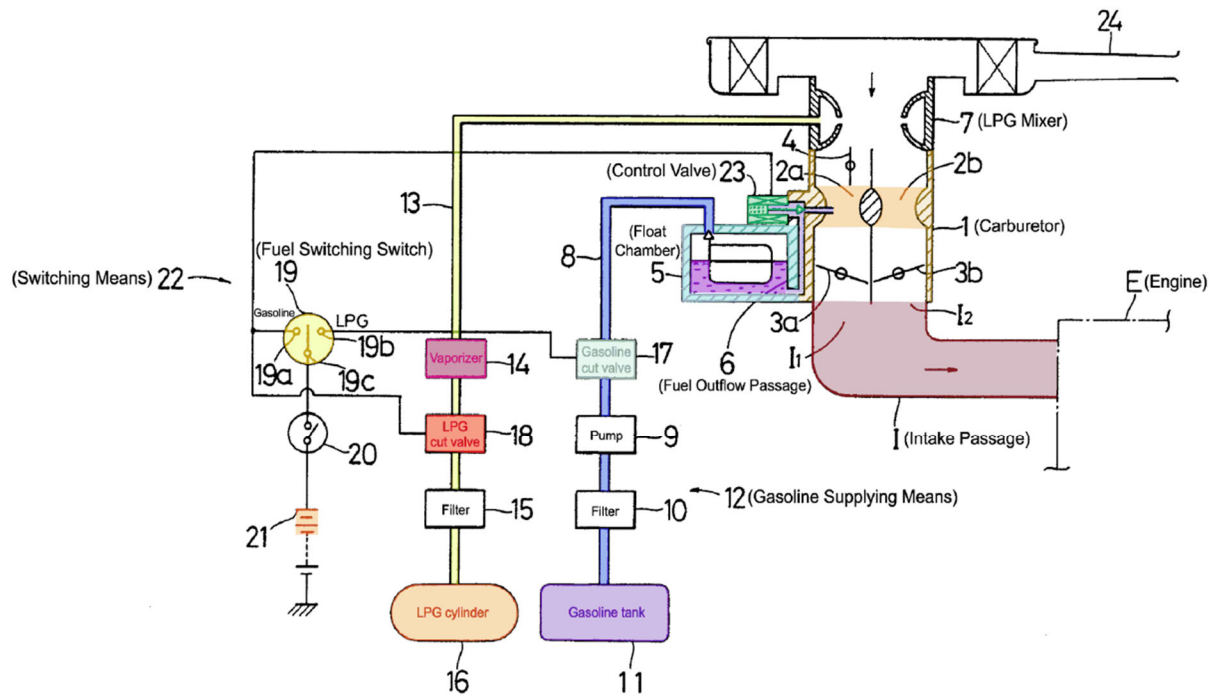
operation of the engine between gaseous fuel and liquid fuel. *Id.*. Accordingly, a POSA would have understood that Nakafushi teaches [1.3]. Ex.1003, [0163].

e. Element [1.4]

Element [1.4] recites “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.”

Nakafushi discloses carburetor 1 attached to the intake of the engine E, as seen in FIG. 1 below:

FIG. 1

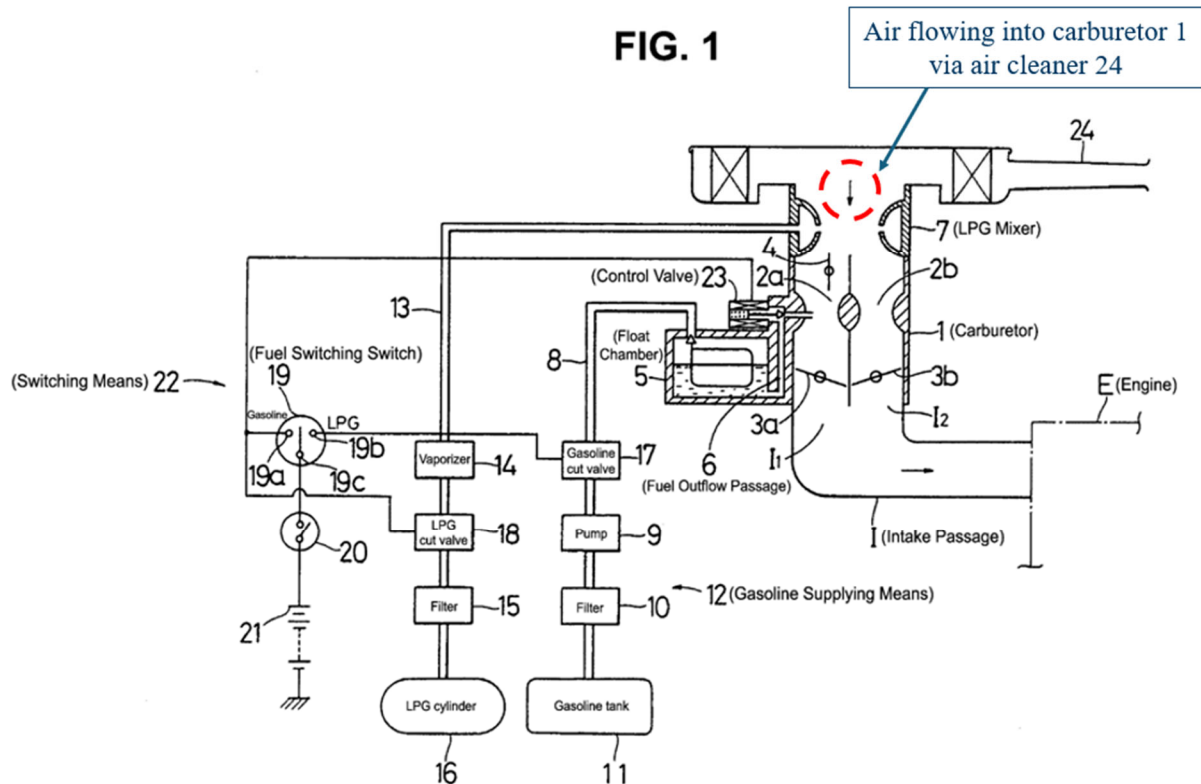


Ex.1005, FIG. 1 (annotated); Ex.1003, [0165].

Nakafushi states “E denotes an engine with a specification of an existing carburetor, I denotes an intake passage connected to the engine E, and a two-barrel

type carburetor 1 is disposed in the intake passage I.” Ex.1005, [0010]. The intake passage I of Nakafushi’s carburetor 1 has venturi portions 2a and 2b. *Id.*

Nakafushi discloses air flowing into carburetor 1 through air cleaner 24 to mix with gasoline or LPG in venturi portions 2a and 2b, as seen in FIG. 1:



Id., FIG. 1 (annotated), [0015]; Ex.1003, [0167].

A POSA would have understood that engines such as those disclosed in Nakafushi operated by mixing fuel (either gasoline or LPG in the case of Nakafushi) with air prior to combustion in the engine, as confirmed by Nakafushi’s numerous references to the “air-fuel ratio” in regard to gasoline (and/or LPG) being mixed with air. *Id.*, [0004]-[0005], [0008], [0016]. A POSA 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, which is attached to the intake for delivery to the engine. Ex.1003, [0168].

A POSA would have understood that Nakafushi teaches carburetor 1 attached to an intake of the engine to mix air and fuel, that thereby connects the gaseous fuel source and the liquid fuel source, as recited in Element [1.4]. Ex.1003, [0169].

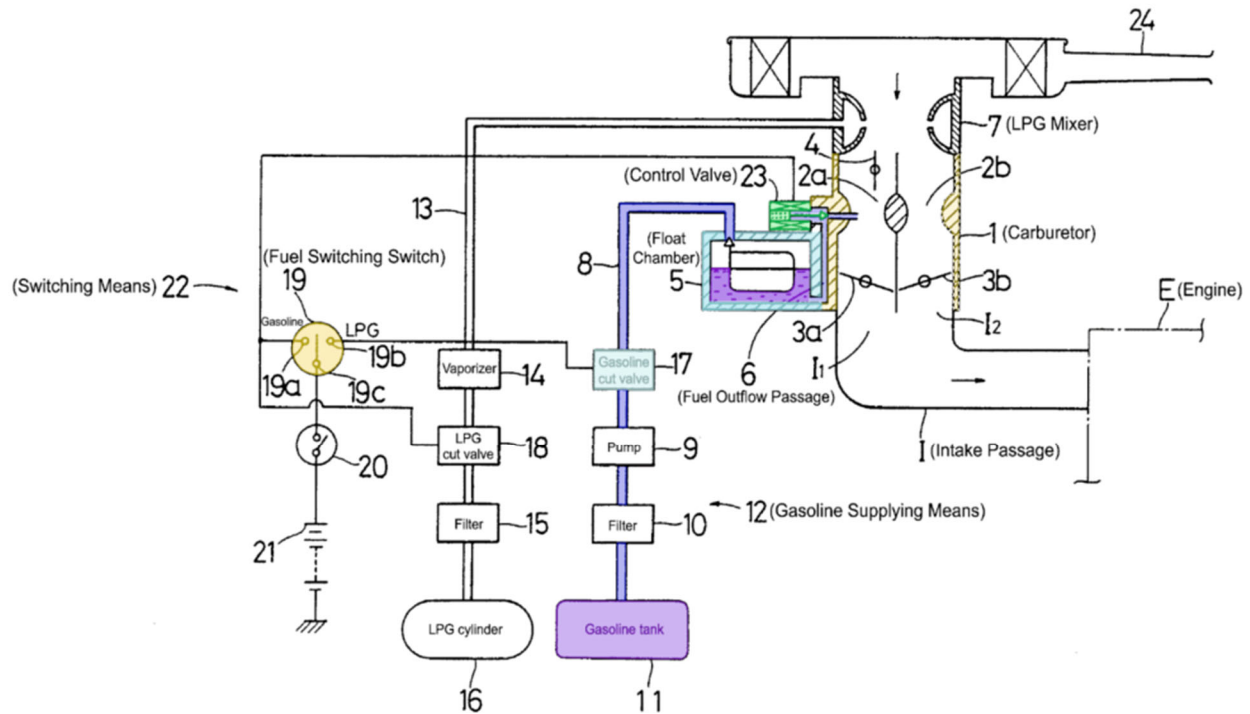
f. Element [1.5]

Element [1.5] recites "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."

Nakafushi discloses two structures, gasoline cut valve 17 and control valve 23 (Ex.1005, [0013]-[0014], FIG. 1), each of which is a "liquid fuel cut-off." Nakafushi explains that "gasoline cut valve 17 [is] configured to close the gasoline supplying passage 8 in response to a cut signal" and "control valve 23 [is] configured to open and close the fuel outflow passage 6...so as to intervene in the fuel outflow passage 6." Ex.1005, [0013]-[0014].

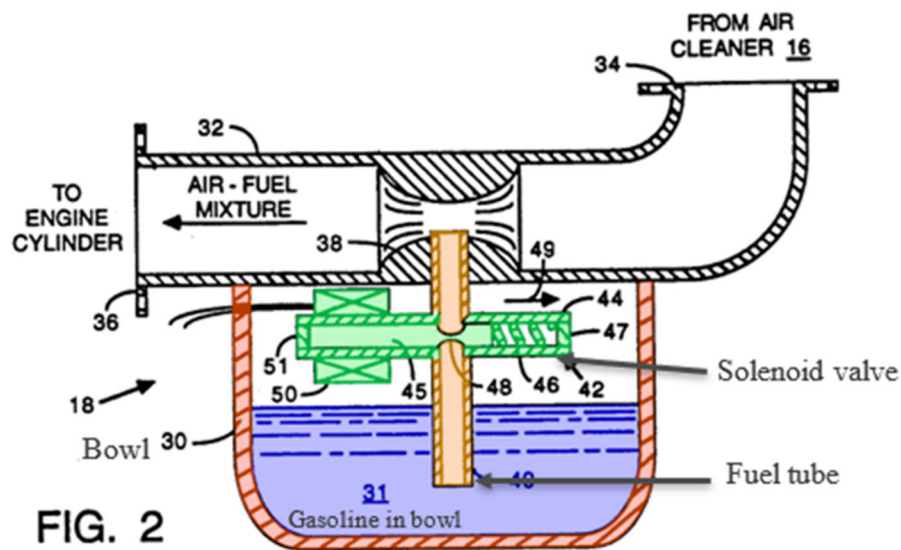
Nakafushi's gasoline supplying passage 8 connects the gasoline tank 11 to float chamber 5. *Id.*, [0012]. Nakafushi's fuel outflow passage 6 connects the float chamber 5 to the carburetor's venturi portions 2a and 2b, with the fuel outflow passage 6 downstream of the float chamber 5. *Id.*, [0010]. Gasoline supplying

passage 8 and fuel outflow passage 6 both are on the path by which gasoline flows from gasoline tank 11 to the engine. This arrangement is shown in FIG. 1:

FIG. 1*Id.*, FIG. 1 (annotated)

The fuel switching switch 19 changes operation of the engine between gaseous fuel and liquid fuel by selectively powering control valve 23, LPG cut valve 18, and gasoline cut valve 17. §VII.C.2.d, *supra*. The switch opens control valve 23 and gasoline cut valve 17, and closes the LPG valve 18 during gasoline operation, and vice versa for LPG operation. Ex.1005, [0013]-[0014]. Thus, upon actuation of the switch from liquid fuel to gaseous fuel, gasoline cut valve 17 and control valve 23 close to interrupt liquid fuel. Ex.1003, [0173].

To the extent Nakafushi does not disclose that gasoline cut valve 17 and/or control valve 23 comprises a “solenoid,” it would have been obvious to a POSA to use a solenoid in view of Olmr. Olmr discloses a gasoline engine having solenoid 42 in a float bowl 30 that cuts off the flow of gasoline to the venturi 38 when the operator closes the kill switch. Ex.1007, 2:30-68, 4:11-27. Olmr’s FIG. 2 shows:



Ex.1007, FIG. 2 (annotated)

Olmr’s valve 42 is a solenoid connected to open and close a fuel path to the engine via venturi 38. Ex.1003, [0175].

A POSA would have found it obvious to use a solenoid, such as that disclosed by Olmr, for Nakafushi’s gasoline cut valve 17 and/or control valve 23, as discussed below.

(1) Motivation to Combine

A POSA would have been motivated to combine Nakafushi and Olmr. Nakafushi and Olmr both relate to gasoline engines and both seek to prevent the flow of gasoline from the float bowl to the engine intake upon cessation of gasoline operation of the engine. Ex.1003, [0177]. In Nakafushi, gasoline cut valve 17 and control valve 23 cut the gasoline flow when the operation of the engine is switched from gasoline to LPG. Nakafushi does not expressly label the type of valve is used, but Olmr expressly teaches using a solenoid (valve 42) for this same purpose. Ex.1007, 2:30-56, 1:33-36, FIG. 2. Olmr teaches an express example—a solenoid valve—for accomplishing the same function taught by Nakafushi, i.e., cutting off gasoline flow when needed. It would have been a simple substitution to incorporate Olmr's solenoid valve to accomplish the same function in Nakafushi. Ex.1003, [0177].

(2) Reasonable Expectation of Success

A POSA would have reasonably expected success in using Olmr's solenoid valve 42 as Nakafushi's gasoline cut valve 17 and/or control valve 23. As of the earliest priority date of the '145 Patent, the use of solenoid valves to cut off/control the flow of fuel was common, with Olmr being just one example. Ex.1003, [0178].

Furthermore, Nakafushi discloses a simple electrical circuit to open and close gasoline cut valve 17 and control valve 23 (Ex.1005, [0013]-[0014], FIG. 1),

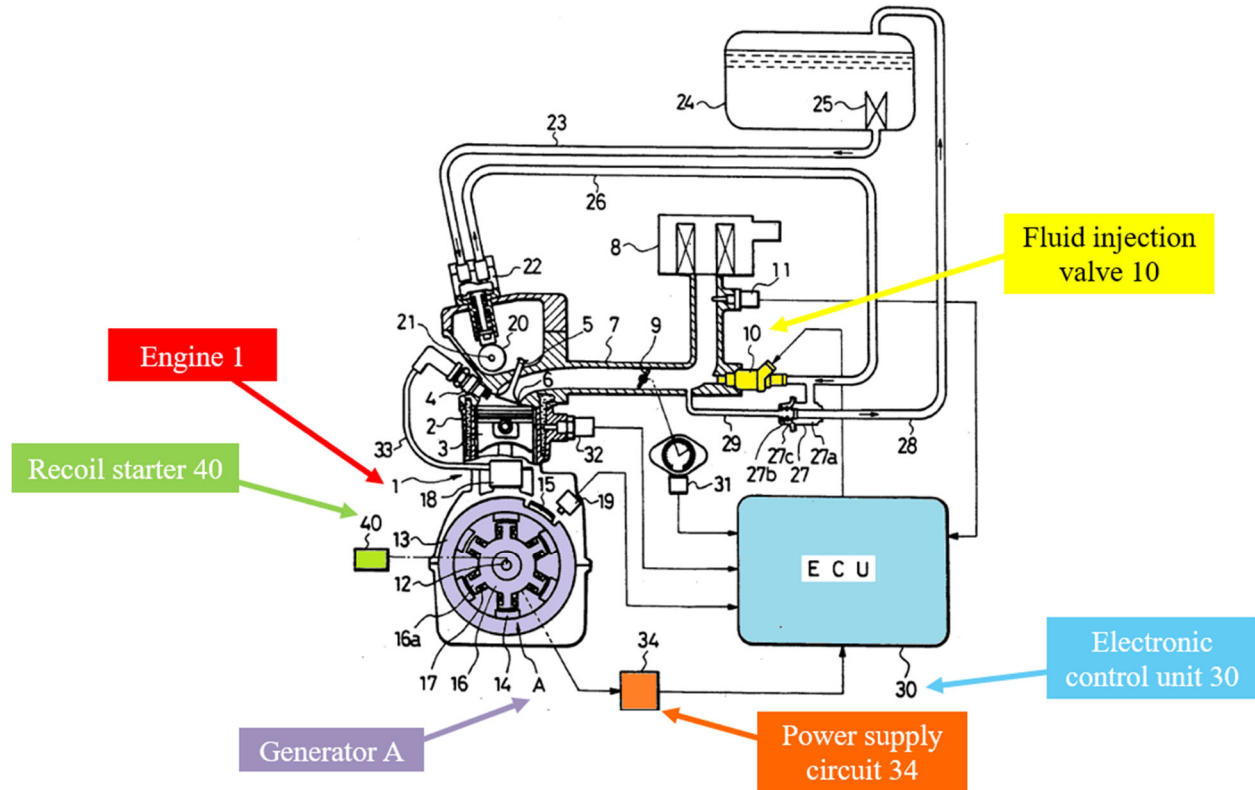
which a POSA would have recognized as being suitable to energize a solenoid valve, such as Olmr's solenoid valve 43, to open and close the fuel pathway. Ex.1003, [0179]. Indeed, Olmr teaches an essentially identical electrical circuit for operating its solenoid valve. Ex.1007, 2:57-4:27, FIGS. 2-3. A POSA would have therefore reasonably expected that Olmr's solenoid valve could be successfully implemented to serve as Nakafushi's gasoline cut valve 17 and/or control valve 23 to accomplish the desired function of cutting off the supply of gasoline from Nakafushi's float chamber 5 to the intake of the engine.

