

(emphasis original). The Examiner also contended that “Pursifull shows a generator system in Fig. 4 which has ‘fuel system... liquid fuel and gaseous fuel’ (§[0011]) which has a fuel rail 108 fed by a liquid fuel tank 112 through a valve 120 and an *undisclosed source of ‘Fuel 2’ which is a gaseous fuel*” and that “[t]he modification of Pursifull with Sugimoto is that of the inclusion of Sugimoto's off-board propane tank systems *not literally all of Sugimoto*.” *Id.* (emphasis original).

Contrary to the Examiner's assertion on page 15 of the Examiner's Answer, Pursifull does not disclose “a generator system in Fig. 4 which has ‘fuel system... liquid fuel and gaseous fuel’ (§[0011]).” Initially, since Pursifull discloses “a vehicle shut-off condition” regarding the fuel system 400 of FIG. 4 (*Pursifull*, §[0043]), the Examiner's assertion that “Pursifull shows a generator system in Fig. 4” is not supported by Pursifull as there is no disclosure of a generator. Further, the Examiner's reference to paragraph [0011] of Pursifull actually discloses “where liquid fuel and gaseous fuel are evacuated from a fuel rail,” not that a gaseous fuel is provided to the fuel rail. That is, when liquid fuel is evacuated from the fuel rail during an engine shut-off condition, the pressure in the fuel rail drops and the remaining liquid fuel changes phase before also being evacuated from the fuel rail. *Pursifull*, §§[0043]-[0046]. Thus, the Examiner's asserted “undisclosed source of ‘Fuel 2’” (*Examiner's Answer*, p. 15) is not a gaseous fuel, but is actually disclosed as a liquid fuel. *Pursifull*, §§[0043]-[0049].

More specifically, Pursifull discloses that “[t]he present description relates to a fuel system for an internal combustion engine of a vehicle.” *Id.* at §[0017]; FIGS. 1-5. Pursifull discloses that its fuel system 110 is included in the engine system 100 along with the fuel rail 108, fuel tank 112, fuel pump 114, and controller 128. *Id.* at §[0021]; FIGS. 1-5. According to Pursifull, the fuel system 110 may be a bi-fuel system that selectively provides gasoline and/or liquid propane to the fuel rail 108. *Id.* at §[0024]. “More particularly, a fuel pump 114 may be operable by controller 128 to pump fuel from the fuel tank 112 to the fuel rail 108.” *Id.* at §[0022]. “The fuel tank 112 may be pressurized to maintain fuel stored in the fuel tank at a desired pressure.” *Id.* During an engine shut-off condition, “[f]uel is evacuated from a fuel rail by directing liquid fuel from the fuel rail to a fuel tank.” *Id.* at Abstract. The evacuation relies on an “ejector 124 [that] pumps fuel in return line 119 to fuel tank 112 based on receiving a motive flow

from the fuel pump 114.” *Id.* at ¶[0026]. Pursifull also discloses a fuel system 300 that selectively provides a plurality of different types of fuel to the fuel rail 108 and includes “a fuel pump 114 selectively operable to pump fuel from the fuel tank 112” and “a fuel pump 136 selectively operable to pump fuel from the fuel tank 134 to the fuel rail 108 based on the state of three-way valve 120.” *Id.* at ¶¶[0037]-[0038]. The system in Pursifull “prevent[s] a selected fuel type from undergoing a liquid-to-gas phase change that would inhibit the fuel pump from pumping the liquid fuel.” *Id.* at ¶[0019]. Thus, “the multi-fuel system may be implemented in a vehicle that selectively combusts liquid propane and/or gasoline.” *Id.* at ¶[0040].

Since Pursifull is directed to an internal combustion engine of a vehicle, and does not disclose a generator, the Examiner’s proposed combination of Pursifull with Sugimoto and GasHose does not arrive at a generator and fuel delivery system of claims 1, 11, 21. While the Examiner asserted that “[t]he modification of Pursifull with Sugimoto is that of the inclusion of Sugimoto’s off-board propane tank systems *not literally all of Sugimoto*” (*Examiner’s Answer*, p. 15 - emphasis original), inclusion of “Sugimoto’s off-board propane tank system” into the vehicle of Pursifull does not arrive at the generator of claims 1, 11, or 21. One skilled in the art would readily recognize that a fuel generator having a fuel regulator system located off board the fuel generator, as called for in claims 1, 11, and 21, is not taught or suggested by a vehicle. That is, an off board fuel regulator system coupled to the vehicle would impede transportation of the vehicle, and thus the vehicle would be unsatisfactory for its intended purpose. As stated in the MPEP, “[i]f a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).” *MPEP* §2143.01(V). Thus, since Pursifull’s engine system 100 is directed to “a propulsion system of an automobile or other vehicle” *Pursifull*, ¶[0021], FIGS. 1-5, the combination of Sugimoto’s external fuel bottle 71 with the vehicle engine system 100 of Pursifull would not be obvious to one skilled in the art.

Further, in contrast with the Examiner’s contention that “[w]hat Pursifull does not discuss or show is how its gaseous fuel system is attached, stored, or operated” (*Examiner’s Answer*, p. 15), Appellant respectfully submits that Pursifull discloses that

its fuel system does not supply gaseous fuel to the fuel rail 108. Initially, Pursifull discloses that “liquid propane injection can provide some potential benefits relative to gaseous propane injection” and describes the invention as including improvements over typical liquid injection propane fuel systems. *Pursifull*, ¶¶[0001]-[0005]. Further, the engine system 100 of Pursifull does not supply gaseous fuel to the fuel rail 108 as evident by the use of fuel pumps 114/136 to pump liquid fuel from tanks 112/134 to the fuel rail 108, and fuel pump 114 to provide motive flow to ejector 124. *Id.* at ¶¶[0026], [0037]-[0038]; FIGS. 1-5. Instead, Pursifull discloses the fuel system may be a bi-fuel system that selectively provides gasoline and/or liquid propane to the fuel rail. *Id.* at ¶[0024]. Since fuel injectors 106 supply liquid fuel from the fuel rail 108 to the cylinders 104, and remaining fuel in the fuel rail is evacuated during vehicle shut-off conditions, the engine 102 does not operate on gaseous fuel. *Id.* at ¶¶[0002], [0021], [0026]. Moreover, Pursifull explicitly discloses the following:

By implementing the above described engine system in a vehicle application that employs liquid propane for combustion, a variety of potential benefits may be achieved. For example, due to the density of liquid propane relative to gaseous propane, the ability to evacuate the fuel rail after engine shut-off may provide a much greater reduction in emissions and increase in fuel economy relative to a gaseous propane application.

Id. at ¶[0032]. Thus, Pursifull clearly does not disclose the use of gaseous fuel in its fuel system, and coupling external fuel bottle 71 of Sugimoto that supplies fuel gas in a gas phase (*Sugimoto*, ¶[0078]) to the engine system 100 of Pursifull would not be obvious. Further, since Pursifull discloses use of liquid fuel pumps to force fuel pumped at a predetermined pressure to the fuel rail 108 (*Pursifull*, ¶[0023]), coupling gaseous fuel pressure regulators in the fuel system of Pursifull to supply fuel to the fuel rail 108 would be illogical.

In addition to the above, in maintaining the rejections of claims 1, 11, and 21, the Examiner asserted that “Sugimoto is not being modified by Gashose. Rather, *the modified Pursifull* is being modified by Gashose. The modified Pursifull does not disclose a fuel regulator and as far as is concerned with its modification of Sugimoto, it simply includes a ‘pressure reduction device 72’ and an off-board propane tank system.” *Examiner’s Answer*, p. 15. (emphasis original). The Examiner also contended that

“[w]hen choosing such a device one of ordinary skill in the art would look for one that is not only common and cheap, but well-known and effective.” *Id.* at p. 16. The Examiner argued that “[t]hese qualities are all supplied by the twin stage devices shown in Gashose” and that “[t]hese devices would provide their benefits regardless of whatever on board conditions exist in the generator in question, they would not break the system nor would they do anything other than benefit it.” *Id.* Further, in response to Appellant’s assertion that the onboard “fuel pressure regulator 62 and pressure reducing device 72 in Sugimoto are a very specific structure/arrangement that provide fuel pressure regulation for a fuel system F” (*Appeal Brief*, p. 11), the Examiner asserted that “appellant is arguing against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references.” *Examiner’s Answer*, p. 16. (citations omitted).

However, “*all* of the relevant teachings of the cited references must be considered in determining what they fairly teach to one having ordinary skill in the art.” *In re Mercier*, 515 F.2d 1161, 1165 (CCPA 1975) (emphasis in original). “The relevant portions of a reference include not only those teachings which would suggest particular aspects of an invention to one having ordinary skill in the art, but also those teachings which would lead such a person away from the claimed invention.” *Id.* at 1166. “It is impermissible... to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 448 (Fed. Cir. 1986). Full appreciation of a statement in a reference requires consideration of the context in which the statement was made. *Id.* An Examiner must view a reference in its entirety and cannot ignore portions of a reference that argue against unpatentability. *See id.*

Initially, as stated in more detail above, modifying Pursifull to include a gaseous fuel pressure regulator would not be obvious since the fuel system of Pursifull provides liquid fuel to the fuel rail 108. Thus, incorporating a twin stage fuel pressure regulator from GasHose into the system of Pursifull would not be obvious. Further, the Examiner must view Sugimoto “in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” *See MPEP §2141.02(VI)* (emphasis original) (citing

W.L. Gore & Assoc., Inc. v. Garlock, Inc., 721 F.2d 1540 (Fed. Cir. 1983)). Contrary to the Examiner's statement above, Appellant is not merely "attacking references individually" but is asserting what each reference fairly suggests to one skilled in the art. See *Bausch & Lomb, Inc.*, 796 F.2d at 448. Since the teachings of Sugimoto require that two-stage pressure regulation is provided using fuel pressure regulator 62 located on-board a generator (*Sugimoto*, FIG. 1), Sugimoto teaches away from substituting pressure reducing device 72 with a twin stage regulator for external fuel bottle 71. Since such substitution would be unnecessary and duplicative of what Sugimoto already discloses, incorporating a twin stage regulator would not "provide their benefits regardless of whatever on-board conditions exists in the generator in questions" as asserted by the Examiner on page 16 of the Examiner's Answer, and may actually cause undesirable pressure reduction of fuel from external fuel bottle 71. Further, incorporating external fuel bottle 71 of Sugimoto into the vehicle of Pursifull would impede transportation of the vehicle. Thus, incorporating the external fuel bottle 71 and a twin stage regulator of GasHose into the fuel system of Pursifull as proposed by the Examiner would not be obvious absent improper hindsight gleaned from the present application. As stated in the MPEP, in arriving at a conclusion of obviousness, "impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art." *MPEP* §2142.

