

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MWE INVESTMENTS, LLC,

Petitioner

v.

CHAMPION POWER EQUIPMENT, INC.,

Patent Owner.

U.S. Patent No. 10,221,780

DECLARATION OF MAHDI SHAHBAKHTI

TABLE OF CONTENTS

I.	BACKGROUND INFORMATION	7
A.	Qualifications and Experience	7
B.	Compensation.....	15
C.	Materials Considered	16
II.	STATEMENT OF LEGAL PRINCIPLES.....	18
A.	Person of Ordinary Skill in the Art	18
B.	Prior Art.....	19
C.	Claim Construction	20
D.	Anticipation (§102)	22
E.	Obviousness (§103).....	22
III.	SUMMARY OF THE ‘780 PATENT	28
IV.	THE CHALLENGED CLAIMS	30
V.	APPLICATION OF PRIOR ART TO THE CHALLENGED CLAIMS.....	30
A.	Brief Summary of Prior Art	31
VI.	CLAIM TERMS	44
A.	The Claimed “Fuel Lockout Apparatus”	45
B.	The Claimed Terms “Coupled,” “Prevent...Coupling” and “Permit...to Couple”.....	67
VII.	THE CHALLENGED CLAIMS ARE UNPATENTABLE BASED ON THE PRIOR ART.....	77
A.	Ground 1: The Combination of DuroMax and Elsdon Renders Obvious Claims 1, 2, 3, 4, 6, 7 and 15.....	77
B.	Ground 2A/2B: Hallberg Anticipates Claims 1, 6, 7, and 9 (Ground 2A) and Renders Obvious Claims 2 and 15 (Ground 2B).	98

C. Ground 3: The Combination of Rumao, DuroMax, and Elsdon, and alternatively the Combination of Rumao and Hallberg Renders Obvious Claims 8, 9, 11, and 14.143

D. Ground 4: The Combination of Rumao, DuroMax, Elsdon, and Parlatore, or alternatively, Rumao, Hallberg, and Parlatore Renders Obvious Claims 12 and 13.162

E. Ground 5: The Combination of DuroMax, Elsdon, and Parlatore Renders Obvious Claim 5.168

F. Ground 6: The Combination of Rumao, DuroMax, and Elsdon Renders Obvious Claim 10.170

VIII. CONCLUSION.....172

LIST OF EXHIBITS

Exhibit	Description
Ex. 1001	U.S. Patent No. 10,221,780 (“the ’780 Patent”)
Ex. 1002	File History of the ’780 Patent
Ex. 1003	Curriculum Vitae of Mahdi Shahbakhti
Ex. 1004	DuroMax XP440EH Operator’s Manual (“DuroMax”)
Ex. 1005	U.S. Patent No. 5,718,265 to Elsdon (“Elsdon”)
Ex. 1006	U.S. Patent No. 4,492,207 to Hallberg (“Hallberg”)
Ex. 1007	U.S. Patent No. 10,337,399 to Rumao (“Rumao”)
Ex. 1008	U.S. Patent No 1,931,698 to Holzapfel (“Holzapfel”)
Ex. 1009	<i>Cambridge Dictionary</i> , https://dictionary.cambridge.org/dictionary/english/couple (last visited July 8, 2025).
Ex. 1010	U.S. Patent Application No. 2011/0100335 A1 to Parlatore (“Parlatore”)
Ex. 1011	Horst Bauer, <i>Bosch Gasoline-Engine Management Basics and Components</i> (2001)
Ex. 1012	A.J. Martyr & M.A. Plint, <i>Engine Testing Theory and Practice</i> (3d ed. 2007)
Ex. 1013	https://www.youtube.com/watch?v=Ip7ckWAZ3xQ
Ex. 1014	<i>American Heritage Dictionary of the English Language</i> (3d ed. 1996).
Ex. 1015	Constantine Arcoumanis, <i>Internal Combustion Engines</i> (Academic Press 1988).

Ex. 1016	M.K. Gajendra Babu & K.A. Subramanian, Alternative Transportation Fuels: Utilisation in Combustion Engines (CRC Press 2013).
Ex. 1017	A. Parrish, Mechanical Engineer's Reference Book (Butterworth & Co. Publ'rs 1973)
Ex. 1018	Carsten Baumgarten, Mixture Formation in Internal Combustion Engines (2006)
Ex. 1019	Günter P. Merker, Christian Schwarz & Rüdiger Teichmann, Combustion Engines Development (2012)
Ex. 1020	Richard Stone, Introduction to Internal Combustion Engines (3d ed. 1999)
Ex. 1021	Rolla C. Carpenter & H. Diederichs, Internal Combustion Engines (2d ed. 1909).
Ex. 1022	Rowlands S. Benson & N.D. Whitehouse, Internal Combustion Engines (Pergamon Press 1979).
Ex. 1023	K.K. Ramalingam, Handbook of Mechanical Engineering Terms (2d ed. 2009)

DECLARATION OF DR. MADHI SHAHBAKHTI

I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true. These statements were made with the knowledge that willful false statements and the like so made are punishable under Section 1001 of Title 18 of the Unites States Code.

Date: July 22, 2025

By: *M. Shahbakhti*
Dr. Mahdi Shahbakhti

I, Dr. Mahdi Shahbakhti declare as follows:

I. BACKGROUND INFORMATION

A. Qualifications and Experience

[0001]. I am a Professor of Mechanical Engineering at the University of Alberta and an Adjunct Professor of Mechanical Engineering at Michigan Technological University. At the University of Alberta, I serve as the Director of the Energy Mechatronics Laboratory. The Energy Mechatronics Laboratory conducts research in a multidisciplinary area of engineering that includes mechanical and electrical systems, design of thermo-fluid systems, and control engineering.

[0002]. I am also a professional engineer (PEng) registered in Alberta (license # 284744). Over the past years, I have led various projects in the area of internal combustion engines and mechanical engineering. I currently lead several design, fabrication, and testing projects in the field of mechanical engineering including, among other things, internal combustion engines and powertrain systems running with conventional and alternative fuels.

[0003]. Before joining Michigan Technological University in 2012, I spent two years as a post-doctoral scholar at the Mechanical Engineering Department at the University of California, Berkeley. My post-doctorate work

focused on model-based design and adaptive control of internal combustion

engines and consisted of working closely with the Toyota Motor Company.

[0004]. I earned a Ph.D. in Mechanical Engineering from the University of Alberta in 2009 and a Master of Science degree from KNT University of Technology in 2003. Both my Ph.D. and MSc. dissertations were in the area of internal combustion engines.

[0005]. I have also worked on various aspects of internal combustion engines including design, modeling, benchmarking, experimental studies, calibration, and electronic control unit (ECU) design and implementation since 2000. These include dual fuel, bi-fuel, and single-fuel engines. I have studied engines running with a variety of fuels including but not limited to gasoline, diesel, ethanol, n-heptane, iso-octane, gaseous fuels (natural gas, butane, hydrogen, ...), and biofuels.

[0006]. I along with my research group have tested various dual fuel and bi-fuel engines for different applications. These include small (< 0.5 liter) to large scale engines (e.g., 15 liter). Our work has included carburetor, throttle body injection (TBI), port fuel injection (PFI), direct injection (DI) systems, and mixer systems for gaseous fuels in engines. In addition, my work has also covered various engine types including spark ignition, compression ignition, lean burn, low

temperature combustion (HCCI, PPCI, RCCI) engines, and their exhaust aftertreatment systems.

[0007]. I have direct industry experience related to the internal combustion engines. From 2001 to 2004, I worked as a researcher in the automotive industry. During this time, I was involved in the research and development of internal combustion engines and powertrain management systems for gasoline and natural gas bi-fuel vehicles. In the past 13 years, I, along with my research group, have performed a number of research projects sponsored by various companies such as Cummins, Westport, Ford Motor Company, Toyota Motor Corporation, General Motors Corporation, Hyundai, IAV GmbH, Hitachi, and Denso.

[0008]. I have taught undergraduate and graduate courses in mechanical engineering departments in the U.S. and Canada since 2004, taking the role as a primary instructor for more than 26 academic semesters, and a teaching assistant for eight academic semesters. I have regularly taught a graduate course and undergraduate technical elective course on “Internal Combustion Engines and Alternative Fuels”, MECE 541, at the University of Alberta since 2008. Some of the others courses I have taught include Thermodynamics, Fluid Dynamics, Energy Thermal Fluids, Feedback Control Design of Dynamic Systems, Model Predictive Control, Machine Learning Control, etc.

[0009]. I have supervised 148 graduate and undergraduate students for mechanical engineering research projects or dissertations. These include 37 Ph.D., 77 M.S. and 34 B.S. students in the mechanical engineering departments in four academic institutions from 2010 to 2025. Such mentorships have been in the areas of modeling, design, experimental studies, and control of mechanical engineering systems.

[0010]. I am currently the Technical Editor for the International Journal of American Society of Mechanical Engineers (ASME)/ Institute of Electrical and Electronics Engineers (IEEE) Transactions on Mechatronics. In addition, I served six years as the Associate Editor for ASME Journal of Dynamic Systems, Measurement, and Controls (2017–2023), Associate Editor (2014-2020) for the International Journal of Powertrains (Inderscience Publishers) and a guest editor for a special issue on “Optimal Design and Operation of Energy Systems” in the International Journal of Optimal Control Applications and Methods (2020–2022). In these roles, I have regularly evaluated research work in the field of mechanical and electrical engineering systems.

[0011]. I have also served on the United States’ National Science Foundation (NSF) and U.S. Department of Energy (DOE) review panels in the areas of mechanical engineering systems, controls, and energy systems. I have been a reviewer for: (i) international grant proposals from funding agencies from

the United States, Canada, Croatia, France, Germany, Poland, and the Netherlands,

(ii) the U.S. Academy of Engineering research program, (iii) 24 international engineering journals, and (iv) Springer International Publishing for books in the areas of mechanical engineering systems and mechatronics.

[0012]. I have been a member of the Society of Automotive Engineers (SAE) (membership #6109271569) for about 20 years. I have organized a number of technical sessions in the area of internal combustion engines at SAE World Congress in Detroit during 2016 and 2022. In addition, I have been a member of SAE Technical Committee on New Engines, Components, Actuators and Sensors since 2016.

[0013]. I have been a member of the American Society of Mechanical Engineers (ASME) for the past thirteen years (membership #125958). I am a very active member of ASME's Dynamic Systems & Control Division and have served as the chair of the Energy Systems technical committee (2018–2020), chair of the Automotive Transportation Systems technical committee (2020–2022), and chaired 45 sessions and co-organized more than 70 technical sessions in the areas of modeling, design, optimization, and control of mechanical engineering systems. I am currently part of the ASME executive committee for the Dynamic Systems & Control Division.

[0014]. I have been awarded over \$6.1 million in grants/support as a Principal Investigator (PI) and over \$9.0 million as a co-PI from international, federal, provincial, and industry sources for conducting research in the areas of design, modeling, optimization, and control of mechanical engineering systems. For example, I along with two of my colleagues recently received 1,140,000 CAD in funding from the Canada National Sciences and Engineering Research Council (NSERC) and Diesel Tech Industries for the period 2025–2028 to design and control dual fuel engines running with hydrogen and diesel fuels.

[0015]. As the director of Energy Mechatronics Laboratory (EML) at the University of Alberta, I currently supervise/co-supervise 26 members for research and development (R&D) engineering works. These include 3 research associates, 5 post-doctoral scholars, 11 PhD students, 3 MSc graduate students, and 2 lab engineers and 2 undergraduate students. The majority of the EML projects are with industry partners specializing in mechanical engineering systems. Our works center on modeling, design, fabrication, testing of mechanical-electrical-chemical engineering systems. Over the past 12 years (UAlberta, MichiganTech), I have led R&D projects with more than 20 companies most of them global companies (e.g., Cummins, Westport, Ford, GM, ...) for different engineering technologies. The majority of EML graduates/trainees (>70) are currently working in mechanical/electrical engineering companies in the U.S. and Canada.

[0016]. I have been recognized by different awards. Some of the recognitions/awards for my work related to internal combustion engines include:

- Transport Canada 2023 Technology Achievement Award Finalist, 2023.
- Best Presentation Award, SAE Int. Powertrain, Fuels & Lubricants Conference, Baltimore, MD, USA, 2016.
- Best Presentation in the Session, American Control Conference (ACC), 2012 (Montreal), 2015 (Chicago).
- Society of Automotive Engineers (SAE) International Ralph R. Teetor Educational Award, 2016 (An international award recognizing top engineering educators for outstanding contributions).
- Best Paper Award, ASME Automotive and Transportation Systems Technical Committee – ASME Dynamic Systems Control Conference, Columbus, OH, USA, 2015.
- Best Paper Award, ASME Automotive and Transportation Systems Technical Committee – ASME Dynamic Systems Control Conference, Fort Lauderdale, FL, USA, 2012.
- Canada NSERC (Natural Science and Engineering Research Council) Postdoctoral Fellowship, 2010 – 2012.

- Zita and John Rosen Teaching Excellence Award for Principal Instructor, University of Alberta, 2009 (An award for teaching Internal Combustion Engine (MECE 541) course. Only one award, across the university, is granted annually to give special recognition to a graduate student principal instructor who is an especially skilled and dedicated teacher).
- David Morris Graduate Scholarship in Automotive Engineering, University of Alberta, 2008.
- Winning Team (first prize) of a Total of 66 Research Teams from 26 Canadian Universities, Canada Automotive21 High Qualified Personnel Competition, Windsor, Canada, June 11-13, 2007.
- Chevron Graduate Scholarship in Natural Gas Engineering, University of Alberta, 2005.
- Best Paper Award in 3rd International Conference on Internal Combustion Engines, Tehran, Iran, 2004.
- Summa Cum Laude (ranked first among graduates) in MSc Mech Eng – Powertrain (2003), K. N. Toosi University of Technology, Tehran, Iran.

[0017]. My publications can be found at https://sites.ualberta.ca/~mahdi/Shahbakhti_Publications.html. These include more than 250 peer-reviewed publications in the field of mechanical engineering. Many of these publications are in the area of internal combustion engines. According to Google Scholar, these research publications have been recognized and cited over 6,400 times from more than 80 different countries.

[0018]. I have been retained as an expert in eight Inter Partes Review (“IPR”) proceedings and two International Trade Commission (“ITS”) proceedings in the past seven years to provide expert opinion in connection with different areas of mechanical engineering systems and mechatronics/control systems including: internal combustion engines, vehicles, powertrains, heating ventilation air conditioning (HVAC) systems, buildings, and vacuum systems.

[0019]. My full curriculum vitae (CV) is attached as Ex. 1004 to this report.

B. Compensation

[0020]. I have been retained by counsel for MWE Investments, LLC (“Petitioner”) to provide my expert opinion in connection with mechanical and control systems for internal combustion engines, fuel regulators, fuel valves, and controllers.

[0021]. I am being compensated through WIT Legal, LCC in connection with this matter. WIT Legal, LCC is being compensated for my time in connection with this matter at a rate of \$550 per hour. My compensation is in no way based on the outcome of this investigation or on the opinions that I provide. I have no interest, financial or otherwise, in the outcome of this matter. I have no financial interest in, or affiliation with, any of the parties in this matter.

C. Materials Considered

[0022]. The analysis that I provide in this Declaration is based on my education, research, and experience, as well as the documents I have considered. In forming my opinions, I have read and considered U.S. Patent No. 10,221,780 (hereafter referred to as the “’780 patent”) and its prosecution history. I have cited to the following documents in my analysis below:

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Ex. 1018	Carsten Baumgarten, <i>Mixture Formation in Internal Combustion Engines</i> (2006)
Ex. 1019	Günter P. Merker, Christian Schwarz & Rüdiger Teichmann, <i>Combustion Engines Development</i> (2012)
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Ex. 1021	Rolla C. Carpenter & H. Diederichs, <i>Internal Combustion Engines</i> (2d ed. 1909).

Ex. 1022	Rowlands S. Benson & N.D. Whitehouse, Internal Combustion Engines (Pergamon Press 1979).
Ex. 1023	K.K. Ramalingam, Handbook of Mechanical Engineering Terms (2d ed. 2009)

[0023]. All the opinions contained in this declaration are based on the documents that I reviewed and my knowledge and professional judgment. My opinions have also been guided by my understanding of how a person of ordinary skill in the art would have understood the claims of the '780 patent.

[0024]. I reserve the right to supplement and amend any of my opinions in this declaration based on documents, testimony, and other information that becomes available to my after the date of this declaration.

II. STATEMENT OF LEGAL PRINCIPLES

[0025]. I am not a lawyer. My understanding of the legal standards to apply in reaching the conclusions in this declaration are based on discussions with counsel for Petitioner, my experience applying similar standards in other patent-related matters, and my reading of the documents submitted in this proceeding. In preparing this declaration, I have tried to faithfully apply these legal standards to the challenged claims.

A. Person of Ordinary Skill in the Art

[0026]. I understand that 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).

[0027]. I have also been advised that to determine the appropriate level of a person having ordinary skill in the art, the following factors may be considered: (1) the types of problems encountered by those working in the field and prior art solutions thereto; (2) the sophistication of the technology in question, and the rapidity with which innovations occur in the field; (3) the educational level of active workers in the field; and (4) the educational level of the inventor.

[0028]. For purposes of this IPR, a POSA would have a college degree in mechanical engineering, physics, or related fields, and three years of work experience in combustion engines. Additional higher graduate education could substitute for work experience, and additional work experience/training could substitute for formal education.

B. Prior Art

[0029]. I have been advised and understand that the information used to evaluate whether an invention was new is generally referred to as “prior art.” I understand that prior art includes patents and printed publications that existed before the earliest priority date or the earliest filing date of the patent (which I have been informed is also called the “effective filing date”). I have been informed and understand that a patent or published patent application is prior art if it was filed before the earliest filing date of the claimed invention and that a printed publication is prior art if it was publicly available before the earliest filing date.

C. Claim Construction

[0030]. I understand that a purpose of claim construction is to determine what a person of ordinary skill in the art would have understood the claim terms to mean. Claim terms are generally given their ordinary and customary meaning, which is the meaning that the term would have to a person of ordinary skill in the art in question as of the effective filing date.

[0031]. I understand that the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification. I understand that the patent specification, under the legal principles, has been described as the single best guide to the meaning of a claim term, and is thus highly relevant to the interpretation of claim terms. And I

understand for terms that do not have a customary meaning within the art, the specification usually supplies the best context of understanding the meaning of those terms.

[0032]. I further understand that other claims of the patent in question, both asserted and unasserted, can be valuable sources of information as to the meaning of a claim term. Because the claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims. Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.

[0033]. I understand that the prosecution history can further inform the meaning of the claim language by demonstrating how the inventors understood the invention and whether the inventors limited the invention in the course of prosecution, making the claim scope narrower than it otherwise would be. Extrinsic evidence, such as dictionaries, may also be consulted in construing the claim terms.

[0034]. I understand that, in Inter Partes Review (IPR) proceedings, a claim of a patent shall be construed using the same claim construction standard that would be used to construe the claim in a civil action filed in a U.S. district court (which I understand is called the “Phillips” claim construction standard), including construing the claim in accordance with the ordinary and customary meaning of

such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

[0035]. Accordingly, I have been instructed by counsel to apply the “Phillips” claim construction standard for purposes of interpreting the claims in this proceeding, to the extent they require a construction.

D. Anticipation (§102)

[0036]. I understand that under 35 U.S.C. §102, a patent claim is unpatentable for anticipation if the claimed subject matter was patented or described in a printed publication before the effective filing date of the claimed invention. I have been informed that this is referred to as unpatentability by anticipation. I have also been informed that a patent claim is anticipated under § 102 if a single prior art reference discloses all limitations of the claimed invention.

E. Obviousness (§103)

[0037]. I understand that a patent claim is obvious if, as of the effective filing date, it would have been obvious to a person having ordinary skill in the field of the technology (the “art”) to which the claimed subject matter belongs.

[0038]. I understand that the following factors should be considered in analyzing obviousness: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims; and (3) the level of ordinary skill in the pertinent art. I also understand that certain other facts known as “secondary

considerations” such as commercial success, unexplained results, long felt but unsolved need, industry acclaim, simultaneous invention, copying by others, skepticism by experts in the field, and failure of others may be utilized as indicia of non-obviousness. I understand, however, that secondary considerations should be connected, or have a “nexus,” with the invention claimed in the patent at issue.

[0039]. I understand that a reference qualifies as prior art for obviousness purposes when it is analogous to the claimed invention. The test for determining what art is analogous is: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.

[0040]. I understand that a person of ordinary skill in the art is assumed to have knowledge of all prior art. I understand that one skilled in the art can combine various prior art references based on teachings of those prior art references, general knowledge present in the art, or common sense. I understand that a motivation to combine references may be implicit in the prior art, and there is no requirement that there be an actual or explicit teaching to combine two references. Thus, one may take into account the inferences and creative steps that a person of ordinary skill in the art would employ to combine the known elements in the prior art in the manner claimed by the patent at issue. I understand that one

should avoid “hindsight bias” and ex post reasoning in performing an obviousness analysis. But this does not mean that a person of ordinary skill in the art for purposes of the obviousness inquiry does not have recourse to common sense.

[0041]. I understand that when determining whether a patent claim is obvious in light of the prior art, neither the particular motivation for the patent nor the stated purpose of the patentee is controlling. The primary inquiry has to do with the objective reach of the claims, and that if those claims extend to something that is obvious, then the entire patent claim is invalid.

[0042]. I understand one way that a patent can be found obvious is if there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent’s claims. I understand that a motivation to combine various prior art references to solve a particular problem may come from a variety of sources, including market demand or scientific literature. I understand that a need or problem known in the field at the time of the invention can also provide a reason to combine prior art references and render a patent claim invalid for obviousness. I understand that familiar items may have obvious uses beyond their primary purpose, and that a person of ordinary skill in the art will be able to fit the teachings of multiple prior art references together like the pieces of a puzzle. I understand that a person of ordinary skill is also a person of at least ordinary creativity. I understand when there is a design need or market

pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this finite number of predictable solutions leads to the anticipated success, I understand that the invention is likely the product of ordinary skill and common sense, and not of any sort of innovation.

[0043]. I understand that the fact that a combination was obvious to try might also show that it was obvious, and hence invalid, under the patent laws. I understand that if a patent claims a combination of familiar elements according to known methods, the combination is likely to be obvious when it does no more than yield predictable results. Thus, if a person of ordinary skill in the art can implement a predictable variation, an invention is likely obvious. I understand that combining embodiments disclosed near each other in a prior art reference would not ordinarily require a leap of inventiveness.

[0044]. I understand that obviousness may be shown by demonstrating that it would have been obvious to modify what is taught in a single piece of prior art to create the patented invention. Obviousness may also be shown by demonstrating that it would have been obvious to combine the teachings of more than one item of prior art. I understand that a claimed invention may be obvious if some teaching, suggestion, or motivation exists that would have led a person of ordinary skill in the art to combine the invalidating references. I also understand

that this suggestion or motivation may come from the knowledge of a person having ordinary skill in the art, or from sources such as explicit statements in the prior art. I understand that when there is a design need or market pressure, and there are a finite number of predictable solutions, a person of ordinary skill may be motivated to apply common sense and his skill to combine the known options in order to solve the problem.

[0045]. I understand the following are examples of approaches and rationales that may be considered in determining whether a piece of prior art could have been combined with other prior art or with other information within the knowledge of a person having ordinary skill in the art:

- Some teaching, motivation, or suggestion in the prior art that would have led a person of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;
- Known work in one field of endeavor may prompt variations of it for use in the same field or a different field based on design incentives or other market forces if the variations would have been predictable to a person of ordinary skill in the art;
- Combining prior art elements according to known methods to yield predictable results;

- Applying a known technique to a known device, method, or product ready for improvement to yield predictable results;
- Applying a technique or approach that would have been “obvious to try” (choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success);
- Simple substitution of one known element for another to obtain predictable results; or
- Use of a known technique to improve similar products, devices, or methods in the same way.

[0046]. I understand that, when determining whether a claimed combination is obvious, the correct analysis is not whether one of ordinary skill in the art, writing on a blank slate, would have chosen the particular combination of elements described in the claim. Instead, I understand the correct analysis considers whether one of ordinary skill, facing the wide range of needs created by developments in the field of endeavor, would have seen a benefit to selecting the combination claimed.

[0047]. I understand that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference. The test for obviousness, in other words, is not whether the

references could be physically combined but whether the claimed inventions are rendered obvious by the teachings of the prior art as a whole.

III. SUMMARY OF THE '780 PATENT

[0048]. The '780 patent generally relates to “a mechanical fuel lockout switch [38] for a dual fuel engine.” Ex. 1001, Abstract. The “[m]echanical fuel lockout switch 38, FIG. 2, includes a mechanical fuel valve 54 actuatable between first position 38(a) as shown in FIG. 2 and second position 38(b) as shown in FIG. 3 to selectively control fuel flow to the dual fuel engine from first fuel source 28 through a first fuel line and second fuel source 30 through a second fuel line 36.” Ex. 1001, 5:31-36.

[0049]. “Mechanical fuel valve 54 opens the first fuel line (to enable liquid fuel flow to the engine) when fuel valve handle 56 is in the first position, and mechanical fuel valve 54 closes the first fuel line (to prevent liquid fuel flow to the engine) when fuel valve handle 56 is in the second position.” Ex. 1001, 6:2-6. “Fuel valve handle 56 is coupled to fuel lockout apparatus 58.” Ex. 1001, 6:10-11.

[0050]. “Fuel lockout apparatus 58 is controlled by fuel valve handle 56 so that moving fuel valve handle 56 to the first position causes fuel lockout apparatus 58 to block fuel inlet 59 for LPG and moving fuel valve handle 56 to the second position causes fuel lockout apparatus 58 to unblock fuel inlet 59 for LPG.” Ex. 1001, 6:13-18.

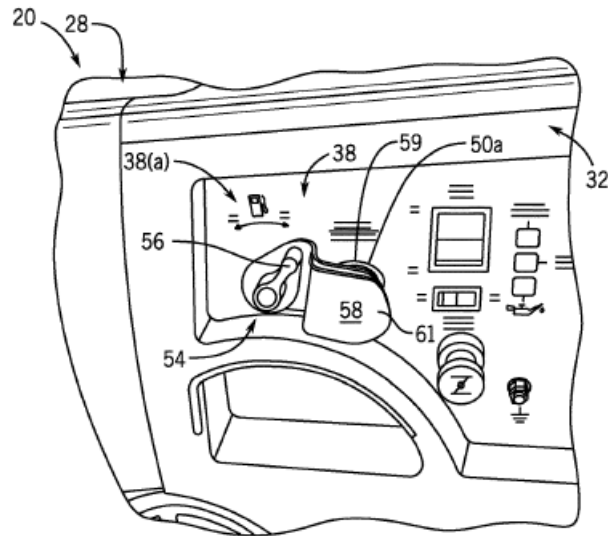
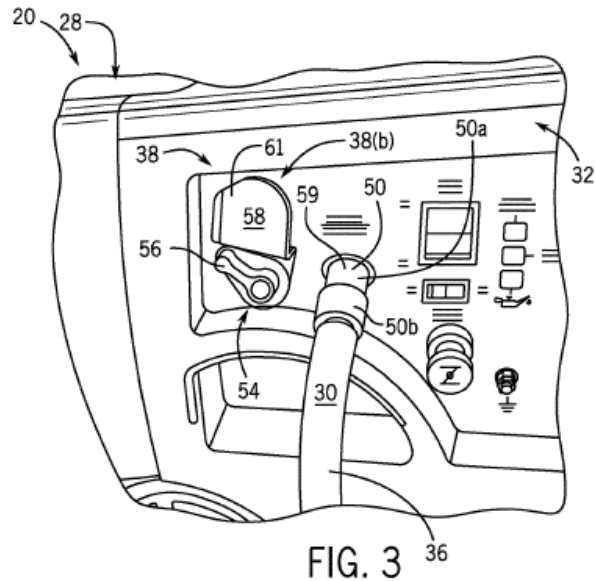


FIG. 2

Ex. 1001, FIG. 2.

[0051]. “Referring to FIG. 3, a detail view of a portion of generator 20 of FIG. 1 depicts mechanical fuel lockout switch 38 in a second position 38(b), in accordance with an embodiment of the invention. In this position, the mechanical fuel lockout switch 38 provides a disconnect to stop gasoline flow from gasoline tank 32 to the engine while allowing connection of LPG supply hose 36 to fuel inlet 59 of the second fuel line. FIG. 3 further shows LPG supply hose 36 coupling second fuel source 30 to generator 20 to deliver LPG to run the generator.” Ex. 1001, 6:32-41.



Ex. 1001, FIG. 3.

IV. THE CHALLENGED CLAIMS

[0052]. This Declaration address claims 1-15 of the '780 patent. Claims 1, 8 and 15 are independent claims. Claims 2, 3, and 6 depend from independent claim 1. Claims 4 and 5 depend from claim 3. Claim 7 depends from claim 6. Claims 9-11 and 14 depend from independent claim 8. Claims 12 and 13 depend from dependent claim 11.

V. APPLICATION OF PRIOR ART TO THE CHALLENGED CLAIMS

[0053]. I have reviewed and analyzed the prior art references and materials listed in §I.C, supra. In my opinion the claims of the '780 patent would have been obvious to a person of ordinary skill in the art based on the following combinations of the prior art.

Ground	Basis	Challenged Claims	Reference(s)
1	§103	1, 2, 3, 4, 6, 7 and 15	DuroMax and Elsdon
2A	§102	1, 6, 7 and 9	Hallberg
2B	§103	2 and 15	Hallberg
3	§103	8, 9, 11 and 14	Rumao, DuroMax, and Elsdon, and alternatively, Rumao and Hallberg
4	§103	12 and 13	Rumao, DuroMax, Elsdon and Parlatore, and alternatively, Rumao, Hallberg, and Parlatore
5	§103	5	DuroMax, Elsdon, and Parlatore
6	§103	10	Rumao, DuroMax, and Elsdon

[0054]. I am informed by counsel that each of the references cited in the grounds above qualifies as prior art to the challenged claims because each reference was filed before the '780 patent priority date of June 12, 2015.

A. Brief Summary of Prior Art

1. Overview of DuroMax XP4400EH Operator's Manual ("DuroMax").

[0055]. DuroMax (Ex. 1004) was published/publicly available at least by November 1, 2012, before the filing date of the earliest application to which the '780 Patent claims priority. Ex.1004, ¶¶18-19. DuroMax is thus prior art to the '780 Patent under 35 U.S.C. §102(a).

[0056]. DuroMax discloses the XP4400EH dual fuel generator—a dual fuel generator that runs alternatively off gasoline or liquefied petroleum gas (LPG). The generator includes a mechanical gasoline fuel shutoff valve having a valve handle. The generator also includes an LPG fuel inlet.

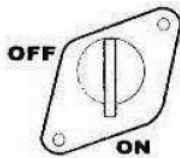


Figure 6 - fuel valve in the "on" position

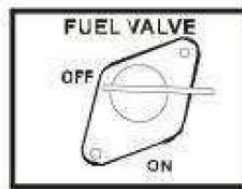


Figure A - Fuel Valve in the "OFF" position

Ex.1004, pp.11,12.

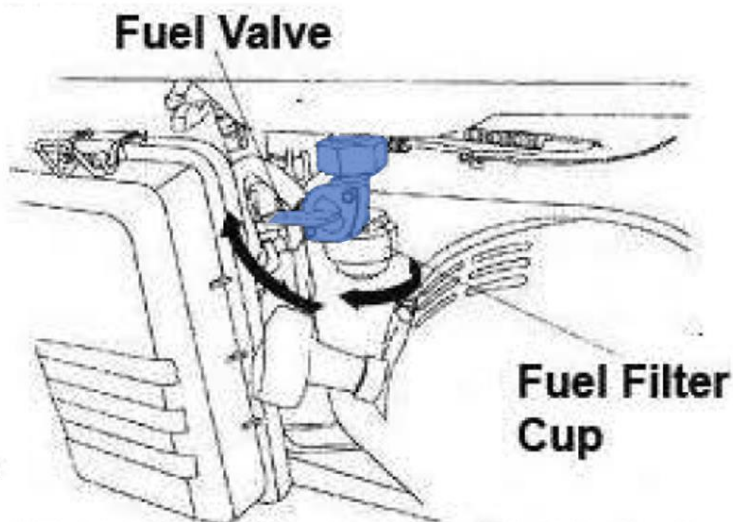
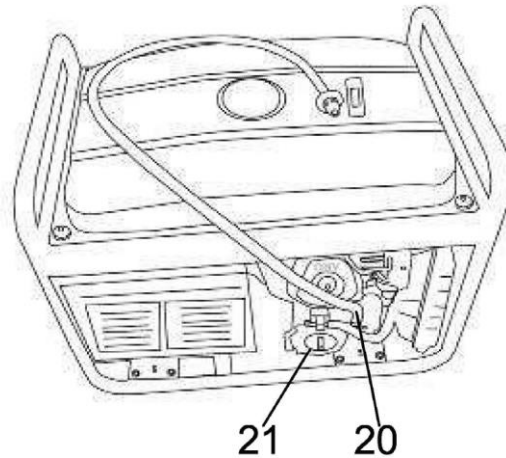


Figure 19 –Removing the Fuel Filter Cup

Ex. 1004, p.20.

[0057]. The generator also includes an LPG fuel inlet.



20. Hose connector- Connect liquid propane gas to generator.

Ex. 1004, p.7-8.

2. Overview of U.S. Patent No. 5,718,265 (“Elsdon”)

[0058]. Elsdon (Ex. 1005) was filed on February 24, 1995. Elsdon issued on February 17, 1998. Elsdon is thus prior art to the ’780 Patent under 35 U.S.C. § 102(a).

[0059]. Elsdon discloses an assembly having cap 16 and shield 14 assembly of a fluid conduit coupler 12 that is used for “flammable or other hazardous fluids, such as fuel...” Ex.1005, 1:10-13, 3:3-4 and FIG. 9.