Accordingly, a POSA would have understood that the combination of Nakafushi and Olmr teaches [1.5]. Ex.1003, [0181].

g. Element [1.6]

Element [1.6] recites “a voltage regulator coupled to the charging coil to receive power therefrom and that operates to provide a regulated voltage to the liquid fuel cut-off solenoid.”

Matsushima's generator includes magnets mounted on the flywheel, a stator core, and a plurality of windings wound on the stator core and disposed to face the magnets during rotation of the flywheel, making Matsushima's generator an alternator. Ex.1012, 2:35-40, Ex.1003, [0182]. Matsushima discloses generator A is connected to “a power supply circuit 34 for rectifying, smoothing and stabilizing output voltage” from the generator. Ex.1012, 43-62; FIG. 1.



Ex.1012, FIG. 1 (annotated).

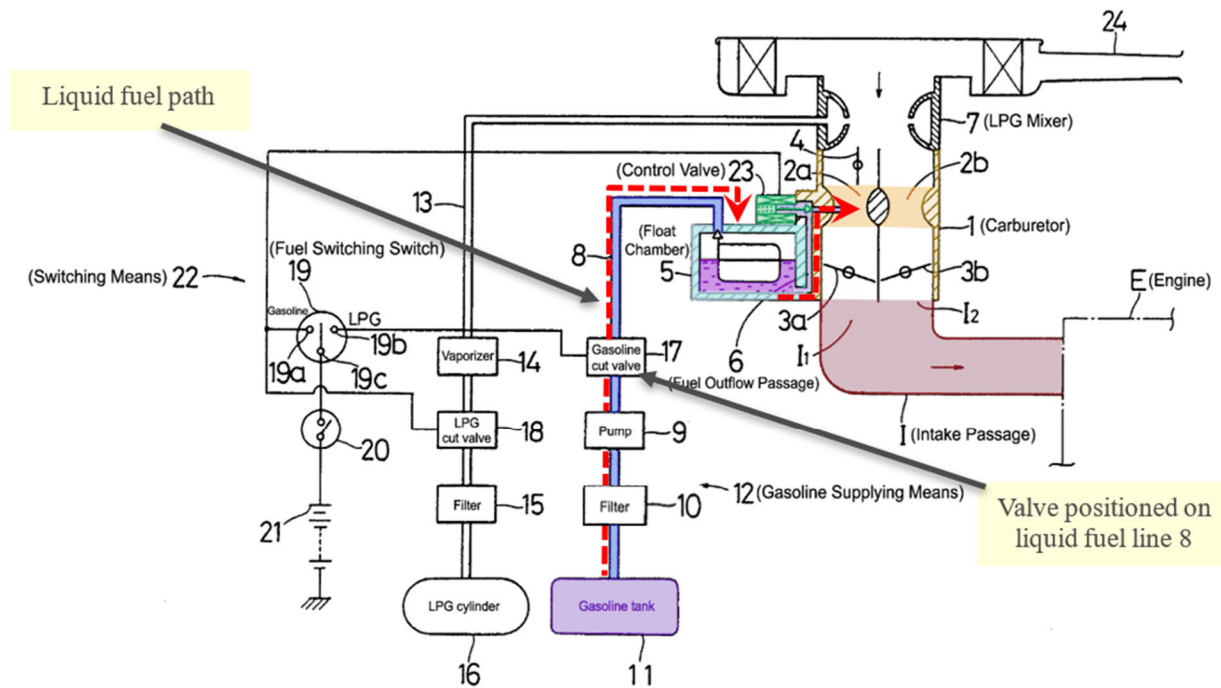
Because the power supply stabilizes the output voltage from the alternator, it is a voltage regulator. A voltage regulator is a common component in power supply systems, designed to maintain a consistent output voltage despite fluctuations in input. Recognizing that potential variations in output voltage from the alternator could have an adverse impact on performance of the liquid fuel cut-off solenoid valve, a POSA would have been motivated to seek a voltage regulating solution. When combined with Nakafushi's engine, a POSA would have understood that Matsushima's alternator and power supply circuit 34 would provide a regulated voltage to Nakafushi's gasoline cut valve 17 and/or control

valve 23 (each a solenoid when combined with Olmr), as recited in [1.6]. Ex.1003, [0183].

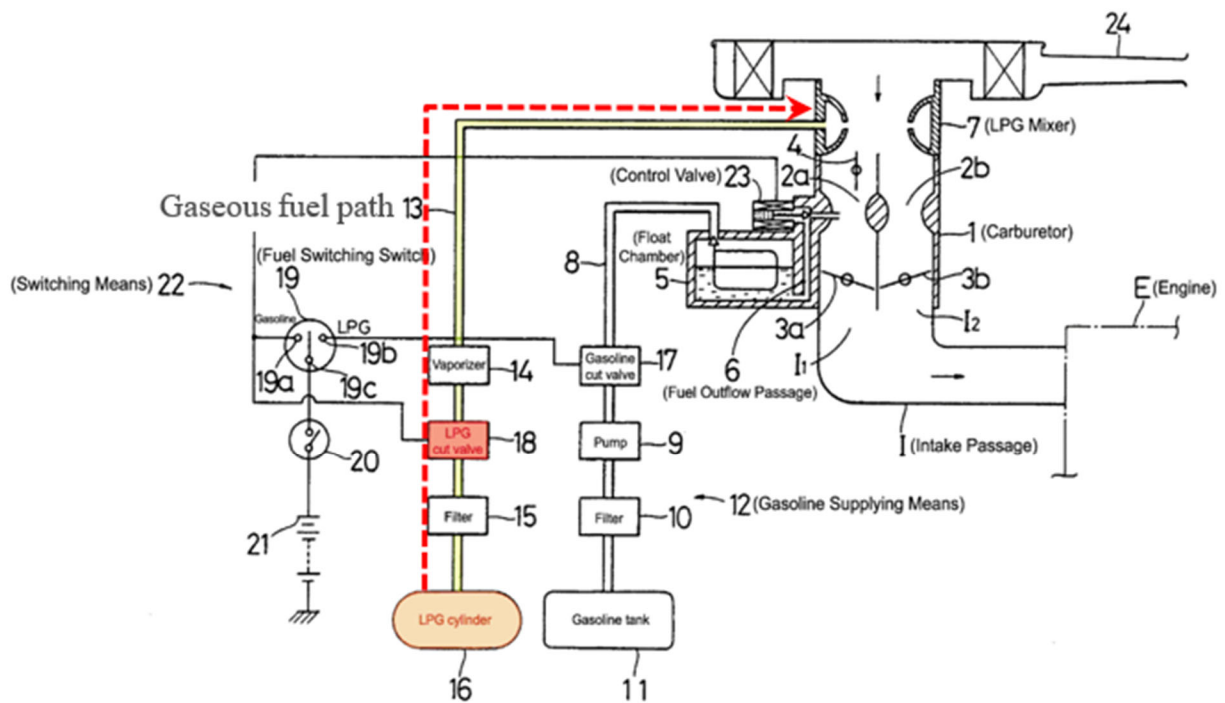
3. Claim 2

Claim 2 depends from claim 1 and recites “a liquid fuel valve along a liquid fuel line coupling the liquid fuel source to the carburetor; and a gaseous fuel valve along a gaseous fuel line coupling the gaseous fuel source to the carburetor.”

Nakafushi discloses a liquid fuel valve (gasoline cut valve 17) “configured to close the gasoline supplying passage 8 in response to a cut signal...to intervene between the float chamber 5 and the pump 9.” Ex.1005, [0013]. FIG. 1 shows gasoline cut valve 17 positioned on the gasoline supply passage 8, which begins at the gasoline tank 11, leading to float chamber 5, which in turn is connected to carburetor 1 through fuel outflow passage 6, as illustrated below:

FIG. 1*Id.*, FIG. 1 (annotated).

Nakafushi discloses a gaseous fuel valve (LPG cut valve 18) “configured to close the LPG supplying passage 13 in response to a cut signal...to intervene between the vaporizer 14 and the filter 15.” Ex.1005, [0013]. 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, as illustrated below:

FIG. 1

Id., FIG. 1 (annotated).

Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Olmr teaches claim 2. Ex.1003, [0187].

4. Claim 3

Claim 3 depends from Claim 2 and recites “wherein each of the liquid fuel valve and the gaseous fuel valve comprises a mechanical valve.”

Nakafushi discloses a liquid fuel valve (gasoline cut valve 17), which mechanically interrupts the flow of gasoline to the carburetor. §VII.C.3, *supra*; Ex.1003, [0189]. To the extent gasoline cut valve 17 is not considered a

mechanical valve, a POSA would have understood that a mechanical valve can substitute for gasoline cut valve 17, and would have had a reasonable expectation of success in doing so. §VII.A.3, *supra*; Ex.1003, [0189].

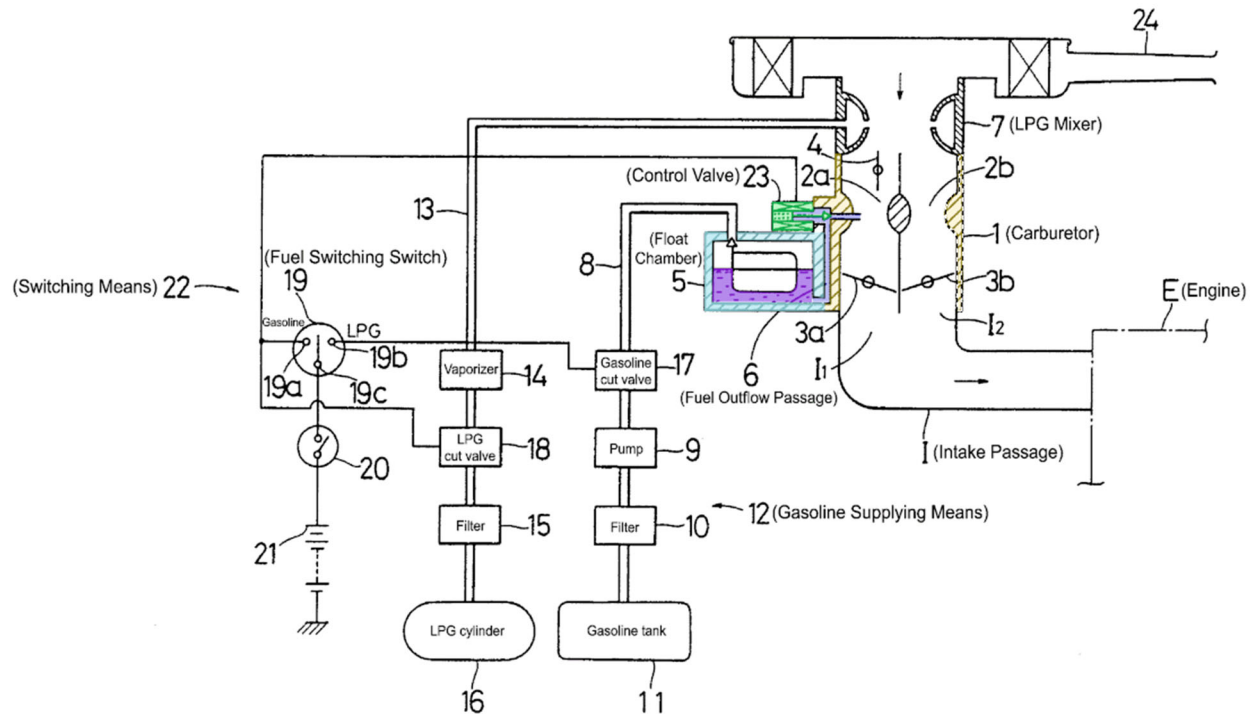
Nakafushi discloses a gaseous fuel valve (LPG cut valve 18), which mechanically interrupts the flow of LPG to the carburetor. §VII.C.3, *supra*; Ex.1003, [0190]. To the extent LPG cut valve 18 is not considered a mechanical valve, a POSA would have understood that a mechanical valve can substitute for LPG cut valve 18, and would have had a reasonable expectation of success in doing so. §VII.A.3, *supra*; Ex.1003, [0190].

Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Olmr teaches claim 3. Ex.1003, [0191].

5. Claim 4

Claim 4 depends from Claim 2 and recites “wherein the liquid fuel cut-off solenoid is attached to the carburetor.”

Nakafushi’s FIG. 1 discloses a liquid fuel cut-off solenoid, control valve 23 (a solenoid when combined with Olmr), that is attached to the carburetor:

FIG. 1

Ex.1005, FIG. 1 (annotated); Ex.1003, [0193].

Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Olmr teaches claim 4. Ex.1003, [0194].

6. Claim 5

Claim 5 depends from Claim 1 and recites “wherein the gaseous fuel is LPG and the liquid fuel is gasoline.”

Nakafushi states “[t]he present invention relates to a gasoline-LPG combined engine configured to selectively use gasoline or LPG as a fuel.” Ex.1005, [0001]. Accordingly, a POSA would have understood that the

combination of Nakafushi, Matsushima, and Olmr teaches claim 5. Ex.1003, [0196].

7. Claim 6

Claim 6 depends from Claim 1 and recites “wherein the switch is an electro-mechanical switch connecting one fuel source to the carburetor and connected to the electrical power generator, and wherein the liquid fuel cut-off solenoid is connected to open and close a fuel path to the engine in response to reception of electrical power from the switch.”

The fuel switching switch 19 changes operation of the engine between gaseous fuel and liquid fuel by selectively powering control valve 23 and LPG cut valve 18, or gasoline cut valve 17. §VII.C.2.d, *supra*. The switch 19 is user actuatable and moves mechanically between the contacts and operates by altering cut signals (i.e., electrical currents), making it an electro-mechanical switch. Ex.1003, [0198]. Because operation of switch 19 dictates which fuel is supplied to the carburetor, it connects one fuel source to the carburetor. *Id.*

Nakafushi’s fuel selecting switch 19 is connected to battery 21. Ex.1005, [0013]. A POSA would have understood that the fuel selecting switch could be connected to the generator in the absence of the battery (to power the solenoids), just as Matsushima’s components (such as its fluid injection valve 10) are connected to its generator. Ex.1012, FIG. 1, 5:1-48; Ex.1003, [0199].

The gasoline cut off solenoid opens and closes the liquid fuel path upon actuation of the fuel select switch. §VII.C.2.f, *supra*. Fuel select switch also selectively powers the gasoline cut off solenoid via current flow. §VII.C.2.d, *supra*. Thus, the fuel select switch dictates whether the gasoline cut off solenoid opens or closes a fuel path to the engine in response to reception of electrical power from the switch. Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Olmr teaches claim 6. Ex.1003, [0200].

8. Claim 7

Claim 7 depends from claim 6 and recites: “wherein the switch selectively powers the solenoid valve by controlling electrical connection between the solenoid valve and the electrical power generator.”

Nakafushi’s control valve 23 (a solenoid when combined with Olmr) opens and closes a fuel path in response to reception of electrical current from the fuel switching switch 19. §VII.C.7, *supra*. Thus, Nakafushi’s switch 19 would selectively power control valve 23 by controlling the electrical current between the control valve 23 and Matsushima’s generator. Ex.1003, [0202]. A POSA would have understood that the combination of Nakafushi, Matsushima, and Olmr teaches claim 7. Ex.1003, [0202].

9. Claim 8

Claim 8 depends from claim 1 and recites: “wherein the liquid fuel cut-off solenoid is normally open to provide liquid fuel to the engine when the liquid fuel cut-off solenoid is unpowered.”

Gasoline cut valve 17 of Nakafushi is normally open. Ex.1005, [0013], FIG. 1. It would have been obvious to a POSA to use Olmr’s solenoid valve 42 as Nakafushi’s gasoline cut valve 17. §VII.C.2.f, *supra*. Olmr’s solenoid valve also is normally open (Ex.1007, 3:43-52).

Control valve 23 of Nakafushi is normally closed. Ex.1005, [0014], FIG. 1. It would have been obvious to a POSA to use Olmr’s solenoid valve 42 as Nakafushi’s control valve 23. §VII.C.2.f, *supra*. Olmr’s solenoid valve is normally open (Ex.1007, 3:43-52), and the decision to configure a solenoid as normally open or normally closed is mere design choice. Ex.1003, [0205].

A POSA would have been motivated to use Olmr’s normally-open solenoid rather than a normally-closed solenoid based on the express teachings of Olmr. §VII.B.1, *supra*.

A POSA would have had a reasonable expectation of success in replacing Nakafushi’s normally-closed solenoid with the normally-open solenoid of Olmr because it would have involved a simple substitution and a rewiring of Nakafushi’s

switch and both types (normally-closed and normally-open) were routinely used at the time of the invention. *Id.*; Ex.1003, [0207].

Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Olmr teaches claim 8. Ex.1003, [0208].

10. Claim 9

Claim 9 depends from claim 8 and recites: “wherein the dual fuel generator is a batteryless dual fuel generator and the engine is a pull-start engine, the batteryless dual fuel generator further comprising a pull-starter that drives the electrical power generator to power and close the liquid fuel cut-off solenoid while starting the engine on gaseous fuel.”

A POSA would have been motivated to combine Nakafushi and Matsushima, and would have had a reasonable expectation of success in combining Nakafushi and Matsushima. §VII.C.1, *supra*.

Matsushima discloses a batteryless engine including a pull-start (recoil starter 40). Ex.1012, 1:6-11 (“adapted for use in...engines with no battery”), 4:63-5:21. It would have been obvious to a POSA to incorporate Matsushima’s pull-start to supply electrical power in place of Nakafushi’s battery. Ex.1003, [0211].