In addition, the Examiner improperly introduced the following references as showing "the state of the art" in the Examiner's Answer: "Champion Power Equipment, 'How-To: Dual Fuel Generator Start-Up,' <https://www.youtube.com/watch?v=CMW2nxPnWpE>, Jun 1st, 2014" (hereinafter - "Champion How-To"); "Chuck Webb, 'Yamaha ef2000is is running on the propane quick connect pulling the Coleman air conditioner.' <https://www.youtube.com/watch?v=L6TB9nqbqtg>, Sep. 24th, 2017" (hereinafter - "Chuck Webb"); "Bassguitarist1985, 'Yamaha EF2000iSTri-Fuel Kit: Final Assembly & Gasoline Break-In,' <https://youtu.be/dTawH4CoK2o>, Jan. 4th, 2014" (hereinafter - "Bassguitarist1985"); and "Bigredd110, 'Sportsman 7500 Watt Dual Fuel Generator with Electric Start,' <https://www.youtube.com/watch?v=5RQRgUG8OeQ>, Feb. 23rd, 2014" (hereinafter - Bigredd110). *Examiner's Answer*, pp. 10-11. According to the Examiner, these references are "important for the future discussions to see exactly

what one of ordinary skill in the art would have in mind when dealing with these devices and what they would know about them.” *Id.* at p. 11.

Appellant notes that none of Champion How-To, Chuck Webb, Bassguitarist1985, nor Bigredd110 were previously applied or discussed as part of the rejection of claim 1, 11, or 21 under 35 U.S.C. §103 in the Final Office Action mailed October 28, 2020. As such, the Examiner’s reliance on Champion How-To, Chuck Webb, Bassguitarist1985, and Bigredd110 as “important for the future discussions to see exactly what one of ordinary skill in the art would have in mind” (*Examiner’s Answer*, p. 11) as a basis for rejection claims 1, 11, and 21 is improper. If the Examiner is now attempting to apply a new ground of rejection, such new grounds of rejection must be “prominently identified in the ‘Grounds of Rejection to be Reviewed on Appeal’ section under the subheading ‘New Grounds of Rejection’ of the answer.” *MPEP §1207.03* (Even if the prior art reference is cited to support the rejection in a minor capacity, it should be positively included in the statement of rejection and be designated as a new ground of rejection. *In re Hoch*, 428 F.2d 1341, 1342 n.3, 166 USPQ 406, 407 n.3 (CCPA 1970).). Since the Examiner did not make any statements as to what is “well-known” in the art in the Final Office Action mailed October 28, 2020 that was challenged by the Appellant in the Appeal Brief (*See MPEP §1207.03(a)(II)*), the Examiner does not have a license thereby to freely base a rejection on Champion How-To, Chuck Webb, Bassguitarist1985, or Bigredd110 in the Examiner’s Answer – and particularly so without even identifying the new rejection in accordance with the MPEP.

Regardless of the above, none of Champion How-To, Chuck Webb, Bassguitarist1985, and Bigredd110 disclose a generator comprising either two regulators or a single dual-stage regulator located off board a generator. Initially, the Examiner did not rely on Bigredd110 as disclosing two pressure regulators or a dual-stage regulator. *See Examiner’s Answer*, p. 11; *see also Bigredd110*, 0:01, 1:40. Despite the Examiner’s assertion that Champion How-To discloses “a dual-stage regulator (i.e. two regulators in one) attached to a propane tank at 1:49” (*Examiner’s Answer*, p. 10), Champion How-To does not disclose a dual-stage regulator, but instead discloses one single stage regulator coupled to a fuel tank. *Champion How-To*, 1:49, 4:30. While the Examiner stated that Chuck Webb discloses that a “Yamaha EF2000is is being modified to operate as a dual

fuel engine with a propane connection and typical propane regulator system of two regulators” (*Examiner’s Answer*, p. 10), Chuck Webb does not disclose two regulators but instead discloses a single pressure regulator located off-board a generator. *Chuck Webb*, 0:01, 3:09. Bassguitarist1985 discloses a Yamaha EF2000iS generator with a demand regulator mounted on-board the generator. *Bassguitarist1985*, 0:30, 2:20.

Further, while the Examiner stated that Chuck Webb’s “Yamaha EF2000iS is known to be modified in this manner since at least 2014 as per Bassguitarist1985” (*Examiner’s Answer*, p. 10), Chuck Webb is not available as prior art to the present application. The present application was filed on November 15, 2018, but is a continuation of, and claims priority to, U.S. Patent Application Serial No. 14/738,060, filed on June 12, 2015. Accordingly, the effective filing date for the present application is June 12, 2015. Chuck Webb provides a publication date of September 24, 2017 and thus does not antedate the present application which has an earlier effective filing date of June 12, 2015. Thus, Chuck Webb is not prior art to the claimed invention and is not relevant to support a rejection under 35 U.S.C. §103 with respect to the present application. *See 35 U.S.C. §103*.

Since reliance on Champion How-To, Chuck Webb, Bassguitarist1985, and Bigredd110 to show the “state of the art” in the Examiner’s Answer is improper, the references do not disclose a generator comprising either two regulators or a single dual-stage regulator located off board the generator, and Chuck Webb is not prior art to the present application, their disclosures do not remedy the deficiencies in the combination of Pursifull, Sugimoto, and GasHose. Thus, the cited art fails to teach or suggest a generator and fuel delivery system comprising a fuel regulator system located off board the generator – i.e., of both the primary pressure regulator and secondary pressure regulator being located off board the dual fuel generator (claim 1) and/or both a first stage and second stage being located off board the generator (claims 11 and 21).

In light of the above, the Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. §103 with respect to claims 1, 11, or 21. No combination of Pursifull, Sugimoto, and GasHose teaches or suggests that which is called for in claims 1, 11, or 21. Accordingly, Appellant respectfully requests reversal of the rejection of claim

1, 11, and 21 under 35 U.S.C. §103, along with the rejection of all claims dependent therefrom.

Rejection under 35 U.S.C. §103 over Pursifull in view of Sugimoto, GasHose, and Nooutage.com

Claims 9 and 15

The Examiner rejected dependent claims 9 and 15 under 35 U.S.C. §103 as being unpatentable over Pursifull in view of Sugimoto, GasHose, and further in view of Nooutage.com (Aug. 27th, 2006, <http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm>).

In the Appeal Brief, Appellant argued that the combination of Pursifull, Sugimoto, GasHose, and Nooutage.com does not teach or suggest an arrangement as called for in claims 9 and 15 where a regulator mounting device secures to the collar of a pressurized fuel container so that primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar. More specifically, Appellant argued that neither GasHose nor Nooutage.com teaches the arrangement called for in claims 9 and 15 – as instead these references teach (at best) a single primary pressure regulator positioned between (and shared by) a pair of pressurized fuel containers and that is attached to the containers via a connecting rod extending between the collars. *Appeal Brief*, p. 13; *See GasHose and Nooutage.com*. Appellant further argued that Nooutage.com does not disclose that a regulator mounting device secures to a collar of a single pressurized fuel container since the connecting rod disclosed by Nooutage.com simply rests on the pair of pressurized fuel containers to hold the single primary pressure regulator therebetween. *Id.*

In Maintaining the rejection of claims 9 and 15, the Examiner asserted regarding Nooutage.com that “while the mounting bracket ‘rests’ on the collars, would be considered ‘secured’ by gravity and friction: there is no specification that being ‘secured’ requires anything more than this. No fasteners or other system are specified in the claims. If the device is maintaining attachment then it is ‘securing’ it.” *Examiner’s Answer*, p. 17. The Examiner also provided an annotated picture of Nooutage.com by

adding an arrow pointing to a single primary pressure regulator and adding text of “Two regulators” adjacent the arrow. *Id.*; *See Nooutage.com*.

Contrary to the Examiner’s assertion, Nooutage.com does not disclose a regulator mounting device secured to a collar of a pressurized fuel container, as called for in claims 9 and 15. As set forth in the MPEP, “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.’ *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).” *MPEP* §2143.03. “The subject matter of a properly construed claim is defined by the terms that limit the scope of the claim when given their broadest *reasonable* interpretation.” *Id.* (emphasis added). By asserting that gravity and friction can “secure” the connecting rod of Nooutage.com to the collar of the pressurized fuel container, the Examiner failed to give the word “secures” of claims 9 and 15 its broadest *reasonable* interpretation. That is, since the regulator mounting device of claim 9 and 15 could be placed on a collar of a pressurized fuel container, a rejection of the claims based on a conclusion that the connecting rod of Nooutage.com rests on a collar of a pressurized fuel container would fail to properly consider the claim limitation “secures” in judging the patentability of the claims. *MPEP* §2143.03.