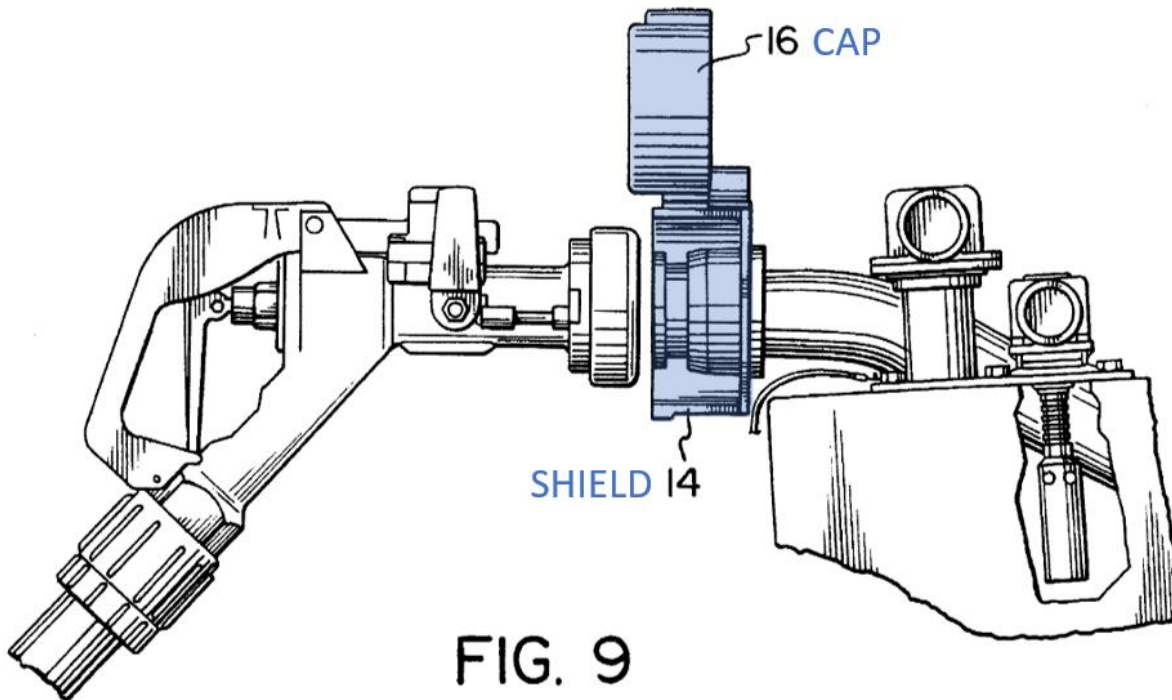


FIG. 9

Ex.1005, FIG. 9 (Emphasis Added).

[0060]. Cap 16 is hingedly connected to shield 14 and is readily moveable between an open position (FIG. 9 above and FIG. 1 below) and a closed position (FIG. 2 below) in which the cap 16 is positioned over the coupler 12 to prevent coupling with a fuel hose. Ex.1005, 3:4-11.

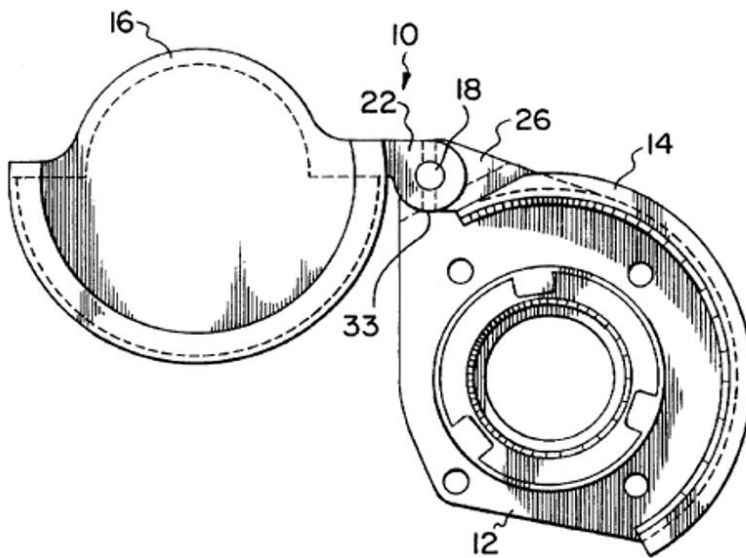


FIG. 1

Ex.1005, FIG. 1.

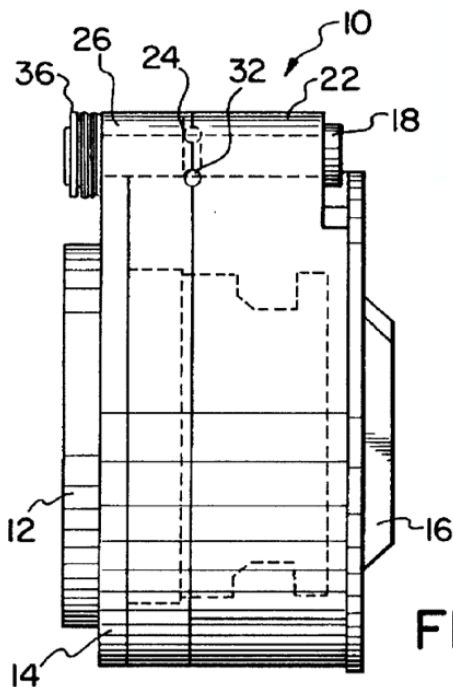


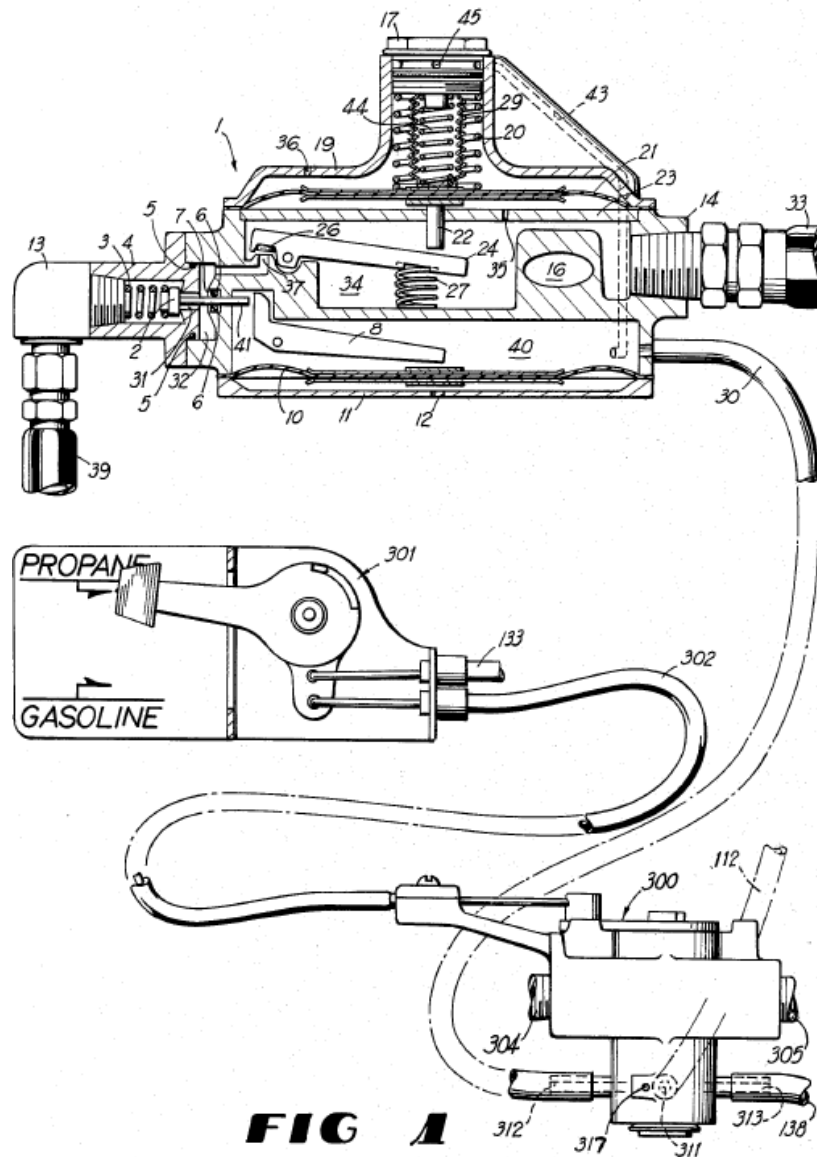
FIG. 2

Ex.1005, FIG. 2.

3. Overview of U.S. Patent No. 4,492,207 (“Hallberg”)

[0061]. Hallberg (Ex. 1006) was filed on February 27, 1981, and issued on January 8, 1985. Hallberg is thus prior art to the '780 Patent under 35 U.S.C. § 102(a).

[0062]. Hallberg discloses a dual fuel system for use with internal combustion engines. Ex. 1006, Abstract. Fuel to be utilized is selected by positioning fluid dual valve control 301 in one of two positions, either “gasoline” or “propane.” Ex. 1006, 7:27-29, Fig. 1.

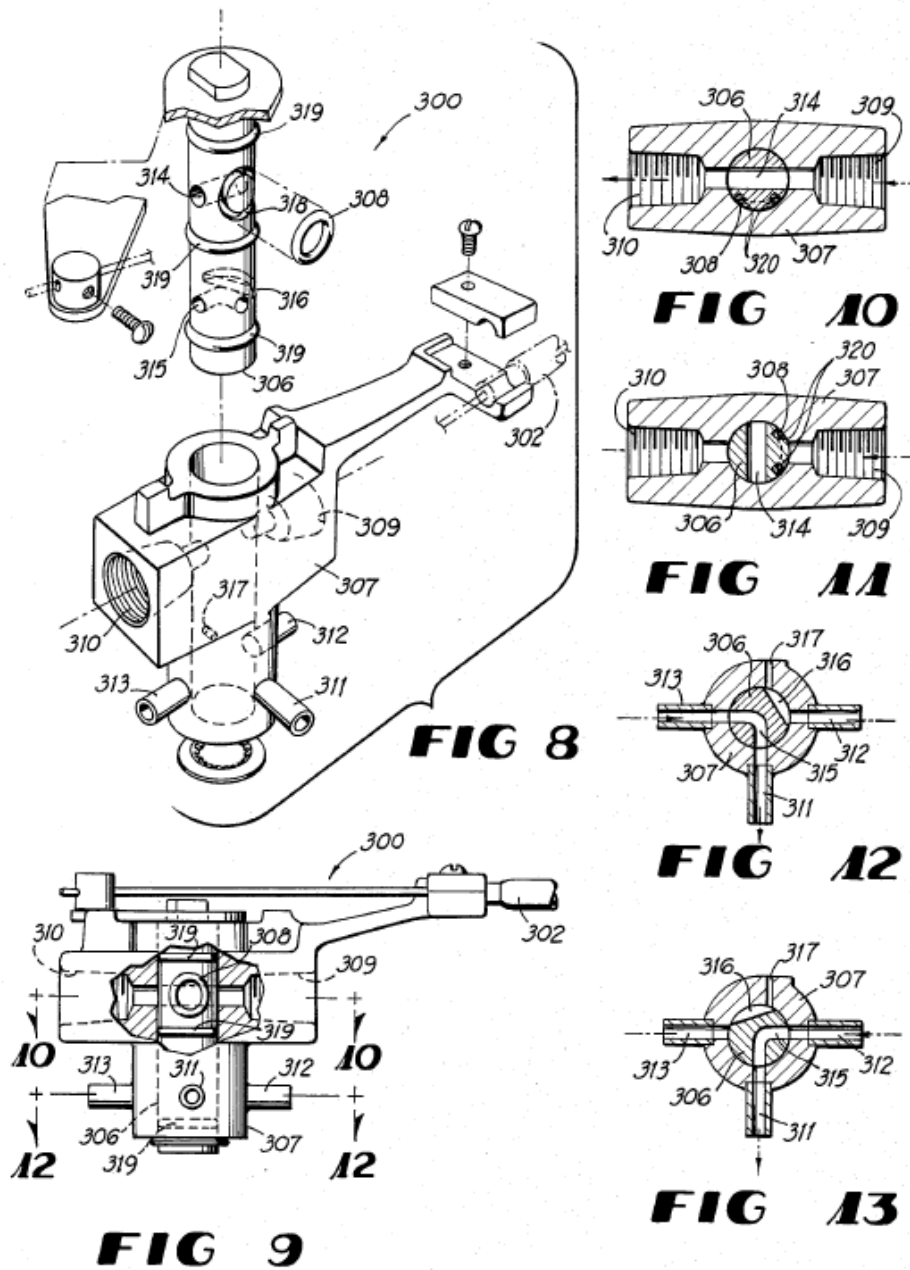


Ex. 1006, FIG. 1.

[0063]. Positioning of control 301 in the “gasoline” mode acts through control cable 302 to rotate spool 306 within valve body 307. Ex. 1006, 7:30-32. Simultaneously, gasoline from gasoline supply line 304 is supplied to the carburetor 110 through engine gasoline line 305, which lines communicate through

tunnel 314 (as shown in FIG. 10) connecting liquid inlet opening 309 and liquid outlet opening 310 in fluid dual valve 300. In this mode, the carburetor functions normally. Ex. 1006, 7:33-44.

[0064]. When the “propane” mode of control 301 is selected, spool 306 is rotated within valve body 307 by control cable 302 such that O-ring 308 on the face of spool 306 forms a seal between spool 306 and valve body 307 around liquid inlet opening 309 (as shown in FIG. 11) thereby prohibiting flow of gasoline to a conventional carburetor 110. Ex. 1006, 8:3-10.



Ex. 1006, FIGS. 8-13.

[0065]. When the engine is started, a vacuum, communicated to the engine intake manifold pressure chamber 40, via lines 112 and 30, creates a reduced pressure on the upper side of the liquid inlet diaphragm 10. Ex. 1006,

8:31-36. Atmospheric pressure on the opposite side of diaphragm 10 urges diaphragm upward against the liquid inlet lever 8, the opposite end of which drives inlet valve shaft 41 against bias spring 3 and opens liquid inlet valve 2. Ex. 1006, 8:36-40. Upon opening valve 2, liquified gaseous fuel (e.g., propane) flows through inlet valve orifice 31 into liquified fuel passage 32 and onto the mixer 100. Ex. 1006, 8:40-60. When valve 2 is closed, valve 2 and related structures provide a “lock-off” of liquified gaseous fuel. Ex. 1006, 7:64-68.

4. Overview of U.S. Patent No. 10,337,399 to Rumao (“Rumao”)

[0066]. Rumao (Ex. 1007) was filed October 3, 2016, and issued July 2, 2019. Rumao is a continuation of Application No. 14/169,739, filed January 31, 2014, which claims priority to a provisional application filed February 2, 2013. A POSA would therefore understand that Rumao is prior art to the ‘780 Patent under 35 U.S.C. §102(a).

[0067]. Rumao discloses methods for assembling a portable generator system. Ex. 1007, Abstract. In one configuration, the portable generator system includes a portable generator 20 having an internal combustion engine powered by propane or gasoline, an onboard fuel tank 40 configured to store fuel supplied to engine 30 by a fluid coupling such as a tube or hose, and a control panel 50 for operating and monitoring the generator. Ex. 1007, 5:6-12, 5:24-30. Figure 4

illustrating the engine 30, fuel tank 40, and control panel 50 of generator 20 is

provided below.

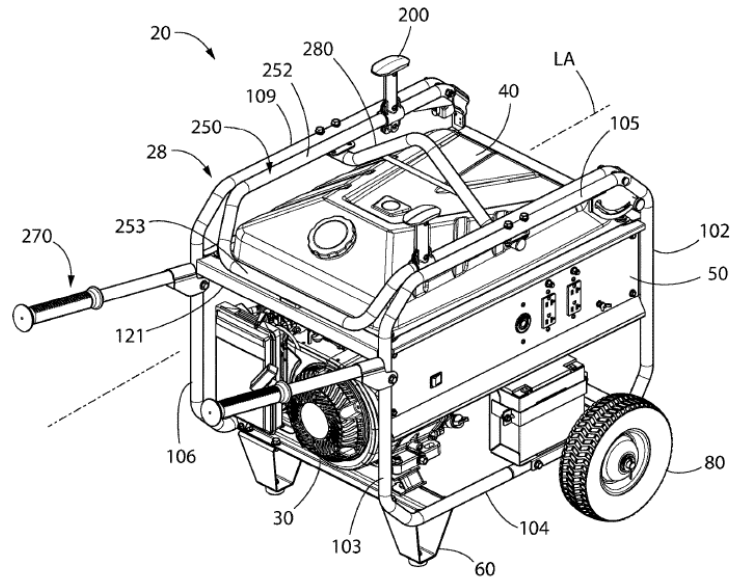


FIG. 24

Ex. 1007, FIG. 24.

[0068]. Rumao also discloses an alternative configuration whereby the portable generator system includes a generator frame 301 supporting a permanent fuel tank 360, a removable fuel tank 380, engine 311, control panel 400, and other accessories for forming a functional generator. Ex. 1007, 18:34-40. In this configuration, any suitable type of engine and fuel source may be used, “including ... liquid fuels or gaseous fuels such as propane.” Ex. 1007, 18:40-43.

[0069]. Figure 82 illustrating the permanent fuel tank 360, and removable fuel tank 380 of the alternative configuration is provided below.

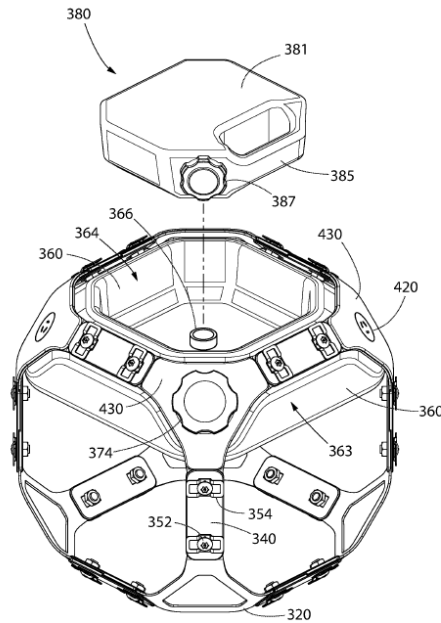


FIG. 82

Ex. 1007, FIG. 82.

[0070]. Rumao also discloses additional non-limiting examples of generators that include “all related appurtenances and accessories necessary for a fully functional generator system (e.g., alternator, electrical system, pressure regulators, relief valves, controls, electrical outlets, etc.)” Ex. 1007, 29:20-33.

5. Overview of U.S. Patent Application No. 2011/0100335 A1 to Parlatore (“Parlatore”)

[0071]. Parlature was filed November 5, 2009 and published May 5, 2011. Parlature is thus prior art to the '780 Patent under 35 U.S.C. § 102(a).

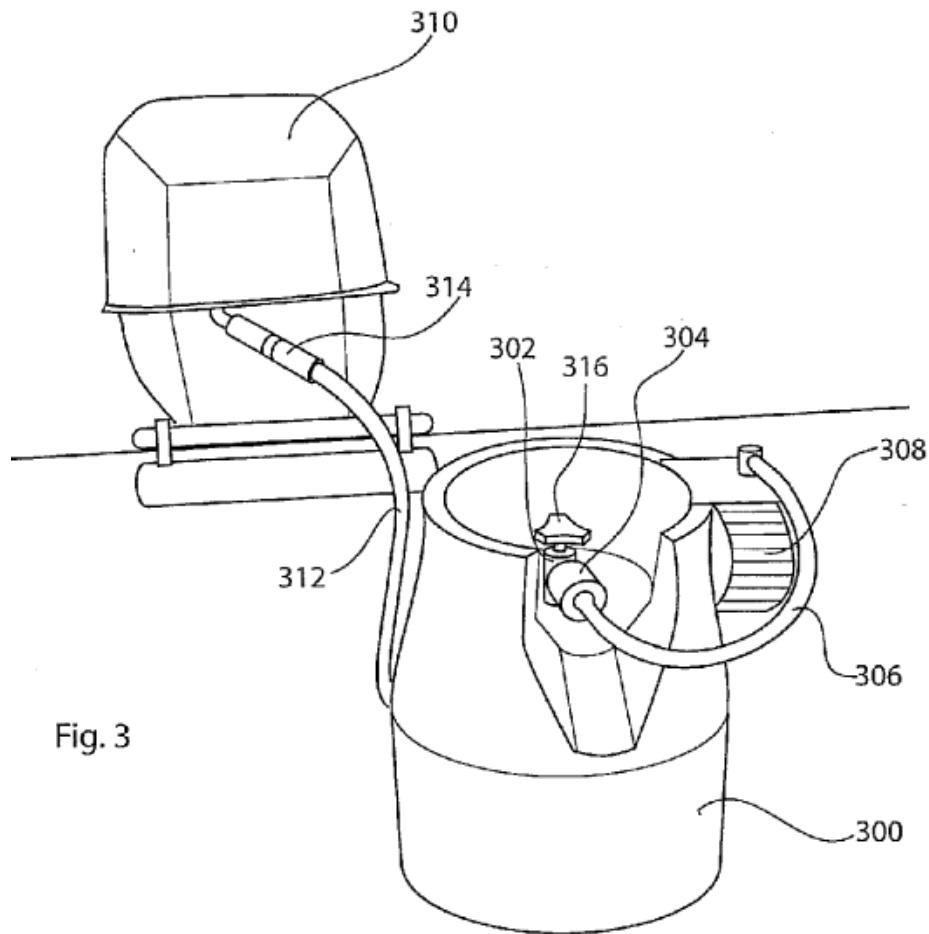
[0072]. Parlature discloses a “method and system [having] one or more fuel storage tanks housing propane, one or more regulators through which fuel may

flow and one or more fuel metering devices or systems.” Ex. 1010, Abstract.

Parlatore also discloses that a “LPG tank 102 may be connected to a regulator, such as a primary regulator 106.” Ex. 1010, [0016]. “The primary regulator 106 may step down the pressure of any stored propane vapor energy in tank 102, and may further output this lowered pressure to a secondary regulator 110.” *Id.* The secondary regulator 110 can act as a vacuum-controlled flow rate regulator. *Id.*

[0073]. The LPG tank 300 may be connected to the primary regulator 304 by connector 302. Ex. 1010, [0020]. A low pressure output of the secondary regulator 308 may be attached to a propane carburetor (not pictured) on the engine 310 in any of a variety of manners, for example through hose 312 and coupling 314. *Id.* A low pressure output of the secondary regulator 308 may be attached to the propane carburetor either permanently or releasably. *Id.*

[0074]. As shown in FIG. 3 (below), the primary regulator 304 and the secondary regulator 308 can be two separate regulators that can be based on the design and size of an engine. Ex. 1010, [0021]. In this example, the primary regulator 304 may be connected to LPG tank 300, and connected to the secondary regulator 308 by a hose 306, pipe, tube or the like. Ex. 1010, [0021].



Ex. 1010, Fig. 3.

VI. CLAIM TERMS

[0075]. I have been instructed that claims should be given their ordinary and customary meaning as understood by a POSA viewing the claim terms in the context of the entire patent. I have also been instructed that claims must always be read in light of the specification as the specification is the single best guide to the meaning of a disputed term. When a patentee defines a claim term, the patentee's definition governs.

A. The Claimed “Fuel Lockout Apparatus”

Claim 1 of the ‘780 Patent recites:

[A] **fuel lockout apparatus** coupled to the mechanical fuel valve...[and] configured to: prevent the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position; and permit the second fuel source to couple to the second fuel line while the mechanical fuel valve is in the second position.

[0076]. I have been told that Section 112(f) applies to claim terms that recite “function without reciting sufficient structure for performing that function.” *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015). The “critical question” in making this assessment “is whether the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure.” *MTD Prods. Inc. v. Iancu*, 933 F.3d 1336, 1341 (Fed. Cir. 2019) (internal citations omitted). Generic terms such as “mechanism,” “element,” “device,” and other nonce words... [are] tantamount to using the word “means” because they “typically do not connote sufficiently definite structure” and therefore invoke Section 112(f). *Williamson*, 792 F.3d at 1350 (Fed. Cir. 2015). Section 112(f) analysis of the term “fuel lockout apparatus” is discussed in §VI.A.1.

[0077]. Alternatively, in lieu of Section 112(f) applying to the term “fuel lockout apparatus,” the plain and ordinary meaning of the term “fuel lockout apparatus” as understood by a POSA is discussed in §VI.A.2.

1. “Fuel Lockout Apparatus” as Recited in the Specification

[0078]. The term “fuel lockout apparatus” recites a function without providing any structure or performing that function. The claim merely replaces the term “means” with “apparatus.” The term “fuel lockout apparatus” has no independent meaning aside from “a means for providing fuel lockout.”

i. The Corresponding Structure for “Fuel Lockout Apparatus”

[0079]. The '780 Patent describes a single embodiment of a “fuel lockout apparatus.” In that embodiment, the “fuel lockout apparatus 58” is a “flange” that “is rigidly coupled to the rotating handle [56].” Ex.1001, 6:19-25. The flange “extends radially outward from fuel valve handle 56” and “sweeps over” the LPG fuel hose coupling “as the fuel valve handle rotates.” *Id.* Based on the user selection, the flange “blocks off” or “uncovers” the “first end 50a of the quick-disconnect hose coupling when fuel valve handle is rotated” between the first and second positions.

[0080]. Specifically, when the fuel lockout apparatus is in the first position (selecting gasoline), the flange provides a barrier that extends over the fuel hose coupling 50a and prevents the user from coupling an LPG supply hose to the fuel hose coupling 50, thereby providing LPG fuel lockout. Ex.1001, 7:4-17; FIGS. 2, 4A.

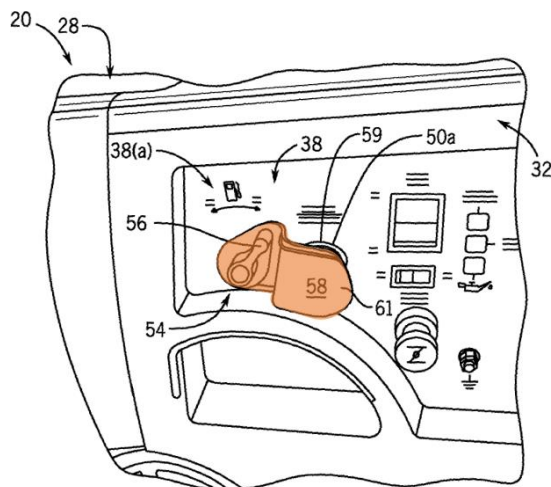


FIG. 2

Ex.1001, FIG. 2 (Emphasis Added).

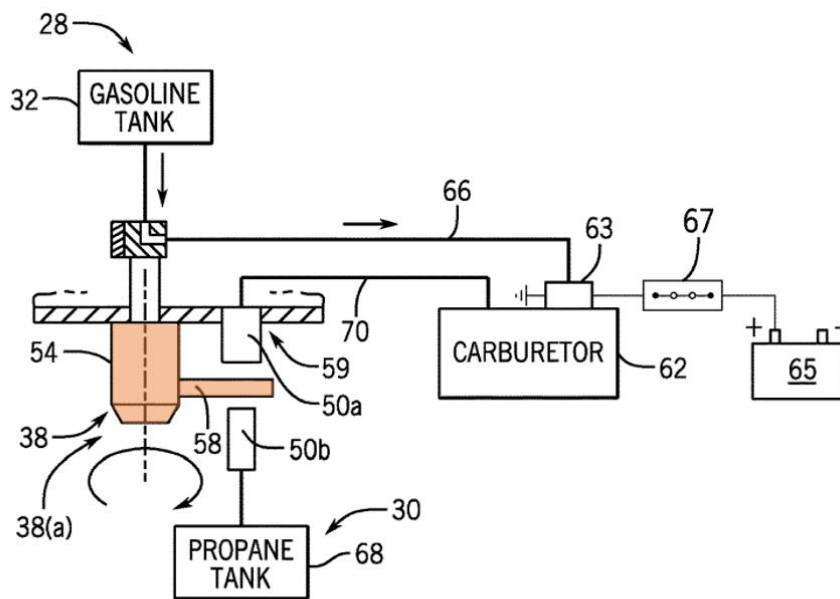


FIG. 4A

Ex.1001, FIG. 4A (Emphasis Added).

[0081]. When the fuel lockout apparatus is in the second position (selecting LPG), the flange prevents the user from selecting gasoline until the LPG

supply hose is removed, and thereby providing gasoline fuel lockout. Ex.1001,

7:18-29, and FIGS. 3, 4B.

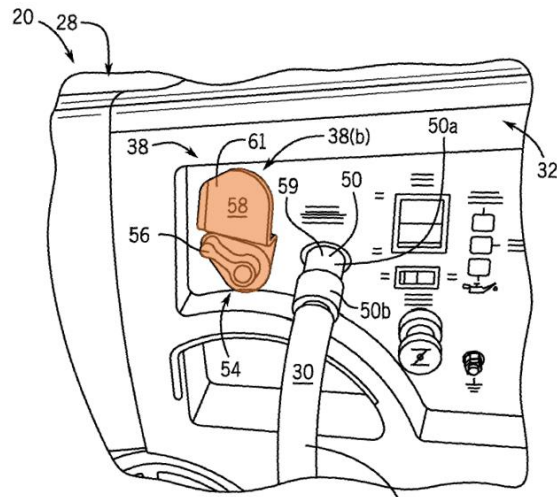


FIG. 3

Ex.1001, FIG. 3 (Emphasis Added).

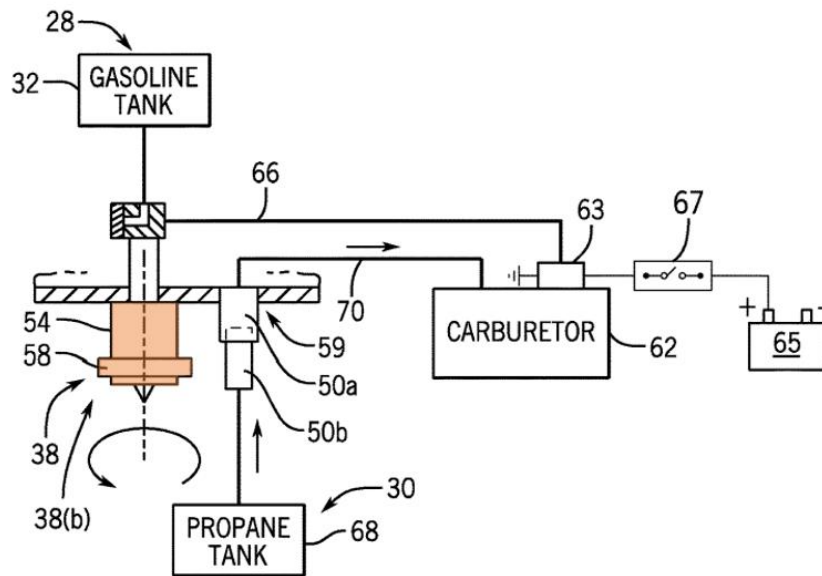


FIG. 4B

Ex.1001, FIG. 4B (Emphasis Added)

[0082]. The flange that extends radially outward from the valve handle and rotates with the valve handle over the fuel hose coupling is what provides both the gasoline and LPG lockout functionality. Thus, the proper structure corresponding to the “providing fuel lockout” functionality is: items 58, 61 in Figs. 2, 3, 4A, 4B, as described at Ex. 1001,5:37-64; 6:10-31; 6:42-7:17; 7:54-67; 8:49-64.

2. Plain and Ordinary Meaning of “Fuel Lockout Apparatus” and “Coupled”

[0083]. An “apparatus,” is defined as a “set of...equipment designed for a particular use.” Ex. 1009, pp. 1-6. From this definition, it is clear that an “apparatus” includes a combination of different parts and equipment to serve a specific purpose. The “apparatus” can include valves (mechanical, electrical), chambers, gears, tubes, pumps, blowers, analyzers, sensors, controllers, or electronic actuators to serve intended purposes.

[0084]. A POSA would therefore understand that a fuel lockout apparatus includes elements that together are designed for a particular use. A POSA also would also understand that the plain and ordinary meaning of the adjective “fuel lockout” is “preventing the flow of fuel.”

[0085]. Accordingly, a POSA would understand that the plain and ordinary meaning of the composite term “fuel lockout apparatus” is therefore a “set of...equipment designed” for “preventing the flow of fuel.”

[0086]. Moreover, “coupled” is defined as “to join or combine.” Ex. 1009, pp. 8-9. A POSA would therefore understand that “coupled” means “joined or combined together.” A POSA would also understand that the plain and ordinary meaning of “coupled” without further limitation in the specification or claims, would include “mechanically coupled,” “electrically coupled,” “fluidly coupled,” “hydraulically coupled,” and the like.

[0087]. As described in detail below, a POSA’s understanding of the plain and ordinary meaning of the terms “apparatus” and “coupled” are supported in internal combustion engine and mechanical engineering literature.

i. Use of the Term “apparatus” in Internal Combustion Engine Literature

[0088]. The definition of “**apparatus**” is aligned with how the term has been used in internal combustion engine (ICE) literature. Some of the examples of using term “apparatus” in ICE literature include: ignition apparatus, suction gas apparatus, starting apparatus, flow apparatus, electronic apparatus, vapor pressure apparatus, emission apparatus, refrigerating apparatus, cleaning apparatus, test apparatus, heating apparatus, cooling apparatus, adjustable guide apparatus, and

exhaust apparatus – these apparatuses support different aspects of operation of internal combustion engines.