Matsushima’s pull-starter drives an electrical power generator to power various components while starting its engine (including its fuel pump, spark plug and fuel injection valve). Ex.1012, Abstract, 5:1-48. Incorporating Matsushima’s

pull-starter assembly with Nakafushi's engine would similarly allow the pull-starter assembly to drive a generator to power and close Nakafushi's control valve 23 and/or gasoline cut valve 17 (each a solenoid when combined with Olmr) while starting the engine on gaseous fuel. Ex.1003, [0212].

A POSA would have been motivated to incorporate Matsushima's pull-start and would have had a reasonable expectation of success. Nakafushi and Matsushima both relate to the same class of small spark-ignition engines that are offered with either battery-dependent electric start or battery-independent recoil (pull) start. Ex.1003, [0213]. Incorporating a pull-start into Nakafushi's dual fuel engine and removing the battery would improve reliability in cold or remote applications, and reduce cost and weight of the generator. Ex.1003, [0213].

A POSA would have reasonably expected success in adopting Matsushima's recoil mechanism for use in Nakafushi's dual fuel engine. A POSA would have found it straightforward to mount Matsushima's recoil mechanism on Nakafushi's engine with only routine mechanical adaptation. Ex.1003, [0214]. At the time of the invention, the use of recoil starters was common on small engines, and their installation required only routine mechanical tasks. Ex.1003, [0214].

Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Olmr teaches claim 9. Ex.1003, [0215].

11. Claim 10

Claim 10 depends from claim 1 and recites: “wherein the electrical power generator comprises a magneto or an alternator.”

Matsushima’s generator includes magnets mounted on the flywheel, a stator core, and a plurality of windings wound on the stator core and disposed to face the magnets during rotation of the flywheel, making Matsushima’s generator an alternator. Ex.1012, 2:35-40, Ex.1003, [0217]. Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Olmr teaches claim 10. Ex.1003, [0217].

D. Ground 4: Claims 1-10 are Rendered Obvious by the Combination of Holzapfel, Matsushima, and Olmr.

1. Motivation to Combine Holzapfel and Matsushima and Reasonable Expectation of Success.

Holzapfel and Matsushima both relate to internal combustion engines. §§VI.C, VI.D, *supra*. Internal combustion engines, including internal combustion engines operable on propane or gasoline, were well known as of the earliest priority date of the ‘145 Patent. §II.A, *supra*; Ex.1003, [0218]. The use of internal combustion engines in a generator, including internal combustion engines operable on propane or gasoline, also was well known as of the earliest priority date of the ‘145 Patent. Ex.1016; Ex.1003, [0218]. A POSA 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, and such engines were well known as of the earliest priority date of the '145 Patent. Ex.1003, [0218].

2. Claim 1

a. Element [1.0]

Holzapfel and Matsushima discloses a dual fuel engines. It would have been obvious to a POSA to have implemented a dual fuel engine in a generator, as dual fuel generators were well known as of the earliest priority date of the '145 Patent. Ex.1016; Ex.1003, [0219].

b. Element [1.1]

Element [1.1] recites “an engine operable on a gaseous fuel and a liquid fuel.”

The engine of Holzapfel is configured to operate on a gaseous fuel and on a liquid fuel. Ex.1008, 1:1-5.

c. Element [1.2]

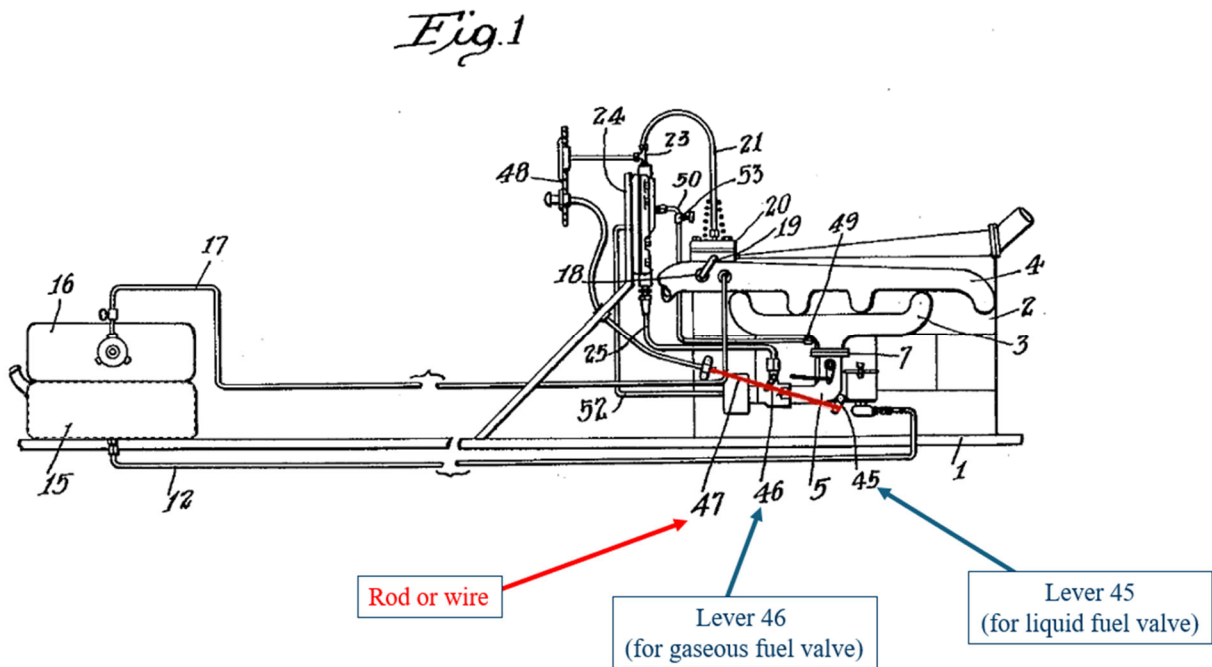
Element [1.2] recites “an electrical power generator driven by the engine and comprising a charging coil.”

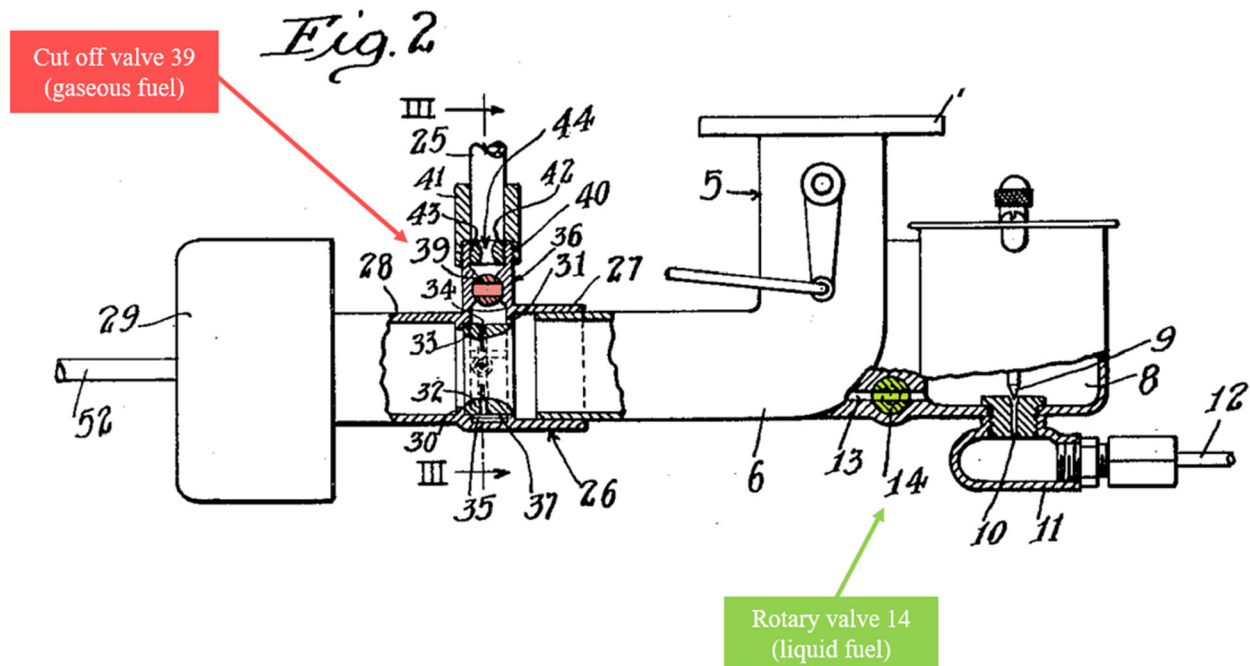
A POSA would have understood that Matsushima discloses “an electrical power generator driven by the engine and comprising a charging coil” as recited in [1.2]. §VII.C.2.c, *supra*; Ex.1003, [0223].

d. Element [1.3]

Element [1.3] recites “a switch to change operation of the engine between gaseous fuel and liquid fuel.”

Holzapfel discloses a “rod or wire 47” that changes operation of the engine between gaseous fuel and liquid fuel. Ex.1008, 2:116-23. Specifically, the rod or wire 47 simultaneously controls valves 14 and 39 by control of operating levers 45 and 46:





Ex.1008, FIGS. 1-2 (annotated), 2:105-07.

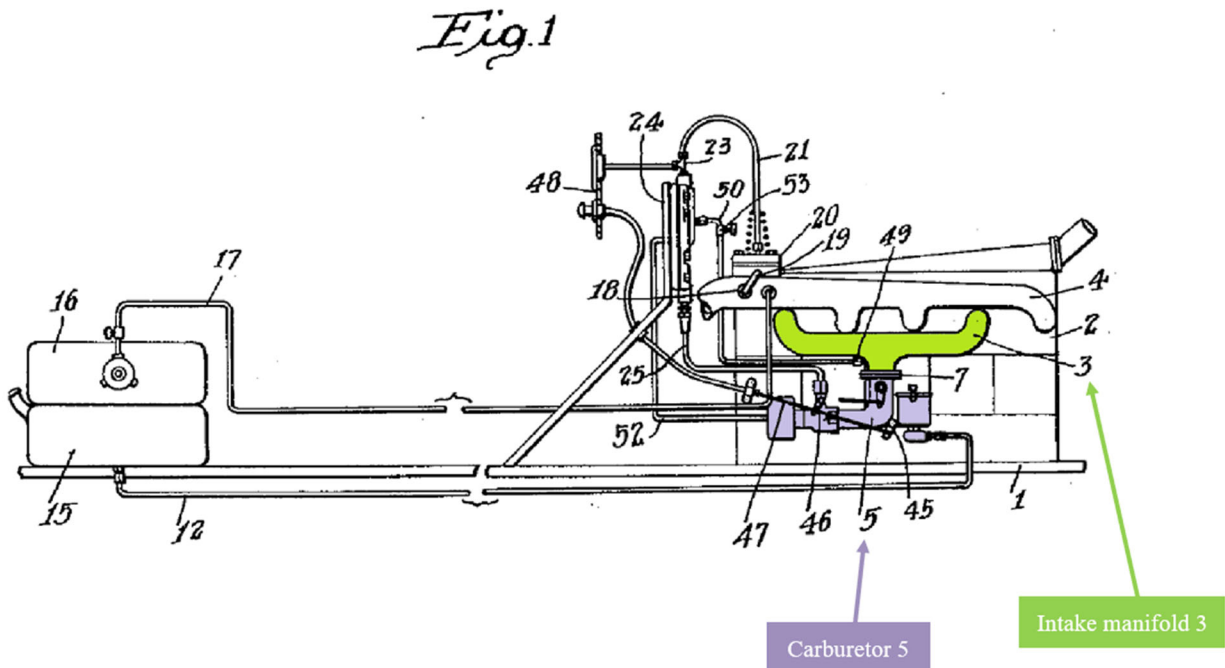
When starting the engine, Holzapfel states that “valve 14 is closed and the valve 39 is open” such that “gaseous fuel will be supplied to the carburetor 5.” Ex.1008, 2:111-115. Then, “as soon as the engine is started it may be switched over to the liquid fuel by manipulating the rod or wire 47.” Ex.1008, 2:118-120. This action “reverse[s] the valves 14 and 39 so that the gaseous fuel supply is cut off and the liquid fuel supply connected to feed the carburetor.” Ex.1008, 2:121-123.

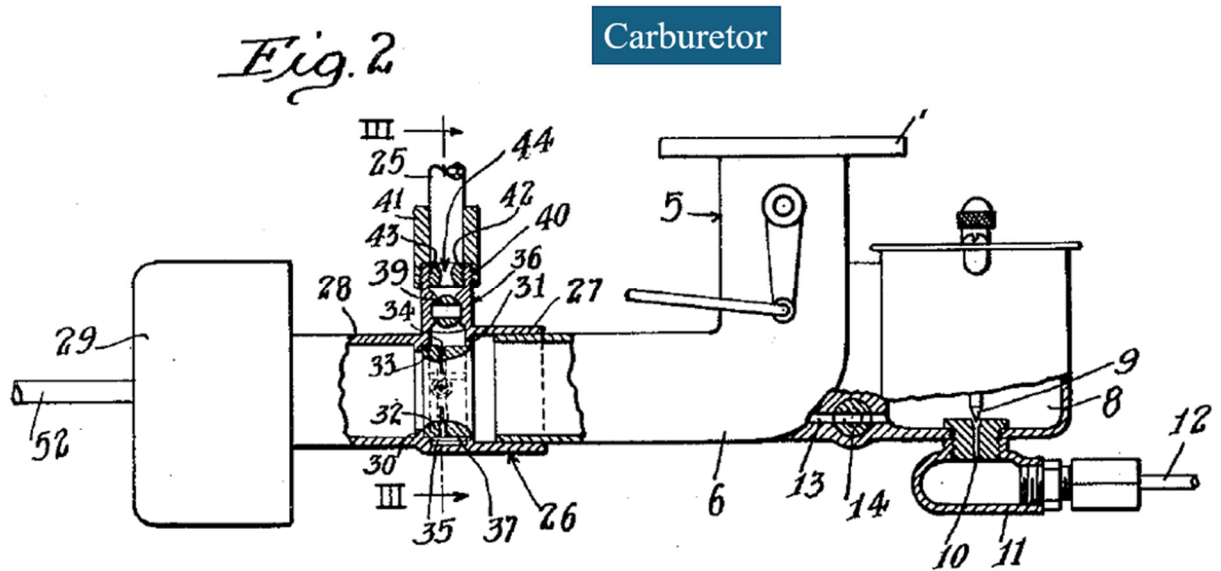
Thus, movement of rod or wire 47 allows for simultaneous operation of valves 14 and 39 which in turn changes operation of the engine between gaseous fuel and liquid fuel. *Id.* Accordingly, a POSA would have understood that Holzapfel teaches [1.3]. Ex.1003, [0227].

e. Element [1.4]

Element [1.4] recites “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.”

Holzapfel discloses a carburetor 5 that is connected to the intake manifold 3, as seen in FIGS. 1-2 below:





Ex.1008, FIG. 2, 1:84-86.

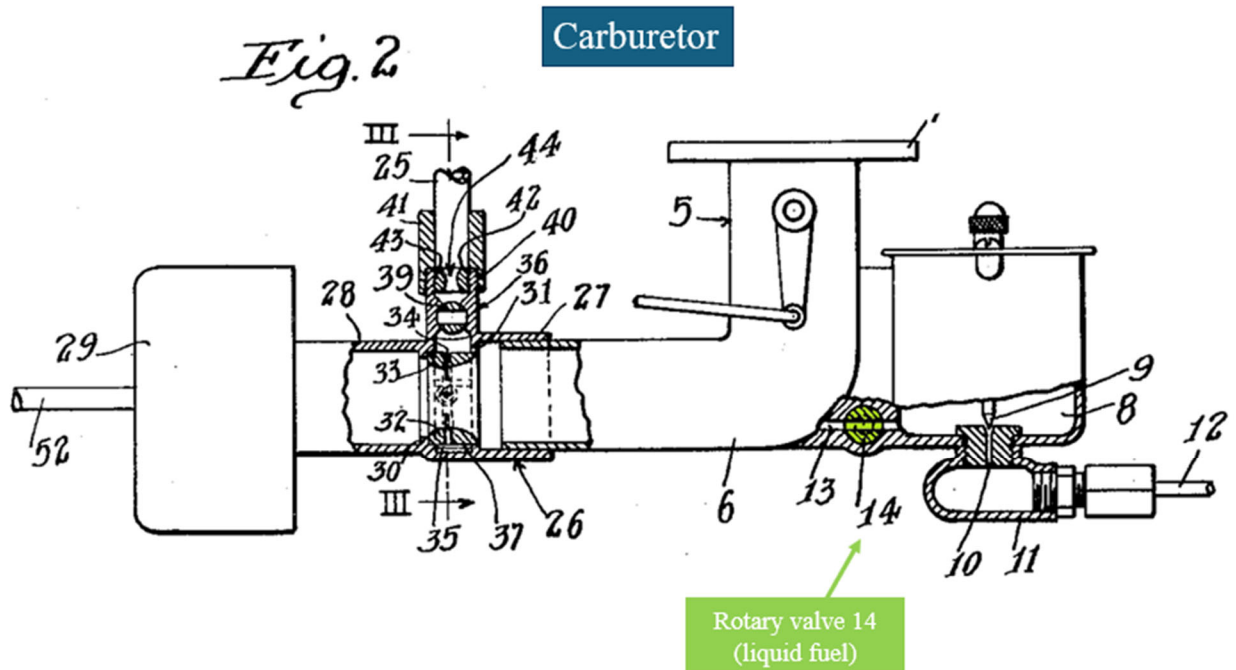
Holzapfel states the other end of the carburetor constitutes an “inlet opening through which air may be sucked for mixing with the fuel injected into the carburetor.” Ex.1008, 1:87-89. The carburetor is “equipped with a float chamber or fuel reservoir 8 which may be of any suitable construction to provide a supply of [liquid] fuel at atmospheric pressure ready for injection into the tube 6 of the carburetor 5.” Ex.1008, 1:89-94. The float chamber 8 communicates with the carburetor by means of passage 13. Ex.1008, 1:100-04. Holzapfel further discloses “the gaseous fuel supply through outlet tube 25 may be mixed with air and passed into the tube 6 of the carburetor 5 so that such air and gas mixture may pass into the intake manifold 3 of the engine 2.” Ex.1008, 2:39-44.