Further, MPEP §2111 states that “the meaning given to a claim term must be consistent with the ordinary and customary meaning of the term (unless the term has been given a special definition in the specification), and must be consistent with the use of the claim term in the specification and drawings... [and] the broadest reasonable interpretation of the claims must be consistent with the interpretation that those skilled in the art would reach.” *MPEP* §2111 (citing *In re Cortright*, 165 F.3d 1353, 1359 (Fed. Cir. 1999)). In the present case, a person having ordinary skill in the art would readily recognize that the term “secure,” in the context of a regulator mounting device that secures to a pressurized fuel container, means “to make fast.” *See* “secure,” *Merriam-Webster Dictionary*, 2021, <https://www.merriam-webster.com/dictionary/secure> (1 November 2021). Further, one skilled in the art would understand that the term “fast” means “firmly fixed” or “not easily freed.” *See* “fast,” *Merriam-Webster Dictionary*, 2021, <https://www.merriam-webster.com/dictionary/fast> (1 November 2021).

The plain meaning of “secure” as being “to make fast” (i.e. firmly fixed or not easily freed) is consistent with the use of the term “secure” as disclosed in the

Specification, which discloses that “[r]egulator mounting bracket 46 has securing mechanism 48 to secure to collar 136” of pressurized fuel container 34 to “hold regulator mounting bracket 46 to collar 136”. *Specification*, ¶[0047]. When given the term “secures” its proper broadest reasonable interpretation consistent with the requirements of MPEP §2111, it is clear that Nooutage.com fails to teach or suggest that a regulator mounting device is secured to a pressurized fuel container. That is, contrary to the Examiner’s contention, a skilled artisan would not conclude that a connective rod resting on collars to be “firmly fixed” to the collars or “not easily freed” because it is held by gravity and friction. Rather, the fact that only gravity and its associated friction is holding the connecting rod in place shows that the connecting rod is clearly easy to remove from the collars. Accordingly, the Examiner’s rejection of the claims based on a connecting rod resting on the collars in Nooutage.com failed to properly consider the term “secures” in judging the patentability of claims 9 and 15, which call for a regulator mounting device that secures to a collar of a pressurized fuel container. *See MPEP §2143.03*.

Also, the connecting rod of Nooutage.com is not secured to a collar of a pressurized fuel container, as would be required to obviate claim 9 or 15, since the connecting rod would clearly fall off the collar of the single pressurized fuel container in Nooutage.com. Further, the Examiner’s annotated picture of Nooutage.com adding a label of “Two regulators” is unsupported by the disclosure of Nooutage.com, as (at best) Nooutage.com discloses a single primary pressure regulator positioned between (and shared by) a pair of pressurized fuel containers. *Nooutage.com*. Since the single primary pressure regulator is positioned along a connecting rod straddling a pair of pressurized fuel containers (*id.*), Nooutage.com does not disclose primary and secondary pressure regulators positioned along an outer periphery of a collar, as called for in claims 9 and 15. (emphasis added). That is, Nooutage.com discloses that a single primary pressure regulator hangs from the connecting rod centrally between the two pressurized fuel containers. Thus, Nooutag.com provides no teaching or suggestion of positioning a primary and a secondary pressure regulator adjacent each other along an outer periphery of a collar of a pressurized fuel container, as called for in claims 9 and 15.

In light of the above, the Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. §103 with respect to claims 9 or 15. No combination of Pursifull, Sugimoto, GasHose and Nooutage.com teaches or suggests that which is called for in claims 9 or 15. Accordingly, Appellant respectfully requests reversal of the rejection of claim 9 and 15 under 35 U.S.C. §103, along with the rejection of all claims dependent therefrom.

CONCLUSION

For at least the reasons set forth above, that which is called for in claims 1-17, 21-22, and 24 is not taught or suggested in the art of record or a combination thereof.

As such, Appellant believes that claims 1-17, 21-22, and 24 are patentably distinct over the art of record.

Appellant appreciates the Board's consideration of these Remarks and respectfully requests timely issuance of a Notice of Allowance.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #
16/191,503

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ATTORNEY DOCKET #
CET1090.070

Title of Invention

DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE

Application Information

APPLICATION TYPE Utility - Nonprovisional Application
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 6187

FILED BY Robyn Templin

PATENT CENTER # 60380104

AUTHORIZED BY Andrew Stark

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FILING DATE 11/15/2018

CORRESPONDENCE ADDRESS -

FIRST NAMED INVENTOR Mark J. Sarder

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PAYMENT AUTHORIZED BY
Robyn Templin

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DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2021.11.02 Reply Brief.pdf	14	Reply Brief Filed	188 KB

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Application Serial No: 16/191,503**

Attorney Docket No: CET1090.070

Customer Number: 26629

Date of Electronic Notification: 09/07/2021

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/191,503	11/15/2018	Mark J. Sarder	CET1090.070	6187
26629 7590 09/07/2021 ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS) 136 S WISCONSIN ST PORT WASHINGTON, WI 53074			EXAMINER LATHERS, KEVIN ANTHONY	
			ART UNIT	PAPER NUMBER
			3747	
			NOTIFICATION DATE	DELIVERY MODE
			09/07/2021	ELECTRONIC

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Application Number: 16/191,503

Filing Date: 15 Nov 2018

Appellant(s): Sarder et al.

Timothy J. Ziolkowski, Andrew C. Stark
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 03/29/2021. The Examiner's Answer to Appeal

Brief mailed 06/29/2021 is vacated due to an error.

Attachments: PTO-1449; PTO-892.

(1) Grounds of Rejection to be Reviewed on Appeal

Every ground of rejection set forth in the Office action dated 10/28/2020 from which the appeal is taken is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

The following ground(s) of rejection are applicable to the appealed claims.

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application,

or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(I)(1) - 706.02(I)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

2. Claims 1-17 and 21-22 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 10,221,780. Although the claims at issue are not identical, they are not patentably distinct from each other because the limitations of claims 1-17 and 21-23 are substantially the same to an anticipatory or obvious degree as those in '780.

Claim Rejections - 35 USC § 103

5. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

6. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention

and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 6, 10-13, 16, and 21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Pursifull et al (US 2011/0168133) in view of Sugimoto et al(US 2007/0137591), and further in view of GasHoseandRegulators (May 17th, 2014,

<https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/>), hereinafter

“Gashose.” For the purposes of ease of finding information, the individual pages of Gashose will be attached, but the citation includes the entirety of the website.

8. Regarding claims 1, 11, 12, 16, and 21-23 Pursifull discloses a dual fuel generator and fuel delivery system, as well as a method for its operation, (Fig. 3, shown dual fuel engine) comprising:

a dual fuel generator 102 configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line (Para. [0040], the dual fuel engine comprises pressurized gaseous fuel and liquid fuel); and a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line (Para. [0025], [0028], and [0066], wherein a three-way valve and lockout apparatus determine which fuel flows to the dual fuel generator).

9. Pursifull fails to disclose a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising: a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the fuel supplied from the pressurized fuel source to a reduced pressure; and a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to a desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator.

10. Sugimoto discloses a dual fuel engine and delivery system (Fig. 1, as shown) wherein the system includes an off-board gaseous fuel system (Fb) which includes an off-board pressure regulator 72 which feeds fuel into an engine system 1 which includes another pressure regulator 62 – it is noted in Fig. 5 of Sugimoto that the coupling point 14 appears to be a typical propane tank pipe connector. The inclusion of pressure reduction devices for the gasification of liquid-held fuel allows for an effective cooling of the fuel system and systems (Para. [0010]) while allowing the dual fuel engine to be powered by an external fuel tank attached to it in an off board fashion such as in emergency situations (Para. [0002]).

11. Therefore, it would have been obvious to one of ordinary skill in the art before the filing date of the invention to modify the device of Pursifull with the pressure regulators and gaseous fuel system methods of Sugimoto in order to improve the cooling of the fuel system parts through pressure reduction as well as regulate the pressure from an external attached fuel tank which allows the dual fuel engine system to be used in varying situations such as emergency ones using an external fuel source.

12. With regards to the inclusion of a dual-pressure regulator in the off-board fuel system of the modified Pursifull: Sugimoto does not disclose the exact details of its off-board fuel system, such as the type of tank and regulator it contains, simply showing a diagram of such devices (Fig. 1) and a typical gaseous fuel tank connector (14 in Fig. 5). However, Gashose discloses making use of twin stage regulators (i.e. two regulators in series) for usage with off-board fuel systems (e.g. a propane tank for a fuel generator as noted in “First Stage and Second Stage Low Pressure Custom Assembly” under “Low Pressure Regulators”), wherein such regulators ensure even pressure output from the regulators and lower possibilities of freeze-ups (“Why use a twin stage regulator?” heading).

13. Therefore, it would have been obvious to one of ordinary skill in the art to modify the generator system of the modified Pursifull with a dual-regulator system such as disclosed in Gashose because doing so would allow for a more even output control and a reduction in freeze-ups from an off-board fuel system (such as a propane tank).

14. **Regarding claims 6 and 13**, the modified Pursifull discloses the dual fuel generator and fuel delivery system of claims 1 and 11, further comprising: a first end of a quick-connect hose coupling coupled to an outlet of the secondary pressure regulator; and a second end of the quick-connect hose coupling coupled to an inlet of the gaseous fuel line to mate with the first end of the quick-connect hose coupling to couple the secondary pressure regulator to the gaseous fuel line (Fig. 1 of Sugimoto modifies Pursifull to include an external source of gaseous fuel and regulators makes use of a connection hose coupling 14, and wherein Gashose's "Propane Quick connect" notes the use of a quick-connect hose with its regulators in order for ease of connection and disconnection along with maintaining gas safety of the generators, such as those in "generator and heater hoses").