[0089]. In forming my opinion, I have reviewed the following ICE literature:

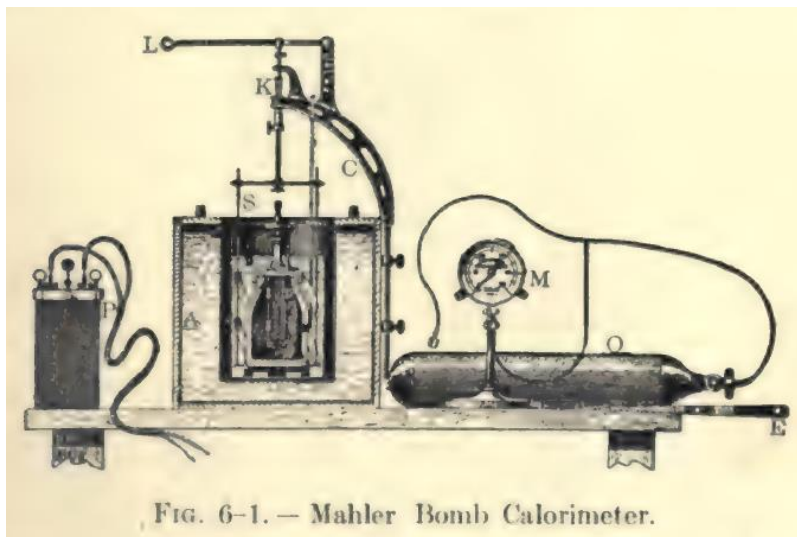
- Rolla C. Carpenter & H. Diederichs, *Internal Combustion Engines* (2d ed. 1909).
- Rowlands S. Benson & N.D. Whitehouse, *Internal Combustion Engines* (Pergamon Press 1979).
- Constantine Arcoumanis, *Internal Combustion Engines* (Academic Press 1988).
- Richard Stone, *Introduction to Internal Combustion Engines* (3d ed. 1999).
- A.J. Martyr & M.A. Plint, *Engine Testing: Theory and Practice* (3d ed. 2007).
- Günter P. Merker, Christian Schwarz & Rüdiger Teichmann, *Combustion Engines Development* (Springer 2012).
- M.K. Gajendra Babu & K.A. Subramanian, *Alternative Transportation Fuels: Utilisation in Combustion Engines* (CRC Press 2013).

[0090]. As found in *Internal Combustion Engines*, the term “apparatus”

is used to describe a “**refrigerating apparatus**” for maintaining engine temperature. *See* Ex. 1021, p. 22.

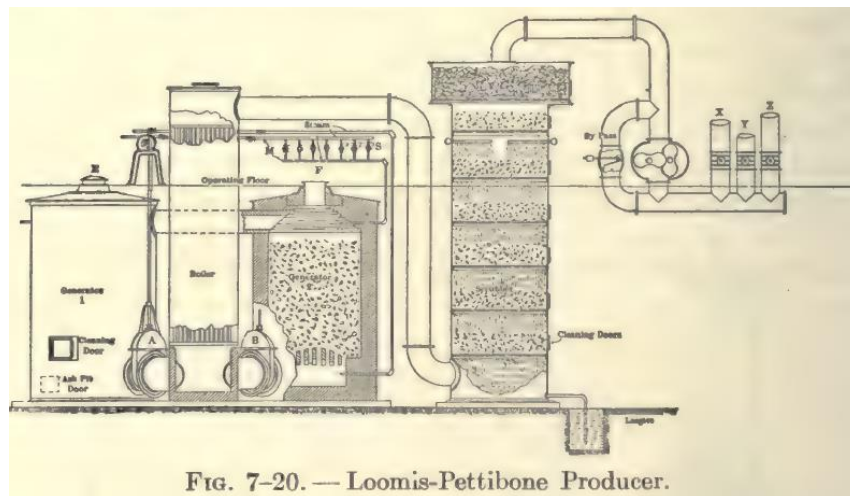
[0091]. “Apparatus” is also used to describe an “**ignition apparatus**” when explaining the importance of adjusting ignition timing for every different fuel mixture and every different piston speed. *See* Ex. 1021, p. 91.

[0092]. “Apparatus is also used to describe “**apparatus L K S**” that includes multiple parts L, K, S (see below) to ensure the water is kept thoroughly stirred. Ex. 1021, p. 130. “The whole apparatus is carefully protected against radiation by an outer vessel.” *Id.*

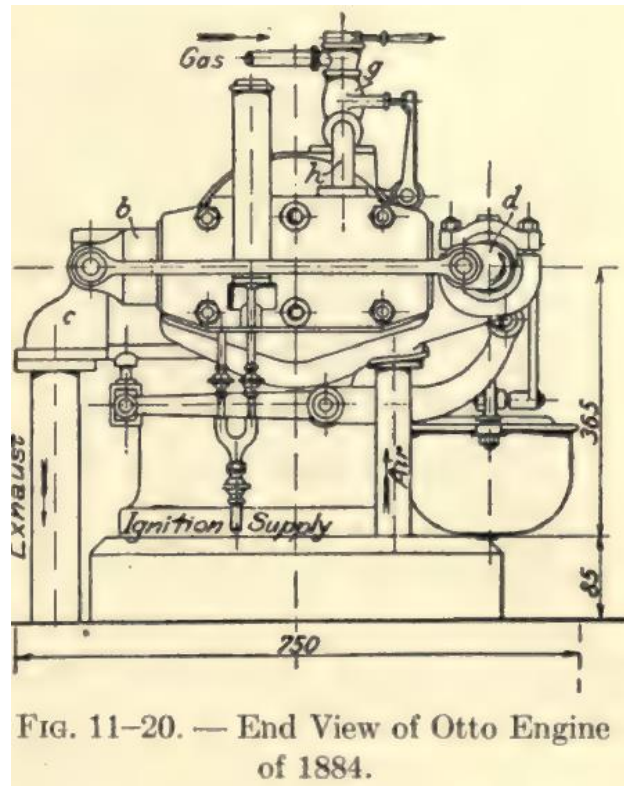


[0093]. Apparatus is also used as a **“cleaning apparatus”** for cleaning equipment to remove/clean hydrocarbons from burning tar gases. Ex. 1021, pp. 157-158.

[0094]. Apparatus is also used as a **“Loomis-Pettibone gas apparatus”** in Figure 7-20 (see below) that may be used for the making of producer gas alone, or for alternate manufacture of water gas and lean power gas. Ex. 1021, p. 174.



[0095]. Apparatus is also used as an **“ignition apparatus”** for an Otto engine in Figure 11-20 (see below). Ex. 1021, p. 252.



[0096]. Apparatus is also used as a **“suction gas apparatus”** for a marine propulsion system/engine. Ex. 1021, pp. 366-367.

[0097]. Apparatus is also used as an **“ignition apparatus.”** Ex. 1011, p. 394. As shown in Figures 11-5 and 13-3 (see below), the ignition apparatus is a device that includes multiple components to provide ignition in the engine combustion chamber: “Ignition by Hot Tube. — The simplest form of the hot tube ignition apparatus has already been shown in Fig. 11-5 Chapter XI. It consists merely of a small tube 3 or 4 inches long, of steel, porcelain, or platinum. The open end of this tube is in communication with the combustion chamber, the other end is closed.” *Id.*

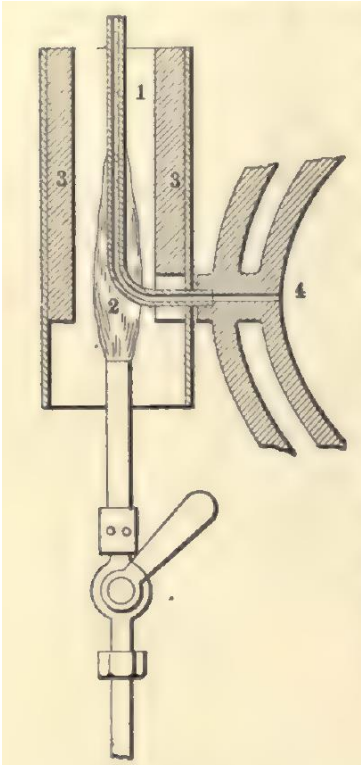
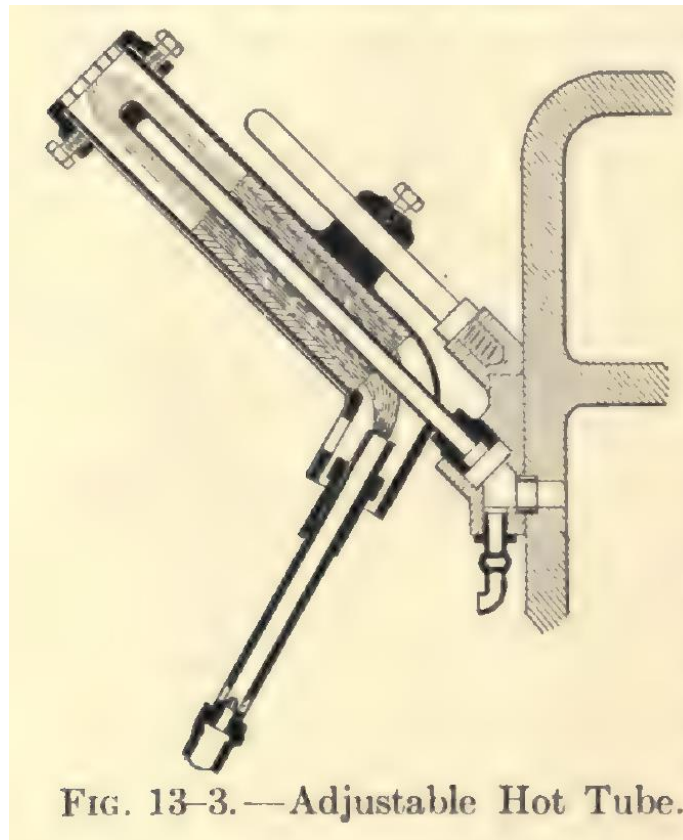
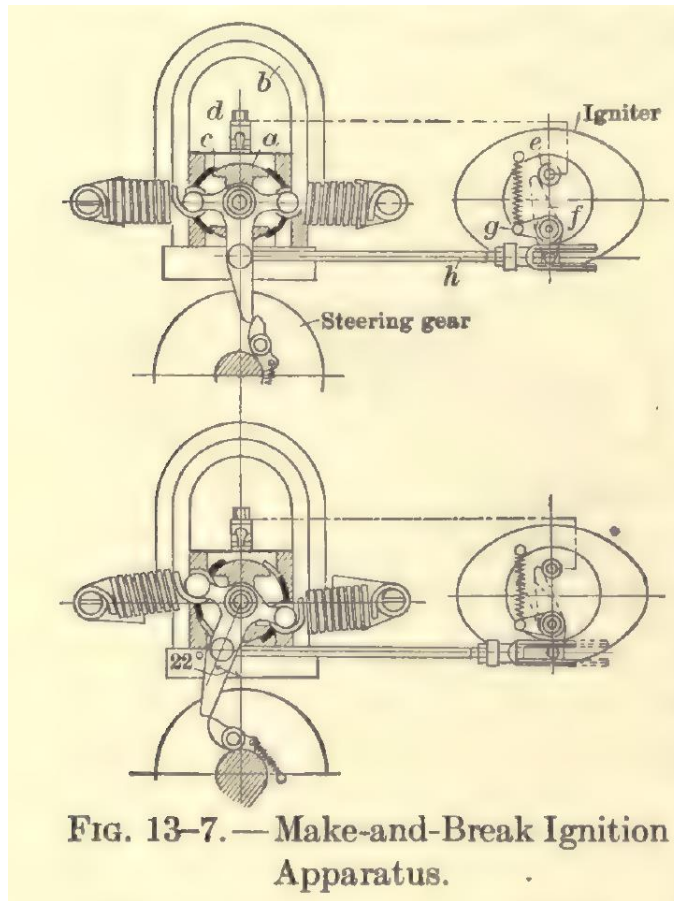


FIG. 11-5. —
Newton's Hot Tube
Igniter.



[0098]. As shown in Figure 13-7 (below), the whole system is referred to as a Make-and-Break Ignition Apparatus. Moreover, the figure further makes clear that “apparatus” includes different components to provide ignition and timing control of ignition. *Id.*



[0099]. Apparatus is also used as a “starting apparatus.” Ex. 1021, p. 428. Figure 13-38 (shown below) illustrates an “Air-starting Apparatus.” *Id.*

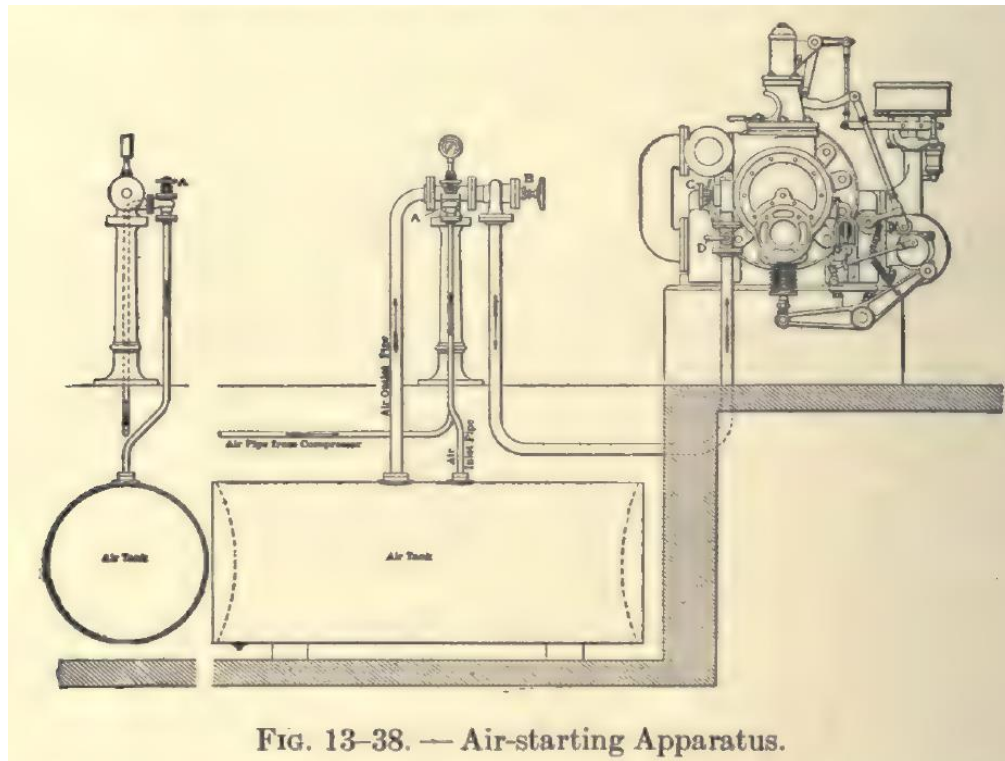


FIG. 13-38. — Air-starting Apparatus.

[0100]. The apparatus in Figure 13-38 includes multiple valves: gas (air) flow control valve A, gas shut-off (stop) valve B, and plug valve D that is inserted in the air pipe immediately ahead of the inlet valve. *Id.* A is the valve controlling the flow of air from a separately driven air compressor to the tank and B a similar valve in the pipe connecting the tank to the engine. *Id.* Both valves are mounted on one pillar, which also has screwed on top of it a gage indicating continuously the pressure in the tank. *Id.* Regulation of the supply of compressed air to the engine cylinder is affected by means of an automatic spring-loaded inlet poppet valve, the stem and disc of which may be released or held fast by screwing down or unscrewing the hand wheel C at the engine end of the air pipe. *Id.* A plug

valve D is inserted in the air pipe immediately ahead of the inlet valve. *Id.* Before starting the engine, the flywheel is turned into such a position that the crank is about 30 degrees above the inner dead center.” *Id.* The valve D is run by turning the handle D 90 degrees. *Id.*

[0101]. Apparatus is also used as a “**heating apparatus**” that consumes fuel. Ex. 1021, p. 482. A “dead weight testing apparatus.” Ex. 1021, p. 490. An “apparatus with which the electrical measurements are executed must be calibrated before and if possible [,] also after the test.” Ex. 1021, p. 520.

[0102]. Apparatus is also used as a “**cooling apparatus.**” Ex. 1021, p. 561.

[0103]. In *Internal Combustion Engines* the term “apparatus” is used as a “**flow apparatus**” for the system to measure and understand the reactions in the end gas of the combustion chamber of an engine. Ex. 1022, p. 106.

[0104]. *Internal Combustion Engines* also uses the term “apparatus” for the setup for photographing the combustion process. Ex. 1022, pp. 189-190. The setup is shown in Figure 1.19 (see below).

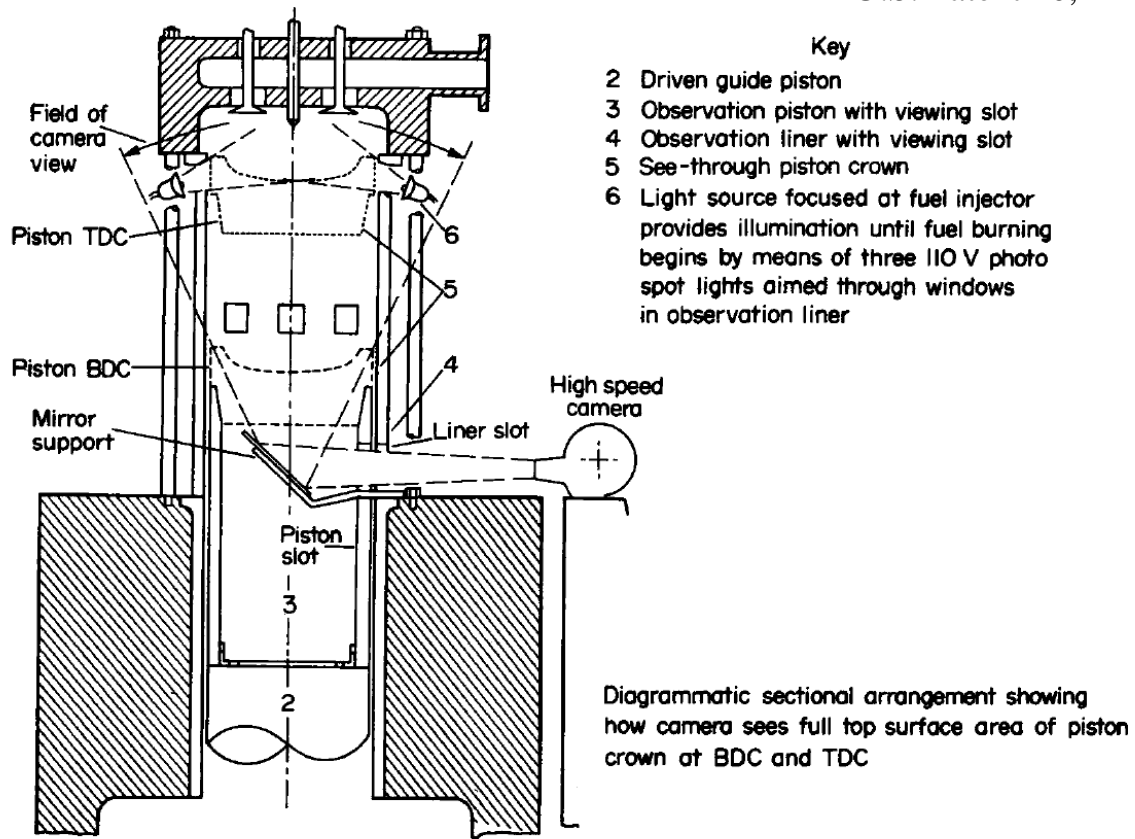


FIG. I.19. Diagrammatic arrangement for indirectly photographing combustion phenomena.

[0105]. Apparatus is also used as an “**Orsat Apparatus**” for the whole system to analyze exhaust gases from an engine. Ex. 1022, p. 190.

[0106]. *Internal Combustion Engines* also uses the term apparatus to describe an experimental setup built for a fuel droplet study. “Nishiwaki built an apparatus in which a droplet of fuel, suspended on a thin filament of silica, could suddenly be plunged into an environment of high temperature air.” Ex. 1015, p. 131. As shown in Figure 27 (see below), the term apparatus is also used to describe a setup that is used for flow visualization in engine design.

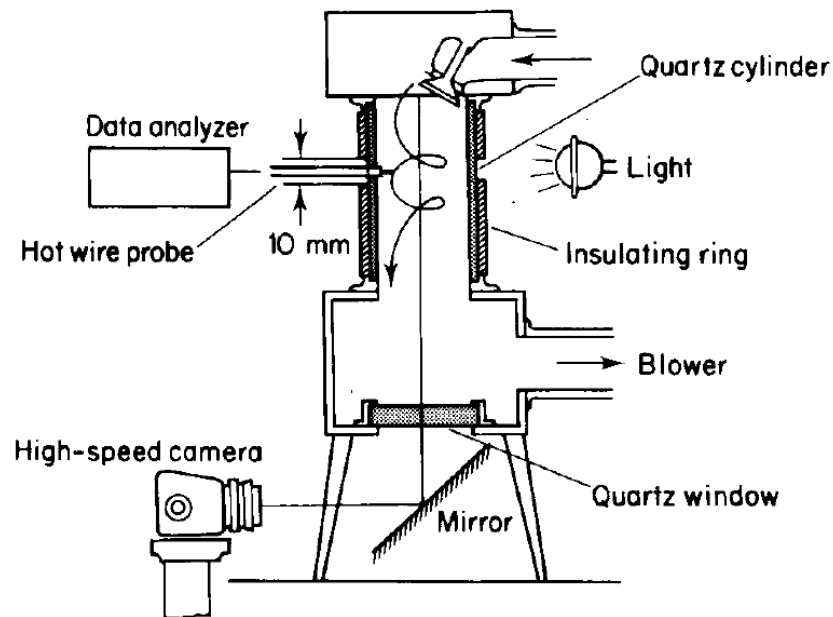
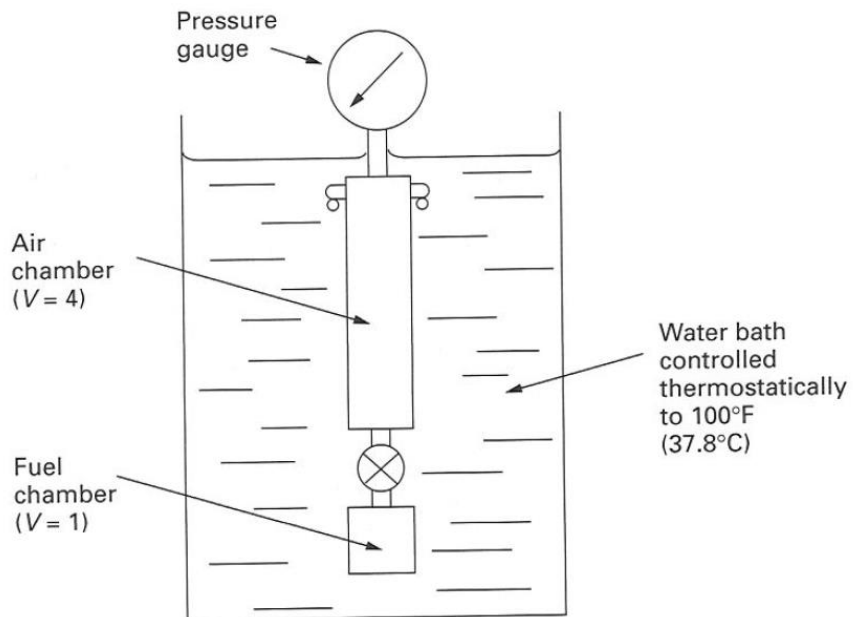


Figure 27 Experimental apparatus for gas flow study in cylinder by high speed photography and hot wire anemometry (Matsushita *et al.*, 1985).

[0107]. *Introduction to Internal Combustion Engines* uses the term apparatus for a “[r]eid vapor pressure apparatus.” Ex. 1020, p. 78. As shown in Figure 3.12 (see below), the setup comprises different chambers, a valve, and a pressure gauge. *Id.* The setup is designed to measure an engine fuel volatility property, known as reid vapor pressure (RVP), that affects engine start-ability during cold/winter seasons.

Figure 3.12
Reid vapour pressure
apparatus (from Goodger,
1975).



[0108]. *Introduction to Internal Combustion Engines*, further describes that “[t]he **Reid apparatus**...consists of a fuel chamber connected to an air chamber.” *Id.*

[0109]. In Chapter 16, of *Engine Testing Theory and Practice* the term “**emissions apparatus**” is used to refer to physical techniques and instruments that are required to measure engine exhaust emissions. Ex. 1012, p. 340.

[0110]. Chapter 18 uses the term “apparatus” as a variety of testing equipment such as brake tester, chassis dynamometers, and related equipment (e.g., safety, detectors, loading and emergency brakes) required for vehicle testing. *Id.*, 368-394. Chapter 18 discloses that “[i]n this chapter, an attempt has been made to survey the whole range of apparatus that may be described by the general heading

of rolling roads/chassis dynamometers, from the simple garage brake tester to complex and very costly climatic chambers and anechoic cells.” *Id.*

[0111]. An apparatus is also used as an “**electronic apparatus**” for the electronic equipment in the test room that generates heat and cause a moderate heating load. Ex. 1013, p. 94.

[0112]. *Combustion Engines Development* uses the term “apparatus” as a special “**test apparatus**” in describing Figure 3.14 (see below). Ex. 1019, p. 56. *Combustion Engines Development* discloses that “the test apparatus shown in Fig. 3.14 above (Glaser 1983) is employed, which makes it possible to subject an unstressed pressure sensor to a cyclical heating of similar size and frequency as arise in the engine. *Id.* The test apparatus includes a sensor, a radiant heat surface and a rotating diaphragm wheel. *Id.*

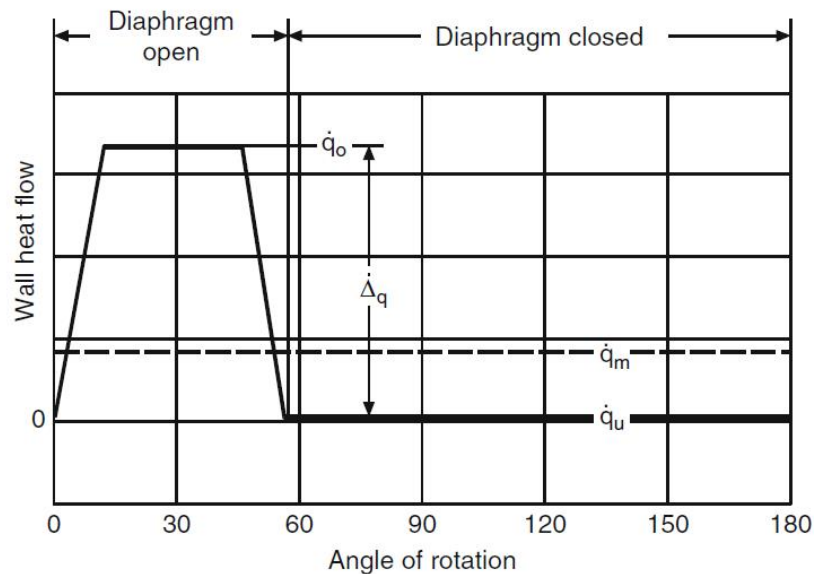
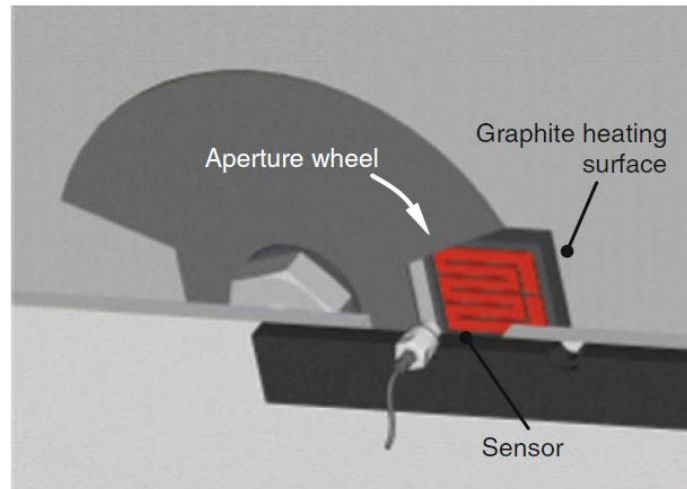


Fig. 3.14 Dynamic test apparatus to determine cyclical temperature drift

[0113]. *Combustion Engines Development* further discloses an “**exhaust apparatus**” for the exhaust system of an engine when describing the required changes for adding a supercharger to an engine. Ex. 1019, p. 318.

[0114]. An “apparatus” is also used as a “**guide apparatus**” for the setup to guide exhaust gas flow of an engine turbocharger to minimize flow dynamic losses. Ex. 1019, p. 324.

[0115]. *Combustion Engines Development* further discloses that

“[n]early all modern turbocharged car diesel engines have charge pressure control using an **adjustable guide apparatus.**” Ex. 1019, p. 327.

[0116]. *Alternative Transportation Fuels* uses the term “apparatus” for setups designed to measure properties of fuels for engines. For example, a Saybolt Viscometer, which consists of a standard cylindrical oil cup surrounded with a water bath with an immersion heater and a stirring device as shown in Figure 6.3. Ex. 1016, p. 321.

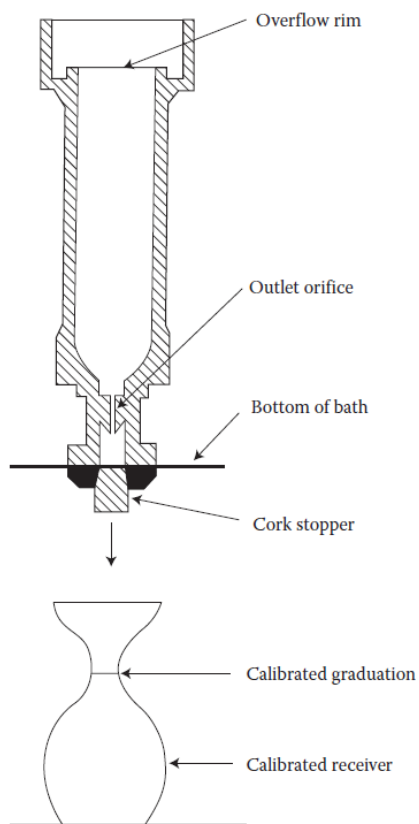


FIGURE 6.3
Saybolt viscometer.

[0117]. *Alternative Transportation Fuels* also discloses “[a]n Ables apparatus is used to determine the flash point that is shown in Figure 6.4.” Ex. 1016, pp. 323-324.

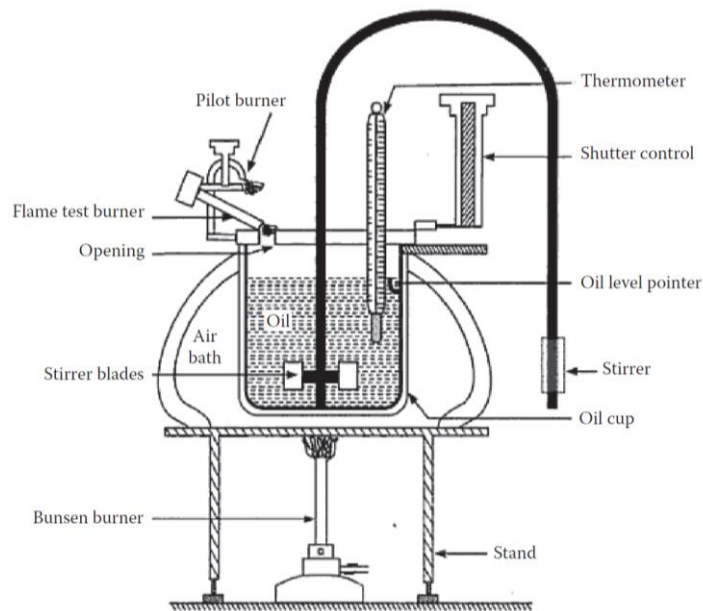


FIGURE 6.4
Ables apparatus.

[0118]. Moreover, *Alternative Transportation Fuels* discloses an apparatus comprising a cylindrical glass test for measuring cloud and pour points in Figure 6.5 (shown below). Ex. 1016, p. 325.

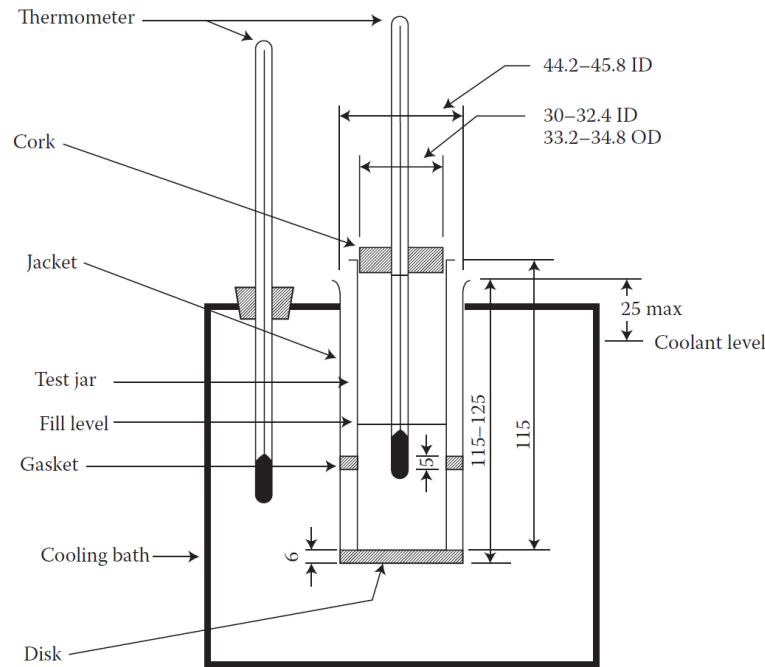


FIGURE 6.5
Apparatus for measuring cloud point and pour point.

B. The Claimed Terms “Coupled,” “Prevent...Coupling” and “Permit...to Couple”

Claim 1 of the ‘780 Patent recites:

[A] fuel lockout apparatus **coupled** to the mechanical fuel valve...[and] configured to: **prevent** the second fuel source from **coupling** to the second fuel line while the mechanical fuel valve is in the first position; and **permit** the second fuel source **to couple** to the second fuel line while the mechanical fuel valve is in the second position.