Thus, a POSA would have understood that Holzapfel teaches carburetor 5 attached to the engine that mixes air and fuel, that thereby connects the gaseous fuel source and the liquid fuel source, as recited in Element [1.4]. Ex.1003, [0231].

f. Element [1.5]

Holzapfel discloses rotary valve 14 (Ex.1008, 1:104, FIG. 2), which is a “liquid fuel cut-off” for purposes of Element [1.5]. Ex.1003, [0232]. The rod or wire 47 controls valve 14 such that the switching from gaseous fuel to liquid fuel results in the opening of valve 14. §VII.D.2.d, *supra*.

Holzapfel discloses that when rod or wire 47 and valves 14 and 39 are in the position opposite that shown in FIG. 2, valve 14 is closed (interrupting liquid fuel flow to the engine) and valve 39 is open (permitting the gaseous fuel source to couple to the engine). Ex.1008, 2:100-123, FIG. 2. FIG. 2 also shows that valve 14 is incorporated into the carburetor:



Ex.1008, FIG. 2.

Thus, rotary valve 14 is incorporated into the carburetor to interrupt liquid fuel upon actuation of the rod or wire 47 from liquid fuel to gaseous fuel. Ex.1003, [0234].

Olmr discloses a gasoline engine having solenoid 42 in a float bowl 30 that cuts off the flow of gasoline to the venturi 38 when the operator closes the kill switch. Ex.1007, 2:30-68, 4:11-27. Olmr's valve 42 is a solenoid connected to open and close a fuel path to the engine via venturi 38. §VII.C.2.f, *supra*.

A POSA would have found it obvious to use a solenoid, such as that disclosed by Olmr, in place of Holzapfel's valve 14, as discussed below.

(1) Motivation to Combine

A POSA would have been motivated to combine Holzapfel and Olmr. Holzapfel and Olmr both relate to engines and both seek to prevent the flow of gasoline from the float bowl to the engine intake. Ex.1003, [0238]. In Holzapfel, valve 14 cuts the gasoline flow from float chamber 13 when the operation of the engine is switched from gasoline to gaseous fuel. Ex.1003, [0238]. Olmr expressly teaches using a solenoid (valve 42) for this purpose. Ex.1007, 2:30-56; *see also, id.*, 1:33-36, FIG. 2. A POSA would have understood that solenoid valves provide fast response times and precise control in fuel flow applications, and can be substituted for mechanical valves in such applications. A POSA would be motivated to incorporate Olmr's solenoid valve to accomplish the same liquid fuel cutoff function described in Holzapfel. Ex.1003, [0238].

(2) Reasonable Expectation of Success

A POSA would have reasonably expected success in using Olmr's solenoid valve 42 as Holzapfel's valve 14. As of the earliest priority date of the '145 Patent, the use of solenoid valves to cut off/control the flow of fuel was common, with Olmr being just one example. Ex.1003, [0239]. A POSA would have recognized it as being suitable to energize a solenoid valve, such as Olmr's solenoid valve 42, to open and close a fuel pathway. Ex.1003, [0239]. A POSA would have therefore reasonably expected that Olmr's solenoid valve could be successfully implemented

to serve as Holzapfel's valve 14 to accomplish the desired function of cutting off the supply of gasoline from Holzapfel's float chamber 8 to the intake of the engine. A POSA also would have reasonably expected that Olmr's control circuit 52 and switch 82 that opens and closes Olmr's solenoid valve 42 could readily be adapted to replace Holzapfel's combination of rod/wire 47 and lever 45 that opens and closes Holzapfel's valve 14. As of the earliest priority date of the '145 Patent, the use of switches to control the energization of solenoid valves was common, with Olmr being just one example. Ex.1003, [0239].

Accordingly, a POSA would have understood that the combination of Holzapfel and Olmr teaches [1.5]. Ex.1003, [0239].

g. Element [1.6]

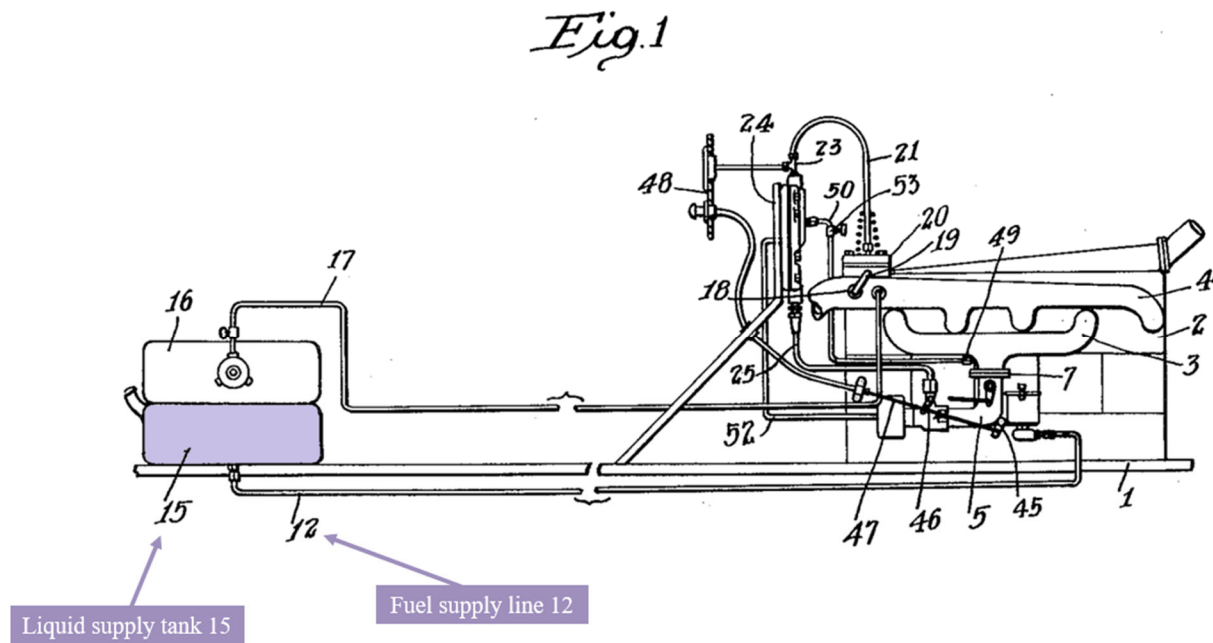
Element [1.6] recites "a voltage regulator coupled to the charging coil to receive power therefrom and that operates to provide a regulated voltage to the liquid fuel cut-off solenoid."

A POSA would have understood that Matsushima teaches "a voltage regulator coupled to the charging coil to receive power therefrom and that operates to provide a regulated voltage to the liquid fuel cut-off solenoid," as recited in [1.6]. §VII.C.2.g, *supra*; Ex.1003, [0242].

3. Claim 2

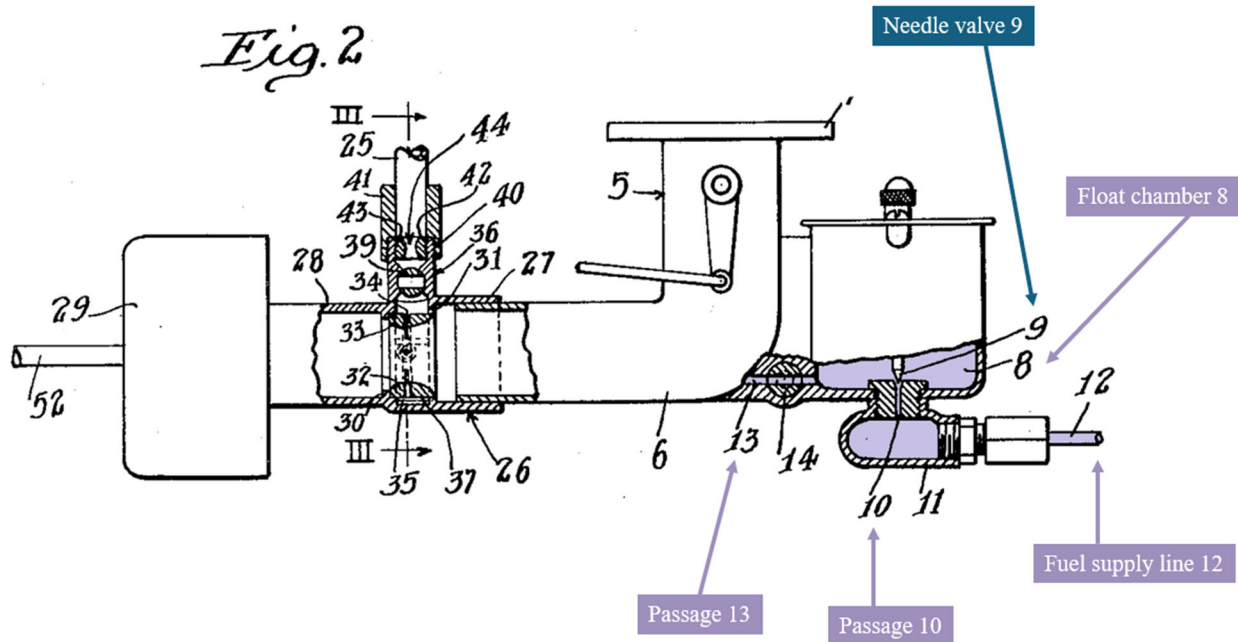
Claim 2 depends from claim 1 and recites “a liquid fuel valve along a liquid fuel line coupling the liquid fuel source to the carburetor; and a gaseous fuel valve along a gaseous fuel line coupling the gaseous fuel source to the carburetor.”

Holzappel discloses “needle valve 9 [i.e., a “liquid fuel valve”] which obstructs the entrance of fuel into the [float] chamber 8 by closing off the passage 10.” Ex.1008, 1:95-99. FIG. 1 shows fuel supply line 12 is attached to liquid supply tank 15 through which fuel from the tank 15 may be passed to the float chamber 8 of the carburetor via inlet connection:



Ex.1008, FIG. 1., 1:108-110, 2:1-2.

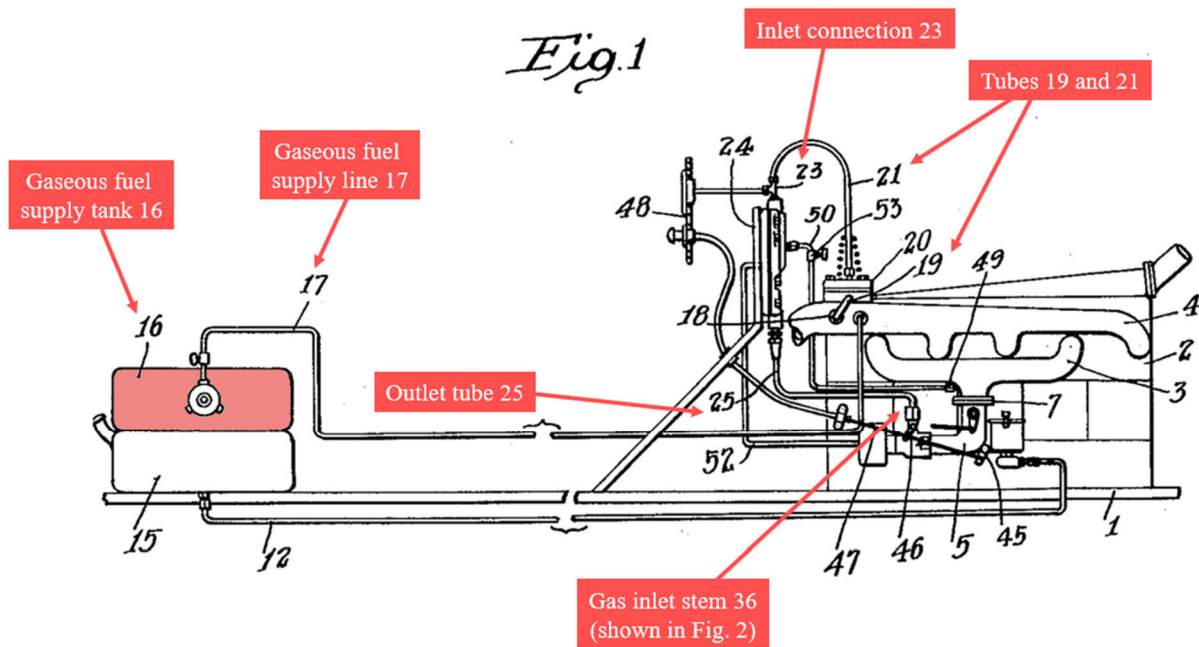
FIG. 2 shows that fuel supply line 12 connects to float chamber 8 by way of passage 10, where needle valve 9 operates by closing passage 10:



Ex.1008, FIG. 2, 1:84-86.

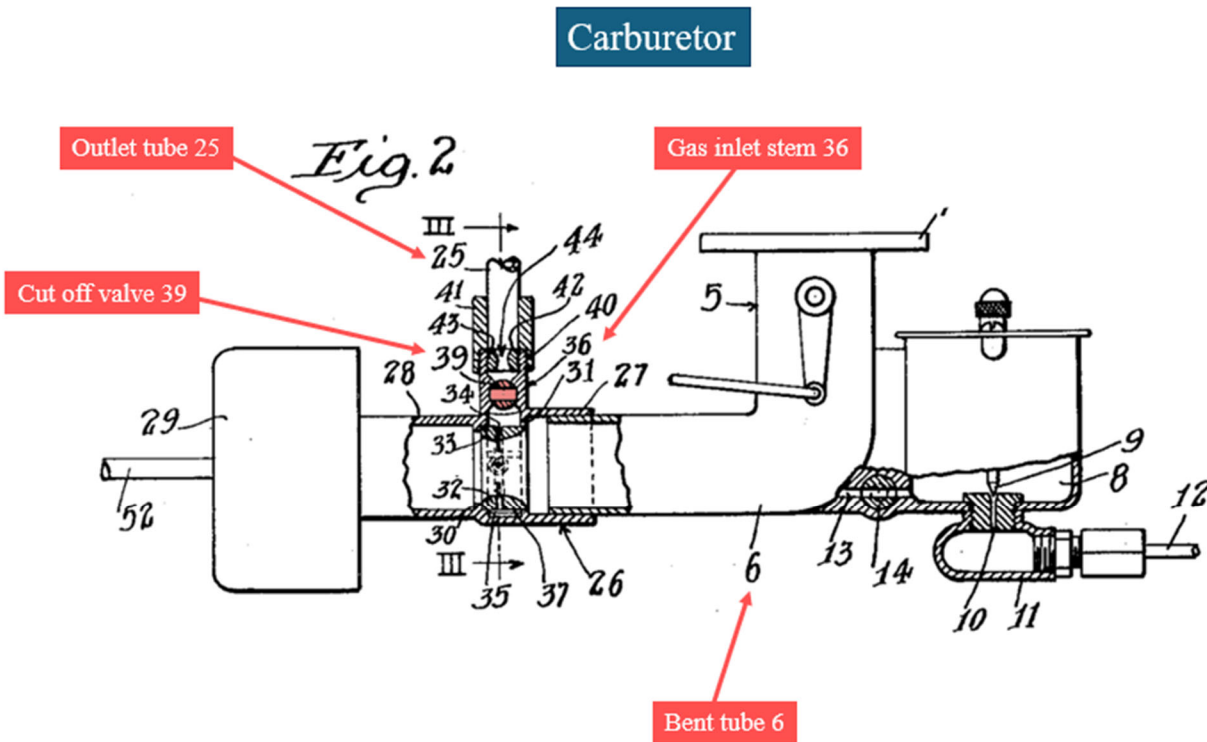
Thus, needle valve 9 is positioned on the gasoline fuel line, which begins at liquid supply tank 15 and leads to float chamber 8. *Id.*; Ex.1003, [0246].

Holzapfel discloses “cut off valve 39 [i.e., a “gaseous fuel valve”] 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.” Ex.1008, 2:86-90. FIG. 1 shows gaseous fuel supply line 17 is attached to gaseous fuel supply tank 16 through which fuel from the tank 16 may be passed through tubes 19 and 21 to the inlet connection 23 and then through outlet tube 25 to the gas inlet stem 36:



Ex.1008, FIG. 1., 2:8-27, 2:85-90.

FIG. 2 shows that gas inlet stem 36 connects to tube 6 of carburetor 5, where cut off valve 39 operates by closing inlet passage 36:



Ex.1008, FIG. 2, 2:39-44, 2:62-90.

Thus, cut off valve 39 is positioned on the gaseous fuel line, which begins at gaseous fuel supply tank 16, leading to gas inlet stem 39, which in turn is connected to carburetor 5 via tube 6. Ex.1003, [0250].

Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Olmr teaches claim 2. Ex.1003, [0251].

4. Claim 3

Claim 3 depends from Claim 2 and recites “wherein each of the liquid fuel valve and the gaseous fuel valve comprises a mechanical valve.”

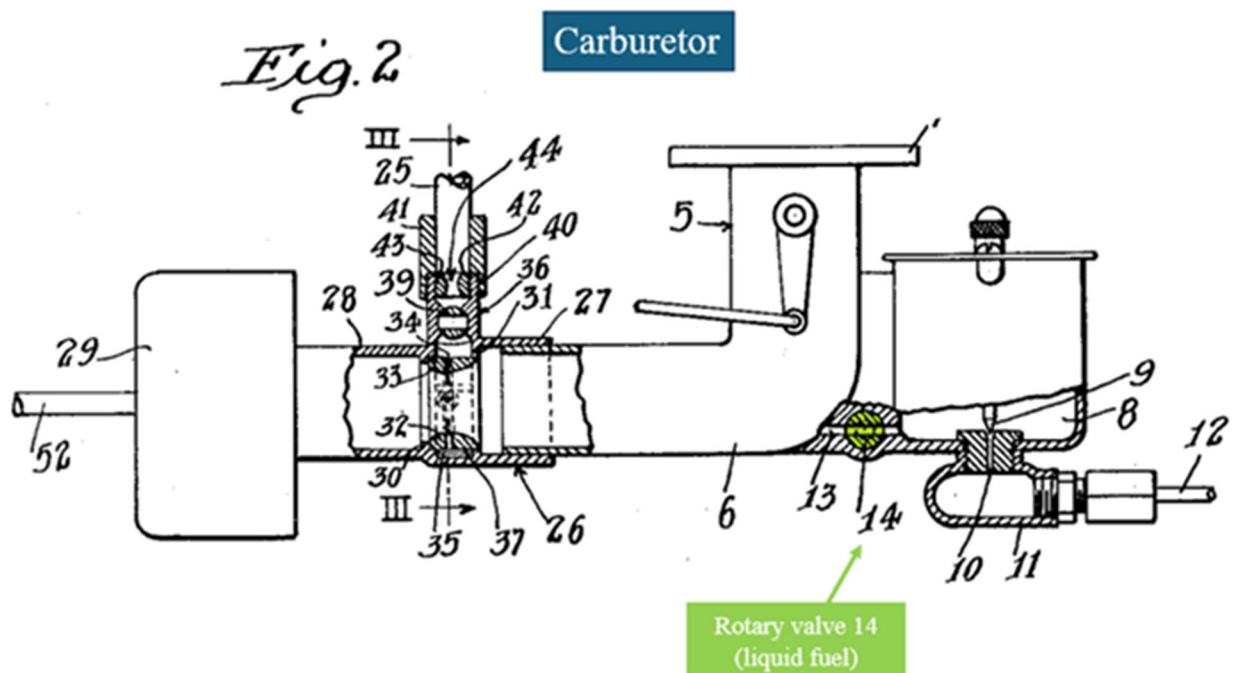
Holzappel discloses a liquid fuel valve (needle valve 9), which is a mechanical valve. §VII.C.3, *supra*; Ex.1003, [0253].