15. **Regarding claim 10**, the modified Pursifull discloses the dual fuel generator and fuel delivery system of claims 1 and 11, wherein the primary and secondary pressure regulators are integral components of a dual stage pressure regulator (as per the modifications using Gashose's regulators above, including the dual regulator twin stage regulator systems under "Low Pressure Regulators").

16. **Claims 7-9, 14, 15, 17, and 22 is/are rejected under 35 U.S.C. 103 as being unpatentable over Pursifull in view of Sugimoto, Gashose, and further in view of Nooutage.com (Aug. 27th, 2006, <http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm>).**

17. **Regarding claims 7-9, 14, 15, and 17**, the dual fuel generator and fuel delivery system of claim 1, discloses the fuel source having a collar (as per Gashose modifications, the system is for a generic propane/natural gas system which include containers having collars as per "Low Pressure Regulators" wherein typical pressurized gaseous fuel tanks are shown), but fails to disclose further comprising a regulator mounting device secured to the pressurized fuel source with at least the secondary pressure regulator mounted on the regulator mounting device, and wherein the regulator mounting device

secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

18. Pursifull and Sugimoto fail to disclose how their regulators are mounted. Gashose shows a “custom assembly” for mounting the regulators to a wall and a “Universal Mounting Bracket” which appears to be for mounting to propane tank collars but does not specifically disclose such.

19. Nooutage discloses a regulation system for a gaseous off-board fuel tank system for a generator (as shown and listed as “dual-mode generator” having a “propane quick connect kit”), wherein the system of Nooutage is shown with a mounting bracket on the collar of the propane tanks supporting the regulator (“Hose Connections to Portable Tanks” picture), the bracket being similar to the one disclosed in Gashose (the “universal mounting bracket” and the vertical bracket shown on the “Dual Tank Automatic Changeover Low Pressure Regulator Assembly”).

20. Therefore, it would have been obvious to one of ordinary skill in the art before the filing date of the invention to modify the modified Pursifull with the mounting brackets of Nooutage as the system already discloses similar mounting brackets and fuel tanks with collars, wherein the inclusion of this mounting bracket in place of or in addition to the bracket of the modified Pursifull is nothing more than a simple substitution of one known element for another, and wherein mounting to a propane tank collars would be both easy, economical, and easily performed. As both components perform functions well-known in the art (attaching and maintaining tank regulators) and the substitution would have been a predictable solution with expected results, then the modification would have been obvious to one of ordinary skill in the art. *Ruiz v. AB Chance Co.*, 357 F.3d 1270, 69 USPQ2d 1686 (Fed. Cir. 2004), MPEP 2143(B).

Allowable Subject Matter

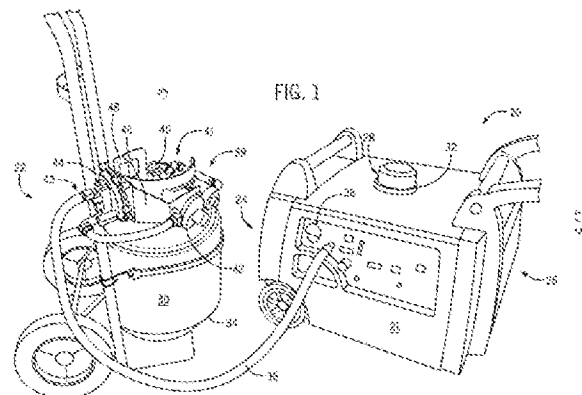
21. Claims 2-5 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims if the Non-Statutory Double Patenting rejection presented above is also overcome.

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The rejection in the Final Rejection mailed 10/28/2020 under 112(a), as it was applied to claim 24, is withdrawn.

(2) Response to Argument

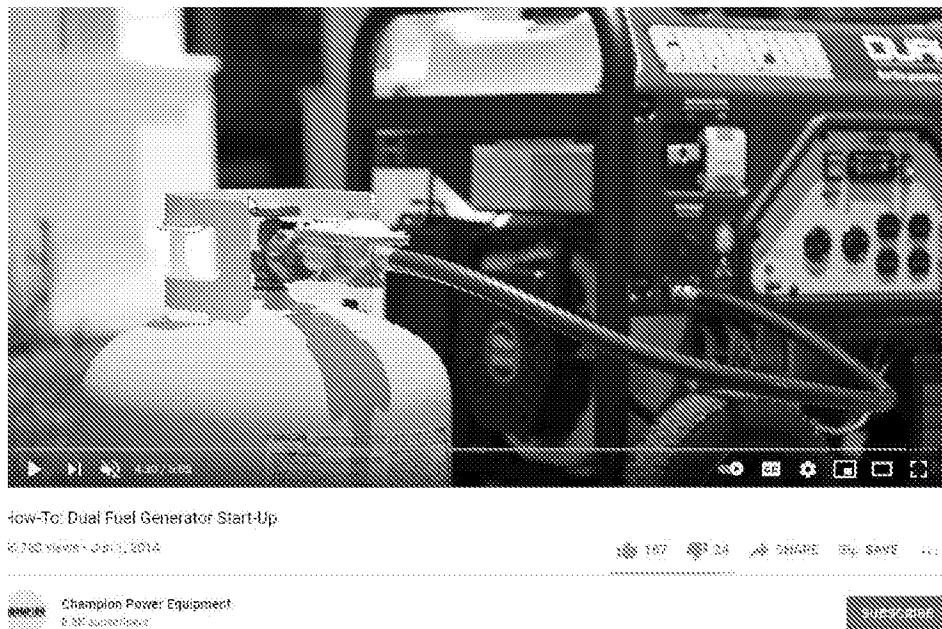
22. **With regards to appellant's arguments, it would be important to note the *state of the art*.** This will be followed by a discussion on the rejection and its art and then address the arguments put forth by appellant. While appellant's disclosure shows a depiction of a generator connected to a propane tank in Fig. 1, reproduced below, most of the prior art patents – not just of record, but as a generality – contain merely stylized depictions and diagrams for the sake of simplicity. Thus it is important to make note of what these depictions are showing and what is known in the art: when a piece of art states a term such as “propane bottle” or “external fuel tank” those are likely, and implicitly, to mean devices such as a typical propane tank. When a dual fuel generator is mentioned, it is often one similar to Fig. 1's.



23. In this case, the key art being discussed is noted in appellant's disclosure to be "dual fuel generators, and more particularly, to an apparatus and method for delivering liquid fuel and gaseous fuel to a dual fuel generator" (§ [0002] of the instant invention's disclosure).

24. Turning to the state of the art, we have devices such as:

- a. A Champion Dual Fuel Generator shown on June 1st, 2014 with a selector switch at 0:19, gasoline fill at 1:07, a dual-stage regulator (i.e. two regulators in one) attached to a propane tank at 1:49, the setup being shown at 4:30 depicted below (Champion Power Equipment, "How-To: Dual Fuel Generator Start-Up," <https://www.youtube.com/watch?v=CMW2nxPnWpE>, Jun 1st, 2014).



- b. Yamaha EF2000is is being modified to operate as a dual fuel engine with a propane connection and typical propane regulator system of two regulators in Webb (Chuck Webb, "Yamaha ef2000is is running on the propane quick connect pulling the Coleman air conditioner." <https://www.youtube.com/watch?v=LGTB9ngbqtg>, Sep. 24th, 2017). Note that the Yamaha EF2000is is known to be modified in this manner since at least 2014 as per Bassguitarist1985

(Bassguitarist1985, "Yamaha EF2000iSTri-Fuel Kit: Final Assembly & Gasoline Break-In," <https://youtu.be/dTawH4CoK2o>, Jan. 4th, 2014).

c. A Sportsman 7500 Dual Fuel Generator can be seen operating from a propane tank which has a regulator mounted on it in Bigredd110 (Bigredd110, "Sportsman 7500 Watt Dual Fuel Generator with Electric Start," <https://www.youtube.com/watch?v=5RQRgUG8OeQ>, Feb. 23rd, 2014).

25. This is important for the future discussions to see exactly what one of ordinary skill in the art would have in mind when dealing with these devices and what they would know about them.

26. **A quick summation of the art used in the rejections will be noted following the above state of the art discussion.** The details of this art and their rejections is above. Below is just a quick reiteration of what exactly is in the rejections in light of the shown state of the art.

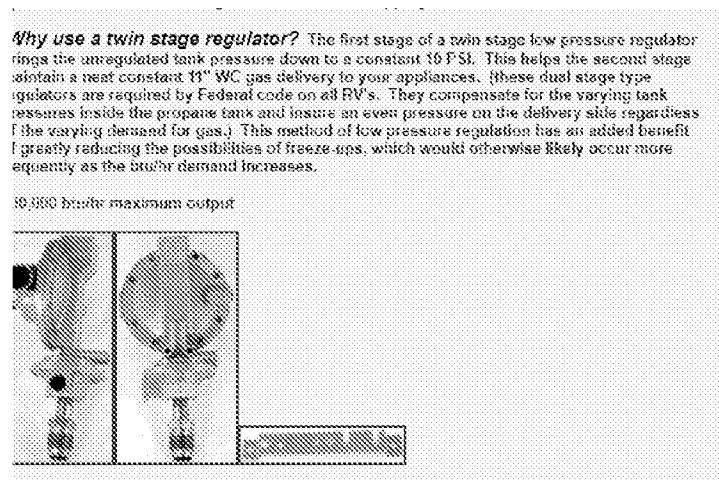
27. Pursifull et al (US 2011/0168133) pertains to "a fuel system that provides versatility so that different fuel types can be injected for combustion, if desired" (¶ [0017]). The real crux of its disclosure is that of a method of operating a fuel system (Abstract), but it also happens to show the internals of a dual fuel system, in a diagram level view (Fig. 3), including the fuel switch valves (Fig. 3, tanks 112, 134 and valves 118, 120).