[0119]. In looking to the specification, a POSA would have understood that the terms “prevent...coupling” and “permit...to couple” to mean “prevent...attaching” and “permit...to attach.” The terms “coupling” and “to couple” refer to physically connecting or attaching two items. Ex.1022, p.4.

[0120]. As it was with the term “fuel lockout apparatus,” the specification of the ‘780 Patent is the best guide for ascertaining what a POSA would have understood the terms “prevent...coupling” and “permit...to couple” to mean.

1. “Prevent...Coupling” and “Permit...Coupling” as Recited in the Specification.

[0121]. The specification of the ‘780 Patent discloses only one way in which the fuel lockout apparatus “prevent[s]...coupling” of the second fuel source to the second fuel line: the “flange” (item 61) of the fuel lockout apparatus “block[s] fuel inlet 59 to *prevent coupling* the first end 50 a and second end 50 b of the quick-disconnect hose coupling *together*.” Ex.1001, 7:60-63; Figs. 2, 4A; *see also id.* 5:52-64, 6:10- 31. FIGS. 2 and 4A illustrate this:

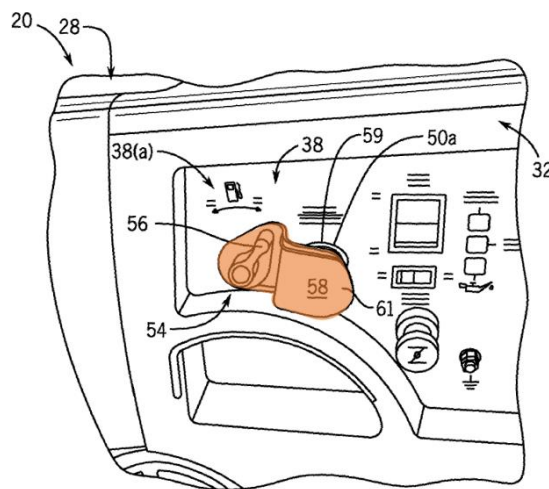


FIG. 2

Ex.1001, FIG. 2 (Emphasis Added).

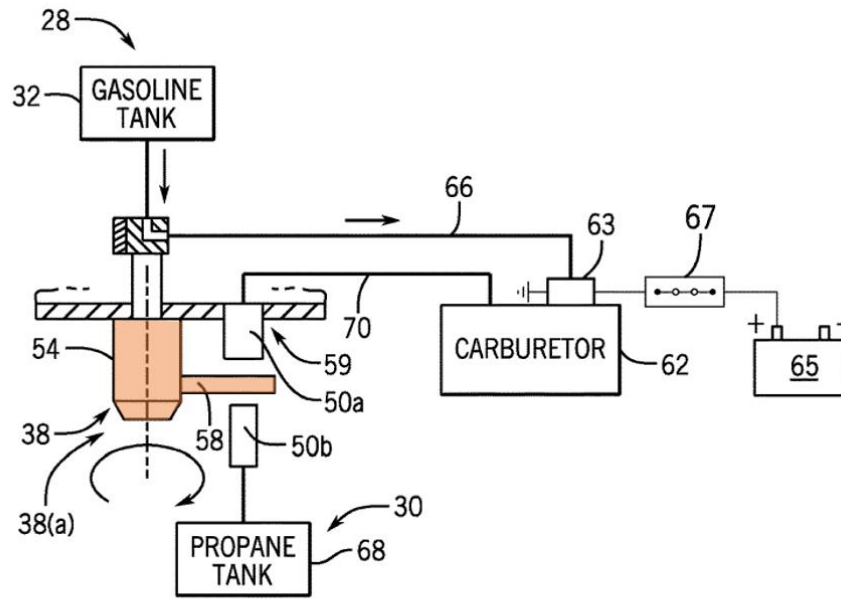


FIG. 4A

Ex.1001, FIG. 4A (Emphasis Added).

[0122]. The specification of the '780 Patent also discloses only one way in which the fuel lockout apparatus "permits" the second fuel source "to couple" to the second fuel line: "flange" (item 61) "unblock[s] fuel inlet 59 to permit attaching first end 50a and second end 50b together." Ex.1001, 7:63-67; Figs. 3, 4B; *see also id.* 6:32-41, 8:38-48. FIGS. 3 and 4B illustrate this:

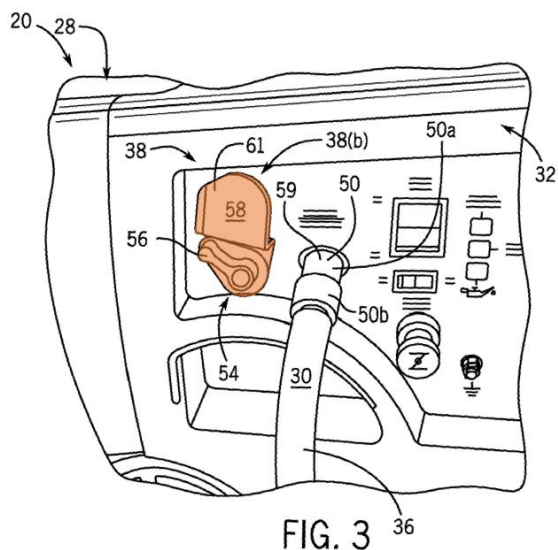


FIG. 3

Ex.1001, FIG. 3 (Emphasis Added).

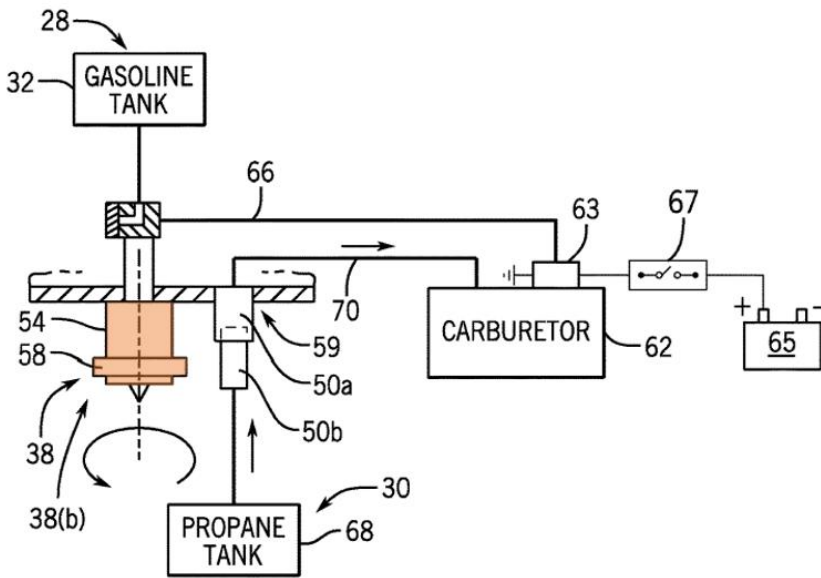


FIG. 4B

Ex.1001, FIG. 4B (Emphasis Added)

[0123]. Therefore, a POSA would have understood the terms “prevent...coupling” and “permit...to couple” to mean “prevent...attaching” and

“permit...to attach,” respectively. This construction finds ample support in the specification of the ‘780 Patent.

[0124]. In addition, during patent prosecution, the Examiner stated that the original dependent claim 3 would be allowable if presented as an independent claim based on the understanding that the “fuel lockout apparatus prevent[s] the second fuel source from coupling to the second fuel line...mean[ing] that not only are the two not in fluid communication but they are not physically connected in any manner.” Ex. 1002, p. 160. In his reasoning, the Examiner stated that the prior art Champion Manual “discloses a dual fuel system as discussed...but its lockout switch does not prevent the hose of the propane tank from even coupling to the engine fuel system lines.” *Id.* The Examiner thus interpreted the term “coupling” to require not only “fluid communication,” but “physical[] connect[ion].”

[0125]. In addition, the *American Heritage Dictionary of the English Language* defines couple as “something that joins or connects two things together: a link.” Ex. 1014, p.4. A POSA would have therefore understood the terms “prevent...coupling” and “permit...to couple” to mean “prevent...attaching” and “permit...to attach,” respectively.

i.-a Use of the Terms “coupled”, and “coupling” in Internal Combustion Engine and Mechanical Engineering Literature

[0126]. The construction of “**coupled**” and “**coupling**” as “**to attach**” is aligned with how the terms have been used in internal combustion engine (ICE) literature. Some examples of using the terms “**coupled**” and “**coupling**” as “**attach**” include “**coupled mechanically**” and “**coupled hydraulically**” or “**fluid coupled.**” In forming my opinion, I have reviewed the following ICE literature:

- John B. Heywood, *Internal Combustion Engine Fundamentals* (McGraw-Hill 1988).
- Richard Stone, *Introduction to Internal Combustion Engines* (3d ed. 1999).
- Constantine Arcoumanis, *Internal Combustion Engines* (Academic Press 1988).
- A.J. Martyr & M.A. Plint, *Engine Testing: Theory and Practice* (3d ed. 2007).
- Lino Guzzella & Christopher H. Onder, *Introduction to Modeling and Control of Internal Combustion Engine Systems* (2010).
- Inst. of Mech. Eng’rs, *Internal Combustion Engines: Performance, Fuel Economy and Emissions* (2013).
- Carsten Baumgarten, *Mixture Formation in Internal Combustion Engines* (2006).

- Richard van Basshuysen & Fred Schäfer, *Internal Combustion Engine Handbook* (SAE Int'l 2004).
- Horst Bauer, *Bosch Gasoline-Engine Management: Basics and Components* (2001).
- Hua Zhao, *HCCI and CAI Engines for the Automotive Industry* (CRC Press 2006).
- Günter P. Merker, Christian Schwarz & Rüdiger Teichmann, *Combustion Engines Development* (2012).
- Eugene A. Avallone, Theodore Baumeister III & Ali M. Sadegh, *Marks' Standard Handbook for Mechanical Engineers* (11th ed. 2007).
- K.K. Ramalingam, *Handbook of Mechanical Engineering Terms* (2d ed. 2009).
- Thomas G. Beckwith, N. Lewis Buck & Roy D. Marangoni, *Mechanical Measurements* (3d ed. 1982).
- Myer Kutz, *Mechanical Engineers' Handbook* (2d ed. 1986).
- A. Parrish, *Mechanical Engineer's Reference Book* (Butterworth & Co. Publ'rs 1973).

- Rowland S. Benson & N.D. Whitehouse, *Internal Combustion Engines* (Pergamon Press 1979).
- Alexander A. Stotsky, *Automotive Engine Control, Estimation, Statistical Detection* (Springer 2009).

[0127]. Examples of “**coupled mechanically**” and “**coupled hydraulically**” or “**fluid coupled.**” are provided below.

i.-a Coupled “Mechanically”

[0128]. **Mechanical coupling** is referred to rigid coupling including but not limited to couplings via gears, shafts, flanges, and stiff rubbers. In this case, movement of an object is linked/coupled to the movement of another object. Some examples are included in the followings.

[0129]. *Bosch Gasoline-engine Management Basics and Components* discloses that “[i]n conventional IC engines, camshaft and crankshaft are **mechanically coupled** to each other through toothed belt or chain. The valve opening period and lift are not affected by camshaft phase adjustment, which means that ‘intake opens’ and ‘intake closes’ remain invariably coupled with each other.” *See* Ex. 1011, p. 22.

[0130]. *Engine Testing: Theory and Practice*, mentions various forms of **mechanical couplings** such as **shaft coupling, flange coupling, stiff rubber coupling** to connect an engine to a dynamometer. *See* Ex. 1012, pp. 170-196.

[0131]. *Mechanical Engineer's Reference Book* explains different types of couplings including **mechanical couplings** with gears, shafts, rubbers, flanges, etc. It classifies couplings to “rigid” and “flexible” or “soft” types, among others. Ex. 1017, pp. 13-2, 13-3.

[0132]. *Mixture Formation in Internal Combustion Engines* discloses that “[t]he second main group of high-pressure injection systems are those in which the generation of injection pressure and the injection itself occur synchronously. These systems are driven by a camshaft, which is **mechanically coupled** with the engine.” See Ex. 1018, p. 34.

[0133]. *Combustion Engines Development* discloses that “in the case of mechanical supercharging, a charging aggregate mounted on the engine is usually powered by a belt or gearwheel drive, which is why the engine and compressor speeds are usually rigidly coupled.” See Ex. 1019, p. 313.

[0134]. *Engine Testing: Theory and Practice* also discloses that a “[m]anifold is coupled to a flexible stainless steel pipe, of fairly large diameter to minimize pressure waves, and led by way of a back pressure regulating valve to a pipe system suspended from the cell roof.” See Ex. 1012, p. 123.

[0135]. *Introduction to Internal Combustion Engines*, discloses that “[t]he injection pump is **directly coupled** to the engine (half engine speed for a

four-stroke engine) and [that] the pump controls the quantity and timing of the fuel injection (figure 5.12).” Ex. 1020, p. 232.

i.-b. Coupled “Hydraulically” or “by Fluid”

[0136]. Hydraulic coupling or coupling via fluids is referred to coupling that is established based on fluid connection between two channels, sources, or objects. The fluid can be oil, coolant, or liquid fuel, but it is not limited to these fluids. The fluid channels will be connected/coupled via fluid pressure and it will include both positive pressures and negative pressures (e.g., vacuum lines). Examples of how fluid couplings are mentioned in the literature are provided below:

[0137]. *Handbook of Mechanical Engineering Terms* discloses “[a] liquid coupling used to transmit the engine effort (torque) to a clutch and transmission. This coupling is always a major part of the engine flywheel.” See Ex. 1023, p. 314.

[0138]. *Mechanical Engineer’s Reference Book* discloses “Hydrokinetic or Fluid Couplings for transmitting power due to the kinetic energy transfer in a fluid filling operation.” See Ex. 1017, pp. 13-3.

[0139]. *Mixture Formation in Internal Combustion Engines* discloses a “assembly consist[ing] of a piezo stack, a hydraulic coupling device, a control valve, and the nozzle module. The hydraulic coupling device amplifies the

elongation of the piezo stack and transfers it to the control valve.” See Ex. 1018, p. 234.

[0140]. *Combustion Engines Development* discloses that a “flow-type coupling of both sub-components results in a significantly delayed torque build-up compared with the steady-state behavior of the engine.” See Ex. 1019, p. 330.

VII. THE CHALLENGED CLAIMS ARE UNPATENTABLE BASED ON THE PRIOR ART

A. Ground 1: The Combination of DuroMax and Elsdon Renders Obvious Claims 1, 2, 3, 4, 6, 7 and 15.

[0141]. As explained in §§VII.A.1-7, claims 1, 2, 3, 4, 6, 7 and 15 of the ‘780 Patent are obvious under §103, as detailed below.

1. Independent claim 1

a. Element [1.0]: “A mechanical fuel lockout switch for a dual fuel engine comprising:”

[0142]. The combination of DuroMax and Elsdon discloses element 1.0. DuroMax discloses a dual fuel generator in which either LPG or gasoline may be selected for operation of the generator. Ex.1004, pp.11-12. DuroMax also discloses a mechanical fuel valve coupled to the internal combustion engine. Ex. 1004, p.20.

[0143]. Elsdon discloses a fuel conduit coupler cap 12 and shield 14. Ex.1005, 4:1-5. As discussed hereafter in §§VII.A.1.a.1-2, it is my opinion that a

POSA would have understood it to be obvious to combine the Elsdon fuel conduit coupler cap with the gasoline valve of DuroMax to provide a mechanical fuel lockout switch and prevent unstable operating conditions, such as where both fuels are simultaneously delivered to the generator engine.

1. Motivation to Combine DuroMax and Elson

[0144]. DuroMax discloses a dual fuel generator that is configured to operate on both LPG and gasoline fuel sources. Ex. 1004, pp.11-12.

To start your generator with gasoline, perform the following steps:

- 3 Turn the gasoline fuel valve to the "ON" position

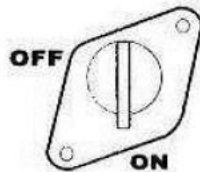


Figure 6 - fuel valve in the "on" position

Ex.1004, p.11.

To start your generator with LPG, perform the following steps:

3. Turn the gasoline fuel valve to the "OFF" position (see *figure 6*).

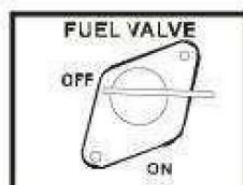


Figure A - Fuel Valve in the "OFF" position

Ex.1004, p.12.

[0145]. DuroMax discloses that the generator includes a gasoline fuel tank with a mechanical fuel valve that stops gasoline fuel from exiting the gasoline tank and being delivered to the generator engine when run on LPG fuel. Ex.1004, p.12.

[0146]. DuroMax discloses a fuel valve having an “on” and “off” position. Ex. 1004, pp. 11-12.

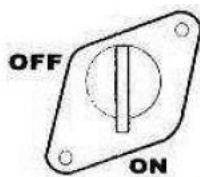


Figure 6 - fuel valve in the "on" position

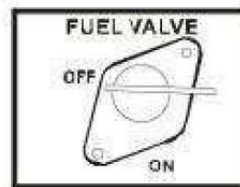


Figure A - Fuel Valve in the "OFF" position

Ex.1004, pp.11,12.

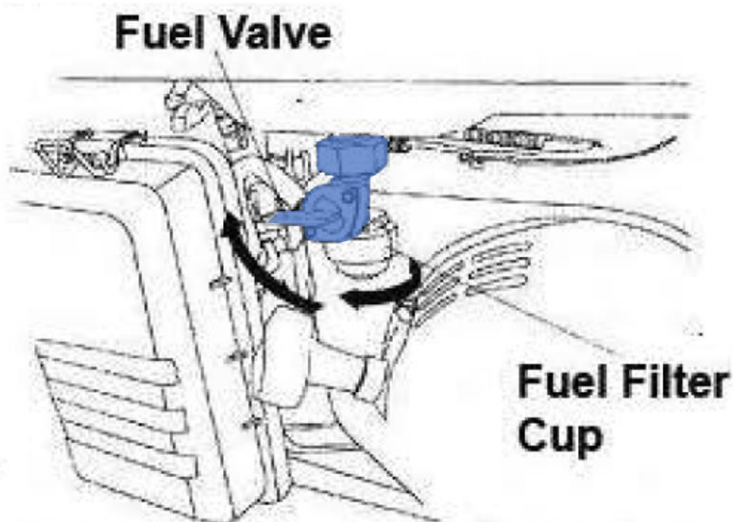
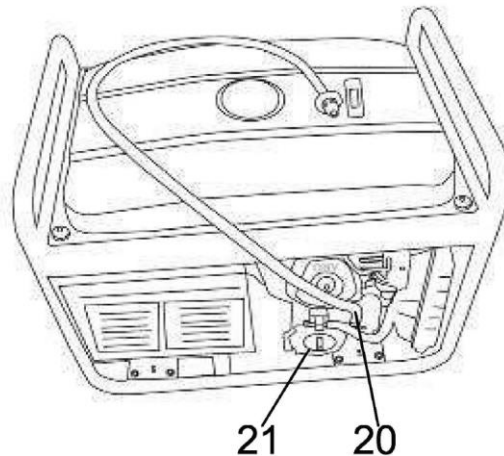


Figure 19 –Removing the Fuel Filter Cup

Ex.1004, p.20 (Emphasis Added).

[0147]. DuroMax also discloses an onboard LPG tank connector which couples to an LPG hose of an external LPG tank for delivering LPG fuel to the generator engine when run on LPG fuel. Ex. 1004, p.7.



20. Hose connector- Connect liquid propane gas to generator.

Ex.1004, pp.7-8.

[0148]. A POSA would understand that while DuroMax can run on either gasoline fuel or LPG fuel, DuroMax is not configured to run on both fuel sources at the same time.

[0149]. For example, DuroMax provides the following warning label:

⚠ CAUTION:
When using gasoline, LPG must be shut off! When using LPG,
gasoline must be shut off!

Ex.1004, p.11.

[0150]. This is consistent with the background section of the '780 Patent, which discloses that prior art dual fuel engines “can experience overly rich air-fuel ratio when both fuels are simultaneously engaged” which can “make the engine hard to start or lead to unstable operating conditions.” Ex.1001, 1:48-55. *See Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1375 (Fed. Cir. 2022) (“[I]t is appropriate to rely on admissions in a patent’s specification when assessing whether that patent’s claims would have been obvious’ in an *inter partes* review proceeding.”); *see also* USPTO, Updated Guidance on the Treatment of Statements of the Applicant in the Challenged Patent in Inter Partes Reviews under §311, at 4 (June 9, 2022).

[0151]. Elsdon discloses a cap and shield assembly for covering a fluid conduit (i.e., a fuel line). Ex.1005, 3:3-14. Elsdon discloses that by rotating the cap 14 over the conduit coupler 12, the cap 14 prohibits access to the coupler interface, thereby preventing connecting of a hose with the coupler interface. Ex. 1005, 3:3-14, 5:1-10.

[0152]. Elsdon explicitly recognizes the importance of properly sequencing the connection of fuel sources with the opening of associated valves. For example, Elsdon notes that it may be important to ensure the closing or opening of fuel valves before permitting coupling or uncoupling to the connection interface. Ex.1005, 1:23-40. Elsdon discloses that its cap and shield may be

utilized in such sequenced interconnected valve and coupler arrangements.

Ex.1005, 4:44-53.

[0153]. A POSA would have been motivated to implement the fuel conduit coupler cap assembly of Elsdon to selectively cover and uncover the LPG fuel conduit coupler of DuroMax. Specifically, a POSA would have been motivated to connect the Elsdon fuel conduit coupler cap to the mechanical fuel valve of DuroMax to restrict access to the LPG hose connector interface of DuroMax when the DuroMax generator is running with gasoline fuel.

[0154]. A POSA would have understood that by implementing the Elsdon fuel conduit coupler cap assembly in this way, one could link the opening and closing of the DuroMax mechanical fuel valve with the covering and uncovering of the LPG fuel conduit coupler.

[0155]. A POSA would have understood such an arrangement to prevent simultaneous use of LPG and gasoline, which was a known problem with generators such as DuroMax.

2. Reasonable Expectation of Success in Combining DuroMax and Elson

[0156]. A POSA would have had a reasonable expectation of success in implementing the fuel conduit coupler cap of Elsdon onto the LPG fuel conduit coupler of DuroMax. Elsdon emphasizes that its cap assembly may be “retrofit” to

cover existing fuel couplers on “construction equipment” such as a generator. Ex.

1005, 2:27-32; 5:11-14. Elsdon utilizes a simple connection arrangement, in which

the cap 16 rotates around the axis of the shaft 18.

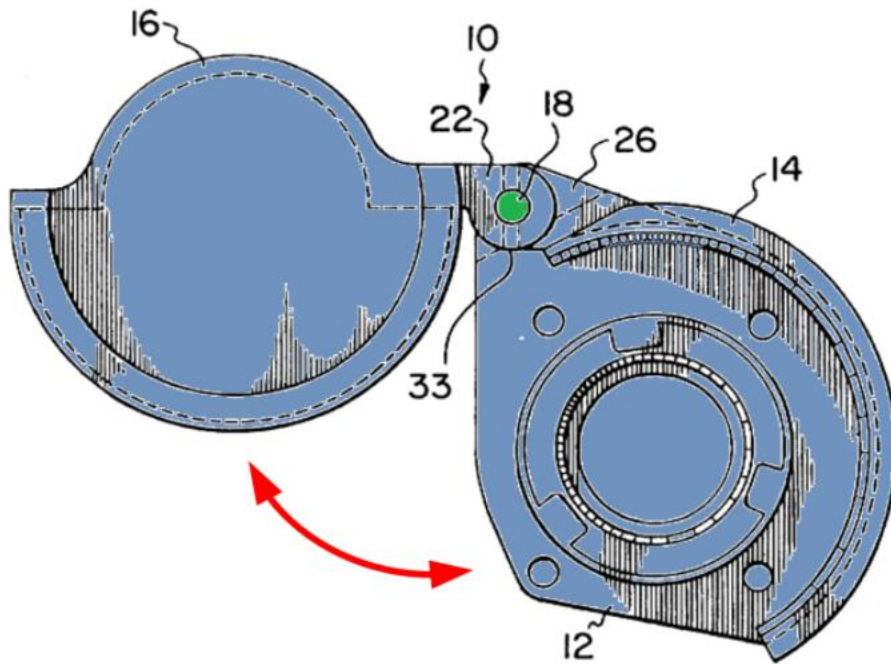


FIG. 1

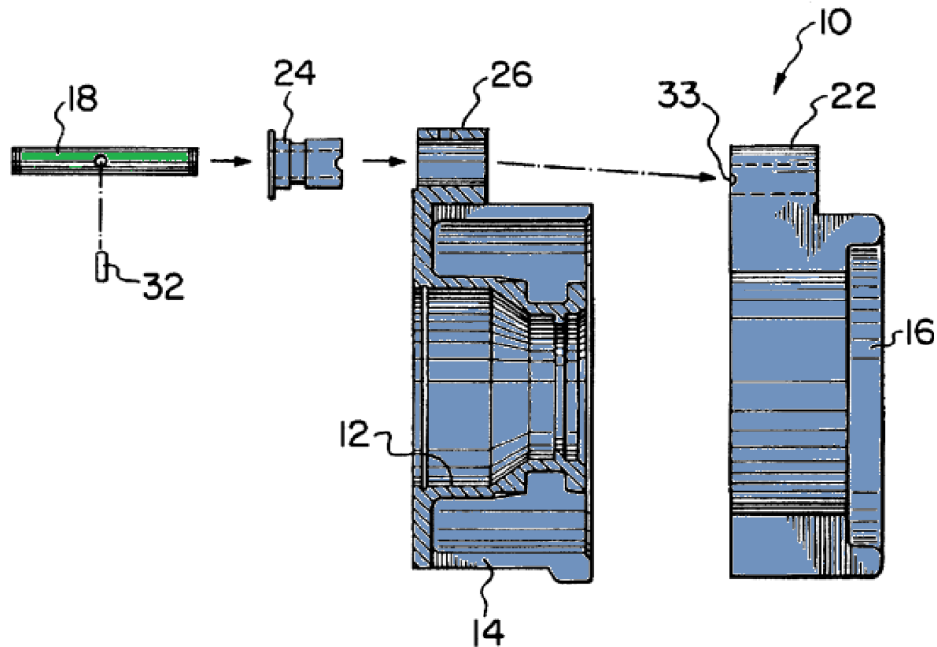


FIG. 3

[0157]. A POSA would have understood that the fuel valve of DuroMax is a simple shut off mechanical fuel valve utilizing a valve handle that rotates a shaft (e.g., valve stem) connected to a stop (e.g., valve seat) inside of the valve body for preventing fuel flow.

[0158]. A POSA would have also understood that the valve handle and shaft of the DuroMax fuel valve could be readily connected to the cap 16 of Elsdon such that the DuroMax valve handle and shaft rotate together with the Elsdon cap 16.

[0159]. A POSA would have further understood that the fuel valve and LPG fuel conduit coupler of DuroMax could easily be moved to different positions

on the generator such that the two components are located immediately next to each other.

[0160]. For example, as disclosed in the YouTube video (Ex. 1010), it was well known in the art that the LPG inlet connector on a portable generator can be easily moved around the generator. Ex.1010, 15:39-16:20. A POSA would understand that the propane inlet port can be installed on any side of the generator accessible to the operator (e.g., the same side as a gasoline valve), so long as the propane inlet port does not interact with hot exhaust gases.

[0161]. Accordingly, a POSA would have understood that the cap 16 of Elsdon can rotate with the valve handle of the DuroMax fuel valve to cover the LPG fuel conduit coupler when the DuroMax mechanical fuel valve is open, and can rotate to permit access to the LPG fuel conduit coupler when the DuroMax mechanical fuel valve is closed.

- b. Element [1.1]: “a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line; and”**

[0162]. DuroMax discloses a mechanical fuel valve coupled to the internal combustion engine. Ex.1004, p.11-12.

To start your generator with gasoline, perform the following steps:

- 3 Turn the gasoline fuel valve to the "ON" position

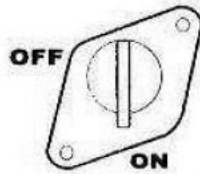


Figure 6 - fuel valve in the "on" position

Ex.1004, p.11.

To start your generator with LPG, perform the following steps:

3. Turn the gasoline fuel valve to the "OFF" position (see *figure 6*).

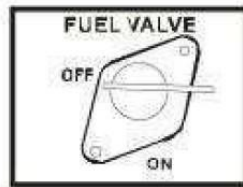
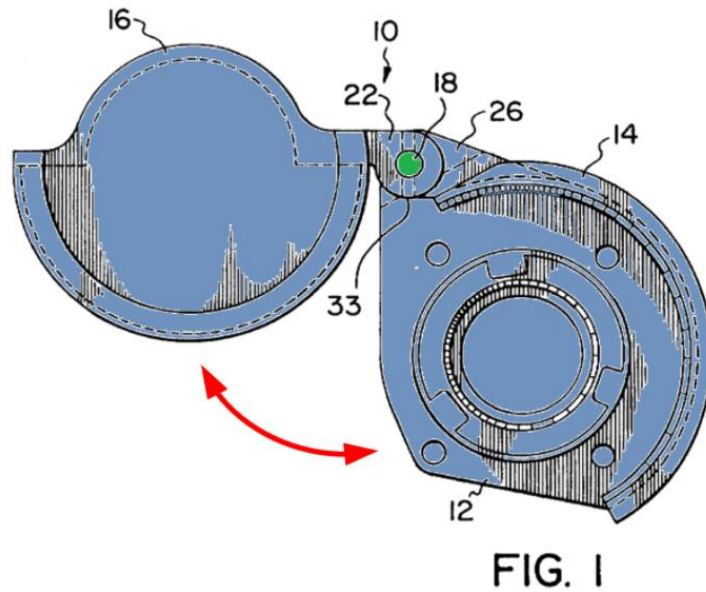


Figure A - Fuel Valve in the "OFF" position

Ex.1004, p.12.

[0163]. Elsdon discloses a fuel conduit coupler shield 14 and cap 16 that when closed prevents connection of a fuel source. Ex. 1005, 3:3-14. Elsdon discloses that by rotating cap 16 over conduit coupler 12, cap 16 prohibits access to the coupler interface, thereby preventing connecting of a hose with the coupler interface. *Id.*, 3:3-14, 5:1-10.



Ex.1005, FIG. 1 (annotated).

[0164]. It would have been obvious to a POSA to combine the Elsdon fuel conduit coupler cap with the mechanical fuel valve of DuroMax to provide a mechanical fuel valve that both controls the flow of gasoline from the tank through the gasoline line (as disclosed by DuroMax) and simultaneously rotates to block and unblock the LPG inlet (as disclosed by Elsdon).

[0165]. By blocking and unblocking the LPG inlet, this combined apparatus would selectively control the flow of LPG through the LPG fuel line. *Id.* This combination would appear and function the same way as Figures 2-4B of the '780 Patent.

- c. **Element [1.2]: “a fuel lockout apparatus coupled to the mechanical fuel valve;”**

[0166]. As noted above, the “fuel lockout apparatus” is properly construed as a means plus function term covering items 58, 61 in Figs. 2, 3, 4A, 4B, as described at Ex. 1001, 5:37-64; 6:10-31; 6:42-7:17; 7:54-67; 8:49-64 and equivalents thereof. *Supra* §VI.A.

[0167]. As noted above, it would have been obvious to have connected the valve handle and shaft of the DuroMax fuel valve to the cap 16 of Elsdon, which would have resulted in a flange that is rigidly coupled to a fuel valve handle, with the flange extending radially out from the fuel valve handle so that the flange rotates with the fuel valve handle and rotates transversely over the fuel inlet for LPG between a first position in which the flange blocks access to the fuel inlet for the LPG when the fuel valve handle is in position to allow gasoline to run the engine, and between a second position in which the flange does not block the fuel inlet for the LPG when the fuel valve handle is in position to restrict gasoline from running the engine. Thus, the combination of DuroMax and Elston teaches a “fuel lockout apparatus.”

- d. Element [1.3]: “wherein the mechanical fuel lockout switch: communicates the first fuel source to the dual fuel engine and prevents communication between the second fuel source and the dual fuel engine when the mechanical fuel valve is in the first position, and communicates the second fuel source to the dual fuel engine and interrupts the first fuel source communication with the dual fuel engine when in the second position; and”**

[0168]. The DuroMax mechanical fuel valve rotates between a first position in which the valve is opened (communicating the gasoline fuel source to the dual fuel engine) and a second position in which the valve is closed (interrupting communication of the gasoline fuel source to the dual fuel engine).

[0169]. As noted above, a POSA would have found it obvious to have connected the valve handle and shaft of the DuroMax fuel valve to the cap 16 of Elsdon to prevent the simultaneous flow of gasoline and LPG fuel to the dual fuel engine. *Supra* §§VII.A.1.a.1-2.

[0170]. Specifically, A POSA would have found it obvious to connect these components that the cap 16 covers the LPG fuel conduit coupler when the mechanical fuel valve is in the open (first) position (preventing communication between the LPG fuel source and the dual fuel engine) and to uncover the LPG fuel conduit coupler (communicating the second fuel source to the dual fuel engine) when the mechanical fuel valve is in the closed (second) position. *See supra* §§VII.A.1.a.1-2.

- e. **Element [1.4]: “wherein the fuel lockout apparatus is configured to: prevent the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position; and permit the second fuel source to couple to the second fuel line while the mechanical fuel valve is in the second position.”**

[0171]. As explained above, it would have been obvious to have connected the valve handle and shaft of the DuroMax fuel valve to the cap 16 of Elsdon so that the cap 16 covers the LPG fuel conduit coupler when the mechanical fuel valve is in the open (first) position and to uncover the LPG fuel conduit coupler when the mechanical fuel valve is in the closed (second) position. *Supra* §VII.A.1.d.