Holzappel discloses a gaseous fuel valve (cut off valve 39), which is a mechanical valve. §VII.C.3, *supra*; Ex.1003, [0254].

Accordingly, a POSA would have understood that the combination of Holzappel, Matsushima, and Olmr teaches claim 2. Ex.1003, [0255].

5. Claim 4

Holzappel's FIG. 2 discloses a liquid fuel cut-off (i.e. a "rotary valve 14") that is attached to the carburetor:



Ex.1008, FIG. 1 (annotated); Ex.1003, [0256].

Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Olmr teaches claim 4. Ex.1003, [0257].

6. Claim 5

Claim 5 depends from Claim 1 and recites “wherein the gaseous fuel is LPG and the liquid fuel is gasoline.”

The dual fuel engine of Holzapfel is configured to operate on “a normally gaseous fuel...which...is compressed and thereby maintained in liquefied condition.” Ex.1008, 2:8-12. LPG is a normally gaseous fuel that may be compressed and maintained in a liquefied condition. Ex.1003, [0259]. LPG is commonly used in dual fuel engines. §§III, VI.A, *supra*; Ex.1003, [0259]. The dual fuel engine of Holzapfel also is configured to operate on gasoline. Ex.1008, 2:124-147. Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Olmr teaches claim 5. Ex.1003, [0259].

7. Claim 6

Claim 6 depends from Claim 1 and recites “wherein the switch is an electro-mechanical switch connecting one fuel source to the carburetor and connected to the electrical power generator, and wherein the liquid fuel cut-off solenoid is connected to open and close a fuel path to the engine in response to reception of electrical power from the switch.”

Matsushima teaches an electrical power generator, and a POSA would have been motivated to combine Holzapfel and Matsushima and would have had a reasonable expectation of success in doing so. §§VII.D.2.c, VII.D.1, *supra*.

Olmr's electrically driven solenoid valve 42, electrical control circuit 52, and switch 82 can be substituted for Holzapfel's valve 14, rod/wire 47, and lever 45, and a POSA would have been motivated to make that substitution and would have had a reasonable expectation of success. §VII.D.2.f, *supra*. Olmr's solenoid valve 42 is a "liquid fuel cut-off solenoid," *id.*, that, when combined with Holzapfel, functions to open and close a fuel path for one fuel source (gasoline) to the engine in response to reception of electrical power. Olmr's switch 82 is user actuatable and moves mechanically between the contacts and operates by opening and closing electrical circuits, making it an electro-mechanical switch. Ex.1007, 4:11-18, FIG. 3; Ex.1003, [0262]. Switch 82 controls the electrical power to Olmr's solenoid valve 42. *Id.*

Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Olmr teaches claim 6. Ex.1003, [0263].

8. Claim 7

Claim 7 depends from claim 6 and recites: "wherein the switch selectively powers the solenoid valve by controlling electrical connection between the solenoid valve and the electrical power generator."

Olmr's solenoid valve 42 opens and closes a fuel path in response to reception of electrical current from Olmr's switch 82. §VII.D.7, *supra*. Thus, Olmr's switch 82 would selectively power solenoid valve 42 by controlling the electrical connection between the solenoid valve 42 and Matsushima's generator. Ex.1003, [0265]. Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Olmr teaches claim 7. Ex.1003, [0265].

9. Claim 8

Claim 8 depends from claim 1 and recites: “wherein the liquid fuel cut-off solenoid is normally open to provide liquid fuel to the engine when the liquid fuel cut-off solenoid is unpowered.”

It would have been obvious to a POSA to use Olmr's solenoid valve 42 in place of Holzapfel's valve 14. §VII.D.2.f, *supra*. Olmr's solenoid valve is normally open (Ex.1007, 3:43-52), and the decision to configure a solenoid as normally open or normally closed is mere design choice. Ex.1003, [0267]. A POSA 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. §VII.B.1, *supra*.

Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Olmr teaches claim 8. Ex.1003, [0269].

10. Claim 9

Claim 9 depends from claim 8 and recites: “wherein the dual fuel generator is a batteryless dual fuel generator and the engine is a pull-start engine, the batteryless dual fuel generator further comprising a pull-starter that drives the electrical power generator to power and close the liquid fuel cut-off solenoid while starting the engine on gaseous fuel.”

A POSA would have been motivated to combine Holzapfel and Matsushima, and would have had a reasonable expectation of success in combining Holzapfel and Matsushima. §VII.D.1, *supra*.

Matsushima discloses a batteryless engine including a pull-start (recoil starter 40). Ex.1012, 1:6-11 (“adapted for use in...engines with no battery”), 4:63-5:21. It would have been obvious to a POSA to incorporate Matsushima’s pull-start to supply electrical power in Holzapfel’s engine. Ex.1003, [0272].

Matsushima’s pull-starter drives an electrical power generator to power various components while starting its engine (including its fuel pump, spark plug and fuel injection valve). Ex.1012, Abstract, 5:1-48; Ex.1003, [0273]. Incorporating Matsushima’s pull-starter assembly with Holzapfel’s engine would similarly allow the pull-starter assembly 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. *Id.*

A POSA would have been motivated to incorporate Matsushima's pull-start and would have had a reasonable expectation of success. Holzapfel and Matsushima both relate to the same class of small spark-ignition engines that are offered with either battery-dependent electric start or battery-independent recoil (pull) start. Ex.1003, [0274]. Incorporating a pull-start into Holzapfel's dual fuel engine would improve reliability in cold or remote applications and reduce costs. Ex.1003, [0274].

A POSA would have reasonably expected success in adopting Matsushima's recoil mechanism for use in Holzapfel's dual fuel engine. A POSA would have found it straightforward to mount Matsushima's recoil mechanism on Holzapfel's engine with only routine mechanical adaptation. Ex.1003, [0275]. As of the earliest priority date of the '145 Patent, the use of recoil starters was common on small engines, and their installation required only routine mechanical tasks. Ex.1003, [0275].

Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Olmr teaches claim 9. Ex.1003, [0276].

11. Claim 10

Claim 10 depends from claim 1 and recites: "wherein the electrical power generator comprises a magneto or an alternator."

A POSA would have understood that Matsushima discloses an “electrical power generator comprises a magneto or an alternator.” §VII.C.11, *supra*. Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Olmr teaches claim 10. Ex.1003, [0278].

E. Ground 5: Claims 11-16 are Rendered Obvious by the Combination of Workshop Manual, Matsushima, and Winberg.

1. Claim 11

a. Element [11.0]

Workshop Manual teaches a dual fuel engine that can be implemented in a generator. §VII.A.1.a, *supra*.

b. Element [11.1]

Workshop Manual teaches an engine operable on a gaseous fuel and a liquid fuel. §VII.A.1.b, *supra*.

c. Element [11.2]

Workshop Manual teaches 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. §VII.A.1.e, *supra*.

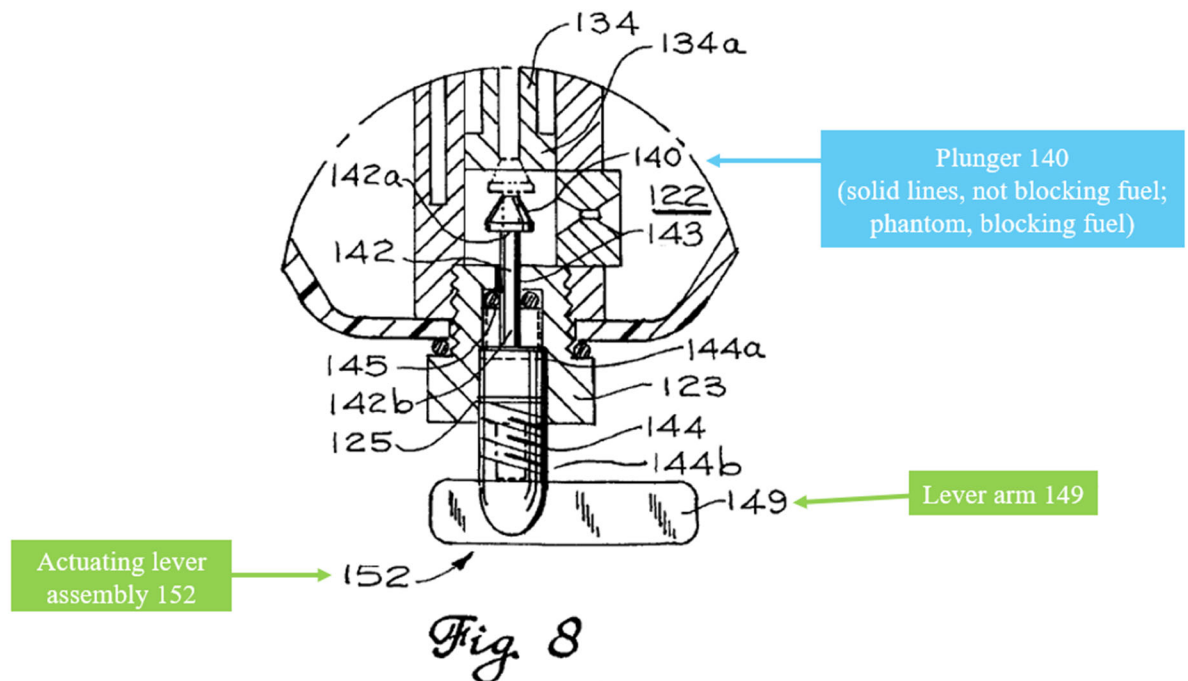
d. Element [11.3]

Element [11.3] recites: “a manually actuated fuel shutoff coupled to the carburetor, the manually actuated fuel shutoff comprising: a first end in the

carburetor that actuates to selectively allow or block a flow of fuel through the carburetor; and a second end external to the carburetor to actuate the first end.”

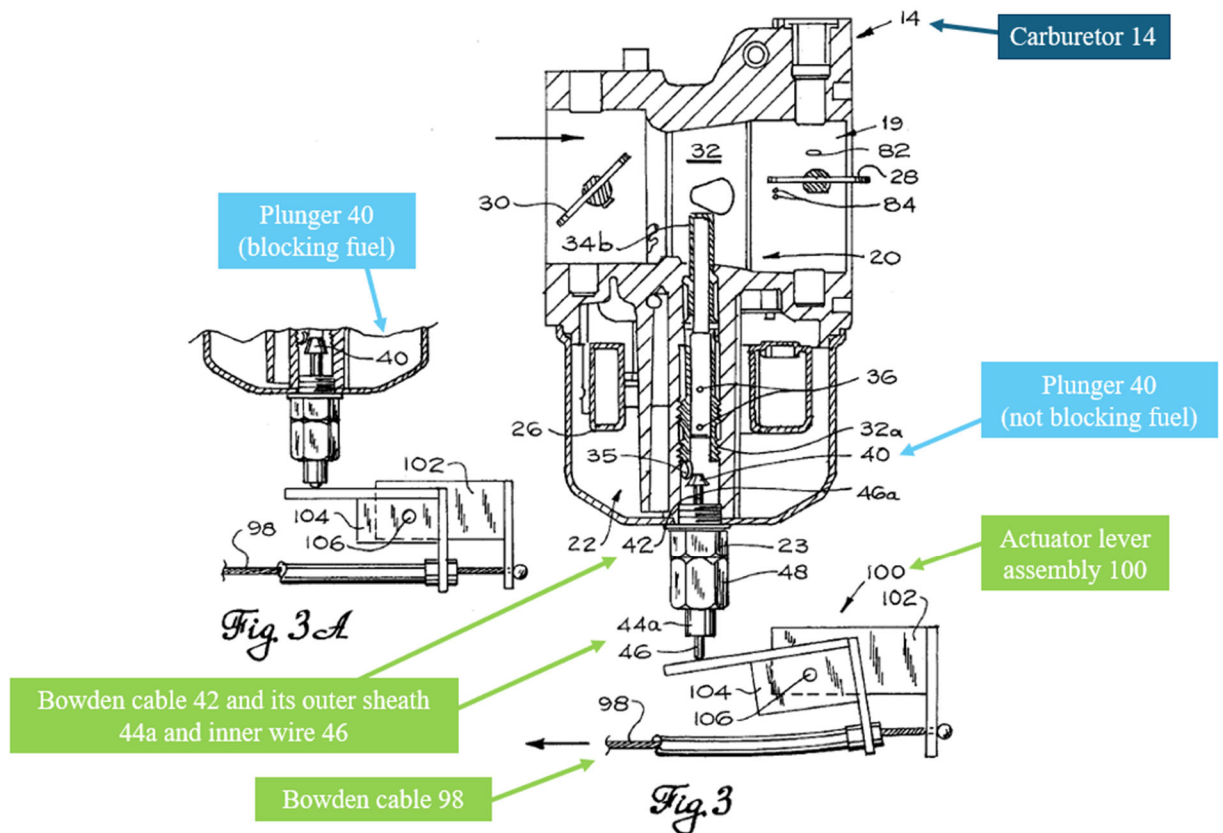
Winberg’s fuel shutoff has a plunger 40/140, which is a first end in the carburetor that actuates to close the fuel passage. Ex.1013, 5:34-46, 7:31-55, 7:65-8:52, FIGS. 3-3A & 8.

In the Figure 8 embodiment, Winberg’s fuel shutoff has an actuating lever assembly 152, which is a second end external to the carburetor to actuate the plunger (the first end). Ex.1013, 7:65-8:52, FIG. 8. Plunger 140 moves between a blocking position (shown in phantom in Figure 8) and a non-blocking position (shown in solid lines in Figure 8) by rotating actuating lever assembly 152 using lever arm 149:



Ex.1013, FIG. 8 (annotated), 7:65-8:52.

In the Figure 3/3A embodiment, Winberg's fuel shutoff has an actuator lever assembly 100, which is a second end external to the carburetor to actuate the plunger 40 (the first end). *Id.* The plunger 40 moves between a blocking position (Figure 3A) and a non-blocking position (Figure 3) through the use of Bowden cables 42 and 98 interconnected with actuator lever assembly 100. *Id.*



Id., FIGS. 3-3A (annotated).

Winberg's fuel shutoff is manually actuated in the Figure 8 embodiment and the Figure 3/3A embodiment. Ex.1013, Abstract, 2:14-24, 7:31-55, 7:65-8:52, FIGS. 3-3A & 8.

A POSA would have been motivated to combine Workshop Manual and Winberg. Workshop Manual and Winberg both relate to internal combustion engines. §§VI.A, VI.F, *supra*. Workshop Manual and Winberg both disclose fuel shutoff systems in carburetors. Ex.1009, 67-68; Ex.1013, Abstract. Winberg discloses that its manually actuated fuel shutoff is useful in generators. Ex.1013, 7:57-64, Ex.1003, [0287]. A POSA would have understood that the valve configurations of Winberg's manually actuated valves and Workshop Manual's solenoid valves to be one of a finite number of valves, each having a reasonable expectation of success. Ex.1003, [0287].

A POSA also would have had a reasonable expectation of success, because Winberg's float bowl configuration was common for use with small engines, and Winberg discloses using its float bowl and fuel shutoff in generators. Ex.1013, 7:58. The float bowl and fuel nozzle configuration of Winberg and Workshop Manual are substantially the same, making it straightforward to substitute the Winberg fuel shutoff for the Workshop Manual fuel shutoff. Ex.1009, 67-68; Ex.1013, 4:11-33, FIG. 4. In addition, a POSA would have understood that mechanical valves, such as Winberg's fuel shutoff, and solenoids, such as the line valves in Workshop Manual, can be configured to operate simultaneously. Walker demonstrates such a solution in a dual fuel engine using gasoline and LPG. Ex.1015, 2:3-32, FIG. 1

Accordingly, a POSA would have understood that Winberg teaches [11.3]. Ex.1003, [0289].

2. Claim 12

Claim 12 depends from claim 11 and recites: “wherein the engine is a pull start, batteryless engine.”

Matsushima discloses a pull start, batteryless engine. §VII.B.4, *supra*. A POSA would have been motivated to combine Workshop Manual and Matsushima, and would have had a reasonable expectation of success in doing so. *Id*. Accordingly, a POSA would have understood that the combination of Workshop Manual, Matsushima, and Winberg teaches claim 12. Ex.1003, [0291].