28. Sugimoto et al (US 2007/070137591) shows a more typical representation of a dual fuel engine (¶ [0073], the on board storage differing) in Fig. 2 (note its similarities to the above devices in the art). Sugimoto more specifically pertains to a dual fuel engine generator (Abstract) and includes an external fuel supply Fb with an external fuel supply pressure regulator 72 and connector 14 which then passes through a fuel selector valve 12 (Fig. 1, shown supplies).

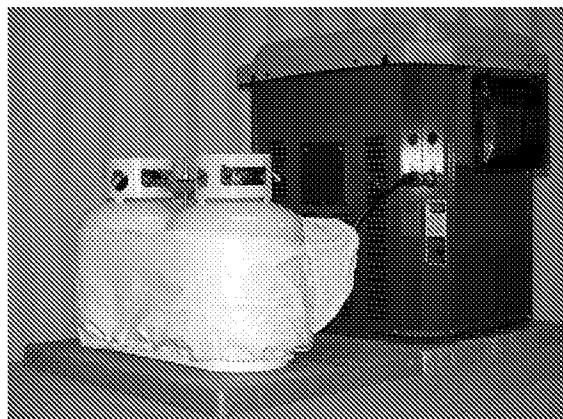
29. GasHoseandRegulators (May 17th, 2014, <https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/>), is an entire

website which pertains to selling and supplying people with gas hoses and regulators for items such as generators making use of propane ("Gas hoses, gas regulators, gas appliance hose, generator connectors, custom length low pressure gas hose, and gas burners from Gas Hoses and Regulators. com"). Specifically Gashose discloses making use of various twin stage regulation devices to facilitate fuel from typical propane tanks

(<https://web.archive.org/web/20140927232814/http://gashosesandregulators.com/lowpressure regulators.html>).



30. Nooutage.com (Nooutage.com, Aug. 27th, 2006, <http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm>) is an entire website dedicated to selling and supplying generators. As noted on its page, it includes "a propane quick connect kit." On its opening page it shows these tanks attached to a generator:



31. And shows a twin regulator mounted to the collar of a propane tank



32. **Thus we can sum up these devices in series:** a dual fuel engine showing a switching valve between liquid and gaseous fuel, but only shows it at a diagram level; a dual fuel engine having a switching valve which shows external pressure regulation for a propane fuel source located off board the system; an online store selling pressure regulators, including twin stage regulators, specifically for off board fuel tanks; and another store sells generators and shows how propane is often connected to the generators.

33. **The rejection in summary in light of this:** *a dual fuel engine is shown without a propane tank detailed (Pursifull), this propane tank is then shown to be obvious in these systems (Sugimoto), and not only obvious but often including dual regulators (Gashose) that are included with their off-board fuel tanks and attached to them (Nooutage.com). These pieces of art are not singular in these ideas and as noted in the state of the art above, their combinations are well-established.*

34. It is noted that appellant has made no arguments pertaining to the Double Patenting rejection. As such, these rejections will not be addressed here.

35. **Arguments presented by appellant are summarized here and addressed in order below:**

- a. *“Failure of Pursifull, Sugimoto, and GasHose to teach Claims 1, 11, and 21,”* on Pg. 7 of the arguments: Appellant asserts that, with regards to Sugimoto, “there is no teaching therein of a fuel regulator system located off board the dual fuel generator – i.e., of both the primary and pressure regulator being located off board.”
- b. Further, appellant asserts that as Sugimoto pertains to an on-board gaseous fuel system together with an off-board gaseous fuel system then there is no reason to modify Sugimoto to have a dual-stage off-board regulator as the device 62 could not be replaced.
- c. Further, appellant argues that the modification of Pursifull and Sugimoto to include a dual stage regulator would constitute improper hindsight as “nothing suggested by the construction of generator 1 in Sugimoto would lead one skill in the art to modify the fuel pressure regulator 62.”
- d. Further, appellant argues that “Sugimoto’s pressure reducing device 72... are a very specific structure/arrangement that provide fuel pressure regulation for a fuel system F.”
- e. *With regards to claims 9 and 15,* appellant argues there “is no indication of any prior art that suggest an arrangement... where a regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other.” And further, that the mounting device does not secure the regulators to a collar since it “rests” on a pair of fuel containers.

34. **With regards to argument a.:** Sugimoto very clearly shows a fuel regulator device located off board its generator in Fig. 1. This device 72 is called a “pressure reducing device” which is exactly the function a pressure regulator performs. Whether or not *the entire* fuel regulation system of Sugimoto is off-board is completely irrelevant for two main reasons: the first is that the claim does not specify there

being no on-board pressure regulation, simply that there exists an off-board pressure regulation; the second being that the proposed modification of Pursifull *is not* wholesale importation of the entirety of Sugimoto. With regards to the rejection, Pursifull *already discloses a dual fuel generator system*. What Pursifull does not discuss or show is how its gaseous fuel system is attached, stored, or operated.

35. Pursifull shows a generator system in Fig. 4 which has “fuel system... liquid fuel and gaseous fuel” (¶ [0011]) which has a fuel rail 108 fed by a liquid fuel tank 112 through a valve 120 and an *undisclosed source of “Fuel 2” which is a gaseous fuel*. The modification of Pursifull with Sugimoto is that of the inclusion of Sugimoto’s off-board propane tank systems *not literally all of Sugimoto*. The pressure regulator 62 does not matter for the purposes of the claim rejection.

36. Further, is noted that the device 72 within Sugimoto is never sated to be a single or dual stage regulator, it is never disclosed in particulars: it is simply disclosed in the most generic term possible, “a pressure reduction device.” This is then why Gashose is a showing of what types of “pressure reducing device” are used and known in the art and why they are used in such off-board propane tank systems.

37. **With regards to b. and c.:** As noted above, Sugimoto is not being modified by Gashose. Rather, *the modified Pursifull* is being modified by Gashose. The modified Pursifull does not disclose a fuel regulator and as far as is concerned with its modification of Sugimoto, it simply includes a “pressure reduction device 72” and an off-board propane tank system. Thus, the question has to be asked: if we are to use a “pressure reduction device” with a propane tank system, which one would be used? Gashose states that it would be a “twin stage regulator”

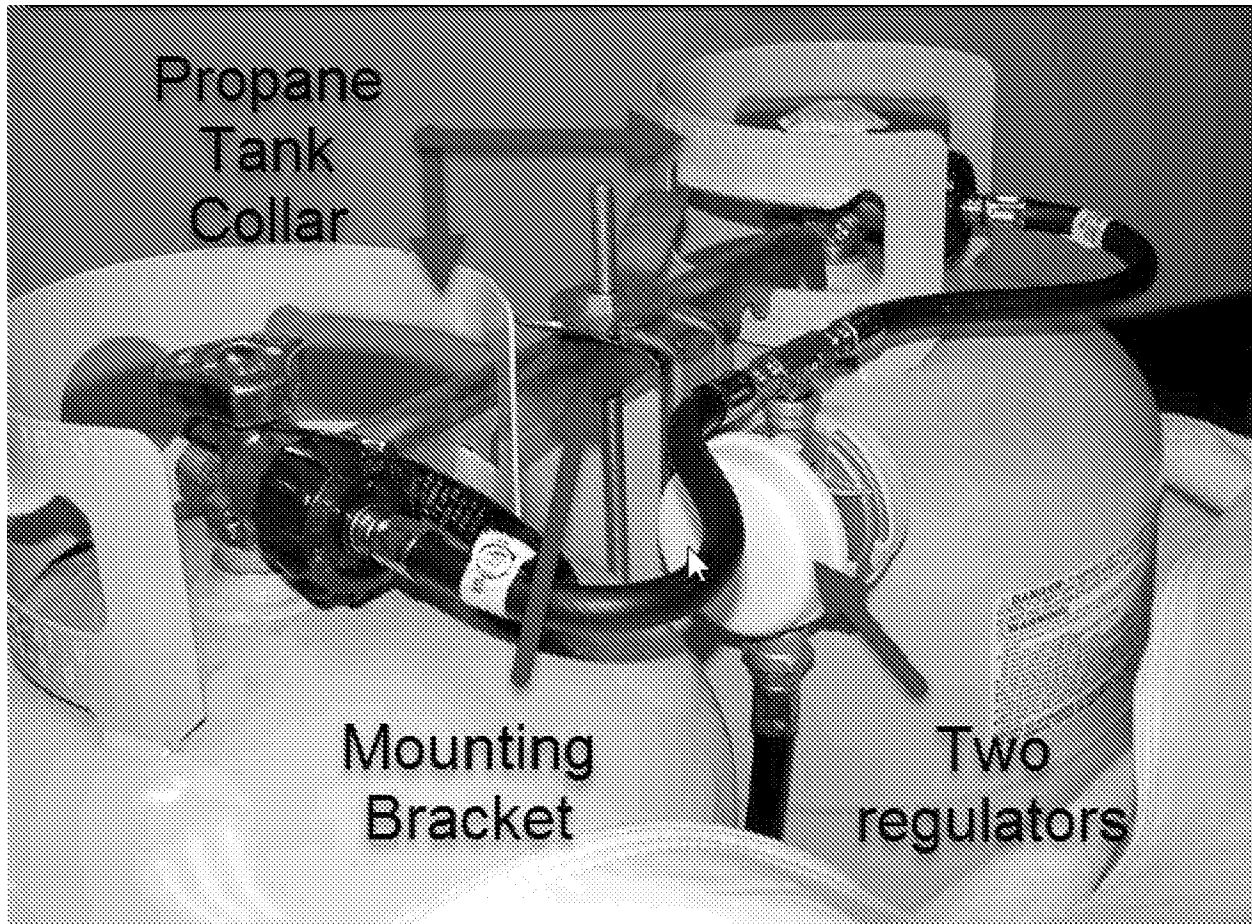
(<https://web.archive.org/web/20140927232814/http://gashosesandregulators.com/lowpressureregulators.html>), under the “Why use a twin stage regulator?” header). It notes these can “compensate for the varying tank pressures inside the propane tank and insure an even pressure on the delivery side regardless of the varying demand for gas” and “reducing the possibilities of freeze-ups.” These benefits of use not only would warrant its inclusion of the modified Pursifull, but, for the sake of argument,

would even warrant its inclusion in Sugimoto as they would supply this benefit *regardless of on-board fuel regulation*. Thus, the regulator 62 is inconsequential to the claim or the rejection.