[0172]. A POSA would have understood that when covering the LPG fuel conduit coupler, the cap 16 would prevent the LPG hose from coupling to the LPG fuel conduit connector. A POSA would also understand that when uncovering the LPG fuel conduit connector, the cap 16 would permit the LPG hose to couple with the LPG fuel conduit connector.

2. **Claim 2: “The mechanical fuel lockout switch for a dual fuel engine of claim 1, wherein the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine.”**

[0173]. The combination of DuroMax and Elsdon teaches claim 2. The combination of DuroMax and Elsdon discloses a fuel lockout apparatus coupled to a mechanical fuel valve. *Supra*, §VII.A.1.c.

[0174]. Elsdon discloses a fuel lockout apparatus comprising a cap and shield. *Supra*, §VII.A.1.c. As seen in FIG. 1 (below), when the cap is in the open

position the second fuel source (LPG) may be communicated to the internal combustion engine.

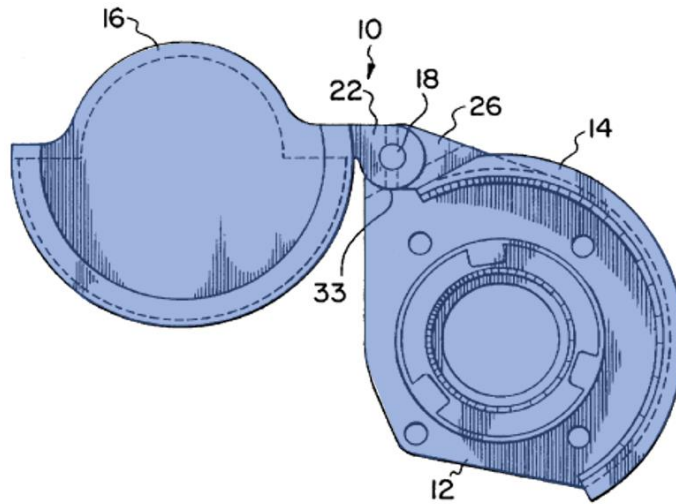
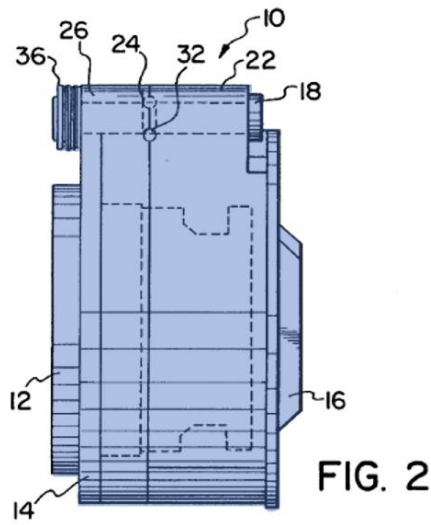


FIG. 1

Ex.1005, FIG. 1 (Emphasis Added).

[0175]. As shown in FIG. 2 (below), when the cap is in the closed position, the second fuel source (LPG) is prevented from being communicated with the internal combustion engine.



Ex.1005, FIG. 2 (Emphasis Added).

[0176]. As described in §VII.A.1.e, *supra*, a POSA would have understood that operation of the mechanical fuel valve and the fuel lockout apparatus is interconnected such that only one fuel can be communicated to the engine at one time.

[0177]. Specifically, the mechanical fuel valve of DuroMax would be rigidly connected to the cap of Eldson such that when the gasoline valve is rotated into a closed position, the cap of Eldson is moved into the open position and when the gasoline valve is rotated into an open position, the cap of Eldson is moved into the closed position.

[0178]. A POSA would have therefore understood that when the fuel lockout apparatus of Eldson is interconnected with the mechanical fuel valve of

DuroMax, the mechanical fuel valve would be prevented from moving into the first position when the second fuel source communicates with the dual fuel engine (due to the cap coming into contact with the LPG input line).

[0179]. Accordingly, a POSA would have understood that the combination of DuroMax and Elsdon teaches claim 2.

3. **Claim 3: “The mechanical fuel lockout switch for a dual fuel engine of claim 1, wherein the fuel lockout apparatus comprises a flange rigidly coupled to the mechanical fuel valve that covers an inlet of the second fuel line while the mechanical fuel valve is in the first position and uncovers the inlet of the second fuel line while the mechanical fuel valve is in the second position.”**

[0180]. The combination of DuroMax and Elsdon teaches claim 3. The combination of DuroMax and Elsdon discloses a fuel lockout apparatus coupled to a mechanical fuel valve. *Supra*, §VII.A.3.c. The fuel lockout apparatus includes a cap. *Supra*, §VII.A.3.c.

[0181]. A POSA would have understood it to be obvious to have rigidly connected the DuroMax mechanical fuel valve to the cap of Elsdon such that the DuroMax valve handle and shaft rotate together with Elsdon cap 16. *Supra* §§VII.A.1.a.1-2; VII.A.1.c. A POSA would have further considered it to be obvious to have arranged the mechanical fuel valve and cap assembly of DuroMax and Elsdon adjacent to the LPG input such that the cap of Elsdon rotates over and also covers the LPG inlet (preventing coupling thereto) when the mechanical fuel

valve is placed into an open position and uncovers the LPG inlet (permitting coupling thereto) when the mechanical fuel valve is placed into the closed position.

Supra §VII.A.1.a.1-2.

[0182]. Accordingly, a POSA would have understood that the combination of DuroMax and Elsdon teaches claim 3.

4. **Claim 4: “The mechanical fuel lockout switch for a dual fuel engine of claim 3, wherein the mechanical fuel valve rotates between the first position and the second position and the flange rotates transversely across the inlet of the second fuel line.”**

[0183]. The combination of DuroMax and Elsdon teaches claim 4. DuroMax discloses a mechanical fuel valve that rotates between a first position and a second position. *Supra*, §VII.A.1.b. Elsdon discloses a flange comprising a cap and shield. *Supra*, §VII.A.1.b.

[0184]. That the cap and shield are arranged such that when the cap is in a closed position, the fluid coupler is protectively disclosed therebetween, and when the cap is rotated from a closed position to an open position, the coupler is exposed. Ex.1005, 2:19-23. A POSA would have understood that the cap and shield can thus rotate transversely across the inlet of a fuel line.

[0185]. Accordingly, a POSA would have understood that when the combination fuel valve of DuroMax is connected to the cap of Elsdon, the mechanical fuel valve rotates between the first position and the second position

and the flange rotates transversely across the inlet of the second fuel line as recited

in claim 4. *Supra* §§VII.A.1.a.1-2.

5. **Claim 6: “The mechanical fuel lockout switch for a dual fuel engine of claim 1, wherein the mechanical fuel valve and the fuel lockout apparatus operate together to ensure that fuel from the first fuel source and fuel from the second fuel source are not simultaneously delivered to the dual fuel engine.”**

[0186]. The combination of DuroMax and Elsdon teaches claim 6. A POSA would have considered it obvious to have connected the mechanical gasoline valve of DuroMax to the cap of Elsdon to prevent the simultaneous delivery of gasoline and LPG fuel to the engine. *Supra* §§VII.A.1.a.1-2

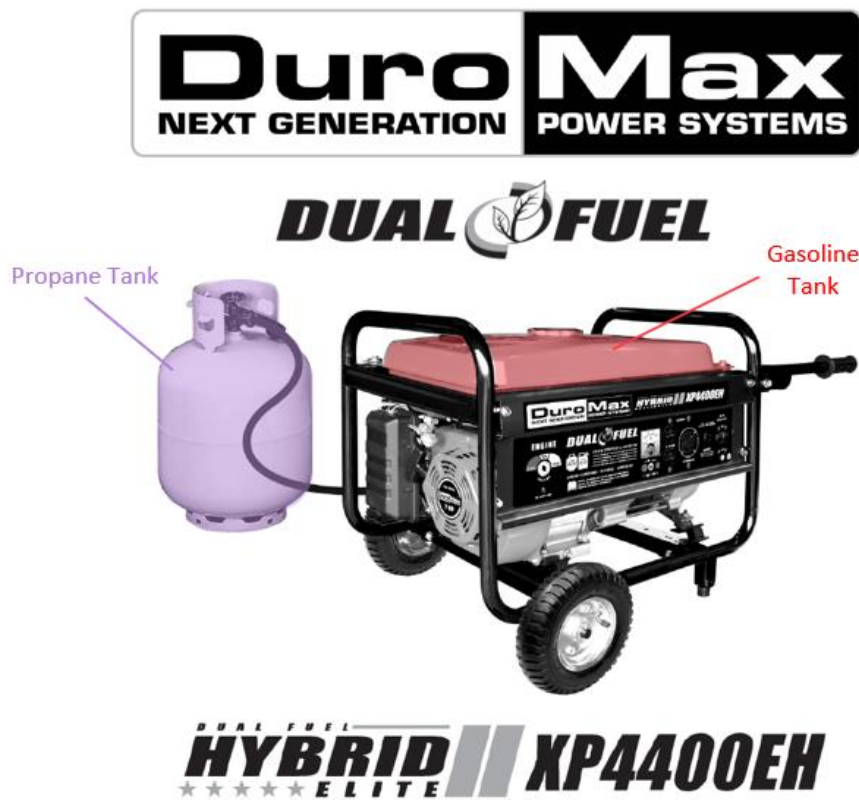
[0187]. Specifically, a POSA would have been motivated to connect the Elsdon fuel conduit coupler cap to the mechanical fuel valve of DuroMax to restrict access to the LPG hose connector interface of DuroMax when the DuroMax generator gasoline valve is in the open position.

[0188]. Likewise, the combination would prevent the gasoline valve of DuroMax from being moved from the closed to the open position when an LPG hose is connected to the LPG hose connector interface due to the interference between the Elsdon flange with the LPG hose. *Supra* §§VII.A.1.a.1-2.

Accordingly, a POSA would have understood that the combination of DuroMax and Elsdon teaches claim 6.

6. **Claim 7: “The mechanical fuel lockout switch for a dual fuel engine of claim 6, wherein the first fuel source provides liquid fuel from a liquid fuel tank to the dual fuel engine and the second fuel source provides gaseous fuel from a pressurized fuel container to the dual fuel engine.”**

[0189]. DuroMax teaches claim 7. DuroMax discloses a first fuel tank and a second fuel tank. Ex.1004, p.1.



Ex.1004, p.1

[0190]. The first fuel tank provides gasoline, and the second fuel tank provides propane. Ex.1004, pp. 7, 11-12. A POSA would have understood that DuroMax discloses a first fuel source that provides liquid fuel from a liquid fuel tank to the dual fuel engine.

[0191]. A POSA would also have understood that DuroMax discloses a second fuel source that provides gaseous fuel from a pressurized fuel container to the dual fuel engine. *Id.*

[0192]. Accordingly, a POSA would have understood that DuroMax teaches claim 7.

7. Independent claim 15

a. Element [15.0]: “A mechanical fuel lockout switch for a dual fuel engine comprising”

[0193]. To the extent the preamble is limiting, DuroMax teaches [15.0] for at least the same reasons as [1.0]. *Supra*, §VII.A.1.a

b. Element [15.1]: “a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line; and”

[0194]. DuroMax teaches [15.1] for at least the same reasons as [1.1].
Supra, §VII.A.1.b

c. Element [15.2]: “a fuel lockout apparatus coupled to the mechanical fuel valve;”

[0195]. The combination DuroMax and Elsdon teaches [15.2] for at least the same reasons as [1.2]. *Supra*, §VII.A.1.c.

d. Element [15.3]: “wherein the mechanical fuel lockout switch: communicates the first fuel source to the dual fuel engine and prevents communication between the second fuel source and the dual fuel engine when the

mechanical fuel valve is in the first position, and communicates the second fuel source to the dual fuel engine and interrupts the first fuel source communication with the dual fuel engine when in the second position; and”

[0196]. DuroMax teaches [15.3] for at least the same reasons as [1.3].

Supra, §VII.A.1.d.

- e. **Element [15.4]: “wherein the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine.”**

[0197]. The combination of DuroMax and Elsdon teaches [15.4] for at least the same reasons as claim 2. *Supra*, §VII.A.2.

B. Ground 2A/2B: Hallberg Anticipates Claims 1, 6, 7, and 9 (Ground 2A) and Renders Obvious Claims 2 and 15 (Ground 2B).

[0198]. As explained in sections §§VII.B.1-VII.B.5 below, it is my opinion that a POSA would have found that Hallberg teaches and/or suggests the limitations of claims 1, 2, 6, 7, 9 and 15. A POSA would have therefore found that Hallberg anticipates claims 1, 6, 7 and 9, and renders obvious claims 2, and 15.

1. Independent claim 1

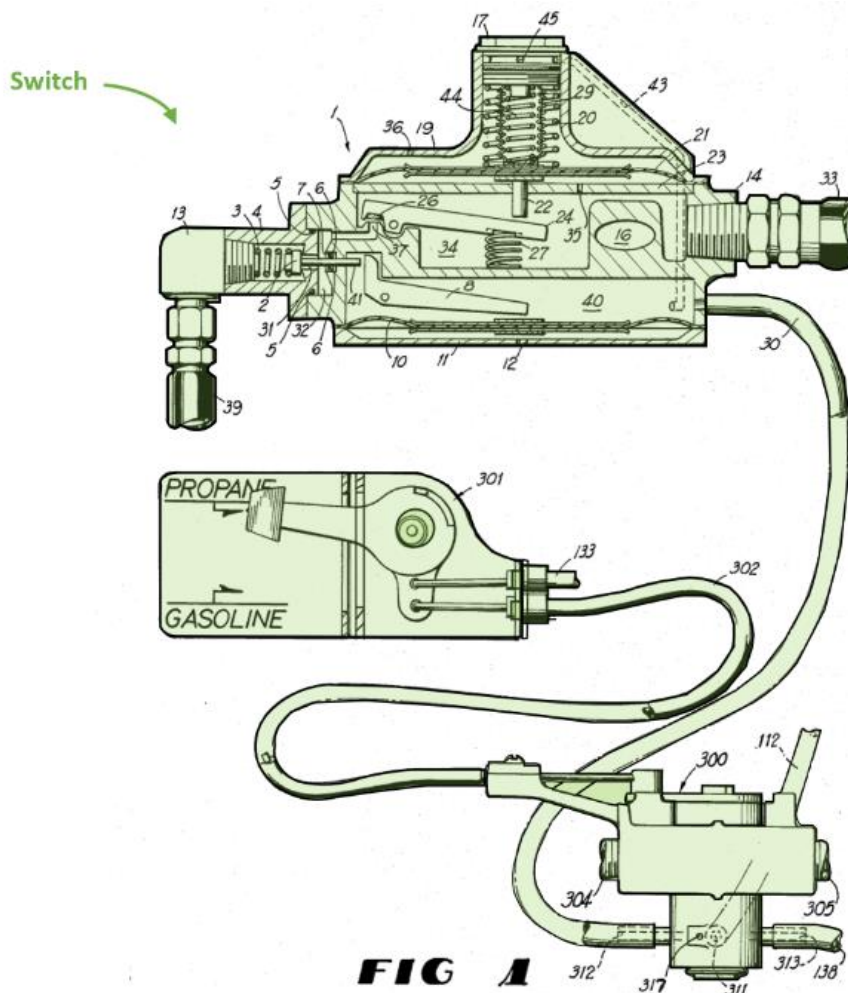
- a. **Element [1.0]: “A mechanical fuel lockout switch for a dual fuel engine comprising:”**

[0199]. It is my opinion that to the extent the preamble is limiting, a POSA would understand that Hallberg discloses “*A mechanical fuel lockout switch for a dual fuel engine.*”

[0200]. Hallberg discloses “a system which may be used with conventional internal combustion engines...to permit alternative utilization of a liquified gas fuel...such as propane...and a liquid fuel...such as gasoline. Ex. 1006, 3:49-55.

[0201]. The system includes a mechanical fuel lockout switch comprising a fluid dual valve control 301, a liquified-to-gaseous fuel converter 1, and a fluid dual valve structure 300. Ex. 1006, 7:5-7, 7:27-29.

[0202]. As shown in FIG. 1 (below), the liquified-to-gaseous fuel converter and fluid dual valve structure are controlled by a fluid dual valve control 301 that selects one of the two positions, either a “gasoline” position or a “propane” position. Ex. 1006, 7:27-29, Fig. 1.



Ex. 1006, FIG. 1 (Emphasis Added).

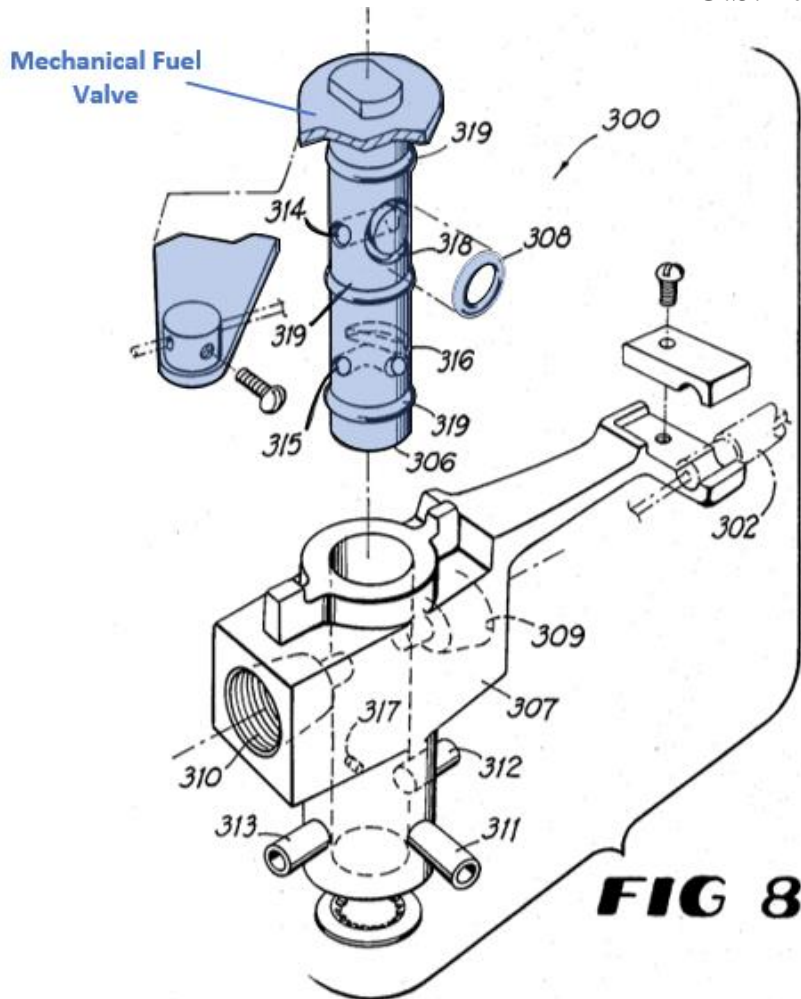
[0203]. A POSA would therefore understand that the fluid dual valve control 301, the liquified-to-gaseous fuel converter 1, and the fuel dual valve structure 300 form a mechanical fuel lockout switch.

[0204]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “a mechanical fuel lockout switch for a dual fuel engine” as recited in [1preamble].

- b. Element [1.1] “a mechanical fuel valve actuateable between a first position and a second position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line; and”**

[0205]. A POSA would understand that Hallberg discloses “*a mechanical fuel valve actuateable between a first position and a second position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line*” as recited in claim limitation [1a].

[0206]. Hallberg discloses a mechanical fuel valve as shown in FIG. 8 below (“[i]n the figures...300 is the fluid dual valve structure.” Ex. 1006, 7:5-7). Positioning of control 301 in “gasoline” mode acts through control cable 302 to rotate spool 306 within valve body 307 such that gasoline from gasoline supply line 304, supplied to the carburetor 110, locks out the flow of propane. Ex. 1006, 7:27-57.



Ex. 1006, FIG. 8 (Emphasis Added).

[0207]. As shown in FIG. 10 below, when the mechanical fuel valve is in gasoline mode, liquid inlet opening 309 and liquid outlet opening 310 communicate through tunnel 314. Ex. 1006, 7:40-7:43.

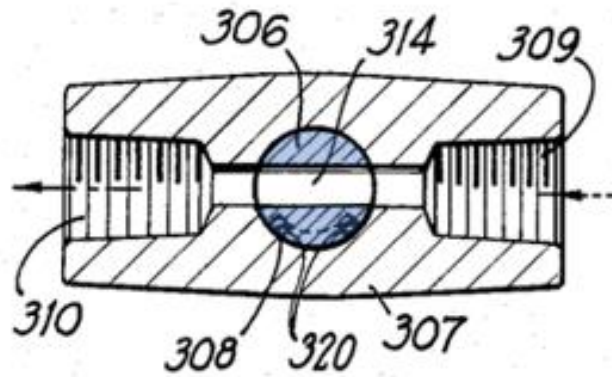


FIG 10

Ex. 1006, FIG. 10 (Emphasis Added).

[0208]. A POSA would understand that the mechanical fuel valve is actuatable to a first position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line. As shown in FIG. 10 below, when the mechanical fuel valve is in the first position (e.g. gasoline mode), the first fuel source (e.g., gasoline) is communicated to the dual fuel engine via a first fuel line (e.g. liquid inlet opening 309 and liquid outlet opening 310).

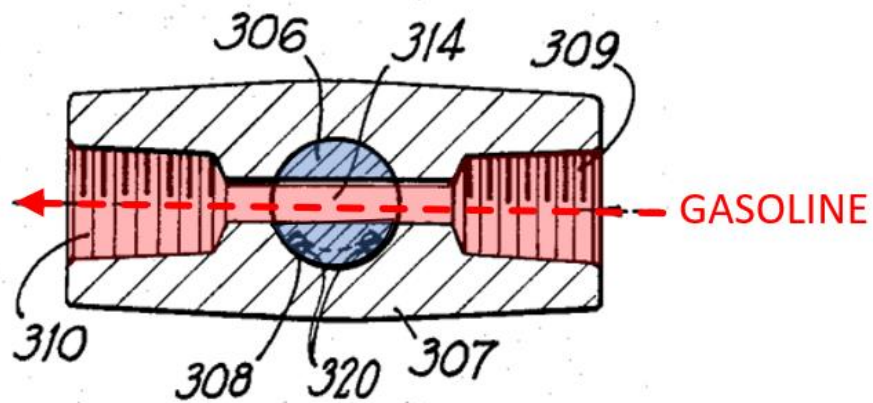


FIG 10

Ex. 1006, FIG. 10 (Emphasis Added).

[0209]. As shown in FIG. 11 (below) when “propane” mode of control 301 is selected, spool 306 is rotated within valve body 307 by control cable 302 such that O-ring 308 on the face of spool 306 forms a seal between spool 306 and valve body 307 around liquid inlet opening 309. Ex. 1006, 8:3-7. Forming a seal between the spool 306 and valve body 307, prohibits the flow of gasoline to conventional carburetor 110. Ex. 1006, 8:7-10.

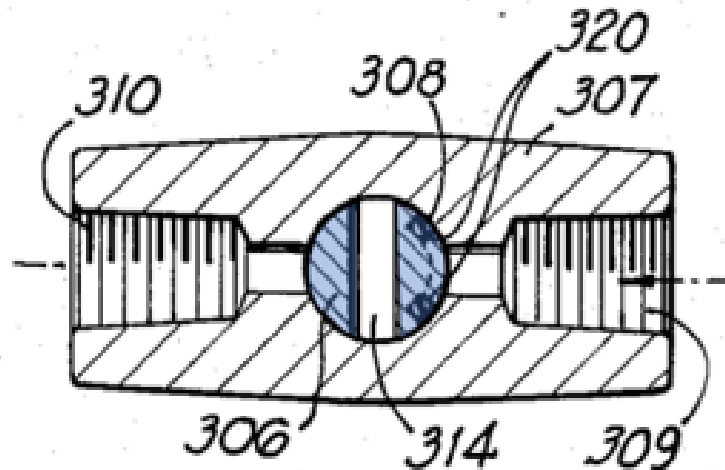


FIG 11

Ex. 1006, FIG. 11 (Emphasis Added).

[0210]. A POSA would understand that during propane mode spool 306 is rotated within valve body 307 such that gasoline is prevented from flowing through liquid outlet opening 310. As shown in FIG. 11 below, when the mechanical fuel valve is in the second position (e.g. propane mode), the first fuel

source (e.g., gasoline) is prevented from communicating to the dual fuel engine via the first fuel line (e.g. liquid inlet opening 309 and liquid outlet opening 310).

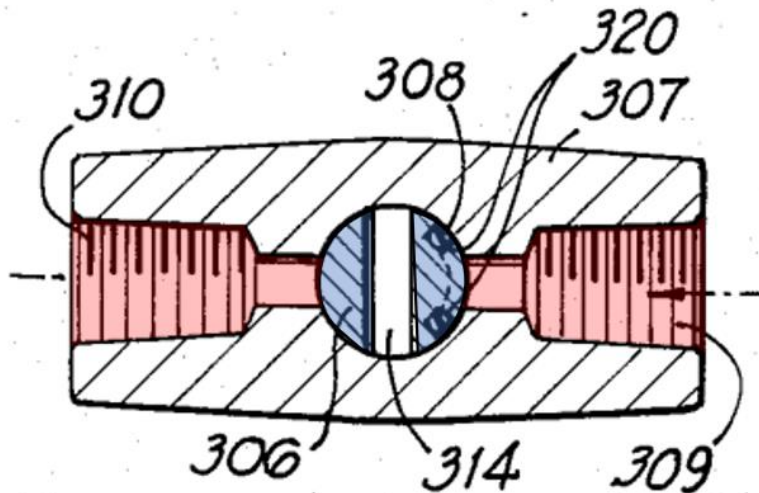
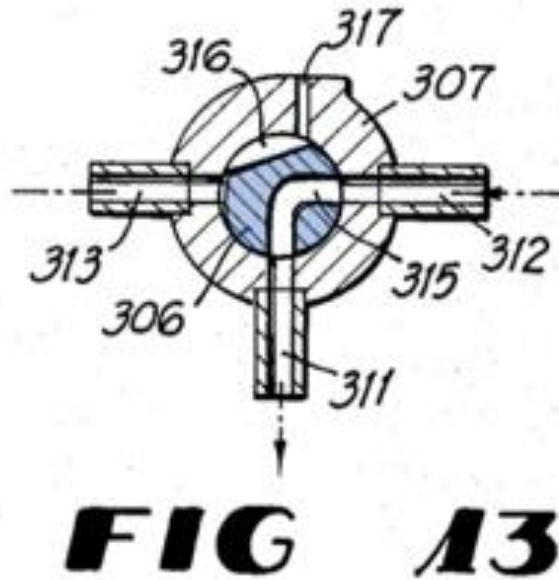


FIG 11

Ex. 1006, FIG. 11 (Emphasis Added).

[0211]. As shown in FIG. 13 (below), during “propane” mode of operation, duct 315 within spool 306 is simultaneously aligned to communicate with vacuum inlet port 311 and first vacuum outlet port 312. Ex. 1006, 8:23-26, Fig. 13. Communicating vacuum inlet port 311 with the first vacuum outlet port 312 connects converter vacuum line 30 (shown in FIG. 1) to the intake manifold, via intake manifold line 112. Ex. 1006, 8:26-30.



Ex. 1006, FIG. 13 (Emphasis Added).

[0212]. During “propane” mode operation, when the engine is started, a vacuum is created in intake manifold vacuum line 112, and vacuum line 30, urging diaphragm 10 upward against liquid inlet lever 8. Ex. 1006, 8:31-38, FIG. 1.

Actuating inlet lever 8 drives inlet valve shaft 41 against bias spring 3 which opens liquid inlet valve 2 allowing liquified gaseous fuel (propane) to flow through the propane fuel line to the engine. Ex. 1006, 8:38-42, FIG. 1. Figure 1 of Hallberg is reproduced below.

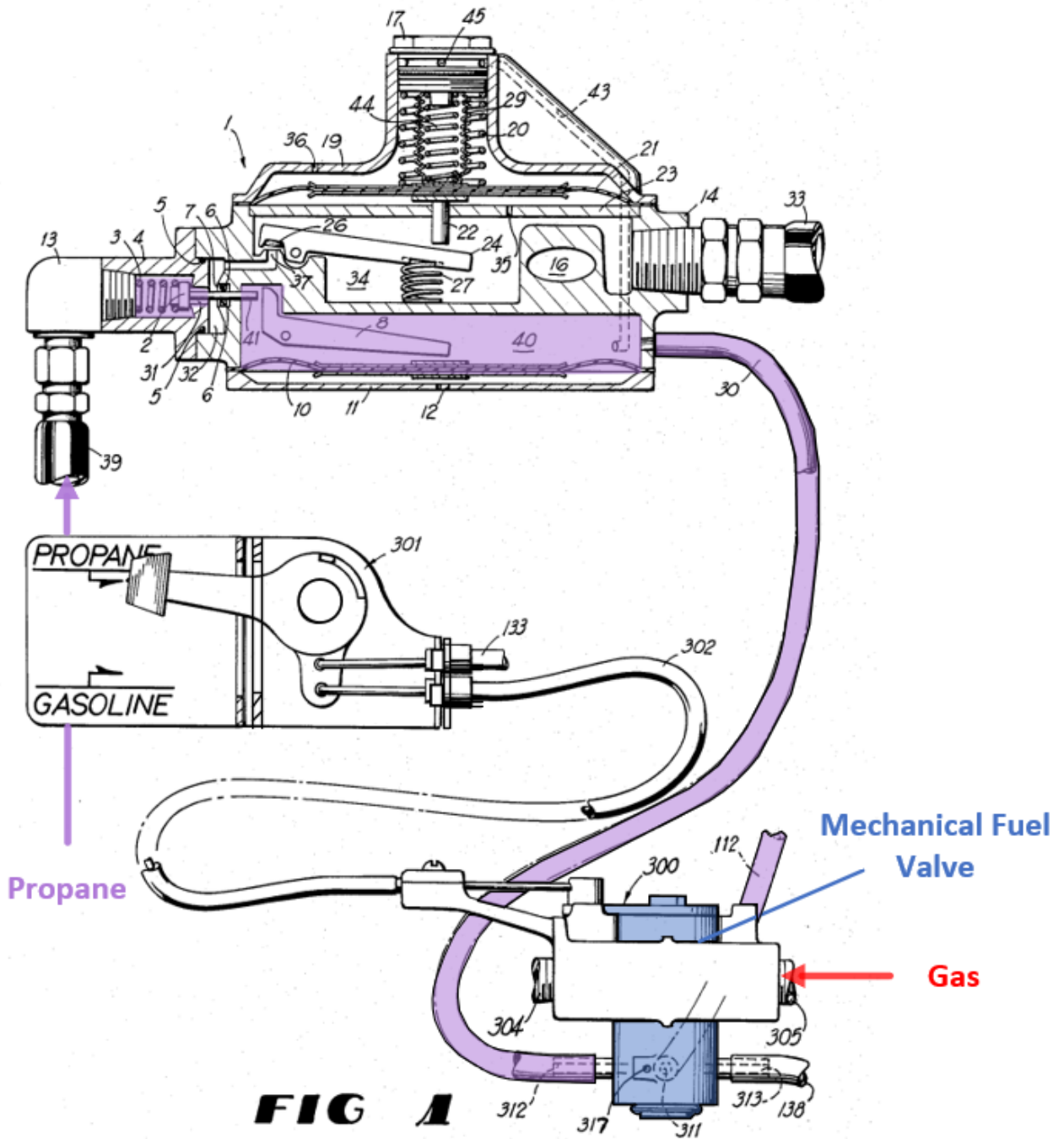


FIG 1

Ex. 1006, FIG. 1 (Emphasis Added).

[0213]. A POSA would understand that actuating the mechanical fuel valve to a second position (e.g., propane) selectively controls the flow of fuel to the

dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line.

[0214]. A POSA would therefore understand that the mechanical fuel valve is actuateable between a first position (e.g., gasoline) and a second position (e.g., propane) to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line.

[0215]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “*a mechanical fuel valve actuateable between a first position and a second position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line*” as recited in limitation [1a].

c. Element [1.2] “a fuel lockout apparatus coupled to the mechanical fuel valve;”

[0216]. A POSA would also understand that Hallberg discloses “*a fuel lockout apparatus coupled to the mechanical fuel valve*” as recited in claim limitation [1b].

[0217]. As discussed in §§VI.A, VI.B, *supra*, a POSA would understand that the plain and ordinary meaning of the composite term “fuel lockout

apparatus” is a “set of...equipment designed” for “preventing the flow of fuel” and the plain and ordinary meaning of “coupled” is “to attach.”

[0218]. In looking to the fuel lockout apparatus and mechanical fuel valve, it is my opinion that a POSA would understand that Hallberg discloses both. A POSA would understand that Hallberg discloses a mechanical fuel valve. *Supra*, §VII.B.1.b. A POSA would also understand that Hallberg discloses a fuel lockout apparatus coupled to the mechanical fuel valve (fluid dual valve structure 300), the fuel lockout apparatus being configured to perform the function described in limitation [1d] of claim 1 (discussed hereinafter in §VII.B.1.e).