3. Claim 13

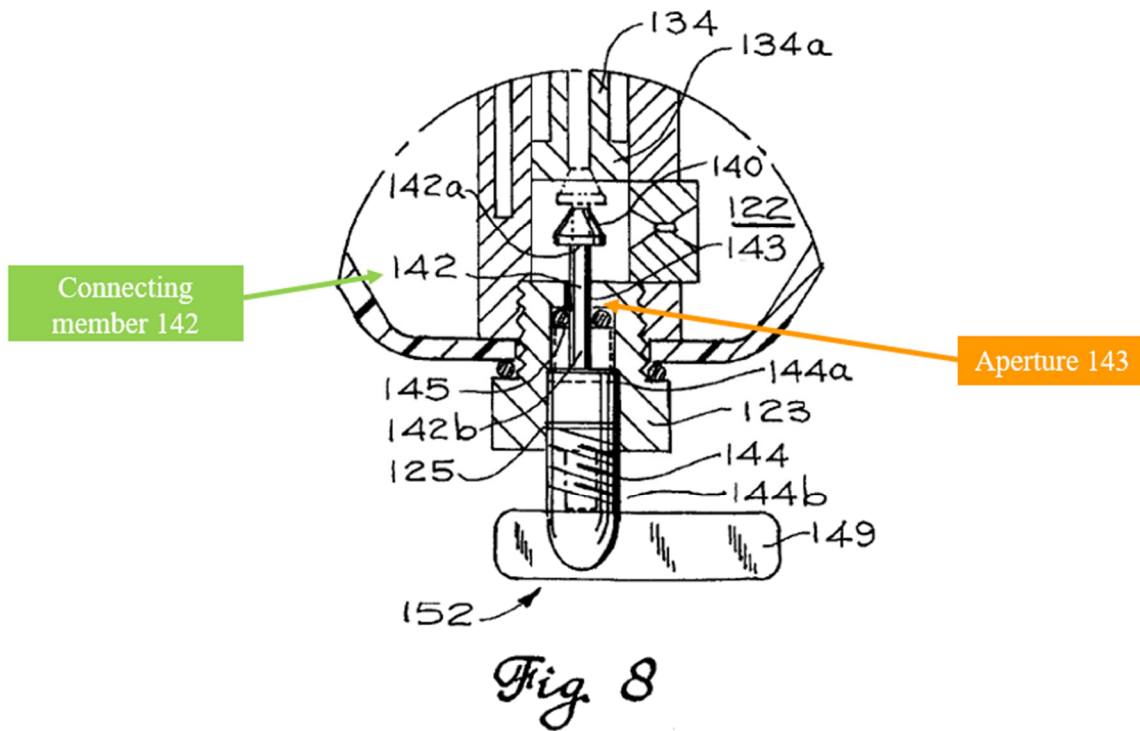
Claim 13 depends from claim 11 and recites: “wherein the gaseous fuel is LPG and the liquid fuel is gasoline.”

Workshop Manual discloses an engine operable on LPG and gasoline. §VII.A.5, *supra*.

4. Claim 14

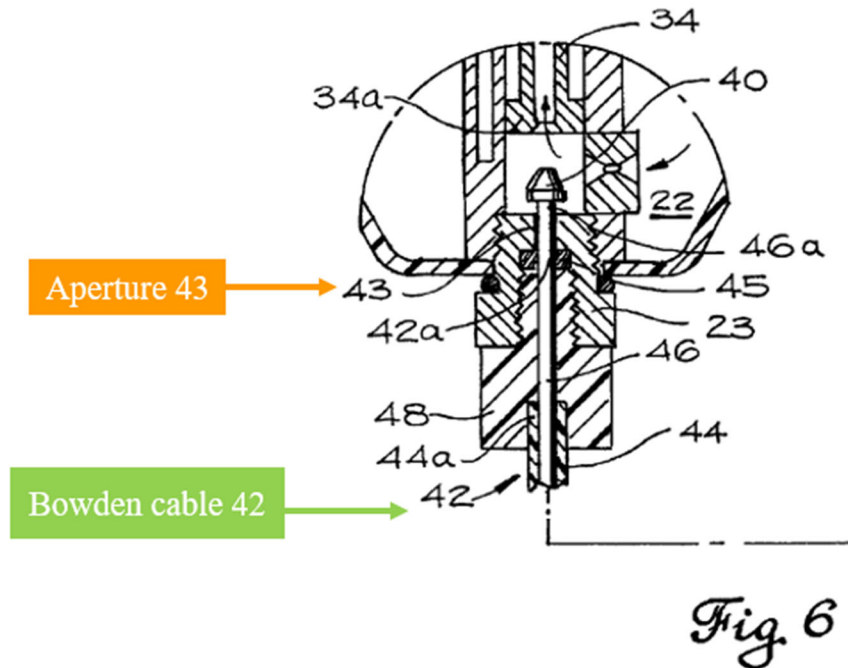
Claim 14 depends from claim 11 and recites: “wherein the manually actuated fuel shutoff comprises a rotating mechanical valve.”

In the Figure 8 embodiment, Winberg discloses a rotating shaft (connecting member 142) that extends through an aperture 143 in the carburetor:



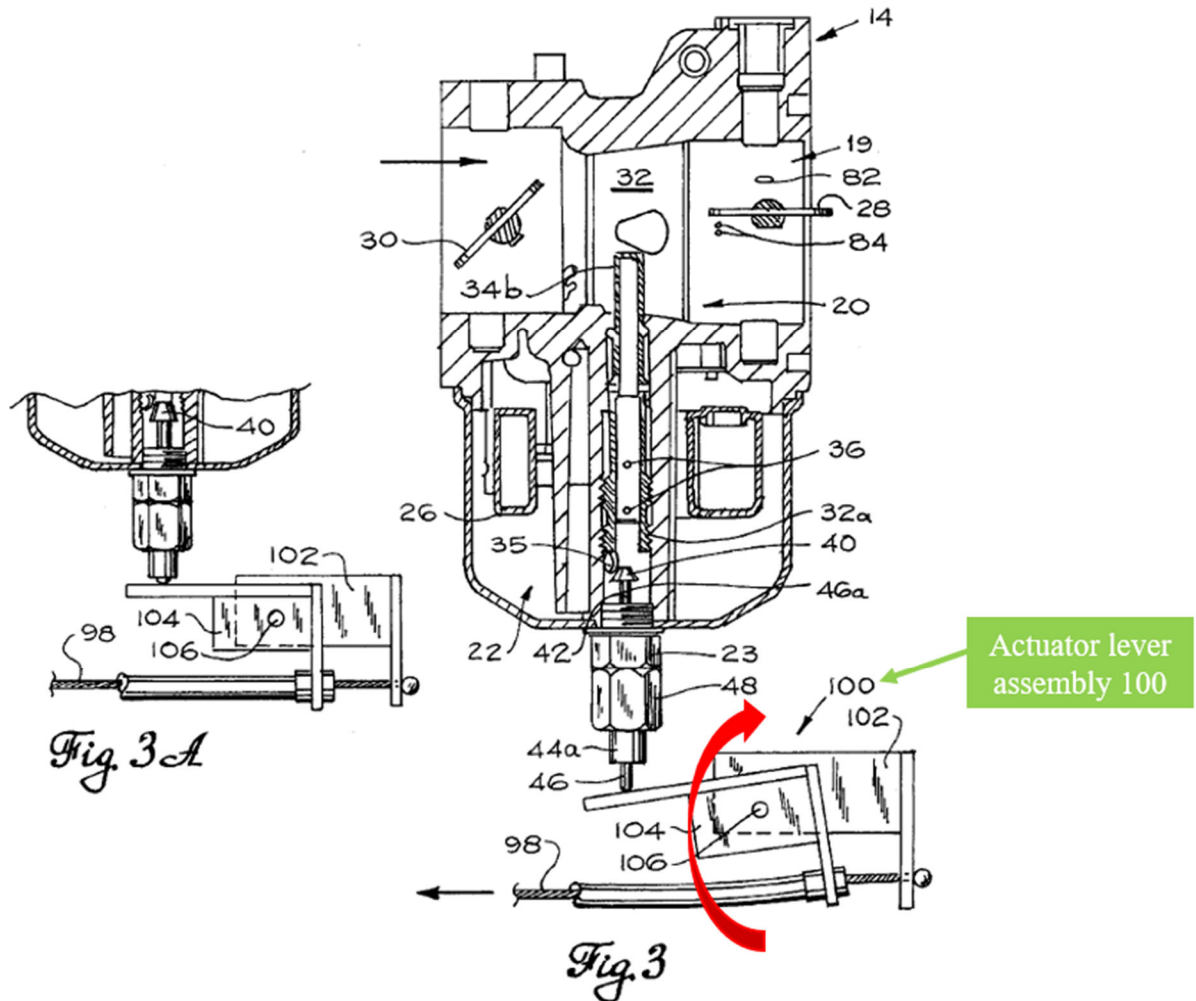
Ex.1013, FIG. 8 (annotated), 7:65-8:52, Ex.1003, [0295].

In the FIGS. 3/3A embodiment, Winberg's fuel shutoff comprises a shaft (Bowden cable 42) attached to plunger 40 that extends through aperture 43 in the carburetor. Ex.1013, 5:53-61, 7:31-55, FIGS. 3-3A & 6.



Id., FIG. 6 (annotated).

Based on Patent Owner's infringement contentions in litigation (Ex.1014, 9), Winberg's valve tip (plunger 40) rotates to open and close the fuel passage because the movable member 104 of the actuating lever assembly 100 rotates about pivot point 106 (Ex.1013, 7:42-56, FIGS. 3-3A), thus causing plunger 40 to also rotate.



Id., FIGS. 3-3A (annotated).

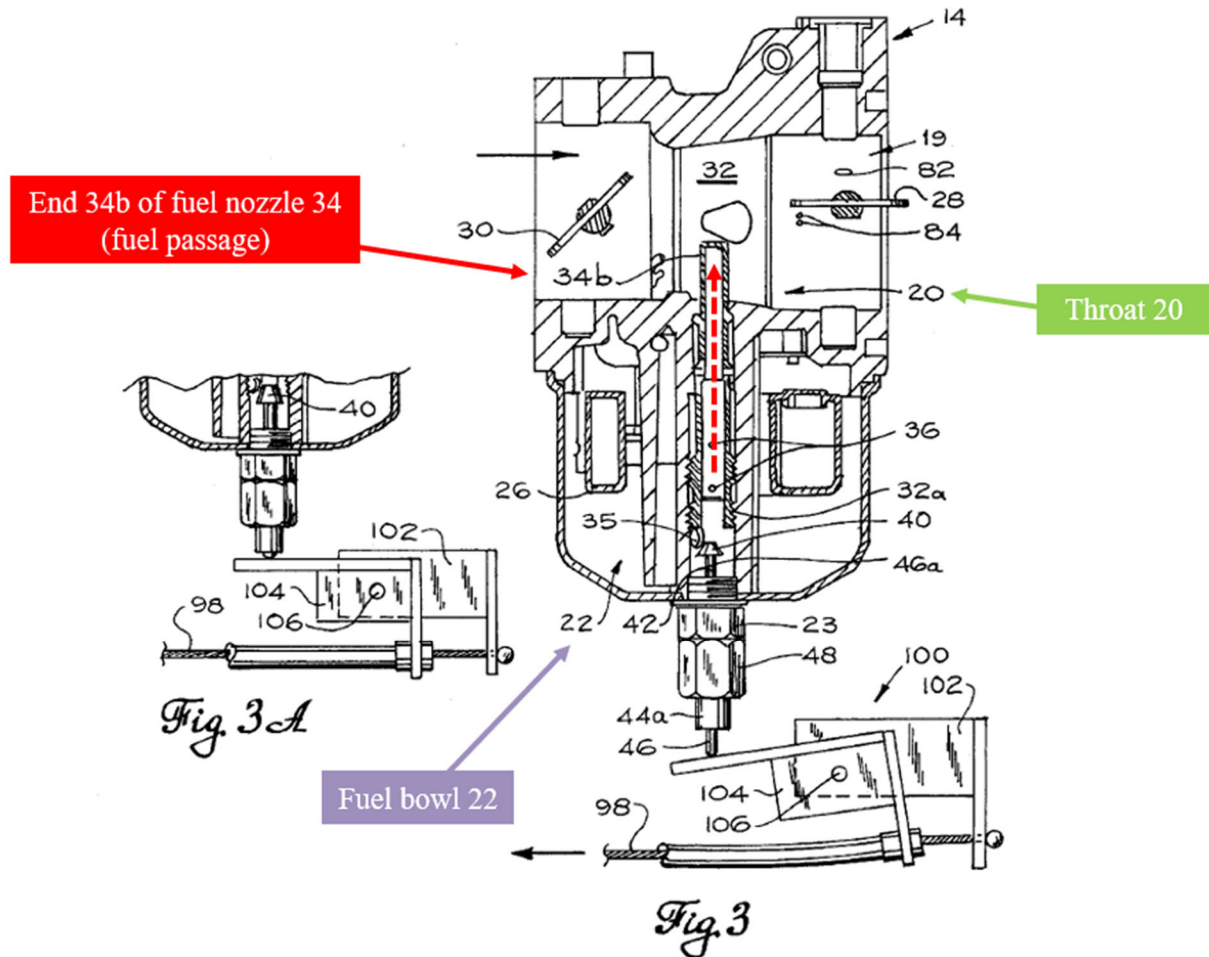
Accordingly, a POSA would have understood that the combination of Workshop Manual, Matsushima, and Winberg teaches claim 14. Ex.1003, [0297].

5. Claim 15

a. Element [15.1]

Element [15.1] recites a carburetor comprising “a float bowl, a throat, and a fuel passage extending from the float bowl to the throat.”

Winberg discloses a carburetor 14, which has a float bowl (fuel bowl 22/122) and throat 20. Ex.1013, 3:61-4:32, 7:65-8:52; FIGS. 3A-5 & 8. The carburetor 14 has a fuel nozzle 34/134, which has a fuel passage extending from the float bowl to the throat. *Id.*, 4:12-33, 7:65-8:52, FIGS. 3A-5 & 8.