38. This also ties into *why it is not improper hindsight*. One of ordinary skill in the art when producing the generator of the modified Pursifull, or even the generator of Sugimoto, would need to use some sort of device for 72. The *specific* device is never stated, so one must be chosen. When choosing such a device one of ordinary skill in the art would look for one that is not only common and cheap, but well-known and effective. These qualities are all supplied by the twin stage devices shown in Gashose. These devices would provide their benefits regardless of whatever on-board conditions exist in the generator in question, they would not break the system nor would they do anything other than benefit it.

39. **With regards to d.:** The pressure reducing device 72 of Sugimoto is specific in its usage within the system of Sugimoto, but the actual *specific* device is never stated. Not only is, once again, the entirety of Sugimoto not wholly relevant in this instance, but even in this case the device 72 being a dual stage regulator would not harm Sugimoto or alter its system in any way. Essentially, appellant is arguing against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

40. **With regard to e.:** It is noted the claims make no claim to a single collar or propane tank being absolute, there can be more propane tanks and collars included, so whether or not the propane tank is alone is irrelevant. Further, the picture of Nooutage.com is provided and annotated to show exactly the claims.



41. The tanks have collars, there is a mounting bracket sitting on the collars and attaching the regulators to them wherein the regulators exist “adjacent each other” (and would be even if they were of the type from Gashose), and “along an outer periphery of the collar” wherein the collar is shown having a “periphery” and the regulators are “along it” as this does not include them having to be physically attached to it (this is performed by the mounting bracket). Note that the regulators shown in the pictures are at nearly the same height as the bracket and are in line with the two collars existing between them. Further, while the mounting bracket “rests” on the collars, would be considered “secured” by gravity and friction: there is no specification that being “secured” requires anything more than this. No fasteners or other system are specified in the claims. If the device is maintaining attachment then it is “securing” it.

Art Unit: 3747

42. It is noted that appellants own disclosure simply shows regulators existing mounted on brackets which are spaced outwardly from the collar and in its peripheral area.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/KEVIN A LATHERS/

Conferees:

/LINDSAY M LOW/

Supervisory Patent Examiner, Art Unit 3747

/NATHANIELE WIEHE/

Supervisory Patent Examiner, Art Unit 3700

Requirement to pay appeal forwarding fee. In order to avoid dismissal of the instant appeal in any application or ex parte reexamination proceeding, 37 CFR 41.45 requires payment of an appeal forwarding fee within the time permitted by 37 CFR 41.45(a), unless appellant had timely paid the fee for filing a brief required by 37 CFR 41.20(b) in effect on March 18, 2013.

<i>Notice of References Cited</i>	Application/Control No. 16/191,503	Applicant(s)/Patent Under Reexamination Sarder et al.	
	Examiner KEVIN A LATHERS	Art Unit 3747	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
	A					
	B					
	C					
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	F					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	ChampionPowerEquipment, "How-To: Dual Fuel Generator Start-Up," https://www.youtube.com/watch?v=CMW2nxPnWpeE , Jun 1st, 2014 (Year: 2014) (Year: 2014)
	V	ChuckWebb, "Yamaha ef2000 is running on the propane quick connect pulling the Coleman air conditioner." https://www.youtube.com/watch?v=L6TB9ngqbqig , Sep. 24th, 2017 (Year: 2017) (Year: 2017)
	W	Bassguitarist1985 (Bassguitarist1985, "Yamaha EF2000i STri-Fuel Kit: Final Assembly & Gasoline Break-In," https://youtu.be/dTawH4Cok2o , Jan. 4th, 2014 (Year: 2014) (Year: 2014)
	X	Bigredd110, "Sportsman 7500 Watt Dual Fuel Generator with Electric Start," https://www.youtube.com/watch?v=5RQRgUG80eQ , Feb. 23rd, 2014 (Year: 2014) (Year: 2014)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Index of Claims</i> 	Application/Control No. 16/191,503	Applicant(s)/Patent Under Reexamination Sarder et al.
	Examiner KEVIN A LATHERS	Art Unit 3747

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	08/27/2019	04/22/2020	10/23/2020	06/10/2021					
	1	✓	✓	✓	✓					
	2	✓	○	✓	✓					
	3	✓	○	✓	✓					
	4	✓	○	✓	✓					
	5	✓	○	✓	✓					
	6	✓	✓	✓	✓					
	7	✓	✓	✓	✓					
	8	✓	✓	✓	✓					
	9	✓	✓	✓	✓					
	10	✓	✓	✓	✓					
	11	✓	✓	✓	✓					
	12	✓	✓	✓	✓					
	13	✓	✓	✓	✓					
	14	✓	✓	✓	✓					
	15	✓	✓	✓	✓					
	16	✓	✓	✓	✓					
	17	✓	✓	✓	✓					
	18	-	-	-	-					
	19	-	-	-	-					
	20	-	-	-	-					
	21	✓	✓	✓	✓					
	22	✓	✓	✓	✓					
	23	✓	✓	-	-					
	24			✓	✓					



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/191,503	11/15/2018	Mark J. Sarder	CET1090.070	6187
26629 7590 08/30/2021 ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS) 136 S WISCONSIN ST PORT WASHINGTON, WI 53074			EXAMINER LATHERS, KEVIN ANTHONY	
			ART UNIT	PAPER NUMBER
			3747	
			NOTIFICATION DATE	DELIVERY MODE
			08/30/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

info@zpspatents.com
jmf@zpspatents.com

<i>Applicant-Initiated Interview Summary</i>	Application No. 16/191,503	Applicant(s) Sarder et al.		
	Examiner KEVIN A LATHERS	Art Unit 3747	AIA (First Inventor to File) Status Yes	Page 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
KEVIN A LATHERS	Primary Examiner	Telephonic
Andrew Stark	Attorney	

Date of Interview: 24 August 2021

Issues Discussed:

Other

The Examiner's Answer to Appeal Brief filed 06/29/2021 is vacated A new examiner's answer will be mailed issued in due course.

This is due to an interview with the applicant's representative noting an error in the Examiner's Answer filed 06/29/2021.

/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	
Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04 Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing	

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.



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26629	7590	06/29/2021	EXAMINER	
ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)			LATHERS, KEVIN ANTHONY	
136 S WISCONSIN ST				
PORT WASHINGTON, WI 53074				
			ART UNIT	PAPER NUMBER
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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Application Number: 16/191,503

Filing Date: 15 Nov 2018

Appellant(s): Sarder et al.

Timothy J. Ziolkowski, Andrew C. Stark
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 03/29/2021.

Attachments: PTO-1449; PTO-892.

(1) Grounds of Rejection to be Reviewed on Appeal

Every ground of rejection set forth in the Office action dated 10/28/2020 from which the appeal is taken is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

The following ground(s) of rejection are applicable to the appealed claims.

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file

provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

2. Claims 1-17 and 21-22 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 10,221,780. Although the claims at issue are not identical, they are not patentably distinct from each other because the limitations of claims 1-17 and 21-23 are substantially the same to an anticipatory or obvious degree as those in '780.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

(a) IN GENERAL. — The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 24 is rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications subject to pre-AIA 35 U.S.C. 112, the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 24 pertains to a negative limitation that the “generator is free of any pressure regulator.” Appellant states that the support for this amendment is in ¶ [0024] and [0053] as well as Figs. 1, 4A, and 4B.

5. Fig. 1 shows an exterior of a generator with no indication what is inside it. Figs. 4A and 4B show a diagram of the Propane tank 68 and its attachment to the supply inlet 59 and fails to show any of the regulation devices in the system. Considering that Figs. 4A and 4B do not even show the specified external regulators, there is no reason to assume they are showing a complete and specific listing of all parts, but rather a generalized diagram of fuel flow.

6. ¶ [0024] and [0053] for their part disclose the remotely mounted fuel regulation system but do not pertain to the generator itself nor its included parts. The rest of the disclosure makes no mention of the generator’s inclusion, or lack, of any particular regulators.

7. Therefore, the disclosure does not have support for a generator which must not have any sort of internal fuel regulation. The disclosure makes no mention of the generator being free of it, the drawings do not show it, and the original claims do not contain it. The disclosure pertains to the attachment method to the generator and the external fuel tank and its associated fuel regulators, it does not disclose or pertain to the construction of the generator and any hypothetically included or disallowed parts.