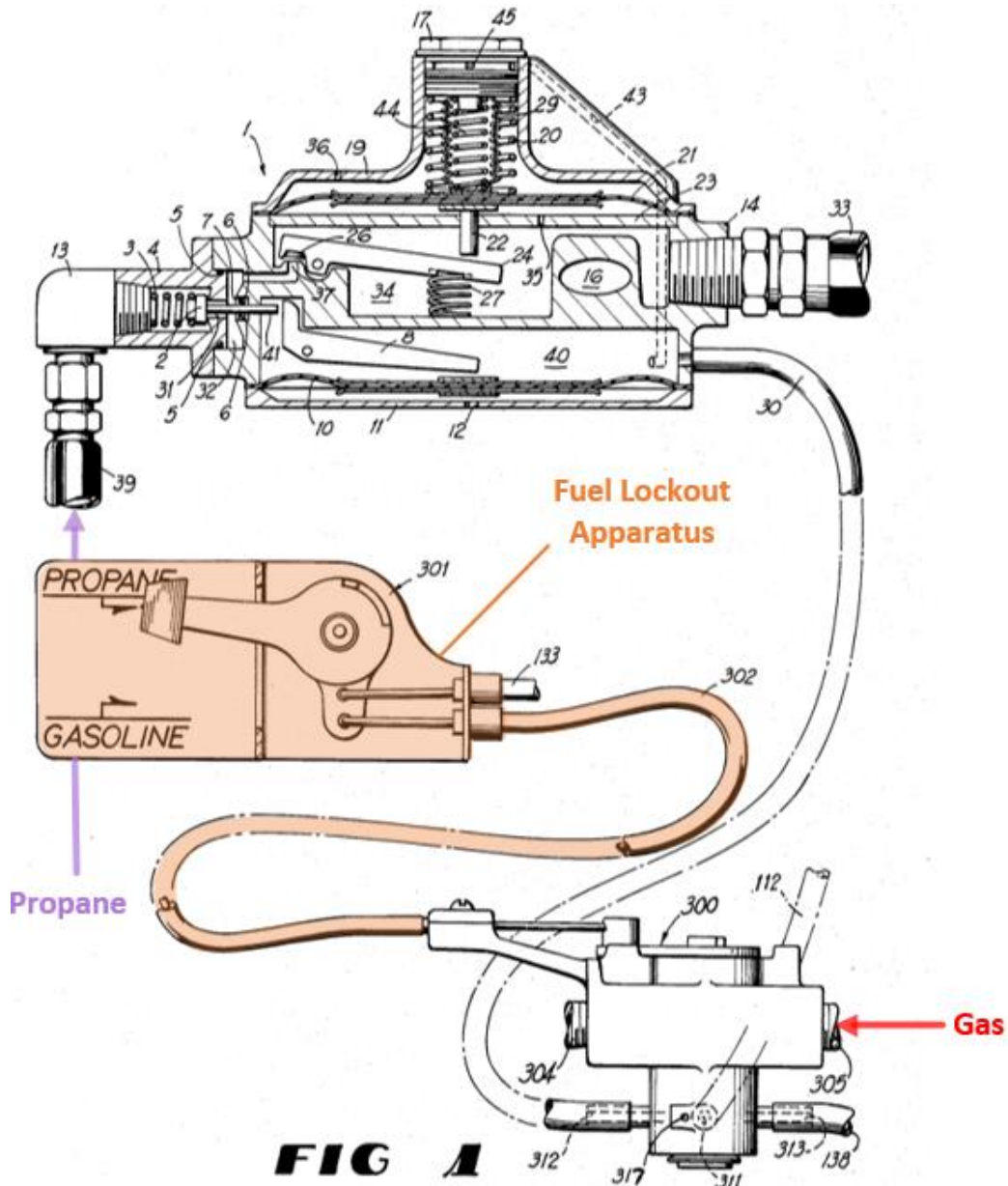
[0219]. First, Hallberg discloses a fuel lockout apparatus comprising fluid dual value control 301 and control cable 302. Ex. 1006, 7:27-44. As shown in FIG. 1 (below), the fuel lockout apparatus comprising fluid dual value control 301 and control cable 302 is coupled to fluid dual valve structure 300. Ex. 1006, 7:28-36 and 8:3-9.

[0220]. Positioning control 301 in the “gasoline” mode acts through control cable 302 to permit gasoline to flow through fluid dual valve structure 300, and to lock out propane from flowing through fluid dual valve structure 300. §VII.B.1.b, *supra*.

[0221]. Positioning control 301 in the “propane” mode acts through control cable 302 to permit propane to flow from propane supply port 39 to the

mixer 100, and to lock out gasoline from flowing through fluid dual valve structure

300. §VII.B.1.b, *supra*.



Ex. 1006, FIG. 1 (Emphasis Added).

[0222]. A POSA would understand that the components of the fuel lockout apparatus (fluid dual valve control 301 and control cable 302) can be

actuated and/or engaged to allow propane to flow through propane supply line 39 to the internal combustion engine. If the components of the fuel lockout apparatus are not actuated and/or engaged, propane is not supplied to the dual fuel generator.

[0223]. Hallberg also discloses that the fuel lockout apparatus is coupled to the mechanical fuel valve. A POSA would have understood “coupled” to mean “attached.” Supra, §VII.B. As shown in FIG. 1 (below), control cable 302 couples the fuel lockout apparatus comprising fluid dual valve control 301 and control cable 302 to the mechanical fuel valve. Without control cable 302, the fluid dual valve control 301 would be unable to rotate spool 306 within the valve body 307. Ex.1006, 7:30-33.

[0224]. Accordingly, a POSA would have understood that Hallberg teaches a fuel lockout apparatus coupled to the mechanical fuel valve as recited in element [1.2].

- d. **Element [1.3] “wherein the mechanical fuel lockout switch: communicates the first fuel source to the dual fuel engine and prevents communication between the second fuel source and the dual fuel engine when the mechanical fuel valve is in the first position, and communicates the second fuel source to the dual fuel engine and interrupts the first fuel source communication with the dual fuel engine when in the second position; and”**

[0225]. It is my opinion that a POSA would understand that Hallberg discloses “*wherein the mechanical fuel lockout switch: communicates the first fuel*

source to the dual fuel engine and prevents communication between the second fuel source and the dual fuel engine when the mechanical fuel valve is in the first position, and communicates the second fuel source to the dual fuel engine and interrupts the first fuel source communication with the dual fuel engine when in the second position” as recited in claim limitation [1c].

[0226]. Hallberg discloses that when gasoline is selected on the fluid dual valve control 301, spool 306, within valve body 307, is rotated such that gasoline from gasoline supply line 304 is supplied to the carburetor 110 through engine gasoline line 305. Ex. 1006, 7:27-44.

[0227]. As shown in FIG. 10 below, when gasoline is selected, gasoline is communicated through inlet opening 309, tunnel 314 and liquid outlet opening 310.

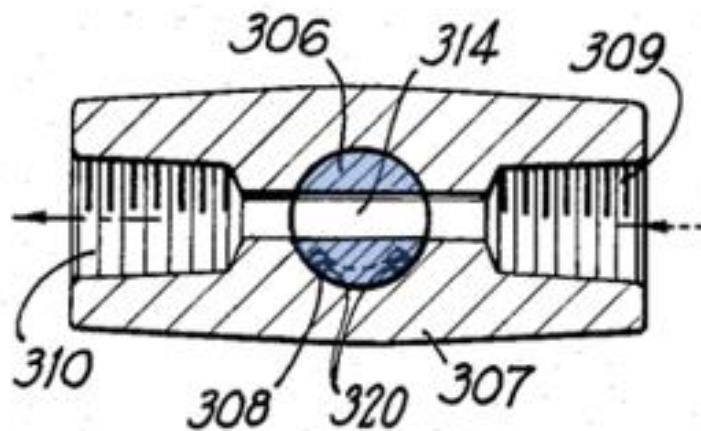


FIG 10

Ex. 1006, FIG. 10 (Emphasis Added).

[0228]. During gasoline mode, the fuel lockout apparatus prevents the flow of propane to the internal combustion engine. *Supra*, §VII.B.1.c. It is my understanding that when the mechanical fuel valve is in the first position (gasoline mode), the mechanical fuel lockout switch communicates the first fuel (gasoline) source to the dual fuel engine and prevents communication between the second fuel (propane) source and the dual fuel engine.

[0229]. When propane mode is selected on the fluid dual valve control 301, propane is provided to the dual fuel engine. Ex. 1006, 8:3-57. As described in §§VII.B.1.b, VII.B.1.c, *supra*, when propane mode is selected, spool 306 is rotated within valve body 307 to form a seal to prevent the flow of gasoline to the engine and a vacuum is created in line 30, urging diaphragm 10 upward against liquid inlet lever 8 which drives fuel inlet valve shaft 41 against bias spring 3 which opens liquid inlet valve 2 allowing propane to flow through the propane fuel line to the engine.

[0230]. A POSA would therefore understand that when the mechanical fuel valve is in a second position (propane mode), the mechanical fuel lockout switch communicates the second fuel (propane) source to the dual fuel engine and interrupts the first fuel (gasoline) source communication with the dual fuel engine.

[0231]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “*wherein the mechanical fuel lockout switch: communicates the first fuel source to the dual fuel engine and prevents communication between the second fuel source and the dual fuel engine when the mechanical fuel valve is in the first position, and communicates the second fuel source to the dual fuel engine and interrupts the first fuel source communication with the dual fuel engine when in the second position*” as recited in claim limitation [1c].

- e. **Element [1.4] “wherein the fuel lockout apparatus is configured to: prevent the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position; and permit the second fuel source to couple to the second fuel line while the mechanical fuel valve is in the second position.”**

[0232]. It is my opinion that a POSA would understand that Hallberg discloses “*wherein the fuel lockout apparatus is configured to: prevent the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position; and permit the second fuel source to couple to the second fuel line while the mechanical fuel valve is in the second position*” as recited in claim limitation [1d].

[0233]. A POSA would understand that Hallberg discloses a structure, that teaches a fuel lockout apparatus. *Supra*, §VII.B.1.c. First, Hallberg discloses

a fuel lockout apparatus comprising fluid dual valve control 301 and control cable

302. *Supra*, §VII.B.1.c.

[0234]. The fluid dual valve control 301 and control cable 302 can be actuated and/or engaged to allow either gasoline or propane to flow to the internal combustion engine. *Supra*, §VII.B.1.c. Positioning control 301 in gasoline mode, acts through control cable 302, to rotate spool 306 within valve body 307 to permit gasoline (e.g., a first fuel) to flow through fluid dual valve structure 300 (e.g., a mechanical fuel valve) and lock out propane (e.g., a second fuel) from flowing through fluid dual valve structure 300. *Supra*, §VII.B.1.b.

[0235]. A POSA would understand that the fluid dual valve control 301 and control cable 302 is therefore a fuel lockout apparatus configured to prevent a second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position.

[0236]. Positioning control 301 in propane mode, acts through control cable 302, to rotate spool 306 within valve body 307, to create a vacuum in line 30, which opens liquid inlet valve 2, allowing propane to flow through the propane fuel line to the engine. Ex. 1006, 8:38-42.

[0237]. It is my opinion that a POSA would understand that the fuel lockout apparatus is therefore configured to permit the second fuel source to

couple to the second fuel line while the mechanical fuel valve is in the second position.

[0238]. As discussed in §§VII.B.1.b, VII.B.1.c, VII.B.1.d, *supra*, when propane mode is selected (and mechanical fuel valve is in second position) a vacuum is created in line 30, urging diaphragm 10 upward against liquid inlet lever 8, which drives fuel inlet valve shaft 41 against bias spring 3, which opens liquid inlet valve 2 allowing propane to flow through the propane fuel line to the engine. Ex. 1006, 8:38-57.

[0239]. A POSA would understand that when the mechanical fuel valve is in the second position, the second fuel source is coupled to the second fuel line.

[0240]. A POSA would therefore understand that the lock-out of the fuel lockout apparatus of Hallberg prevents the mechanical fuel valve from coupling the second fuel source when the mechanical fuel valve is in the first position and permits the second fuel source to couple with the second fuel line when the mechanical fuel valve is in the second position.

[0241]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “*wherein the fuel lockout apparatus is configured to: prevent the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position; and permit the second fuel source to couple to the*

second fuel line while the mechanical fuel valve is in the second position” as

recited in claim limitation [1d].

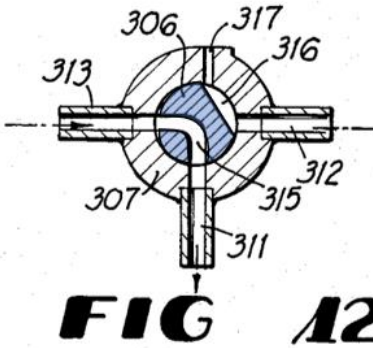
2. **Claim 2: “The mechanical fuel lockout switch for a dual fuel engine of claim 1, wherein the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine.”**

[0242]. It is my opinion that a POSA would understand that Hallberg discloses “*wherein the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine*” as recited in claim 2.

[0243]. As described in §VII.B.1.e, *supra*, a POSA would understand that operation of the mechanical fuel valve and the fuel lockout apparatus is interconnected such that only one fuel can be communicated to the engine at one time.

[0244]. As shown in FIG. 12, positioning of control 301 in the “gasoline” mode acts through control cable 302 to rotate spool 306 within valve body 307 such that converter vacuum line 30 (communicating with first vacuum outlet port 312) is open to the atmosphere through notch 316 between first vacuum outlet port 312 and vent 317. Ex. 1006, 7:30-38.

[0245]. In this configuration, no vacuum is provided to vacuum line 30.



Ex. 1006, FIG. 12 (Emphasis Added).

[0246]. As described in §§VII.B.1.b, VII.B.1.c, *supra*, when propane mode is engaged, spool 306 is rotated within valve body 307 to form a seal between spool 306 and valve body 307.

[0247]. When the spool 306 is rotated, vacuum inlet port 311 and vacuum outlet port 312 are aligned to provide vacuum, via vacuum line 30, to the fuel lockout apparatus to open liquid inlet valve 2. *Supra*, §§VII.B.1.b, VII.B.1.c.

[0248]. It is my understanding that when propane is communicated to the engine and vacuum is provided to the fuel lockout apparatus via vacuum line 30, the rotatable spool cannot be in a gasoline position as it is well known in the art that when a valve is in a first position, it cannot be in a second position.

[0249]. A POSA would therefore understand that the fuel lockout apparatus therefore prevents actuation of the mechanical fuel valve to a first position (i.e., gasoline) when propane is communicated to the dual fuel engine.

[0250]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches and/or suggests “*wherein the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine*” as recited in claim 2.

3. **Claim 6 “The mechanical fuel lockout switch for a dual fuel engine of claim 1, wherein the mechanical fuel valve and the fuel lockout apparatus operate together to ensure that fuel from the first fuel source and fuel from the second fuel source are not simultaneously delivered to the dual fuel engine.”**

[0251]. It is my opinion that a POSA would understand that Hallberg discloses “*wherein the mechanical fuel valve and the fuel lockout apparatus operate together to ensure that fuel from the first fuel source and fuel from the second fuel source are not simultaneously delivered to the dual fuel engine*” as recited in claim 6.

[0252]. “Operate” in its plain and ordinary meaning, is defined as “to (cause to) work.” Ex. 1009, pp.12-18. “Together” in its plain and ordinary meaning, is defined as “with each other.” Ex. 1009, pp.19-24. Accordingly, it is my understanding that the plain and ordinary meaning of “operating together” is “to cause to work with each other.”

[0253]. Hallberg discloses a mechanical fuel valve actuateable between a first position and a second position to selectively control fuel flow to the dual fuel engine from a first fuel source and a second fuel source. *Supra*, §VII.B.1.b.

[0254]. Hallberg also discloses a fuel lockout apparatus configured to prevent the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position and permit the second fuel source to couple to the second fuel line while the mechanical fuel valve is in the second position. *Supra*, §VII.B.1.e.

[0255]. The fuel lockout apparatus also prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine. *Supra*, §VII.A.2.

[0256]. A POSA would therefore understand that the mechanical fuel valve and fuel lockout apparatus “function with each other” to ensure that the first fuel and the second fuel are not simultaneously delivered to the dual fuel engine.

[0257]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “*wherein the mechanical fuel valve and the fuel lockout apparatus operate together to ensure that fuel from the first fuel source and fuel from the second fuel source are not simultaneously delivered to the dual fuel engine*” as recited in claim 6.

4. **Claim 7 “The mechanical fuel lockout switch for a dual fuel engine of claim 6, wherein the first fuel source provides liquid fuel from a liquid fuel tank to the dual fuel engine and the second fuel source provides gaseous fuel from a pressurized fuel container to the dual fuel engine.”**

[0258]. It is my opinion that a POSA would understand that Hallberg discloses “*wherein the first fuel source provides liquid fuel from a liquid fuel tank to the dual fuel engine and the second fuel source provides gaseous fuel from a pressurized fuel container to the dual fuel engine*” as recited in claim 7.

[0259]. Hallberg discloses that gasoline is provided to the dual fuel engine by way of the carburetor (e.g. “gasoline from gasoline supply line 304 is supplied to the carburetor 110 through engine gasoline line 305.” Ex. 1006, 7:36-43).

[0260]. Propane is supplied to the dual fuel engine by way of the mixer (“the mixer 100 admits pressurized gaseous fuel to the engine.” Ex. 1006, 8:56-60). The propane is stored in a pressurized fuel tank (“[l]iquidified petroleum gas, propane and the other “gaseous” fuels with which the present invention is intended to be used are normally held for use in a reservoir or tank under sufficient pressure and at a temperature such that the fuels are in a liquid state.” Ex. 1006, 1:54-58).

[0261]. A POSA would therefore understand that the first fuel source provides liquid fuel from a liquid fuel tank to the dual fuel engine and the second fuel source provides gaseous fuel from a pressurized fuel container to the dual fuel engine.

[0262]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “*wherein the first fuel source provides liquid fuel from a*

liquid fuel tank to the dual fuel engine and the second fuel source provides gaseous fuel from a pressurized fuel container to the dual fuel engine” as recited in claim 7.

5. Independent claim 15

a. Element [15.0]: “A mechanical fuel lockout switch for a dual fuel engine comprising:”

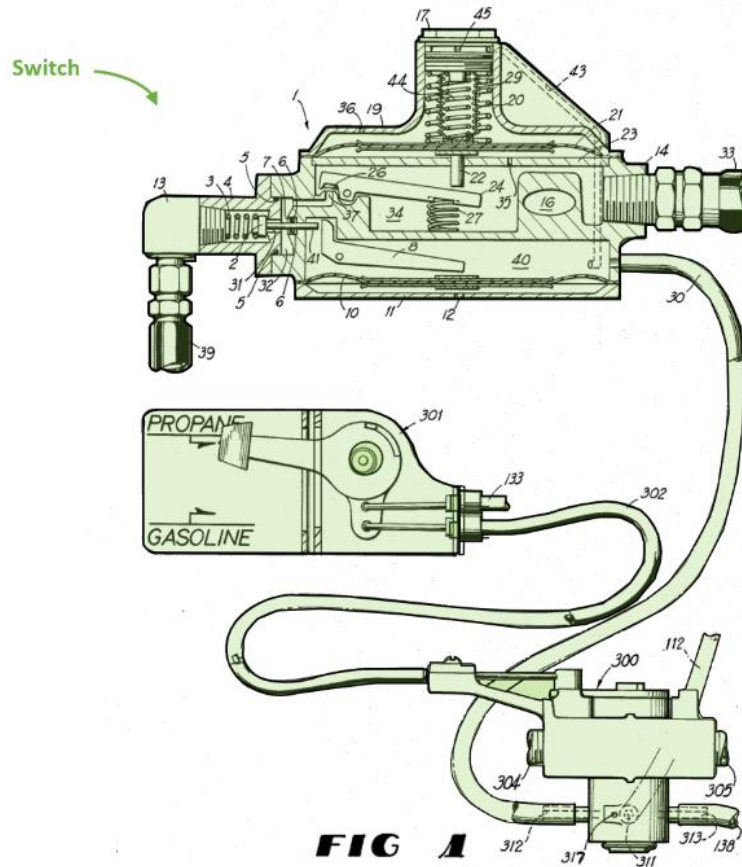
[0263]. It is my opinion that to the extent the preamble is limiting, a POSA would understand that Hallberg discloses “*A mechanical fuel lockout switch for a dual fuel engine.*”

[0264]. Claim limitation [15preamble] contains similar language to that of [1preamble]. My opinion that a POSA would understand that Hallberg discloses claim limitation [15preamble] is thus similar to that of claim limitation [1preamble].

[0265]. Hallberg discloses a system which may be used with conventional internal combustion engines...to permit alternative utilization of a liquified gas fuel...such as propane...and a liquid fuel...such as gasoline. Ex. 1006, 3:49-55.

[0266]. The system includes a mechanical fuel lockout switch comprising a fluid dual valve control 301, a liquified-to-gaseous fuel converter 1, and a fluid dual valve structure 300. Ex. 1006, 7:5-7, 7:27-29.

[0267]. As shown in FIG. 1 (below), the liquified-to-gaseous fuel converter and fluid dual valve structure are controlled by a fluid dual valve control 301 that selects one of the two positions, either “gasoline” or “propane” position. Ex. 1006, 7:27-29, Fig. 1.



Ex. 1006, FIG. 1 (Emphasis Added).

[0268]. A POSA would therefore understand that the fluid dual valve control 301, the liquified-to-gaseous fuel converter 1, and the fuel dual valve structure 300 form a mechanical fuel lockout switch. Accordingly, it is my opinion

that a POSA would understand that Hallberg teaches a mechanical fuel lockout switch for a dual fuel engine.

[0269]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “*a mechanical fuel lockout switch for a dual fuel engine*” as recited in [1 preamble].

- b. Element [15.1] a mechanical fuel valve actuateable between a first position and a second position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line; and**

[0270]. It is my opinion that to the extent the preamble is limiting, a POSA would understand that Hallberg discloses: “*a mechanical fuel valve actuateable between a first position and a second position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line*” as recited in claim limitation [15a].

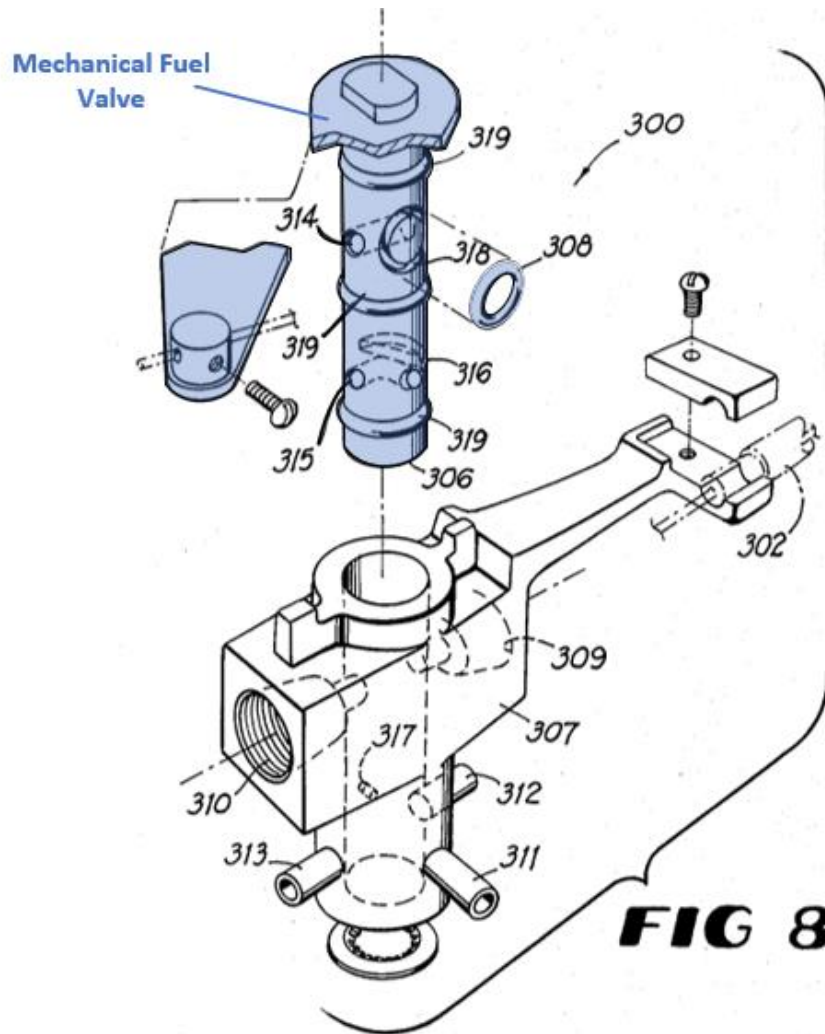
[0271]. Claim limitation [15a] contains similar language to that of [1a]. My opinion that a POSA would understand that Hallberg discloses claim limitation [15a] is thus similar to that of claim limitation [1a].

[0272]. Hallberg discloses a mechanical fuel valve as shown in FIG. 8 below (“[i]n the figures...300 is the fluid dual valve structure.” Ex. 1006, 7:5-7). Positioning of control 301 in “gasoline” mode acts through control cable 302 to

rotate spool 306 within valve body 307 such that gasoline from gasoline supply

line 304, supplied to the carburetor 110, locks out the flow of propane. Ex. 1006,

7:27-57.



Ex. 1006, FIG. 8 (Emphasis Added).

[0273]. As shown in FIG. 10 below, when the mechanical fuel valve is in gasoline mode, liquid inlet opening 309 and liquid outlet opening 310 communicate through tunnel 314. Ex. 1006, 7:40-7:43.

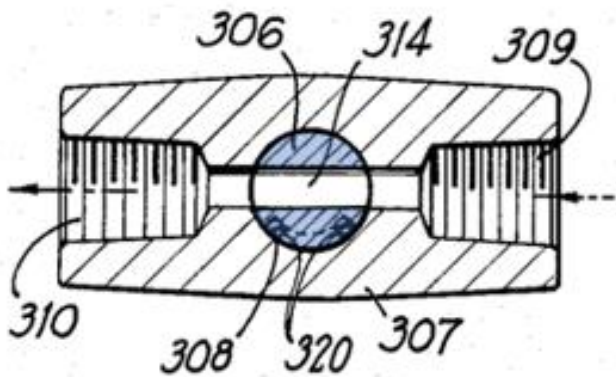


FIG 10

Ex. 1006, FIG. 10 (Emphasis Added).

[0274]. A POSA would understand that the mechanical fuel valve is actuatable to a first position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line. As shown in FIG. 10 below, when the mechanical fuel valve is in the first position (e.g. gasoline mode), the first fuel source (e.g., gasoline) is communicated to the dual fuel engine via a first fuel line (e.g. liquid inlet opening 309 and liquid outlet opening 310).

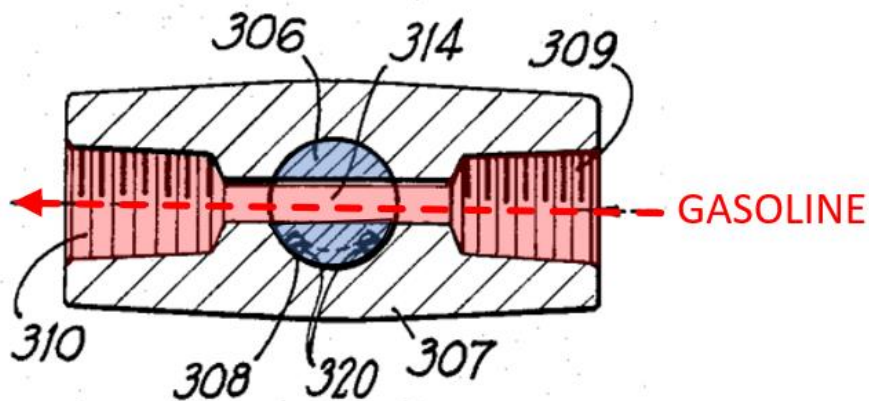


FIG 10

Ex. 1006, FIG. 10 (Emphasis Added).

[0275]. As shown in FIG. 11 (below) when “propane” mode of control 301 is selected, spool 306 is rotated within valve body 307 by control cable 302 such that O-ring 308 on the face of spool 306 forms a seal between spool 306 and valve body 307 around liquid inlet opening 309. Ex. 1006, 8:3-7. Forming a seal between the spool 306 and valve body 307, prohibits the flow of gasoline to conventional carburetor 110. Ex. 1006, 8:7-10.

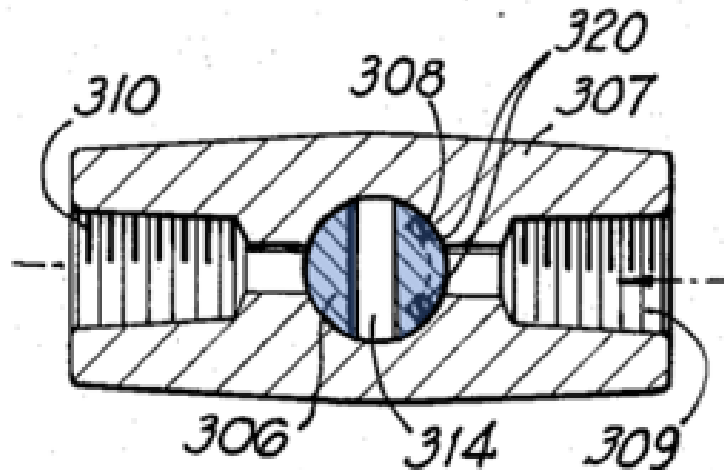


FIG 11

Ex. 1006, FIG. 11 (Emphasis Added).

[0276]. A POSA would understand that during propane mode spool 306 is rotated within valve body 307 such that gasoline is prevented from flowing through liquid outlet opening 310. As shown in FIG. 11 below, when the mechanical fuel valve is in the second position (e.g. propane mode), the first fuel

source (e.g., gasoline) is prevented from communicating to the dual fuel engine via the first fuel line (e.g. liquid inlet opening 309 and liquid outlet opening 310).

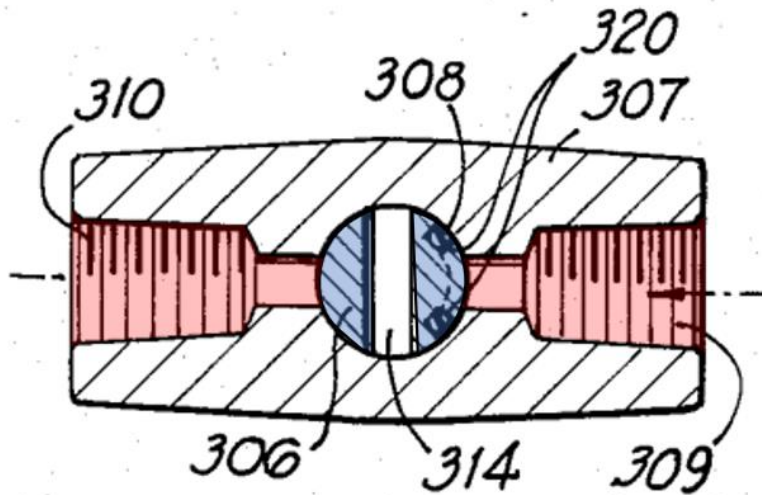
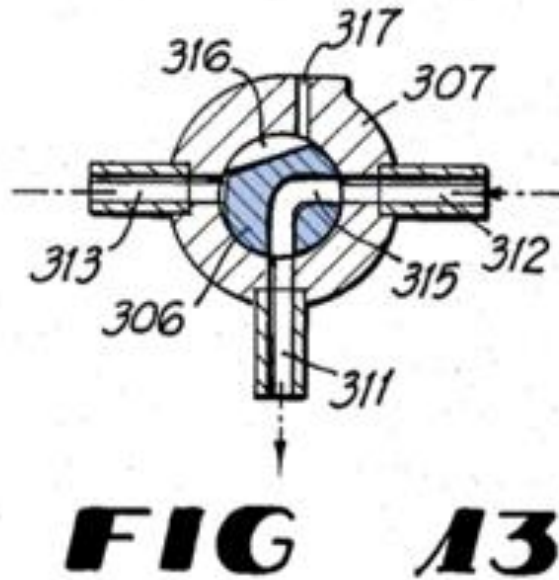


FIG 11

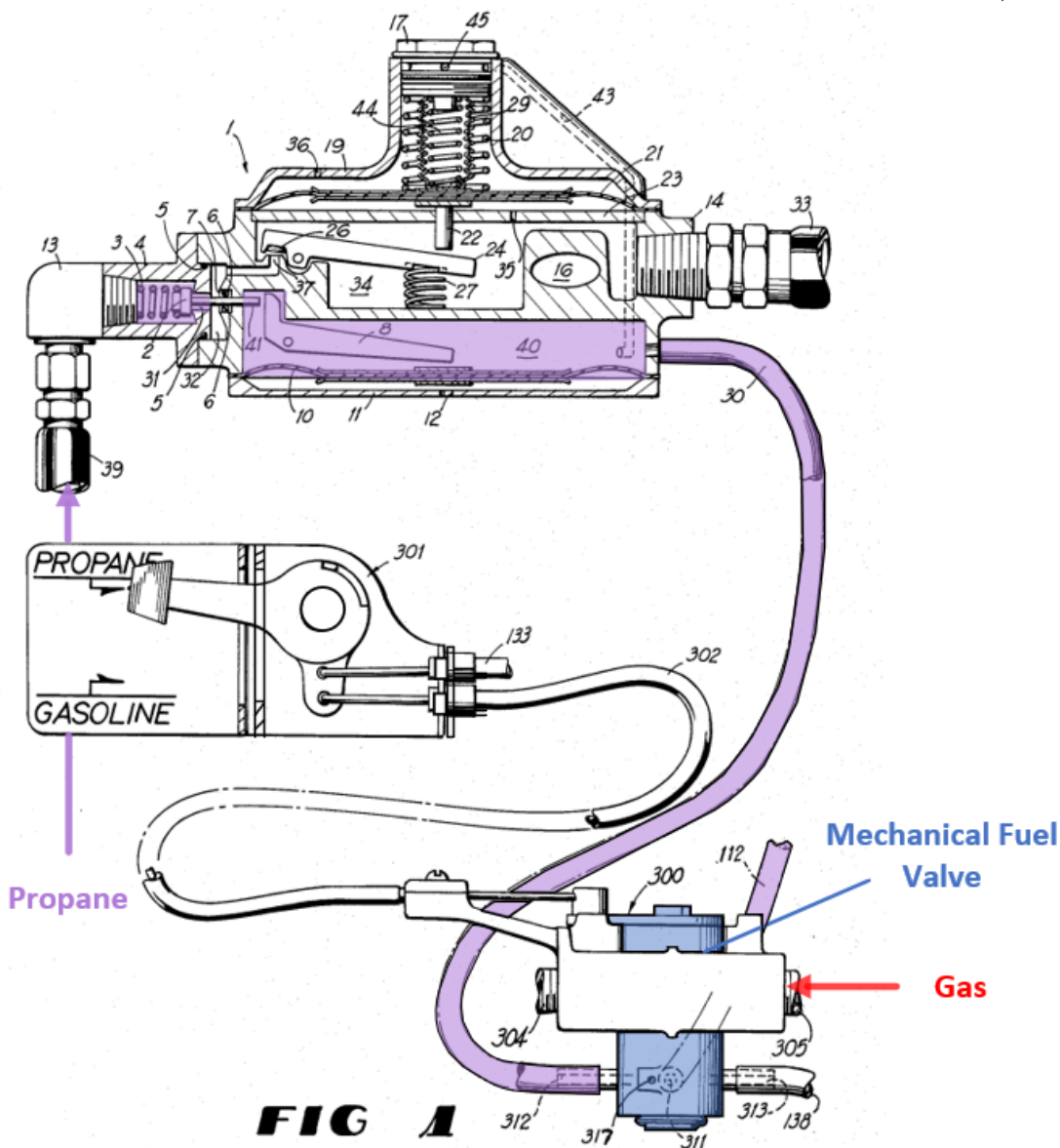
Ex. 1006, FIG. 11 (Emphasis Added).