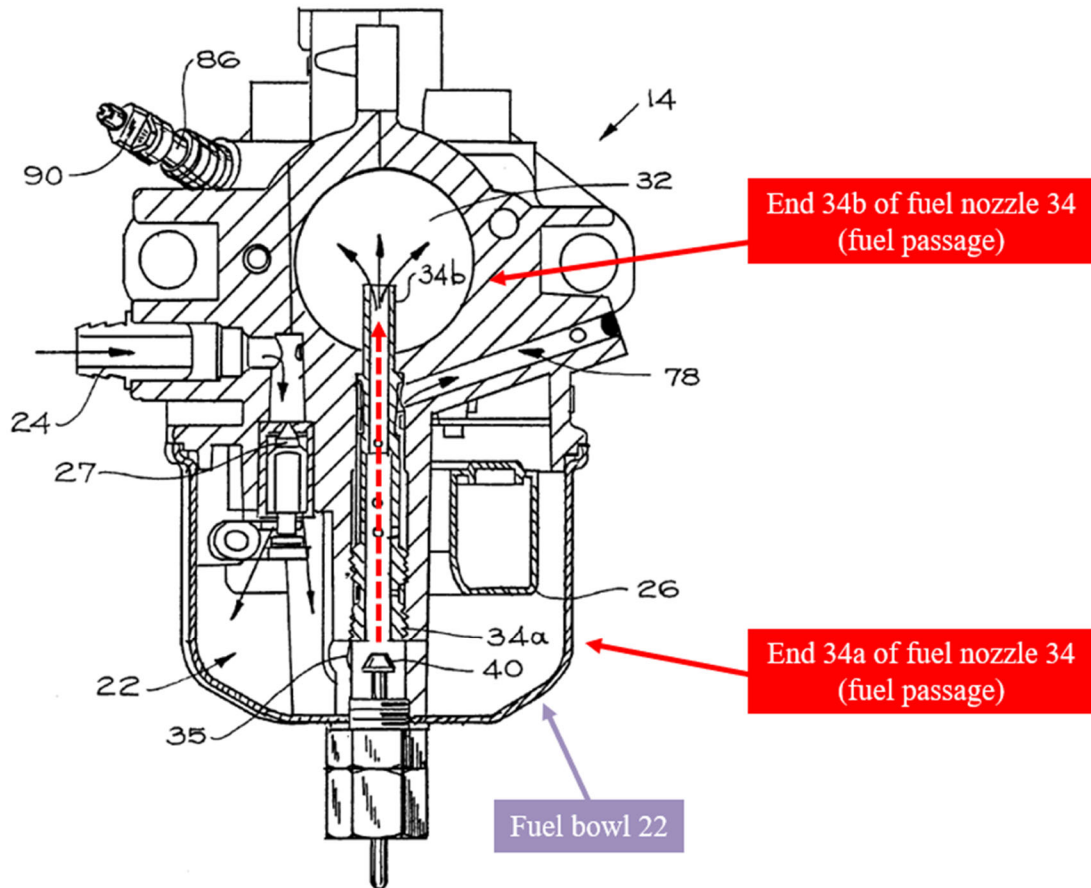


Fig. 4

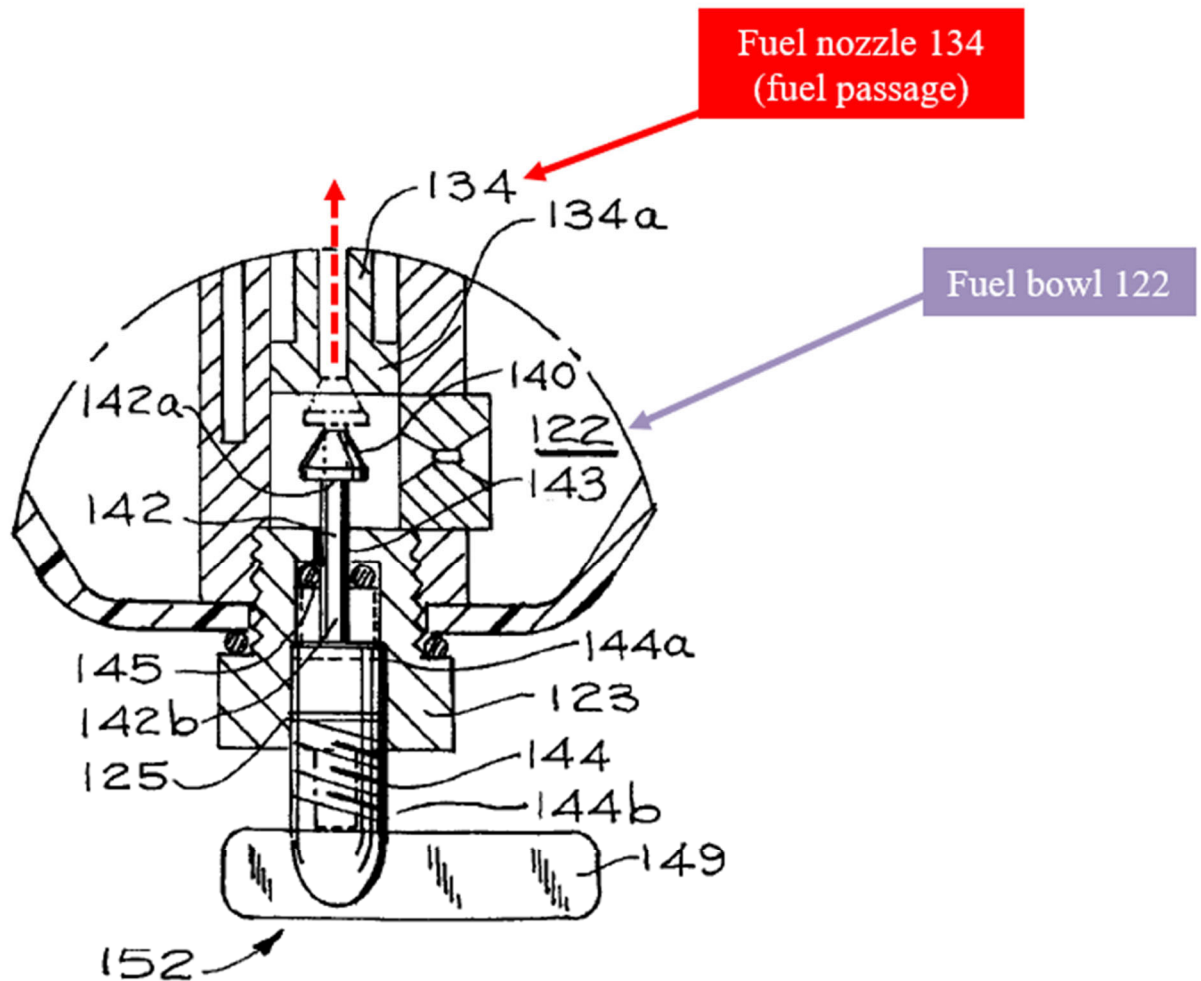


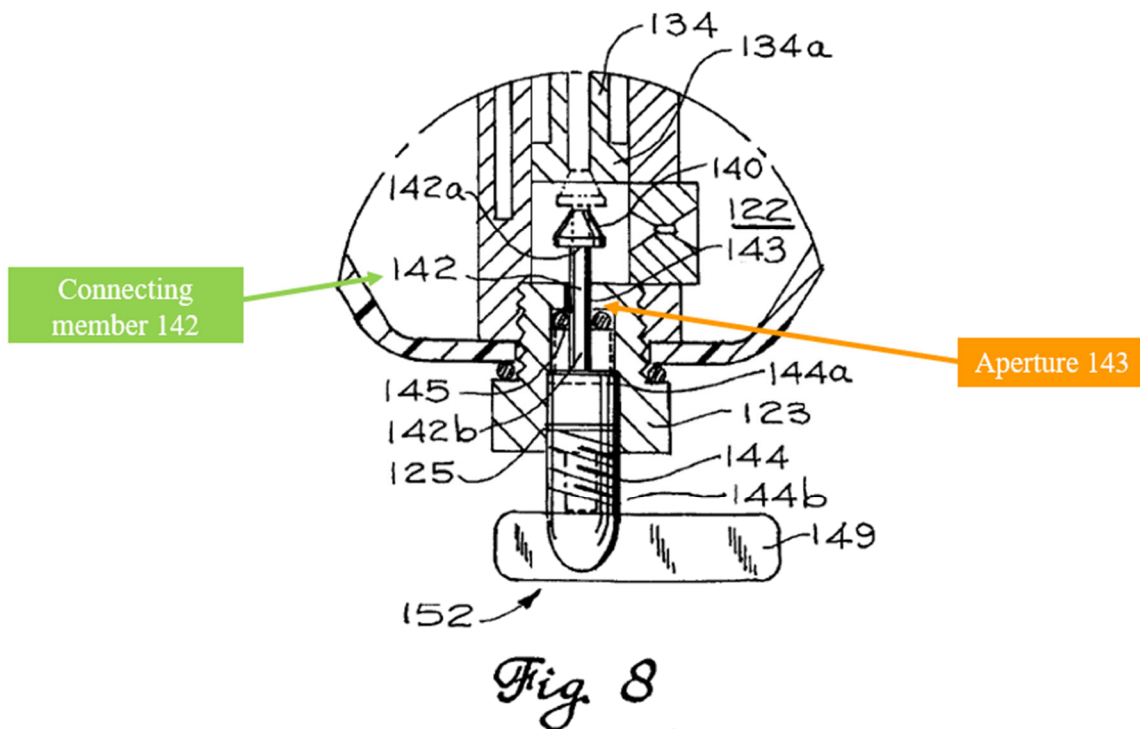
Fig. 8

Id., FIGS. 3-3A, 4 & 8 (annotated).

b. Element [15.2]

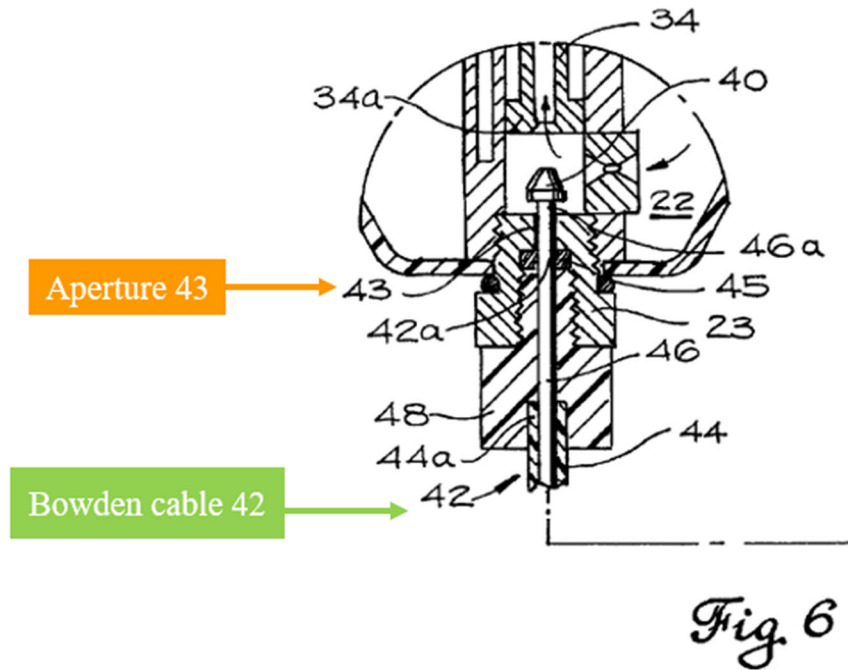
Element [15.2] recites “wherein the fuel shutoff comprises a shaft extending into the carburetor through an aperture in the float bowl and coupled to a valve tip in the float bowl that rotates to open and close the fuel passage.”

In the Figure 8 embodiment, Winberg's fuel shutoff comprises a shaft (connecting member 142) attached to plunger 140 that extends through aperture 143 in the carburetor. Ex.1013, 7:65-8:52, FIG. 8. Winberg's valve tip (plunger 140) rotates to open and close the fuel passage. *Id.*



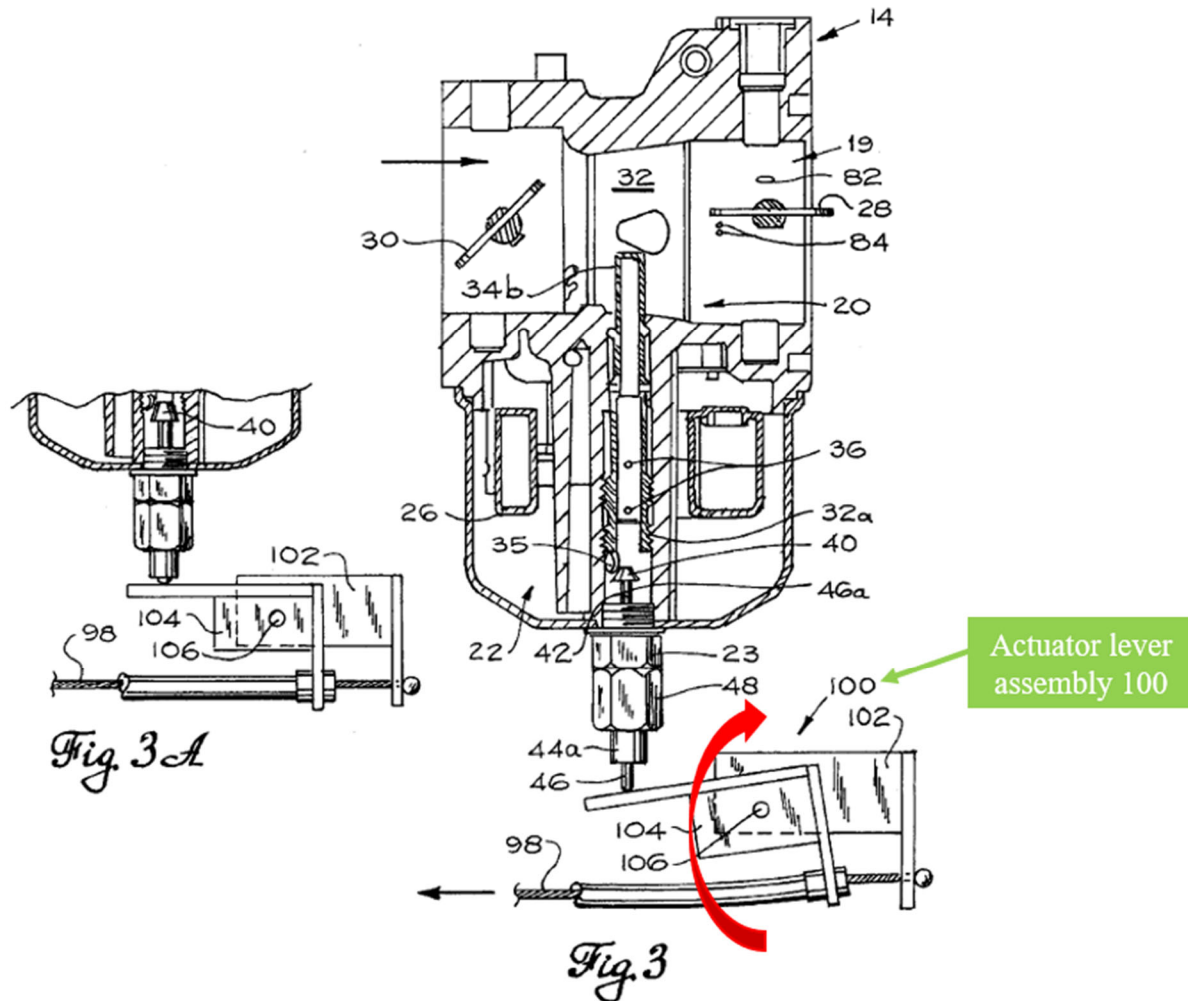
Id., FIG. 8 (annotated), 7:65-8:52.

In the FIGS. 3/3A embodiment, Winberg's fuel shutoff comprises a shaft (Bowden cable 42) attached to plunger 40 that extends through aperture 43 in the carburetor. Ex.1013, 5:53-61, 7:31-55, FIGS. 3-3A & 6.



Id., FIG. 6 (annotated).

Based on Patent Owner's infringement contentions in litigation (Ex.1014, 9), Winberg's valve tip (plunger 40) rotates to open and close the fuel passage because the movable member 104 of the actuating lever assembly 100 rotates about pivot point 106 (Ex.1013, 7:42-56, FIGS. 3-3A), thus causing plunger 40 to also rotate.



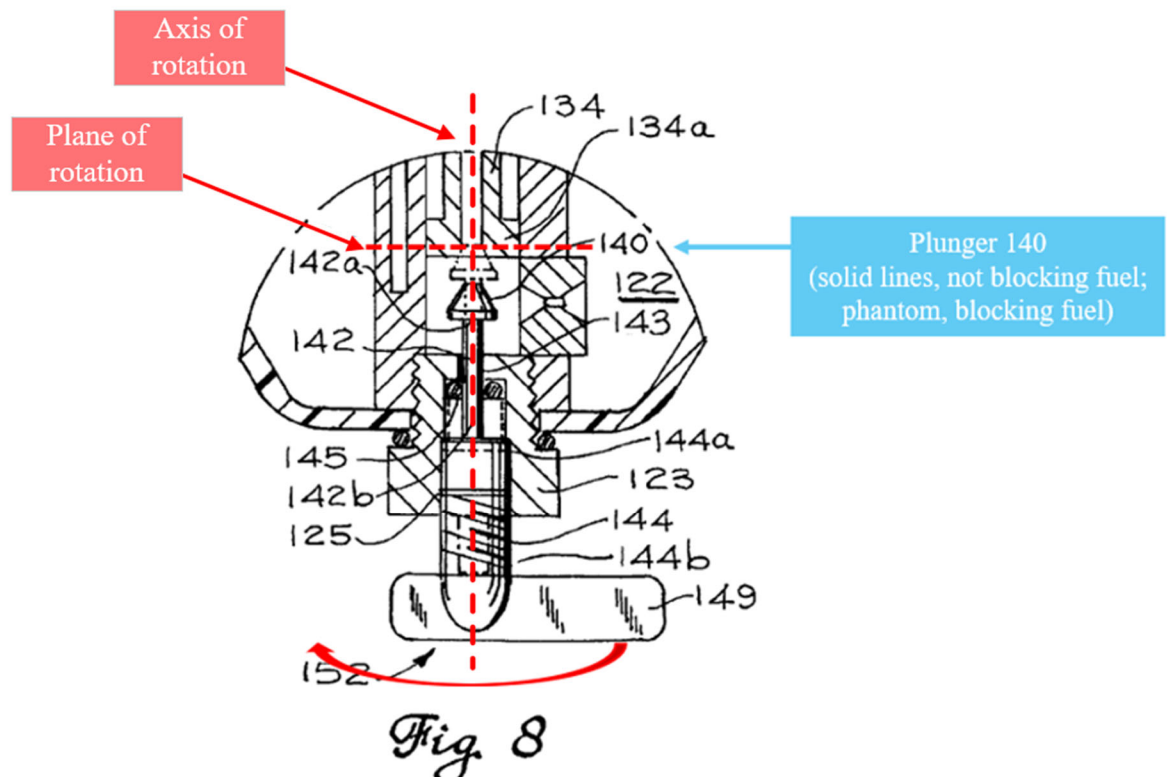
Id., FIGS. 3-3A (annotated).

Accordingly, a POSA would have understood that the combination of Workshop Manual, Matsushima, and Winberg teaches claim 15. Ex.1003, [0303].

6. Claim 16

Claim 16 depends from claim 15, and recites “wherein the valve tip rotates parallel to an inlet of the fuel passage between a first position permitting fuel flow into the inlet and a second position blocking fuel flow into the inlet.”

In the Figure 8 embodiment, Winberg's valve tip (plunger 140) has a rotational plane that is parallel to the inlet (input end 134a) of the fuel passage (fuel nozzle 134):



Id., FIG. 8 (annotated), 7:65-8:52.

Winberg's plunger 140 rotates between a position permitting fuel flow into the inlet of the fuel passage (first position) and a second position blocking fuel flow into the inlet of the passage. *Id.* Accordingly, a POSA would have understood that the combination of Workshop Manual, Matsushima, and Winberg teaches claim 16. Ex.1003, [0306].

F. Ground 6: Claims 11-16 are Rendered Obvious by the Combination of Nakafushi, Matsushima, and Winberg.

1. Claim 11

a. Element [11.0]

Nakafushi and Matsushima disclose a dual fuel engines that can be implemented in a generator. §VII.C.2.a, *supra*.

b. Element [11.1]

Nakafushi teaches an engine operable on a gaseous fuel and a liquid fuel. §VII.C.2.b, *supra*.

c. Element [11.2]

Nakafushi teaches 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. §VII.C.2.e, *supra*.

d. Element [11.3]

Winberg teaches “a manually actuated fuel shutoff coupled to the carburetor, the manually actuated fuel shutoff comprising: a first end in the carburetor that actuates to selectively allow or block a flow of fuel through the carburetor; and a second end external to the carburetor to actuate the first end.” §VII.E.1.d, *supra*.

It would have been obvious to a POSA to incorporate Winberg’s manually actuated fuel shutoff in the dual fuel engine of Nakafushi. A POSA would have been motivated to combine Nakafushi and Winberg. Nakafushi and Winberg both

relate to internal combustion engines. §§VI.B, VI.F, *supra*. Nakafushi and Winberg both disclose fuel shutoff systems in carburetors. Ex.1005, [0003]-[0004]; Ex.1013, Abstract. Winberg discloses that its manually actuated fuel shutoff is applicable to internal combustion engines. Ex.1013, 1:8-10, Ex.1003, [0315].

A POSA also would have had a reasonable expectation of success, because Winberg's float bowl configuration was common for use with small engines, and Winberg discloses using its float bowl and fuel shutoff in many applications of small engines. Ex.1003, [0316]. In addition, a POSA would have understood that mechanical valves, such as Winberg's fuel shutoff, and solenoids, such as the line valves in Nakafushi, can be configured to operate simultaneously. Walker demonstrates such a solution in a dual fuel engine using gasoline and LPG. Ex.1015, 2:3-32, FIG. 1. Ex.1003, [0316].

2. Claim 12

Claim 12 depends from claim 11 and recites: "wherein the engine is a pull start, batteryless engine."

Matsushima discloses a pull start, batteryless engine. §VII.B.4, *supra*. A POSA would have been motivated to combine Nakafushi and Matsushima, and would have had a reasonable expectation of success in doing so. *Id.* Accordingly, a

POSA would have understood that the combination of Nakafushi, Matsushima, and Winberg teaches claim 12. Ex.1003, [0319].

3. Claim 13

Claim 13 depends from claim 11 and recites: “wherein the gaseous fuel is LPG and the liquid fuel is gasoline.”

Nakafushi discloses an engine operable on LPG and gasoline. §VII.C.6, *supra*.

4. Claim 14

Claim 14 depends from claim 11. Winberg teaches the limitations added by dependent claim 14. §VII.E.4, *supra*.

Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Winberg teaches claim 14. Ex.1003, [0324].

5. Claim 15

Claim 15 depends from claim 14. Winberg teaches the limitations added by dependent claim 15. §VII.E.5, *supra*.

Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Winberg teaches claim 15. Ex.1003, [0329].

6. Claim 16

Claim 16 depends from claim 15. Winberg teaches the limitations added by claim 16. §VII.E.6, *supra*.

Accordingly, a POSA would have understood that the combination of Nakafushi, Matsushima, and Winberg teaches claim 16. Ex.1003, [0332].

G. Ground 7: Claims 11, 13, and 14 are Rendered Obvious by Holzapfel.

1. Claim 11

a. Element [11.0]

Holzapfel teaches a dual fuel engine. Ex.1008, 1:1-5. It would have been obvious to a POSA to have implemented Holzapfel's dual fuel engine in a generator, as dual fuel generators were well known as of the earliest priority date of the '145 Patent. Ex.1016; Ex.1003, [0333].

b. Element [11.1]

The engine of Holzapfel is configured to operate on a gaseous fuel and on a liquid fuel. Ex.1008, 1:1-5.

c. Element [11.2]

Holzapfel teaches 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. §VII.D.2.e, *supra*.