Claim Rejections - 35 USC § 103

5. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory

basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

6. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 1, 6, 10-13, 16, and 21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Pursifull et al (US 2011/0168133) in view of Sugimoto et al (US 2007/0137591), and further in view of GasHoseandRegulators (May 17th, 2014,**

<https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/>), hereinafter

“Gashose.” For the purposes of ease of finding information, the individual pages of Gashose will be attached, but the citation includes the entirety of the website.

8. **Regarding claims 1, 11, 12, 16, and 21-23** Pursifull discloses a dual fuel generator and fuel delivery system, as well as a method for its operation, (Fig. 3, shown dual fuel engine) comprising:

a dual fuel generator 102 configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line (Para. [0040], the dual fuel engine comprises pressurized gaseous fuel and liquid fuel); and a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line (Para. [0025], [0028], and [0066], wherein a three-way valve and lockout apparatus determine which fuel flows to the dual fuel generator).

9. Pursifull fails to disclose a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising: a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the fuel supplied from the pressurized fuel source to a reduced pressure; and a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to a desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator.

10. Sugimoto discloses a dual fuel engine and delivery system (Fig. 1, as shown) wherein the system includes an off-board gaseous fuel system (Fb) which includes an off-board pressure regulator 72 which feeds fuel into an engine system 1 which includes another pressure regulator 62 – it is noted in Fig. 5 of Sugimoto that the coupling point 14 appears to be a typical propane tank pipe connector. The inclusion of pressure reduction devices for the gasification of liquid-held fuel allows for an effective cooling of the fuel system and systems (Para. [0010]) while allowing the dual fuel engine to be powered by an external fuel tank attached to it in an off board fashion such as in emergency situations (Para. [0002]).

11. Therefore, it would have been obvious to one of ordinary skill in the art before the filing date of the invention to modify the device of Pursifull with the pressure regulators and gaseous fuel system methods of Sugimoto in order to improve the cooling of the fuel system parts through pressure reduction as well as regulate the pressure from an external attached fuel tank which allows the dual fuel engine system to be used in varying situations such as emergency ones using an external fuel source.

12. With regards to the inclusion of a dual-pressure regulator in the off-board fuel system of the modified Pursifull: Sugimoto does not disclose the exact details of its off-board fuel system, such as the type of tank and regulator it contains, simply showing a diagram of such devices (Fig. 1) and a typical gaseous fuel tank connector (14 in Fig. 5). However, Gashose discloses making use of twin stage regulators (i.e. two regulators in series) for usage with off-board fuel systems (e.g. a propane tank for a fuel generator as noted in “First Stage and Second Stage Low Pressure Custom Assembly” under “Low

Pressure Regulators”), wherein such regulators ensure even pressure output from the regulators and lower possibilities of freeze-ups (“Why use a twin stage regulator?” heading).

13. Therefore, it would have been obvious to one of ordinary skill in the art to modify the generator system of the modified Pursifull with a dual-regulator system such as disclosed in Gashose because doing so would allow for a more even output control and a reduction in freeze-ups from an off-board fuel system (such as a propane tank).

14. **Regarding claims 6 and 13**, the modified Pursifull discloses the dual fuel generator and fuel delivery system of claims 1 and 11, further comprising: a first end of a quick-connect hose coupling coupled to an outlet of the secondary pressure regulator; and a second end of the quick-connect hose coupling coupled to an inlet of the gaseous fuel line to mate with the first end of the quick-connect hose coupling to couple the secondary pressure regulator to the gaseous fuel line (Fig. 1 of Sugimoto modifies Pursifull to include an external source of gaseous fuel and regulators makes use of a connection hose coupling 14, and wherein Gashose’s “Propane Quick connect” notes the use of a quick-connect hose with its regulators in order for ease of connection and disconnection along with maintaining gas safety of the generators, such as those in “generator and heater hoses”).

15. **Regarding claim 10**, the modified Pursifull discloses the dual fuel generator and fuel delivery system of claims 1 and 11, wherein the primary and secondary pressure regulators are integral components of a dual stage pressure regulator (as per the modifications using Gashose’s regulators above, including the dual regulator twin stage regulator systems under “Low Pressure Regulators”).

16. **Claims 7-9, 14, 15, 17, and 22 is/are rejected under 35 U.S.C. 103 as being unpatentable over Pursifull in view of Sugimoto, Gashose, and further in view of Nooutage.com (Aug. 27th, 2006, <http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm>).**

17. **Regarding claims 7-9, 14, 15, and 17**, the dual fuel generator and fuel delivery system of claim 1, discloses the fuel source having a collar (as per Gashose modifications, the system is for a generic propane/natural gas system which include containers having collars as per “Low Pressure Regulators” wherein typical pressurized gaseous fuel tanks are shown), but fails to disclose further comprising a regulator mounting device secured to the pressurized fuel source with at least the secondary pressure regulator mounted on the regulator mounting device, and wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

18. Pursifull and Sugimoto fail to disclose how their regulators are mounted. Gashose shows a “custom assembly” for mounting the regulators to a wall and a “Universal Mounting Bracket” which appears to be for mounting to propane tank collars but does not specifically disclose such.

19. Nooutage discloses a regulation system for a gaseous off-board fuel tank system for a generator (as shown and listed as “dual-mode generator” having a “propane quick connect kit”), wherein the system of Nooutage is shown with a mounting bracket on the collar of the propane tanks supporting the regulator (“Hose Connections to Portable Tanks” picture), the bracket being similar to the one disclosed in Gashose (the “universal mounting bracket” and the vertical bracket shown on the “Dual Tank Automatic Changeover Low Pressure Regulator Assembly”).

20. Therefore, it would have been obvious to one of ordinary skill in the art before the filing date of the invention to modify the modified Pursifull with the mounting brackets of Nooutage as the system already discloses similar mounting brackets and fuel tanks with collars, wherein the inclusion of this mounting bracket in place of or in addition to the bracket of the modified Pursifull is nothing more than a simple substitution of one known element for another, and wherein mounting to a propane tank collars would be both easy, economical, and easily performed. As both components perform functions well-known in the art (attaching and maintaining tank regulators) and the substitution would have been a

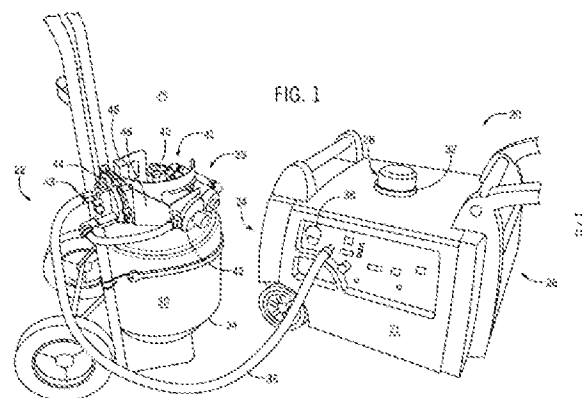
predictable solution with expected results, then the modification would have been obvious to one of ordinary skill in the art. *Ruiz v. AB Chance Co.*, 357 F.3d 1270, 69 USPQ2d 1686 (Fed. Cir. 2004), MPEP 2143(B).

Allowable Subject Matter

21. Claims 2-5 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims if the Non-Statutory Double Patenting rejection presented above is also overcome.

(2) Response to Argument

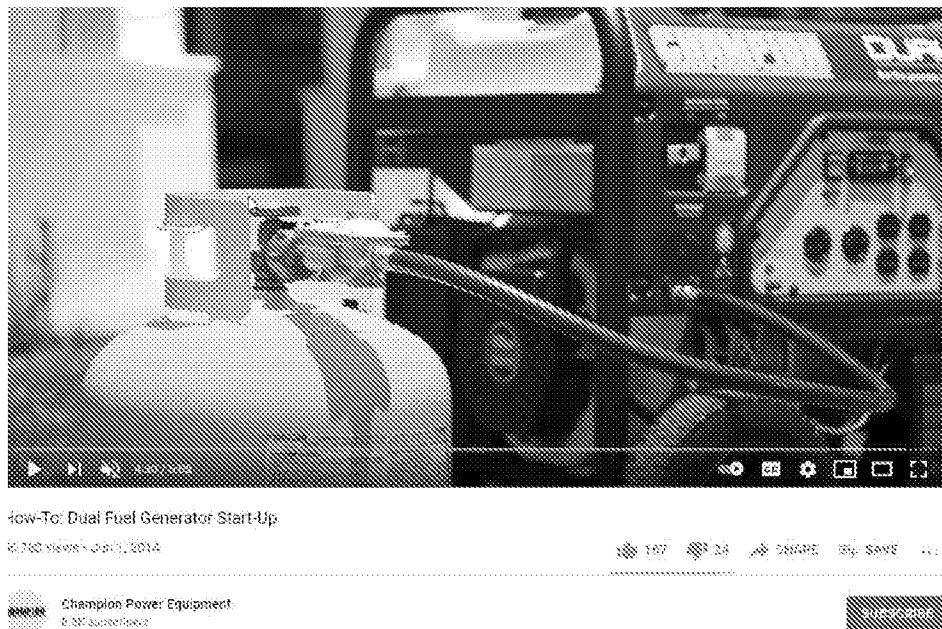
22. **With regards to appellant's arguments, it would be important to note the *state of the art*.** This will be followed by a discussion on the rejection and its art and then address the arguments put forth by appellant. While appellant's disclosure shows a depiction of a generator connected to a propane tank in Fig. 1, reproduced below, most of the prior art patents – not just of record, but as a generality – contain merely stylized depictions and diagrams for the sake of simplicity. Thus it is important to make note of what these depictions are showing and what is known in the art: when a piece of art states a term such as “propane bottle” or “external fuel tank” those are likely, and implicitly, to mean devices such as a typical propane tank. When a dual fuel generator is mentioned, it is often one similar to Fig. 1's.