[0277]. As shown in FIG. 13 (below), during “propane” mode of operation, duct 315 within spool 306 is simultaneously aligned to communicate with vacuum inlet port 311 and first vacuum outlet port 312. Ex. 1006, 8:23-26, Fig. 13. Communicating vacuum inlet port 311 with the first vacuum outlet port 312 connects converter vacuum line 30 (shown in FIG. 1) to the intake manifold, via intake manifold line 112. Ex. 1006, 8:26-30.



Ex. 1006, FIG. 13 (Emphasis Added).

[0278]. During “propane” mode operation, when the engine is started, a vacuum is created in intake manifold vacuum line 112, and vacuum line 30, urging diaphragm 10 upward against liquid inlet lever 8. Ex. 1006, 8:31-38, FIG. 1. Actuating inlet lever 8 drives inlet valve shaft 41 against bias spring 3 which opens liquid inlet valve 2 allowing liquified gaseous fuel (propane) to flow through the propane fuel line to the engine. Ex. 1006, 8:38-42, FIG. 1. Figure 1 of Hallberg is reproduced below.



Ex. 1006, FIG. 1 (Emphasis Added).

[0279]. A POSA would understand that actuating the mechanical fuel valve to a second position (e.g., propane) selectively controls the flow of fuel to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line.

[0280]. A POSA would therefore understand that the mechanical fuel valve is actuateable between a first position (e.g., gasoline) and a second position (e.g., propane) to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line.

[0281]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “*a mechanical fuel valve actuateable between a first position and a second position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line*” as recited in claim limitation [15a].

c. Element [15.2] a fuel lockout apparatus coupled to the mechanical fuel valve;

[0282]. It is my opinion that a POSA would understand that Hallberg discloses “*a fuel lockout apparatus coupled to the mechanical fuel valve*” as recited in claim limitation [15b].

[0283]. Claim limitation [15b] contains similar language to that of [1b]. My opinion that a POSA would understand that Hallberg discloses claim limitation [15b] is thus similar to that of claim limitation [1b].

[0284]. It is my understanding that an “apparatus,” in its plain and ordinary meaning, is a “set of...equipment designed for a particular use.” *Supra*,

§VI.A.1.c.i.i-1. Accordingly, it is my opinion that a POSA would understand that a fuel lockout apparatus includes at least two elements that together are designed for a particular use.

[0285]. It is also my understanding that the plain and ordinary meaning of the adjective “fuel lockout” is “preventing the flow of fuel.” Therefore, it is my opinion that a POSA would understand that the plain and ordinary meaning of the composite term “fuel lockout apparatus” is a “set of...equipment designed” for “preventing the flow of fuel.”

[0286]. It is also my understanding that the plain and ordinary meaning of “coupled” is “to join or combine.” *Supra*, §VI.B. Accordingly, it is my opinion that in the dual fuel engine mechanical fuel lockout switch art, a POSA would understand that the term “coupled,” without further limitation in the specification or claims, would include “mechanically coupled,” “fluidly coupled,” or “hydraulically coupled.”

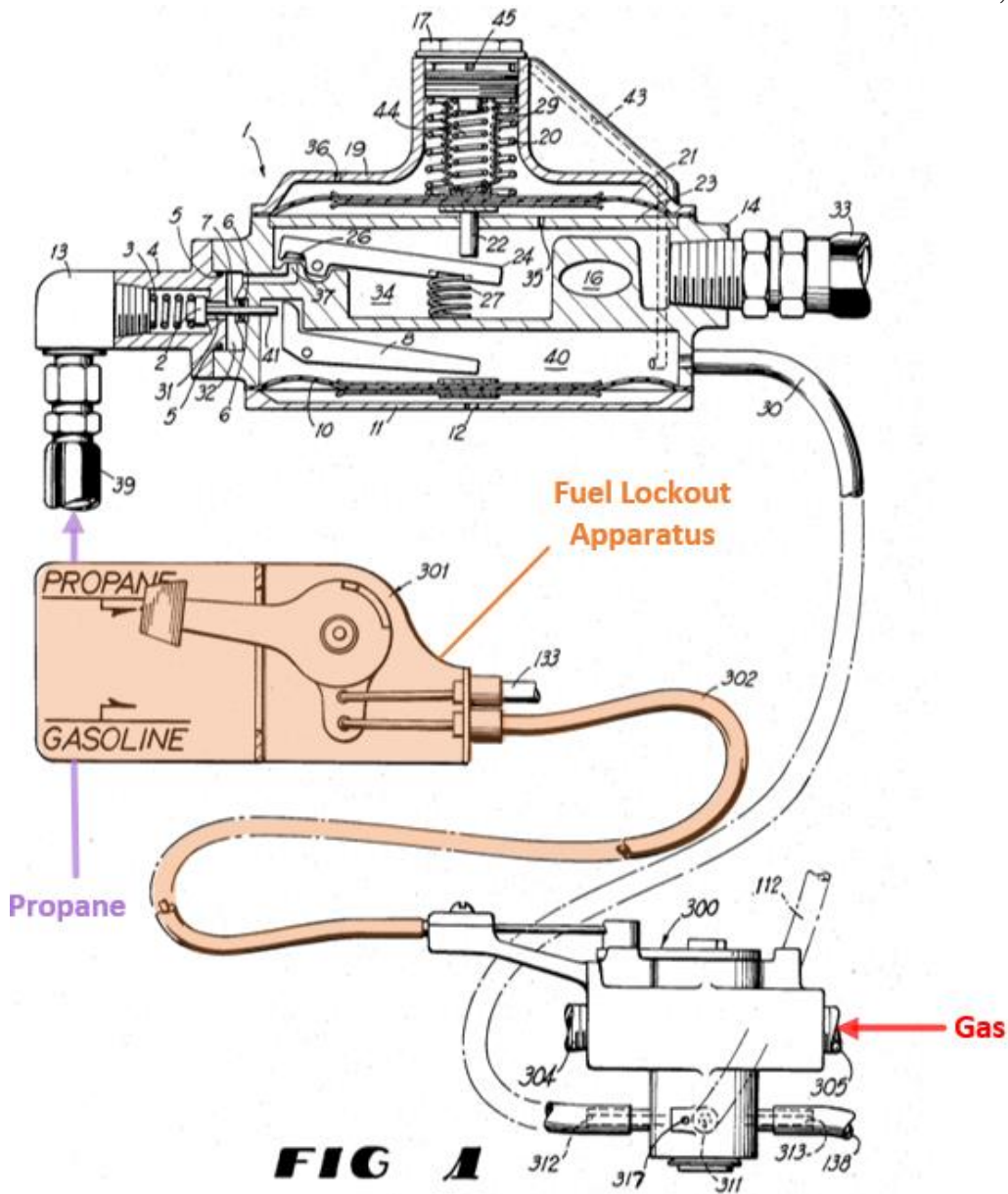
[0287]. A POSA would also understand that Hallberg discloses a mechanical fuel valve. *Supra*, §VII.B.1.b. A POSA would also understand that Hallberg also discloses a structure that teaches a fuel lockout apparatus coupled to the mechanical fuel valve (fluid dual valve structure 300), the fuel lockout apparatus being configured to perform the function described in [15d] of claim 15 (discussed hereinafter in §VII.B.5.d).

[0288]. Hallberg discloses a fuel lockout apparatus comprising fluid dual value control 301 and control cable 302. Ex. 1006, 7:27-44. As shown in FIG. 1 (below), the fuel lockout apparatus comprising fluid dual value control 301 and control cable 302 is coupled to fluid dual valve structure 300. Ex. 1006, 7: 28-36 and 8:3-9.

[0289]. Positioning control 301 in the “gasoline” mode acts through control cable 302 to permit gasoline to flow through fluid dual valve structure 300, and to lock out propane from flowing through fluid dual valve structure 300.

§VII.B.1.b, *supra*.

[0290]. Positioning control 301 in the “propane” mode acts through control cable 302 to permit propane to flow from propane supply port 39 to the mixer 100, and to lock out gasoline from flowing through fluid dual valve structure 300. §VII.B.1.b, *supra*.



Ex. 1006, FIG. 1 (Emphasis Added).

[0291]. A POSA would understand that the components of the fuel lockout apparatus (fluid dual valve control 301 and control cable 302) can be actuated and/or engaged to allow propane to flow through propane supply line 39 to the internal combustion engine.

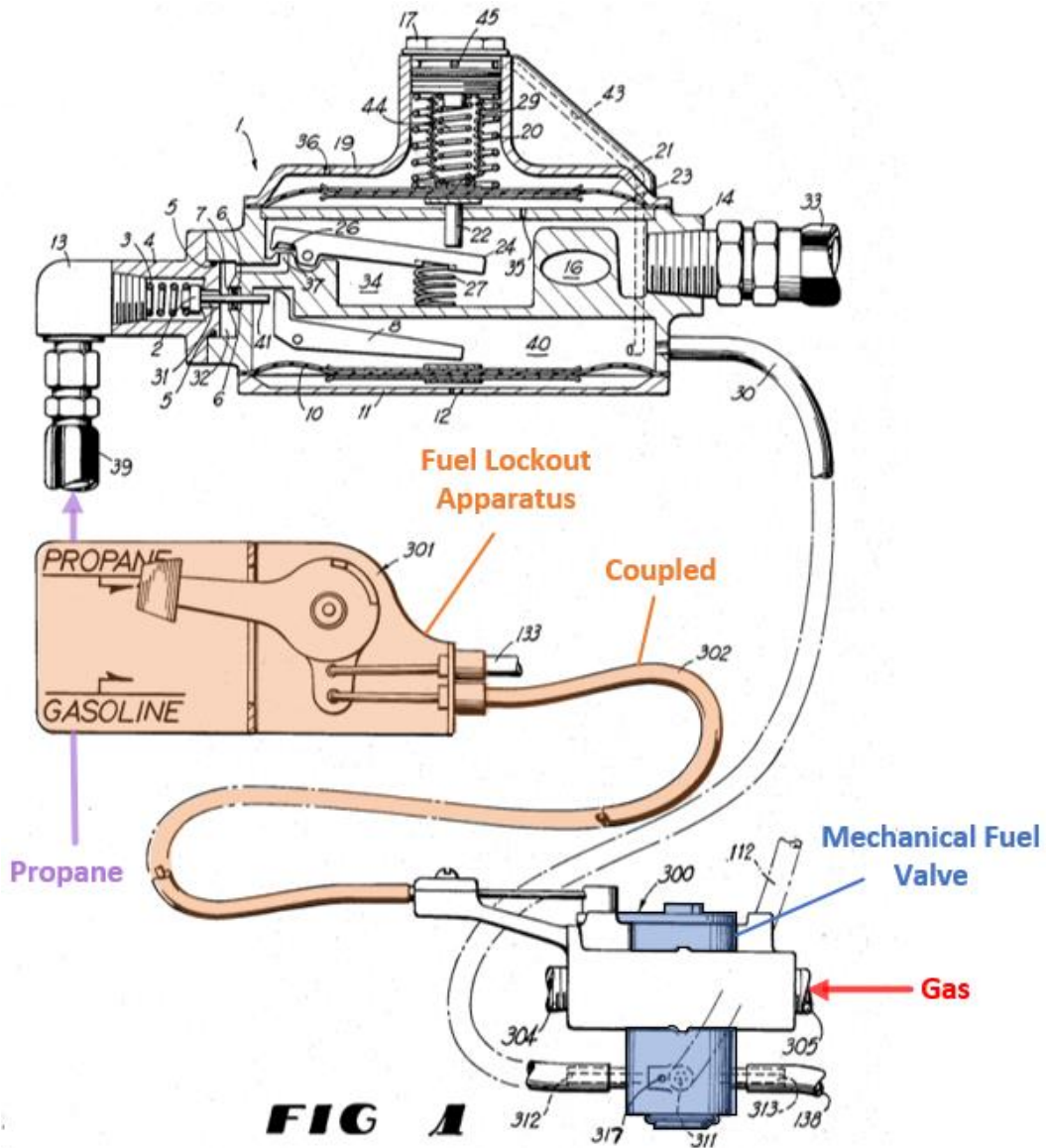
[0292]. If the components of the fuel lockout apparatus are not actuated and/or engaged, propane is not supplied to the dual fuel generator.

[0293].

[0294]. A POSA would understand that Hallberg discloses that the fuel lockout apparatus is coupled to the mechanical fuel valve.

[0295]. As discussed in §§VI.B, and VII.B.1.c., it is my understanding that “coupled” means “attached...” As shown in FIG. 1 (below), control cable 302 “attaches” the fuel lockout apparatus to the mechanical fuel valve.

[0296]. Without control cable 302, the fluid dual valve control 301 would be unable to rotate spool 306 within the valve body 307. Ex. 1006, 7:30-33.



Ex. 1006, FIG. 1 (Emphasis Added).

[0297]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “a fuel lockout apparatus coupled to the mechanical fuel valve” as recited in claim limitation [15b].

- d. Element [15.3] wherein the mechanical fuel lockout switch: communicates the first fuel source to the dual fuel engine and prevents communication between the second fuel source and the dual fuel engine when the mechanical fuel valve is in the first position, and communicates the second fuel source to the dual fuel engine and interrupts the first fuel source communication with the dual fuel engine when in the second position; and**

[0298]. It is my opinion that a POSA would understand that Hallberg discloses “*wherein the mechanical fuel lockout switch: communicates the first fuel source to the dual fuel engine and prevents communication between the second fuel source and the dual fuel engine when the mechanical fuel valve is in the first position, and communicates the second fuel source to the dual fuel engine and interrupts the first fuel source communication with the dual fuel engine when in the second position*” as recited in claim limitation[15c].

[0299]. Claim limitation [15c] contains similar language to that of [1c]. My opinion that a POSA would understand that Hallberg discloses claim limitation [15c] is thus similar to that of claim limitation [1c].

[0300]. Hallberg discloses that when gasoline is selected on the fluid dual valve control 301, spool 306, within valve body 307, is rotated such that gasoline from gasoline supply line 304 is supplied to the carburetor 110 through engine gasoline line 305. Ex. 1006, 7:27-44.

[0301]. As shown in FIG. 10 below, when gasoline is selected, gasoline is communicated through inlet opening 309, tunnel 314 and liquid outlet opening 310.

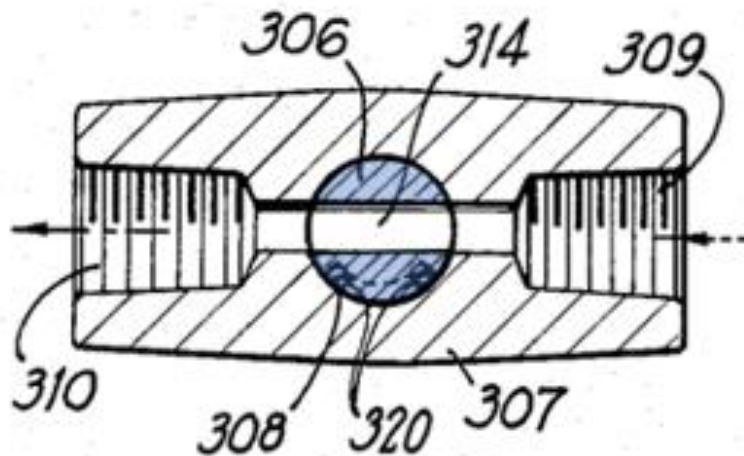


FIG 10

Ex. 1006, FIG. 10 (Emphasis Added).

[0302]. During gasoline mode, the fuel lockout apparatus prevents the flow of propane to the internal combustion engine. *Supra*, §VII.B.1.c. It is my understanding that when the mechanical fuel valve is in the first position (gasoline mode), the mechanical fuel lockout switch communicates the first fuel (gasoline) source to the dual fuel engine and prevents communication between the second fuel (propane) source and the dual fuel engine.

[0303]. When propane mode is selected on the fluid dual valve control 301, propane is provided to the dual fuel engine. Ex. 1006, 8:3-57. As described

in §§VII.B.1.b, VII.B.1.c, *supra*, when propane mode is selected, spool 306 is rotated within valve body 307 to form a seal to prevent the flow of gasoline to the engine and a vacuum is created in line 30, urging diaphragm 10 upward against liquid inlet lever 8 which drives fuel inlet valve shaft 41 against bias spring 3 which opens liquid inlet valve 2 allowing propane to flow through the propane fuel line to the engine.

[0304]. A POSA would therefore understand that when the mechanical fuel valve is in a second position (propane mode), the mechanical fuel lockout switch communicates the second fuel (propane) source to the dual fuel engine and interrupts the first fuel (gasoline) source communication with the dual fuel engine.

[0305]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches “*wherein the mechanical fuel lockout switch: communicates the first fuel source to the dual fuel engine and prevents communication between the second fuel source and the dual fuel engine when the mechanical fuel valve is in the first position, and communicates the second fuel source to the dual fuel engine and interrupts the first fuel source communication with the dual fuel engine when in the second position*” as recited in claim limitation[15c].

- e. **Element [15.4] wherein the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine.**

[0306]. It is my opinion that a POSA would understand that Hallberg discloses “*wherein the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine*” as disclosed in limitation [15d].

[0307]. Claim limitation [15d] contains similar language to that of claim 2. My opinion that a POSA would understand that Hallberg discloses claim limitation [15d] is thus similar to that of claim 2.

[0308]. A POSA would understand that Hallberg discloses a structure, that teaches a fuel lockout apparatus. *Supra*, §VII.B.1.c. First, Hallberg discloses a fuel lockout apparatus comprising fluid dual valve control 301 and control cable 302. *Supra*, §VII.B.1.c.

[0309]. The fluid dual valve control 301 and control cable 302 can be actuated and/or engaged to allow either gasoline or propane to flow to the internal combustion engine. *Supra*, §VII.B.1.c. A POSA would understand that the valve control 301 will be in “either” the first position (gasoline) “or” the second position (propane).

[0310]. Positioning valve control 301 in the first position (gasoline mode), acts through control cable 302, to rotate spool 306 within valve body 307 to permit gasoline (e.g., a first fuel) to flow through fluid dual valve structure 300

(e.g., a mechanical fuel valve) and lock out propane (e.g., a second fuel) from flowing through fluid dual valve structure 300. *Supra*, §VII.B.1.b.

[0311]. Positioning control 301 in the second position (propane mode), acts through control cable 302, to rotate spool 306 within valve body 307, to create a vacuum in line 30, which opens liquid inlet valve 2, allowing propane to flow through the propane fuel line to the engine. Ex. 1006, 8:38-42.

[0312]. A POSA would therefore understand that while in the second position, the valve control 301 cannot be obviously in the first position. By selecting the valve control 301 in the second position, the first position cannot be actuated. In other words, putting the valve control 301 in the second position, prevents actuation to the first position.

[0313]. Moreover, as I discussed in §VII.B.2., when propane is communicated to the engine and vacuum is provided to the fuel lockout apparatus via vacuum line 30, the rotatable spool cannot be in a gasoline position as it is well known in the art that when a valve is in a first position, it cannot be in a second position.

[0314]. A POSA would therefore understand that the fuel lockout apparatus therefore prevents actuation of the mechanical fuel valve to a first position (i.e., gasoline) when propane is communicated to the dual fuel engine.

[0315]. Accordingly, it is my opinion that a POSA would understand that the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine.

[0316]. A POSA would understand that when the valve control 301 is in gasoline mode, vent 317 communicates with the atmosphere. Ex. 1006, 7:36-38. A POSA would understand that spool 306 is thus prevented from actuating to propane mode whereby the spool 306 is aligned to communicate with the intake manifold line 112 via vacuum inlet port 311. Ex. 1006, 8:23-30.

[0317]. A POSA would understand that if vacuum line 30 is not activated, fuel inlet valve 2 of the fuel lockout apparatus would remain closed, preventing the propane supply line from coupling to propane supply. Moreover, when gasoline mode is selected, control cable 302 activates spool 306 within the dual valve 300 to allow gasoline to flow to the internal combustion engine. *Supra*, §§VII.B.1.b, VII.B.1.d.

[0318]. As discussed in §§VII.B.1.b, VII.B.1.c, VII.B.1.d, *supra*, when propane mode is selected, the mechanical fuel valve is in second position, and a vacuum is created in line 30, urging diaphragm 10 upward against liquid inlet lever 8, which drives fuel inlet valve shaft 41 against bias spring 3, which opens liquid

inlet valve 2 allowing propane to flow through the propane fuel line to the engine.

Ex. 1006, 8:38-42.

[0319]. Accordingly, it is my opinion that a POSA would understand that Hallberg teaches and/or suggests “*wherein the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source communicates with the dual fuel engine*” as disclosed in limitation [15d].

C. Ground 3: The Combination of Rumao, DuroMax, and Elsdon, and alternatively the Combination of Rumao and Hallberg Renders Obvious Claims 8, 9, 11, and 14.

[0320]. As discussed in §VII.A, *supra*, claims 1, 3, 4, 6, 7, and 15 are rendered obvious by the combination of DuroMax and Elsdon. Claims 1, 6 and 7 are also anticipated under §102 by Hallberg (Ground 2A) and claims 2 and 15 are rendered obvious under §103 by Hallberg (Ground 2B). *Supra*, §VII.B. Claims 8, 9, 11, and 14 include limitations similar to those of claims 1, 2, 6, 7, and 15. A POSA would have looked to Rumao to teach, and render obvious, any limitation not disclosed by the combination of DuroMax and Elsdon, and alternatively, Hallberg.

1. Independent claim 8

- a. Element [8.0]: “A method of assembling a mechanical fuel lockout switch for an internal combustion engine comprising:”**

[0321]. To the extent the preamble is limiting, the combination of Rumao, DuroMax, and Elsdon teaches element [8.0]. Alternatively, the combination of Rumao and Hallberg teaches element [8.0].

[0322]. Rumao discloses methods of assembling generators including internal combustion engines powered by propane or gasoline. Ex.1007, Abstract; Ex.1007, 5:6-12.

[0323]. The combination of DuroMax and Elsdon discloses a mechanical fuel lockout switch for an internal combustion engine. *Supra*, §VII.A. Alternatively, Hallberg discloses a mechanical fuel lockout switch for an internal combustion engine. *Supra*, §VII.B.

[0324]. Accordingly, a POSA would have understood that Rumao, DuroMax, and Elsdon could be combined to teach a method of assembling a mechanical fuel lockout switch for an internal combustion engine.

[0325]. Alternatively, a POSA would have understood that Rumao and Hallberg could be combined to teach a method of assembling a mechanical fuel lockout switch for an internal combustion engine.

b. Element [8.1]: “providing an internal combustion engine configured to operate on a fuel from a first fuel source and a different fuel from a second fuel source;”

[0326]. The combination of Rumao and DuroMax, and alternatively, Rumao and Hallberg teaches [8.1]. Rumao discloses methods of assembling a

generator. *Supra*, §VII.C.1.a. In one configuration (see FIG. 82 below), the generator includes permanent fuel tank 360 (i.e., a primary fuel source) and removable fuel tank 380 (i.e., a secondary fuel source). Ex.1007, 18:34-36, FIG. 82.

[0327]. A POSA would therefore have understood that Rumao discloses assembling an internal combustion engine that, in one configuration, operates on a first fuel (e.g., gasoline) from a first fuel source (e.g., permanent fuel tank 360 and/or removable fuel tank 380), and in a second configuration, operates on a second fuel (e.g., propane) from a second fuel source.

[0328]. DuroMax also discloses an internal combustion engine operable alternately on gasoline or propane. *Supra*, §VII.A.1.a. A POSA would have understood that the internal combustion engine of DuroMax can be combined with the methods of assembling generators of Rumao to teach element [8.1].

[0329]. Alternatively, a POSA would have looked to Hallberg. Hallberg also discloses a conventional internal combustion engine operable on a liquified gas fuel (e.g., propane) and a liquid fuel (e.g., gasoline). Ex.1006, 1:6-12.

[0330]. Accordingly, a POSA would have understood that the internal combustion engine of Hallberg can be combined with the method of assembling generators of Rumao to teach element [8.1].

c. Element [8.2]: “coupling a mechanical fuel valve to the internal combustion engine actuatable between a first position and a second position to selectively control fuel flow to the internal combustion engine from the first fuel source through a first fuel line and the second fuel source through a second fuel line; and”

[0331]. Rumao discloses methods of assembling a generator system comprising engine 311 and “other accessories for forming a fully functional generator.” Ex.1007, 18:34-40. A POSA would have understood that “other accessories for forming a fully functional generator” for the case of a dual fuel generator include a mechanical fuel valve that selectively controls fuel flow of propane or gasoline to the internal combustion engine.

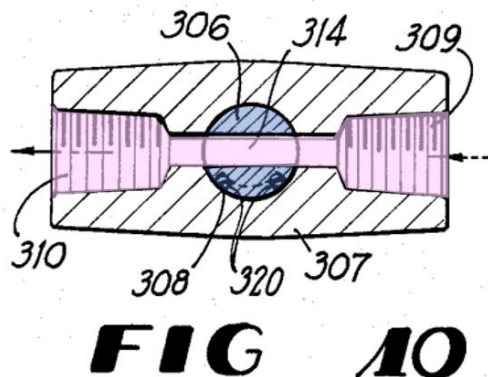
[0332]. DuroMax describes a mechanical fuel valve that is actuatable between an open and closed position in which gasoline is selectively permitted to flow through a gasoline fuel line. *Supra*, §VII.A.1.b. The mechanical fuel valve is coupled to the internal combustion engine. Ex.1004, pp.7-8. A POSA also would have found it obvious to combine the Elsdon fuel conduit coupler cap with the mechanical fuel valve of DuroMax to have enabled the mechanical fuel valve of DuroMax to further control the flow of LPG fuel through the LPG fuel conduit coupler via cap 16. *Supra*, §VII.A.1.b.

[0333]. A POSA would have understood that the mechanical fuel valve of DuroMax coupled to the internal combustion engine of DuroMax can be

combined with the methods of assembling generators of Rumao (discussed hereinafter in §VII.C.1.d.i-ii) to teach element [8.2].

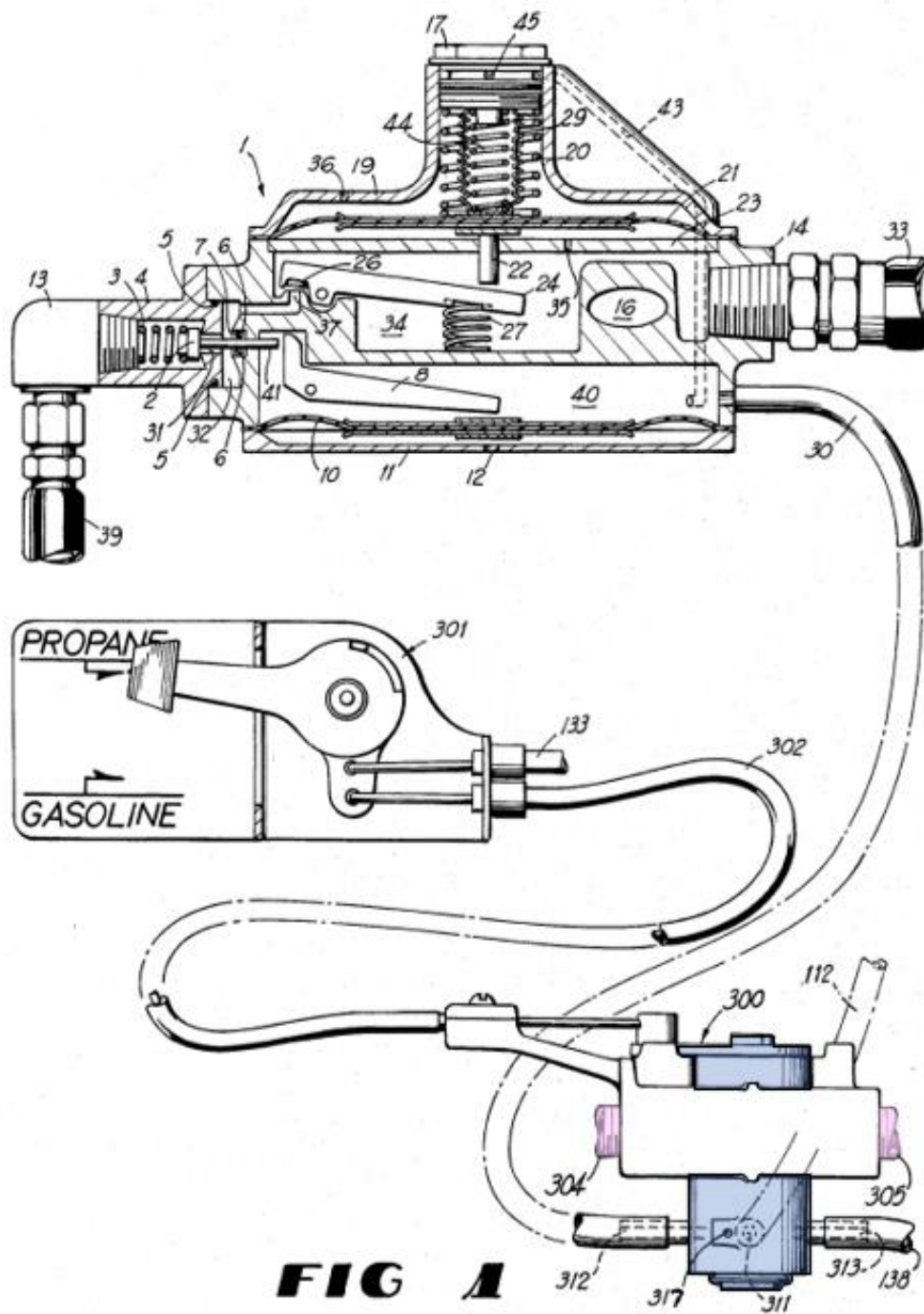
[0334]. Alternatively, Hallberg discloses a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow from a first fuel source through a first fuel line and a second fuel source through a second fuel line to a dual fuel engine. *Supra*, §VII.B.1.b. Hallberg also discloses that the mechanical fuel valve is coupled to the internal combustion engine. *Supra*, §VII.B.1.b.

[0335]. As shown in FIG. 10 of Hallberg (see below), the mechanical fuel valve is coupled to liquid outlet opening 310. Ex.1006, FIG. 10.



Ex.1006, FIG. 10 (Emphasis Added).

[0336]. FIGS. 1 and 9 of Hallberg (below) further disclose that the liquid outlet opening 310 is coupled to gasoline line 305. Ex.1006, FIGS. 1,9. Gasoline from gasoline supply line 304 is supplied to the carburetor 110 through engine gasoline line 305. Ex.1006, 7:39-43.



Ex.1006, FIG.1 (Emphasis Added).

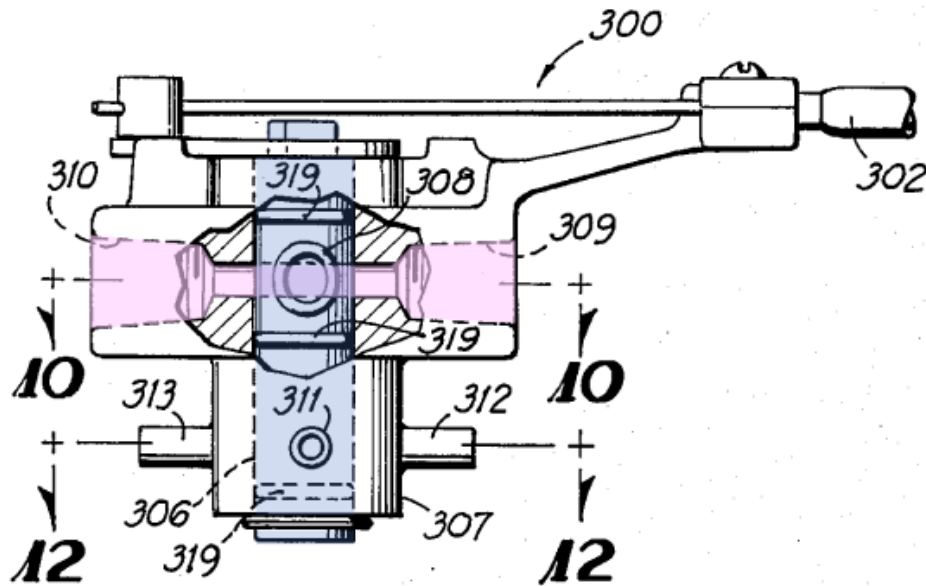


FIG 9

Ex.1006, FIGS. 1, 9 (Emphasis Added).

[0337]. Accordingly, a POSA would have understood that the mechanical fuel valve and internal combustion engine of Hallberg can be combined with the methods of assembling generators of Rumao (discussed hereinafter in §§VII.C.1.i-ii) to teach element [8.2].

d. Element [8.3]: “coupling a fuel lockout apparatus to the mechanical fuel valve;”

[0338]. The combination of Rumao, DuroMax and Elsdon, or alternatively, Rumao and Hallberg, teaches [8.3].