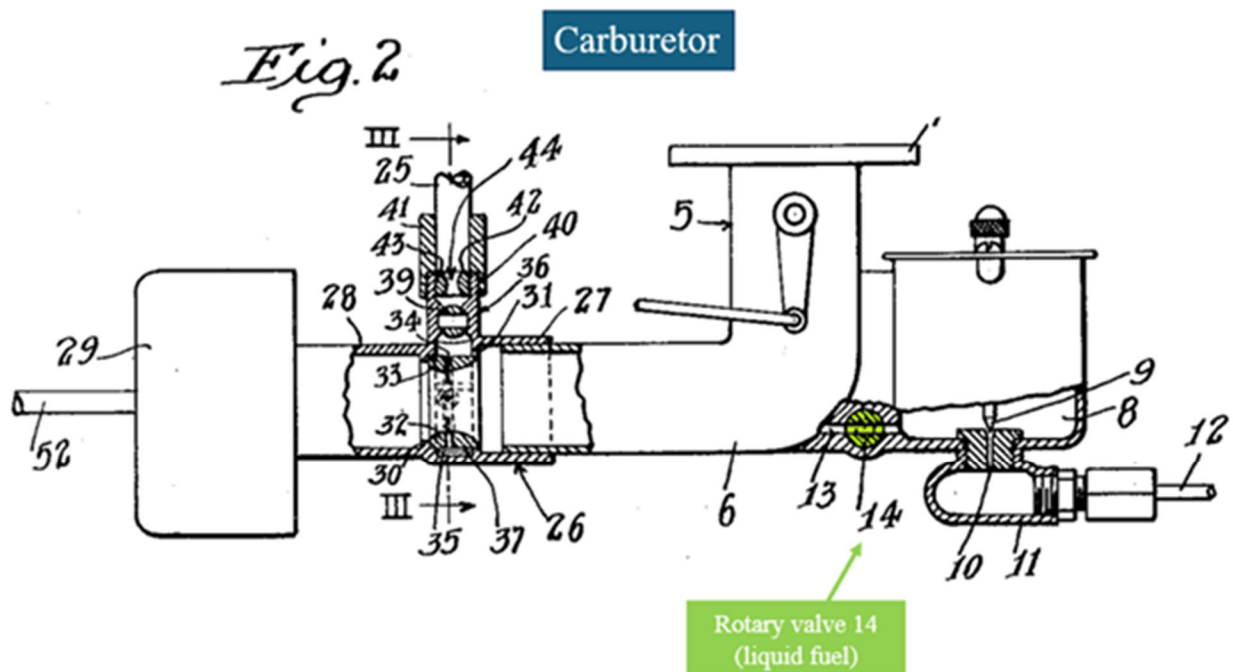
d. Element [11.3]

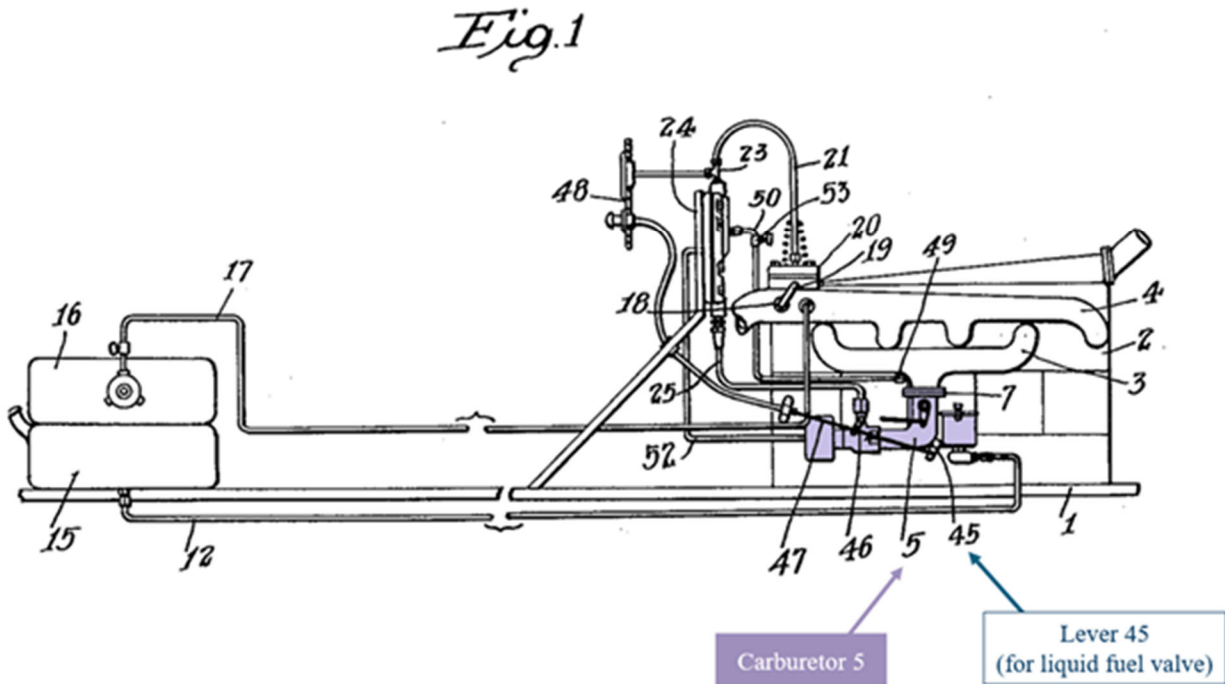
Element [11.3] recites “a manually actuated fuel shutoff coupled to the carburetor...comprising: a first end in the carburetor that actuates to selectively

allow or block a flow of fuel through the carburetor; and a second end external to the carburetor to actuate the first end.”

Holzapfel discloses rotary valve 14 connected to lever 45, which together are a “manually actuated fuel shutoff.” Ex.1008, 2:100-123; FIGS. 1-2.

As seen in FIGS. 1 and 2, rotary valve 14 and lever 45 are coupled to carburetor 5:





Ex.1008, FIGS. 1-2 (annotated).

Rotary valve 14 defines the first end of the fuel shutoff, which operates in carburetor 5, and lever 45 defines the second end of the fuel shutoff, which operates external to carburetor 5. Ex.1003, [0342].

Rotary valve 14 is manually actuated to selectively allow or block a flow of fuel through the carburetor. Ex.1008, 2:100-123.

Accordingly, a POSA would have understood that Holzapfel teaches [11.3]. Ex.1003, [0344].

2. Claim 13

Holzapfel discloses an engine operable on LPG and gasoline. §VII.D.6, *supra*.

3. Claim 14

Claim 14 depends from Claim 11 and recites “wherein the manually actuated fuel shutoff comprises a rotating mechanical valve.” Holzapfel discloses a “manually actuated fuel shutoff” comprising “a rotating mechanical valve,” i.e., rotary valve 14. Ex.1008, 1:104-107. Accordingly, a POSA would have understood that Holzapfel teaches claim 14. Ex.1003, [0346].

H. Ground 8: Claims 12, 15, and 16 are Rendered Obvious by the Combination of Holzapfel, Matsushima, and Winberg.

1. Claim 12

Claim 12 depends from claim 11 and recites: “wherein the engine is a pull start, batteryless engine.”

Holzapfel teaches or renders obvious all limitations of claim 11. §VII.G.1, *supra*. Matsushima discloses a pull start, batteryless engine. §VII.D.1, *supra*. A POSA would have been motivated to combine Holzapfel and Matsushima, and would have had a reasonable expectation of success in doing so. *Id.* Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Winberg teaches claim 12. Ex.1003, [0348].

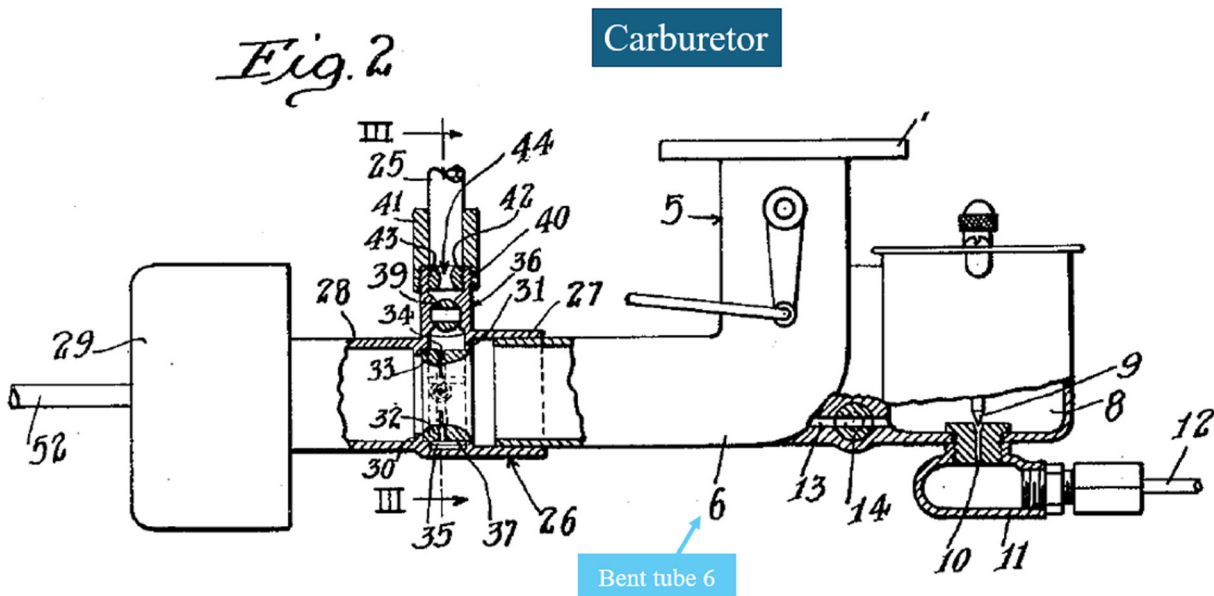
2. Claim 15

Claim 15 depends from claims 11 and 14. Holzapfel teaches or renders obvious all limitations of claims 11 and 14. §§VII.G.1, VII.G.3, *supra*.

a. Element [15.1]

Element [15.1] recites a carburetor comprising “a float bowl, a throat, and a fuel passage extending from the float bowl to the throat.”

Holzapfel’s carburetor includes float chamber or fuel reservoir 8 that communicates with the carburetor by means of passage 13. As seen in Figure 2, carburetor 5 also includes a throat (which is bent tube 6):



Ex.1008, FIG. 2.

b. Element [15.2]

Winberg teaches “wherein the manually actuated fuel shutoff comprises a shaft extending into the carburetor through an aperture in the float bowl, the shaft being coupled to a valve tip in the float bowl that rotates to open and close the fuel passage.” §VII.E.5.b, *supra*.

It would have been obvious to a POSA that Winberg's fuel bowl 22/122 and fuel shutoff could substitute for Holzapfel's float chamber 8 and valve 14. A POSA would have understood that Winberg's plunger structures perform the same function as Holzapfel's valve 14, namely, blocking and unblocking an aperture through which fuel flows. Ex.1003, [0354]. A POSA would have been motivated to combine Holzapfel and Winberg. Holzapfel and Winberg both relate to internal combustion engines. §§VI.C, VI.F, *supra*. Holzapfel and Winberg both disclose fuel shutoff systems in carburetors. Ex.1008, 2:108-123; Ex.1013, Abstract. Winberg discloses that its manually actuated fuel shutoff is applicable to internal combustion engines. Ex.1013, 7:57-64. In addition, a POSA would have been motivated to use Winberg's float bowl and fuel cutoff to minimize any gasoline leaks caused by a defective plunger 140 or if the user forgets to close the shutoff valve, particularly for a portable generator that is transported to different locations between uses. Ex.1003, [0355]. Because Winberg's fuel nozzle 134 is vertical, any leaks caused by a defective plunger 140 would be minimal compared with Holzapfel's configuration, which has a horizontal fuel passage 13. Ex.1003, [0355].

A POSA also would have had a reasonable expectation of success, because Winberg's float bowl configuration was common for use with small engines, and

Winberg discloses using its float bowl and fuel shutoff in many applications of small engines, including generators. Ex.1003, [0356].

Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Winberg teaches claim 15. Ex.1003, [0357].

3. Claim 16

Claim 16 depends from claim 15. Winberg teaches the limitations added by claim 16. §VII.E.6, *supra*.

Accordingly, a POSA would have understood that the combination of Holzapfel, Matsushima, and Winberg teaches claim 16. Ex.1003, [0361].

VIII. MANDATORY NOTICES**A. Real Party in Interest**

In addition to Petitioners, Midwest Equipment Sales, LLC, Harbor Freight Holdings, Inc., and Generac Holdings, Inc., are listed as potential real-parties-in-interest.

B. Related Matters

To the best of Petitioners' knowledge, the '145 Patent is or has been involved in the following district court litigations/proceedings:

Name	Number	Court	Filed
<i>Champion Power Equipment Inc. v. Firman Power Equipment Inc.</i>	2:23-cv-02371	DAZ	Nov. 10, 2023
<i>Champion Power Equipment Inc. v. Generac Power Systems Inc.</i>	2:24-cv-01281	EDWI	Oct. 9, 2024
<i>Harbor Freight Tools USA Inc. v. Champion Power Equipment Inc.</i>	2:24-cv-08722	CDCA	Oct. 9, 2024
<i>Champion Power Equipment Inc. v. Harbor Freight Tools USA Inc.</i>	2-24-cv-01302	EDWI	October 14, 2024
<i>Champion Power Equipment Inc. v. Westinghouse Elec. Corp. et al.</i>	3:25-cv-00239	DNV	May 14, 2025

Patent Owner has asserted the '145 Patent, and related 10,221,780 ('780 Patent), 10,393,034 ('034 Patent), 10,697,398 ('398 Patent), 11,143,120 ('120 Patent), 11,492,985 ('985 Patent), 11,530,654 ('654 Patent), and 11,840,970 ('970 Patent), as well as other non-family member patents, in *Champion Power Equipment Inc. v. Firman Power Equipment Inc.*, 23-cv-02371-DWL (D. Ariz.).

Patent Owner has asserted the '145 Patent and related '398 Patent, '120 Patent, '985 Patent, '654 Patent, '970 Patent, '780 Patent, as well as other non-family member patents, in *Champion Power Equipment Inc. v. Generac Power Systems Inc.*, 24-cv-01281-LA (E.D. Wis.).

Petitioner Harbor Freight has filed a declaratory judgment action alleging non-infringement of the '145 Patent and related '034 Patent, '654 Patent, '985 Patent, '398 Patent, '120 Patent, '970 Patent, '780 Patent, as well as other non-family member patents, in *Harbor Freight Tools USA, Inc. v. Champion Power Equipment, Inc.*, 24-cv-08722-SVW-AS (C.D. Cal.).

Patent Owner has asserted the '145 Patent, and related '985 Patent, '034 Patent, '780 Patent, '398 Patent, '120 Patent, as well as other non-family member patents, in *Champion Power Equipment Inc. v. Westinghouse Elec. Corp. et al.*, 3:25-cv-00239 (D. Nev.).

Patent Owner asserted the '145 Patent, and related '034 Patent, '398 Patent, '120 Patent, '985 Patent, '654 Patent, '970 Patent, '780 Patent, as well as other non-family member patents, against Petitioner Harbor Freight in *Champion Power Equipment Inc. v. Harbor Freight Tools USA Inc.*, 24-cv-01302- PP (E.D. Wis.). This case was dismissed on April 29, 2025, in favor of the earlier filed action in C.D. California cited above.

C. Lead and Back-Up Counsel Under 37 C.F.R. §42.8(b)(3)

Pursuant to 37 C.F.R. §§42.8(b)(3) and 42.10(a), Petitioners provide the following designation of counsel, to which all correspondence should be addressed. Pursuant to 37 C.F.R. §42.10(b), a Power of Attorney for each Petitioner accompanies this Petition.

Lead Counsel	Backup Counsel
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D. Service Information Under 37 C.F.R. §42.8(b)(4)

Please address all correspondence and service to the addresses listed above.

Petitioners consent to electronic service by email at thomas.walsh@icemiller.com,
tom.rammer@icemiller.com, alek.siliunas@icemiller.com,

samantha.chan@icemiller.com, and kristina.davis@icemiller.com. Petitioners consent to electronic service directed to the aforementioned email addresses.

E. Payment of Fees

The Office is authorized to charge fees for this Petition to Deposit Account No. 09-0007. Any additional fees that might be due are also authorized.

IX. CONCLUSION

Petitioners respectfully request that the Board institute an *inter partes* review trial for Claims 1–16 of the '145 Patent to cancel these claims as unpatentable.

October 7, 2025

Respectfully submitted,

/Thomas A. Walsh/
Thomas Walsh, Reg. No. 45,196

CERTIFICATE OF WORD COUNT UNDER 37 CFR §42.24

I hereby certify that the foregoing Petition for *Inter Partes Review* of U.S. Patent No. 11,143,145 complies with the type-volume limitations of 37 CFR §42.24 and general format requirements of CFR §42.6(a).

The foregoing Petition for *Inter Partes Review* of U.S. Patent No. 11,143,145 includes 13,868 words (as calculated by Microsoft Word), excluding those in the table of contents, table of authorities, claim listing, mandatory notices, certificate of service, certificate of word count, and appendix of exhibits. The Petition for *Inter Partes Review* of U.S. Patent No. 11,143,145 has also been prepared using Microsoft® Word in 14-point Times New Roman.

October 7, 2025

Respectfully submitted,

/Thomas A. Walsh/

Thomas Walsh, Reg. No. 45,196

CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§42.6(e)(4)(i) *et. seq.* and 42.105(b), I hereby certify on October 7, 2025, that a true and correct copy of the Petition for *Inter Partes Review* of U.S. Patent No. 11,143,145 was served in its entirety via e-mail and courier service to the Patent Owner by serving the correspondence address of record for the 11,143,145 Patent:

26629 – ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
136 S WISCONSIN ST
PORT WASHINGTON, WI

Courtesy copies of the same documents were served electronically on Patent Owner's litigation counsel by email at the following addresses:

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October 7, 2025

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