[0339]. Rumao discloses a method of assembling a generator system that includes “other accessories for forming a fully functional generator.” *Supra*,

§VII.C.1.c. A POSA would have understood that “other accessories for forming a fully functional generator” for the case of a dual fuel generator include a fuel lockout apparatus configured to communicate the first fuel source to the internal combustion engine and prevent the second fuel source from coupling to the internal combustion engine when the mechanical fuel valve is in the first position, and vice versa.

[0340]. Elsdon discloses a fuel lockout apparatus. *Supra*, §VII.A.1.c. A POSA would have been motivated to combine the fuel lockout apparatus of Elsdon with the mechanical fuel valve of DuroMax to provide a fuel lockout apparatus coupled to the mechanical fuel valve. *Supra* §§VII.A.1.a.1-2.

[0341]. A POSA would have therefore understood that the fuel lockout apparatus of Elsdon, coupled to the mechanical fuel valve of DuroMax, can be combined with the methods of assembling generators of Rumao to teach element [8.3] (discussed hereinafter in §§VI.D.2.f.i-ii).

[0342]. Alternatively, Hallberg discloses a structure which teaches a fuel lockout apparatus coupled to the mechanical fuel valve. *Supra*, §VII.B.1.c. Hallberg discloses a fuel lockout apparatus comprising fluid dual valve control 301 and control cable 302 that is coupled to a mechanical fuel valve. *Id.*

[0343]. A POSA would have understood that the fuel lockout apparatus coupled to the mechanical fuel valve of Hallberg can be combined with the

methods of assembling generators of Rumao to teach the step of [8.3] (discussed hereinafter in §§VII.C.1.d.i-ii).

i. Motivation to Combine Rumao, DuroMax, and Elsdon, and alternatively, Rumao and Hallberg, Elsdon.

[0344]. Rumao, DuroMax, Elsdon, and Hallberg, all relate to internal combustion engines. Ex.1004, pp.2-5; Ex.1005, 6:35-52; Ex.1006, 1:6-8; Ex.1007, 5:6-10. The internal combustion engines of Hallberg and DuroMax are operable on propane or gasoline. Ex.1004, pp.11-12; Ex.1006, 29:28-33.

[0345]. Rumao discloses methods of assembling a generator system. Ex.1007, Abstract. The generator system includes “other accessories for forming a fully functional generator.” *Supra*, §VII.C.1.c.

[0346]. A POSA would have understood that “other accessories for forming a fully functional generator” for the case of a dual fuel generator include a mechanical fuel valve to selectively control fuel flow of propane or gasoline that is coupled to the internal combustion engine, and a fuel lockout apparatus configured to prevent the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position and permit the second fuel source to couple to the second fuel line while the mechanical fuel valve is in the second position.

[0347]. DuroMax discloses a mechanical fuel valve that is actuatable between open and closed positions in which gasoline is selectively permitted to flow through a gasoline fuel line. *Supra*, §VII.A.1.b.

[0348]. Hallberg discloses a mechanical fuel valve actuatable between a first position and second position to selectively control fuel flow to the dual fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line. *Supra*, §VII.B.1.b.

[0349]. A POSA would have therefore been motivated to combine the mechanical fuel valve of either DuroMax or Hallberg with the methods of assembling a generator system of Rumao.

[0350]. Elsdon discloses a fuel lockout apparatus, comprising a cap and shield. *Supra*, §VII.A.1.c. A POSA would have found it obvious to combine the Elsdon fuel conduit coupler cap with the gasoline valve of DuroMax to have enabled the gasoline valve of DuroMax to further control the flow of LPG fuel through the LPG fuel conduit coupler via the cap 16. *Supra*, §VII.A.1.b.

[0351]. Alternatively, Hallberg discloses a fuel lockout apparatus comprising fluid dual valve control 301 and control cable 302. *Supra*, §VII.B.1.c.

[0352]. A POSA would have understood that the fuel lockout apparatuses of Elsdon and Hallberg are configured to prevent the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in

the first position and permit the second fuel source to couple to the second fuel line while the mechanical fuel valve is in the second position. *Supra*, §§VII.A.1.c, VII.B.1.c.

[0353]. A POSA would have therefore been motivated to combine the fuel lockout apparatus of Elsdon, and alternatively, Hallberg with the methods of assembling a generator system of Rumao.

ii. Reasonable Expectation of Success

[0354]. A POSA would have had a reasonable expectation of success in using the method of Rumao to assemble a generator with the fuel lockout apparatus of Elsdon and mechanical fuel valve of DuroMax.

[0355]. As of the date that the application that became '780 Patent was filed, the assembly of dual fuel generators was well known in the art, with Rumao and DuroMax being just two examples. A POSA would have therefore reasonably expected that the fuel lockout apparatus of Elsdon and the mechanical fuel valve of DuroMax could be successfully implemented in the methods of assembling a generator system as disclosed in Rumao and discussed in §§VII.C.1.a-b.

[0356]. A POSA would have also had a reasonable expectation of success in using the methods of Rumao to assemble a generator with the fuel lockout apparatus and mechanical fuel valve of Hallberg. The assembly of dual

fuel generators was well known in the art, as of the date that the application that became '780 Patent was filed, with Rumao being just one example.

[0357]. A POSA would have therefore reasonably expected that the mechanical fuel valve and fuel lockout apparatus of Hallberg could be successfully implemented in the methods of assembling a generator system disclosed in Rumao.

e. Element [8.4]: “wherein when the mechanical fuel valve is in the first position, the fuel lockout apparatus communicates the first fuel source to the internal combustion engine and prevents the second fuel source from coupling to the internal combustion engine, and actuation of the mechanical fuel valve to the second position causes the fuel lockout apparatus to permit the second fuel source to couple to the internal combustion engine, and interrupts the first fuel source communication with the internal combustion engine; and”

[0358]. The combination of Rumao, DuroMax, and Elsdon, and alternatively, Rumao and Hallberg teaches element [8.4].

[0359]. A POSA would have understood that the combination of DuroMax and Elsdon discloses a mechanical fuel lockout switch comprising a mechanical fuel valve. *Supra*, §VII.A.1.b. A POSA would have understood that Elsdon discloses a fuel lockout apparatus that, when coupled to a mechanical fuel valve disclosed in DuroMax, selectively controls the flow of fuel. *Supra*, §VII.A.1.c.

[0360]. A POSA would have also understood that when the mechanical fuel valve is in the first position, the fuel lockout apparatus communicates the first

fuel source to the engine and prevents communication between the second fuel

source and the engine. *Supra*, §§VII.A.1.d-e.

[0361]. When the mechanical fuel valve is in a second position, the fuel lockout apparatus communicates the second fuel source to the engine and interrupts the first fuel source communication with the engine. *Id.*

[0362]. A POSA would have therefore understood that the combination of Rumao, DuroMax, and Elsdon teaches a method of assembling a mechanical fuel lockout switch where a fuel lockout apparatus communicates the first fuel source to the internal combustion engine and prevents the second fuel source from coupling to the internal combustion engine when the mechanical fuel valve is in the first position.

[0363]. A POSA would have also understood that actuation of the mechanical fuel valve to the second position causes the fuel lockout apparatus to permit the second fuel source to couple to the internal combustion engine and interrupt the first fuel source communication with the internal combustion engine.

[0364]. Hallberg discloses a mechanical fuel valve coupled to a fuel lockout apparatus. *Supra*, §VII.B.1.c. When the mechanical fuel valve is in the first position, the fuel lockout apparatus communicates the first fuel source to the dual fuel engine and prevents communication between the second fuel source and the dual fuel engine. *Supra*, §VII.B.1.d. When the mechanical fuel valve is in a

second position, the fuel lockout apparatus communicates the second fuel source to the dual fuel engine and interrupts the first fuel source communication with the dual fuel engine. *Supra*, §VII.B.1.d.

[0365]. A POSA would have understood that the combination of Rumao and Hallberg discloses a method of assembling a mechanical fuel lockout switch where a fuel lockout apparatus communicates the first fuel source to the internal combustion engine and prevents the second fuel source from coupling to the internal combustion engine when the mechanical fuel valve is in the first position.

[0366]. A POSA also would have understood that actuation of the mechanical fuel valve to the second position causes the fuel lockout apparatus to permit the second fuel source to couple to the internal combustion engine and interrupt the first fuel source communication with the internal combustion engine.

f. Element [8.5]: “wherein the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source is coupled to the internal combustion engine.”

[0367]. The combination of Rumao, DuroMax and Elsdon, and alternatively, Rumao and Hallberg, teaches [8.5].

[0368]. As discussed in §VII.A.2, *supra*, a POSA would have understood that the combination of the fuel lockout apparatus of Elsdon and the

mechanical fuel valve of DuroMax discloses a fuel lockout apparatus that prevents actuation of the mechanical fuel valve to the first position when the second fuel source is coupled to the internal combustion engine.

[0369]. As discussed in §VII.B.2, *supra*, Hallberg discloses a fuel lockout apparatus that prevents actuation of the mechanical fuel valve to the first position when the second fuel source is coupled to the internal combustion engine.

[0370]. Accordingly, a POSA would have understood that the combination of Rumao, DuroMax and Elsdon, and alternatively, Rumao and Hallberg, teaches a method of assembling a mechanical fuel lockout switch where the fuel lockout apparatus prevents actuation of the mechanical fuel valve to the first position when the second fuel source is coupled to the internal combustion engine fuel lockout apparatus that communicates the first fuel source to the internal combustion engine.

2. **Claim 9: “The method of claim 8, wherein the fuel lockout apparatus is further configured to: prevent coupling of the second fuel source to the second fuel line while the mechanical fuel valve is in the first position; and permit coupling of the second fuel source to the second fuel line while the mechanical fuel valve is in the second position.”**

[0371]. The combination of Rumao, DuroMax, and Elsdon, and alternatively, Rumao and Hallberg teaches claim 9.

[0372]. As discussed in §VII.A.1.c, *supra*, the combination of Elsdon and DuroMax discloses a fuel lockout apparatus that prevents the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position and permits the second fuel source to couple to the second fuel line while the mechanical fuel valve is in the second position.

[0373]. As discussed in §VII.B.1.c, *supra*, Hallberg discloses a fuel lockout apparatus that prevents the mechanical fuel valve from coupling to the second fuel source when the mechanical fuel valve is in the first position and permits the second fuel source to couple with the second fuel line when the mechanical fuel valve is in the second position.

[0374]. Accordingly, a POSA would have understood that the combination of Rumao, DuroMax, and Elsdon, and alternatively, Rumao and Hallberg, teaches claim 9.

3. **Claim 11: “The method of claim 8, further comprising coupling a fuel regulator system to the second fuel source to reduce fuel pressure therefrom and deliver fuel to the second fuel line at a pressure required for operation of the internal combustion engine.”**

[0375]. The combination of Rumao, DuroMax, and Elsdon, and alternatively, Rumao and Hallberg teaches claim 11.

[0376]. Rumao discloses methods of assembling generators that includes “an engine configured to operate on a gaseous fuel source and...all related

appurtenances and accessories necessary for a fully functional generator system

(e.g., ... pressure regulators).” Ex.1007, 29:20-33. For example, Rumao discloses

that “the backpack generator 500 may include...pressure regulators 512...and

other appurtenances and accessories for a fully functional generator system.

Ex.1007, 29:45-51.

[0377]. A POSA would have understood that a “pressure regulator” is a “fuel regulator system ... to reduce fuel pressure ... and deliver fuel ... at a pressure required for operation of the internal combustion engine.”

[0378]. A POSA would have thus understood that Rumao discloses the step of “coupling a fuel regulator system to the second fuel source to reduce fuel pressure therefrom and deliver fuel to the second fuel line at a pressure required for operation of the internal combustion engine.”

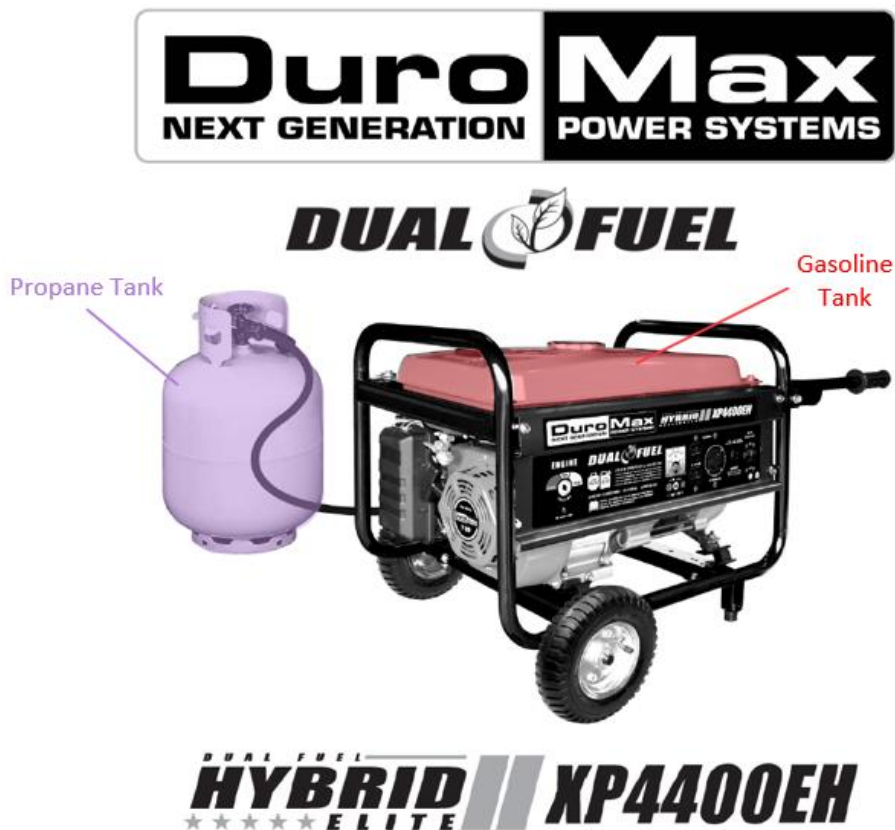
[0379]. Accordingly, a POSA would have understood that the combination of Rumao, DuroMax, and Elsdon, and alternatively, Rumao and Hallberg teaches claim 11.

4. Claim 14: “The method of claim 8, further comprising providing gasoline in a liquid fuel tank as the first fuel source and LPG in a pressurized fuel container as the second fuel source.”

[0380]. The combination of Rumao and DuroMax, or alternatively, Rumao and Hallberg discloses claim 14.

[0381]. Rumao discloses methods of assembling generators that includes internal combustion engines powered by propane or gasoline. *Supra*, §VII.C.1.a.

[0382]. In the event that a Rumao does not explicitly disclose providing gasoline as a first fuel source and LPG as a second source, DuroMax discloses gasoline tank and propane tank Ex.1004, p.1. A POSA would have understood that the gasoline is stored in a liquid fuel tank, and propane is stored in a pressurized fuel container. *Id.*



Ex.1001, p.1

[0383]. A POSA would have therefore understood that the gasoline tank and propane tank of DuroMax can be combined with the method of assembling a generator of Rumao to disclose the step of providing gasoline in a liquid fuel tank as the first fuel source and LPG in a pressurized fuel container as the second fuel source.

[0384]. Accordingly, a POSA would have understood that the combination of Rumao and DuroMax teaches claim 14.

[0385]. Alternatively, Hallberg discloses a propane fuel source and gasoline fuel source supplied to the dual fuel generator. *Supra*, §VII.B.1.b. A POSA would have understood that the gasoline fuel source is stored in a liquid fuel tank, and the propane fuel source is stored in a pressurized fuel container.

[0386]. A POSA would have thus understood that the propane fuel source and gasoline fuel source of Hallberg can be combined with the method of assembling a mechanical fuel lockout switch for an internal combustion engine of Rumao to disclose a method of assembling a mechanical fuel lockout switch for an internal combustion engine further comprising providing gasoline in a liquid fuel tank as the first fuel source and LPG in a pressurized fuel container as the second fuel source.

[0387]. Accordingly, a POSA would have understood that the combination of Rumao and Hallberg also teaches claim 14.

D. Ground 4: The Combination of Rumao, DuroMax, Elsdon, and Parlatore, or alternatively, Rumao, Hallberg, and Parlature Renders Obvious Claims 12 and 13.

[0388]. As discussed in §VII.C, *supra*, a POSA would have understood that claims 8, 9, 11 and 14 are rendered obvious by the combination of Rumao, DuroMax, and Elsdon, or alternatively the combination of Rumao and Hallberg. Claims 12 and 13 depend from claim 11 which depends from claim 8. A POSA would have looked to Parlature to teach, and render obvious, any limitation not disclosed by the combination of Rumao, DuroMax and Elsdon, or alternatively, Rumao and Hallberg.

1. Claim 12: “The method of claim 11, further comprising: mounting the fuel regulator system to the second fuel source located off-board the internal combustion engine.”

[0389]. The combination of Rumao, DuroMax, Elsdon, and Parlature, or alternatively, Rumao, Hallberg and Parlature, teaches claim 12.

[0390]. Rumao discloses a method of assembling generators that includes “an engine configured to operate on a gaseous fuel source and...all related appurtenances and accessories necessary for a fully functional generator system (e.g., ... pressure regulators).” Ex.1007, 29:20-33. A POSA would have understood that “all related appurtenances and accessories necessary for a fully functional generator system” includes a fuel regulator system. A POSA would also

have understood that the fuel regulator system can be mounted onto an LPG tank and located off-board the internal combustion engine. *Id.*

[0391]. In the event that Rumao does not explicitly disclose the aforementioned limitation, a POSA would have looked to Parlatore. Parlatore discloses a propane vapor delivery system. Ex.1011, [0013]. As shown in FIG. 1, the propane vapor delivery system includes a first pressure regulator (e.g., Reg. 1) and a second pressure regulator (e.g., Reg. 2). Ex.1011, FIG. 1

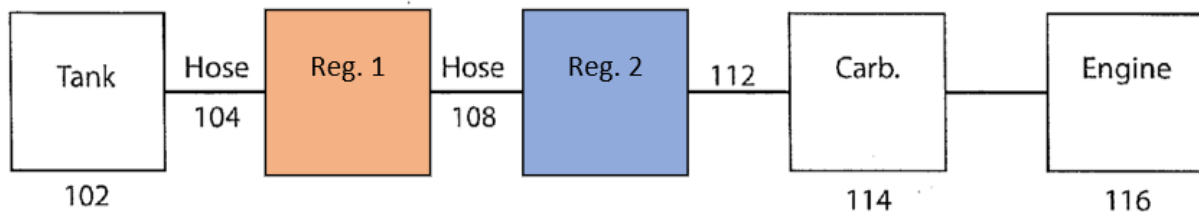
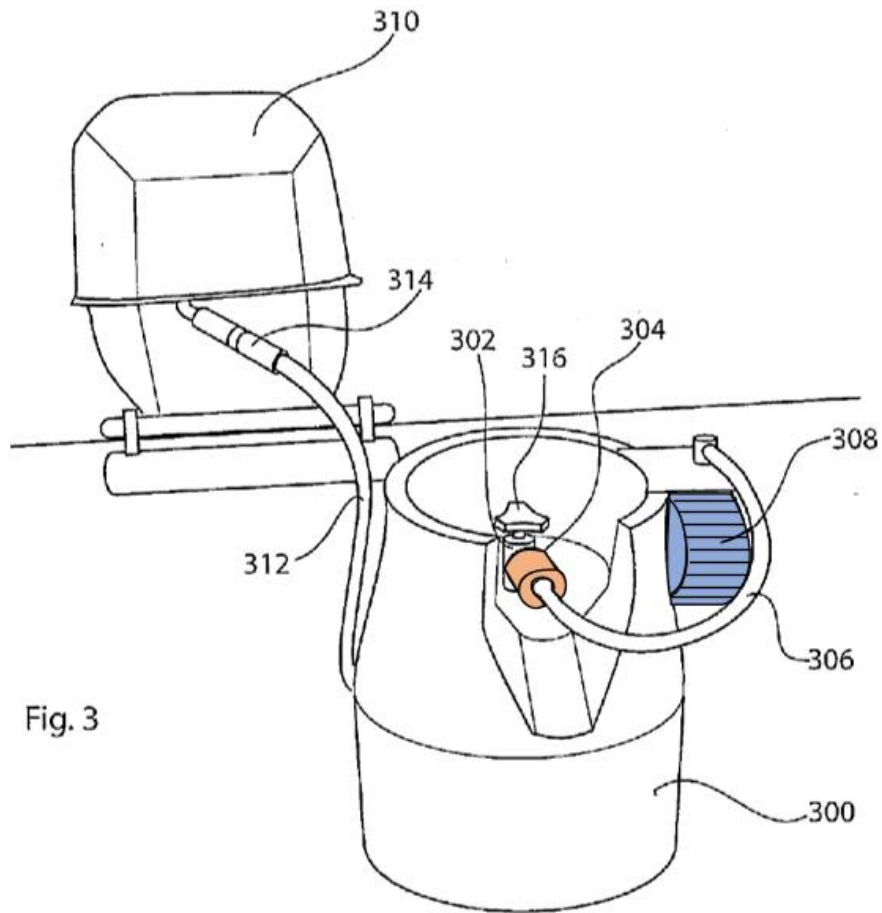


Fig. 1

Ex.1011, FIG. 1 (Emphasis Added).

[0392]. As shown in FIG. 3, the “LPG tank 300 may be located separate, but coupled to, an engine 310.” Ex.1011, FIG. 3.



Ex.1011, FIG. 3 (Emphasis Added).

[0393]. FIG. 3 of Parlatore discloses the primary and secondary regulator regulator mounted to a regulator mounting device. Ex.1011, FIG. 3. A POSA would understand that Parlatore discloses a fuel regulator system mounted to a LPG fuel source located off-board the internal combustion engine.

[0395]. The combination of Rumao, DuroMax, Elsdon, and Parlatore, or alternatively, Rumao, Hallberg, and Parlature, teaches claim 13.

[0396]. Rumao discloses a method of assembling generators that includes “an engine configured to operate on a gaseous fuel source and...all related appurtenances and accessories necessary for a fully functional generator system (e.g., ... pressure regulators).” Ex.1007, 29:20-33.

[0397]. Parlature discloses hose 104 coupling an LPG supply to a first pressure regulator (e.g., Reg. 1). Ex.1011, FIG. 1. The first pressure regulator is coupled to the second pressure regulator (e.g., Reg. 2) via hose 108. *Id.* The second pressure regulator is coupled to the carburetor via hose 112. *Id.*

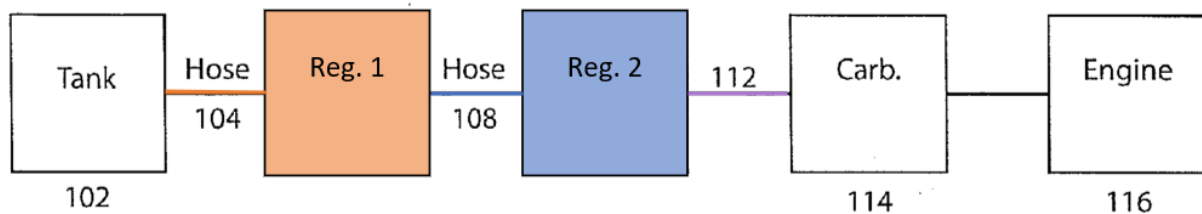
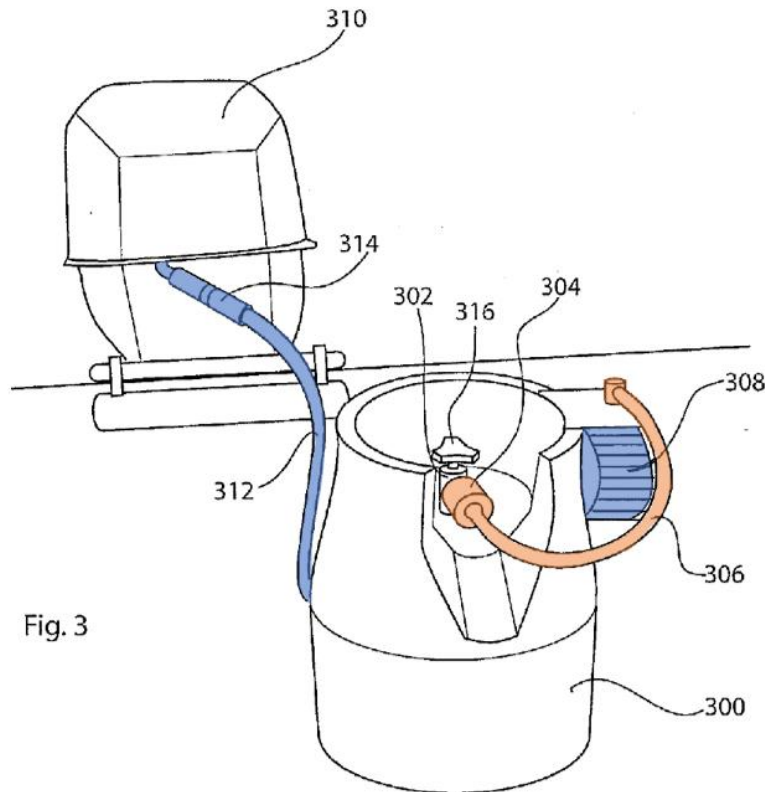


Fig. 1

Ex.1011, FIG. 1 (Emphasis Added).

[0398]. As shown in FIG. 3 (see below), in one embodiment, the LPG tank (e.g., LPG tank 300) may be coupled to the primary regulator 304 via connector 302. Ex.1011, [0020] and FIG. 3. Primary regulator 304 is also coupled

to secondary pressure regulator 308 via hose 306. *Id.* Secondary pressure regulator 308 is coupled to carburetor 114 via hose 312. *Id.*



Ex.1011, FIG. 3 (Emphasis Added).

[0399]. A low pressure output of secondary regulator 308 may be releasably attached to the propane carburetor. Ex.1011, [0020] and FIG. 3.

[0400]. A POSA would understand that a quick disconnect attachment could be attached to the LPG supply hose to releasably attach and disconnect the LPG supply hose to and from an inlet of the internal combustion engine. A quick-disconnect hose attachment is well known in the art as an attachment that allows a hose to be releasably coupled.

[0401]. A POSA would also understand that primary regulator 304 and secondary regulator 308 form a fuel regulator system, with secondary regulator 308 having an outlet connected to an internal combustion engine. A POSA would therefore have understood that Parlatore discloses a quick disconnect hose that can be coupled to an inlet on the internal combustion engine on one end, and coupled to an outlet of the fuel regulator system on the opposite end.

[0402]. Accordingly, a POSA, would understand that the combination of Rumao, DuroMax, Elsdon, and Parlatore, or alternatively, Rumao, Hallberg, and Parlatore teaches claim 13.

E. Ground 5: The Combination of DuroMax, Elsdon, and Parlature Renders Obvious Claim 5.

[0403]. As discussed in §VII.A.1, *supra*, claim 1 is rendered obvious by the combination of DuroMax and Elsdon. Claim 3 depends from claim 1 and is also rendered obvious by the combination of DuroMax and Elsdon. *Supra*, §VII.A.3. Claim 5 depends from claim 3.

[0404]. A POSA would have looked to Parlature to teach, and render obvious, any limitation not disclosed by the combination of DuroMax and Elsdon.

- 1. Claim 5: “The mechanical fuel lockout switch for a dual fuel engine of claim 3, further comprising; a first end of a quick-disconnect hose coupling attached to the inlet of the second fuel line; and a second end of the quick-disconnect hose coupling attached to the second fuel source to mate with the**

first end of the quick-disconnect hose coupling to couple the second fuel source to the second fuel line.”

[0405]. FIG. 3 of Parlatore discloses an LPG tank 102 coupled to an engine 310 via: primary regulator 304, hose 306, secondary pressure regulator 308, hose 312, and coupling 314. Ex.1011, [0020]-[0021], and FIG. 3.

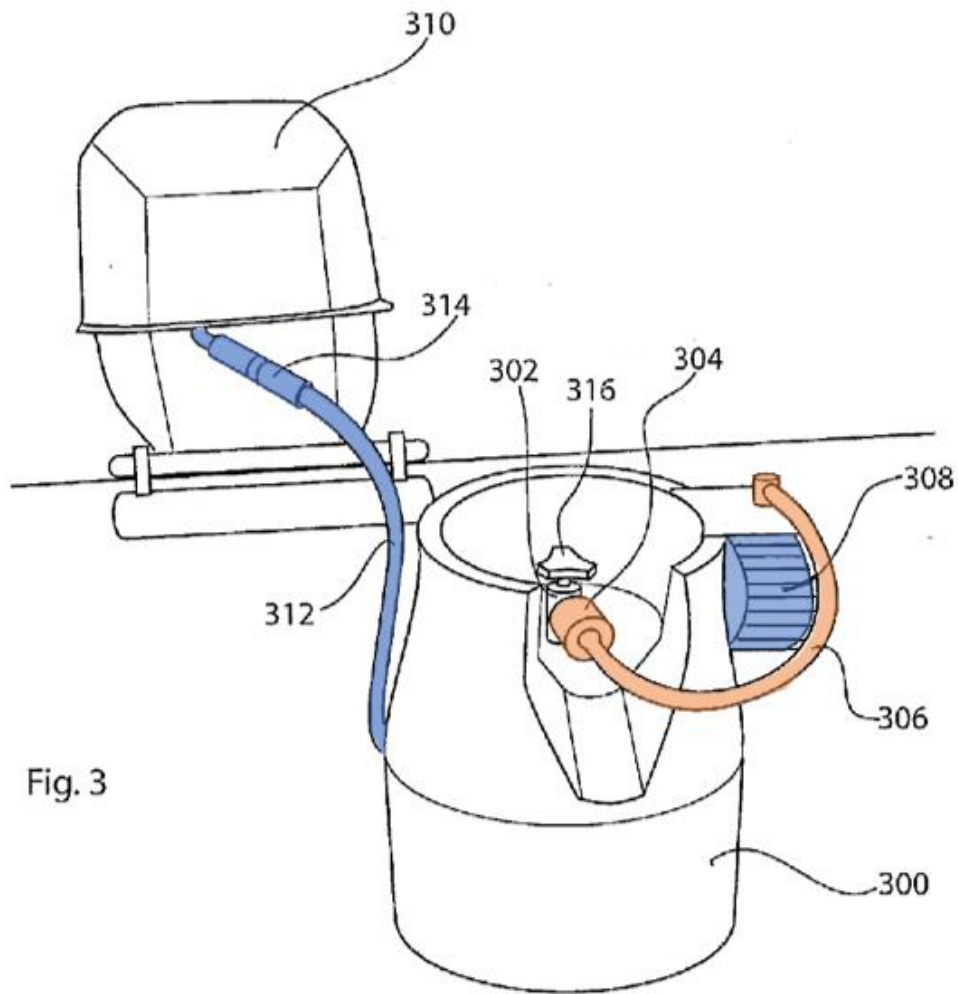


Fig. 3

Ex.1011, FIG. 3 (Emphasis Added).

[0406]. Parlatore also discloses that a low pressure output of secondary regulator 308 can be releasably attached to a propane carburetor. Ex.1011, [0020].

The low pressure output can be attached to the propane carburetor through hose 312 and coupling 314. *Id.*

[0407]. A POSA would have understood that coupling 314 and hose 312 can be a first end of a quick disconnect hose coupling attached to an inlet of the second fuel line of the engine 310.

[0408]. A POSA would also have understood that a second end of the quick disconnect hose coupling could be attached to an LPG supply tank to couple the LPG supply tank to the second fuel line.

[0409]. A POSA would therefore have understood that the combination of DuroMax, Elsdon and Parlato teaches claim 5.

F. Ground 6: The Combination of Rumao, DuroMax, and Elsdon Renders Obvious Claim 10.

[0410]. As discussed in §VII.C.1, *supra*, claim 8 is anticipated and/or rendered obvious by the combination of Rumao, DuroMax and Elsdon. Claim 10 depends from claim 8.

- 1. Claim 10: “The method of claim 8, wherein the fuel lockout apparatus comprises a fuel inlet cover configured to actuate in unison with the mechanical fuel valve to cover a fuel inlet on the internal combustion engine for the second fuel source when the mechanical fuel valve is in the first position and uncover the fuel inlet when the mechanical fuel valve is in the second position.”**

[0411]. The combination of Rumao, DuroMax and Elsdon teaches claim 10. DuroMax discloses a mechanical fuel valve. *Supra*, §VII.A.1.b. Elsdon discloses a fuel lockout apparatus comprising a cap and shield. *Supra*, §VII.A.1.c.

[0412]. A POSA would have understood that the fuel lockout apparatus of Elsdon can be coupled to the mechanical fuel valve of DuroMax and configured to prevent the second fuel source from coupling to the second fuel line while the mechanical fuel valve is in the first position and permit the second fuel source to couple to the second fuel line while the mechanical fuel valve is in the second position. *Supra*, §§VII.A.1.c-e.

[0413]. A POSA would have also understood that when the cap is closed, the fluid conduit is covered. *Supra*, §VII.A.2. As described in §VII.A.1.e, *supra*, a POSA would have understood that operation of the mechanical fuel valve and the fuel lockout apparatus is interconnected such that only one fuel can be communicated to the engine at one time.

[0414]. It would thus have been obvious to a POSA that the fuel inlet cover actuate in unison with the mechanical fuel valve to cover a fuel inlet on the internal combustion engine for the second fuel source when the mechanical fuel valve is in the first position, and uncover the fuel inlet when the mechanical fuel valve is in the second position.

VIII. CONCLUSION

[0415]. In signing this Declaration, I recognize that the Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in this proceeding. If required, I will appear for cross-examination at the appropriate time. I reserve the right to offer opinions relevant to the invalidity of the challenged claims and/or offer testimony in support of this Declaration.

[0416]. I hereby declare that all statements made herein of my own knowledge are true and that all statements are made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001.