23. In this case, the key art being discussed is noted in appellant's disclosure to be "dual fuel generators, and more particularly, to an apparatus and method for delivering liquid fuel and gaseous fuel to a dual fuel generator" (§ [0002] of the instant invention's disclosure).

24. Turning to the state of the art, we have devices such as:

- a. A Champion Dual Fuel Generator shown on June 1st, 2014 with a selector switch at 0:19, gasoline fill at 1:07, a dual-stage regulator (i.e. two regulators in one) attached to a propane tank at 1:49, the setup being shown at 4:30 depicted below (Champion Power Equipment, "How-To: Dual Fuel Generator Start-Up," <https://www.youtube.com/watch?v=CMW2nxPnWpE>, Jun 1st, 2014).



- b. Yamaha EF2000is is being modified to operate as a dual fuel engine with a propane connection and typical propane regulator system of two regulators in Webb (Chuck Webb, "Yamaha ef2000is is running on the propane quick connect pulling the Coleman air conditioner." <https://www.youtube.com/watch?v=LGTB9ngbqtg>, Sep. 24th, 2017). Note that the Yamaha EF2000is is known to be modified in this manner since at least 2014 as per Bassguitarist1985

(Bassguitarist1985, "Yamaha EF2000iSTri-Fuel Kit: Final Assembly & Gasoline Break-In," <https://youtu.be/dTawH4CoK2o>, Jan. 4th, 2014).

c. A Sportsman 7500 Dual Fuel Generator can be seen operating from a propane tank which has a regulator mounted on it in Bigredd110 (Bigredd110, "Sportsman 7500 Watt Dual Fuel Generator with Electric Start," <https://www.youtube.com/watch?v=5RQRgUG8OeQ>, Feb. 23rd, 2014).

25. This is important for the future discussions to see exactly what one of ordinary skill in the art would have in mind when dealing with these devices and what they would know about them.

26. **A quick summation of the art used in the rejections will be noted following the above state of the art discussion.** The details of this art and their rejections is above. Below is just a quick reiteration of what exactly is in the rejections in light of the shown state of the art.

27. Pursifull et al (US 2011/0168133) pertains to "a fuel system that provides versatility so that different fuel types can be injected for combustion, if desired" (¶ [0017]). The real crux of its disclosure is that of a method of operating a fuel system (Abstract), but it also happens to show the internals of a dual fuel system, in a diagram level view (Fig. 3), including the fuel switch valves (Fig. 3, tanks 112, 134 and valves 118, 120).

28. Sugimoto et al (US 2007/070137591) shows a more typical representation of a dual fuel engine (¶ [0073], the on board storage differing) in Fig. 2 (note its similarities to the above devices in the art). Sugimoto more specifically pertains to a dual fuel engine generator (Abstract) and includes an external fuel supply Fb with an external fuel supply pressure regulator 72 and connector 14 which then passes through a fuel selector valve 12 (Fig. 1, shown supplies).

29. GasHoseandRegulators (May 17th, 2014, <https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/>), is an entire

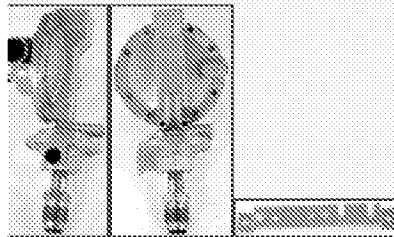
Art Unit: 3747

website which pertains to selling and supplying people with gas hoses and regulators for items such as generators making use of propane ("Gas hoses, gas regulators, gas appliance hose, generator connectors, custom length low pressure gas hose, and gas burners from Gas Hoses and Regulators. com"). Specifically Gashose discloses making use of various twin stage regulation devices to facilitate fuel from typical propane tanks

(<https://web.archive.org/web/20140927232814/http://gashosesandregulators.com/lowpressure regulators.html>).

Why use a twin stage regulator? The first stage of a twin stage low pressure regulator rings the unregulated tank pressure down to a constant 10 PSI. This helps the second stage maintain a neat constant 11" WC gas delivery to your appliances. (these dual stage type regulators are required by Federal code on all RV's. They compensate for the varying tank pressures inside the propane tank and insure an even pressure on the delivery side regardless of the varying demand for gas.) This method of low pressure regulation has an added benefit of greatly reducing the possibilities of freeze-ups, which would otherwise likely occur more frequently as the btu/hr demand increases.

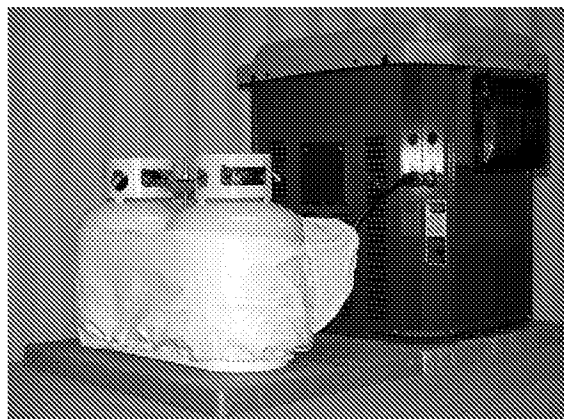
50,000 btu/hr maximum output



30. Nooutage.com (Nooutage.com, Aug. 27th, 2006,

<http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm>) is an entire

website dedicated to selling and supplying generators. As noted on its page, it includes "a propane quick connect kit." On its opening page it shows these tanks attached to a generator:



31. And shows a twin regulator mounted to the collar of a propane tank



32. **Thus we can sum up these devices in series:** a dual fuel engine showing a switching valve between liquid and gaseous fuel, but only shows it at a diagram level; a dual fuel engine having a switching valve which shows external pressure regulation for a propane fuel source located off board the system; an online store selling pressure regulators, including twin stage regulators, specifically for off board fuel tanks; and another store sells generators and shows how propane is often connected to the generators.

33. **The rejection in summary in light of this:** *a dual fuel engine is shown without a propane tank detailed (Pursifull), this propane tank is then shown to be obvious in these systems (Sugimoto), and not only obvious but often including dual regulators (Gashose) that are included with their off-board fuel tanks and attached to them (Nooutage.com). These pieces of art are not singular in these ideas and as noted in the state of the art above, their combinations are well-established.*

34. It is noted that appellant has made no arguments pertaining to the Double Patenting rejection or the 112(a) rejection above. As such, these rejections will not be addressed here.

35. **Arguments presented by appellant are summarized here and addressed in order below:**

- a. *“Failure of Pursifull, Sugimoto, and GasHose to teach Claims 1, 11, and 21,”* on Pg. 7 of the arguments: Appellant asserts that, with regards to Sugimoto, “there is no teaching therein of a fuel regulator system located off board the dual fuel generator – i.e., of both the primary and pressure regulator being located off board.”
- b. Further, appellant asserts that as Sugimoto pertains to an on-board gaseous fuel system together with an off-board gaseous fuel system then there is no reason to modify Sugimoto to have a dual-stage off-board regulator as the device 62 could not be replaced.
- c. Further, appellant argues that the modification of Pursifull and Sugimoto to include a dual stage regulator would constitute improper hindsight as “nothing suggested by the construction of generator 1 in Sugimoto would lead one skill in the art to modify the fuel pressure regulator 62.”
- d. Further, appellant argues that “Sugimoto’s pressure reducing device 72... are a very specific structure/arrangement that provide fuel pressure regulation for a fuel system F.”
- e. *With regards to claims 9 and 15,* appellant argues there “is no indication of any prior art that suggest an arrangement... where a regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other.” And further, that the mounting device does not secure the regulators to a collar since it “rests” on a pair of fuel containers.

34. **With regards to argument a.:** Sugimoto very clearly shows a fuel regulator device located off board its generator in Fig. 1. This device 72 is called a “pressure reducing device” which is exactly the function a pressure regulator performs. Whether or not *the entire* fuel regulation system of Sugimoto is off-board is completely irrelevant for two main reasons: the first is that the claim does not specify there

being no on-board pressure regulation, simply that there exists an off-board pressure regulation; the second being that the proposed modification of Pursifull *is not* wholesale importation of the entirety of Sugimoto. With regards to the rejection, Pursifull *already discloses a dual fuel generator system*. What Pursifull does not discuss or show is how its gaseous fuel system is attached, stored, or operated.

35. Pursifull shows a generator system in Fig. 4 which has “fuel system... liquid fuel and gaseous fuel” (¶ [0011]) which has a fuel rail 108 fed by a liquid fuel tank 112 through a valve 120 and an *undisclosed source of “Fuel 2” which is a gaseous fuel*. The modification of Pursifull with Sugimoto is that of the inclusion of Sugimoto’s off-board propane tank systems *not literally all of Sugimoto*. The pressure regulator 62 does not matter for the purposes of the claim rejection.

36. Further, is noted that the device 72 within Sugimoto is never sated to be a single or dual stage regulator, it is never disclosed in particulars: it is simply disclosed in the most generic term possible, “a pressure reduction device.” This is then why Gashose is a showing of what types of “pressure reducing device” are used and known in the art and why they are used in such off-board propane tank systems.

37. **With regards to b. and c.:** As noted above, Sugimoto is not being modified by Gashose. Rather, *the modified Pursifull* is being modified by Gashose. The modified Pursifull does not disclose a fuel regulator and as far as is concerned with its modification of Sugimoto, it simply includes a “pressure reduction device 72” and an off-board propane tank system. Thus, the question has to be asked: if we are to use a “pressure reduction device” with a propane tank system, which one would be used? Gashose states that it would be a “twin stage regulator”

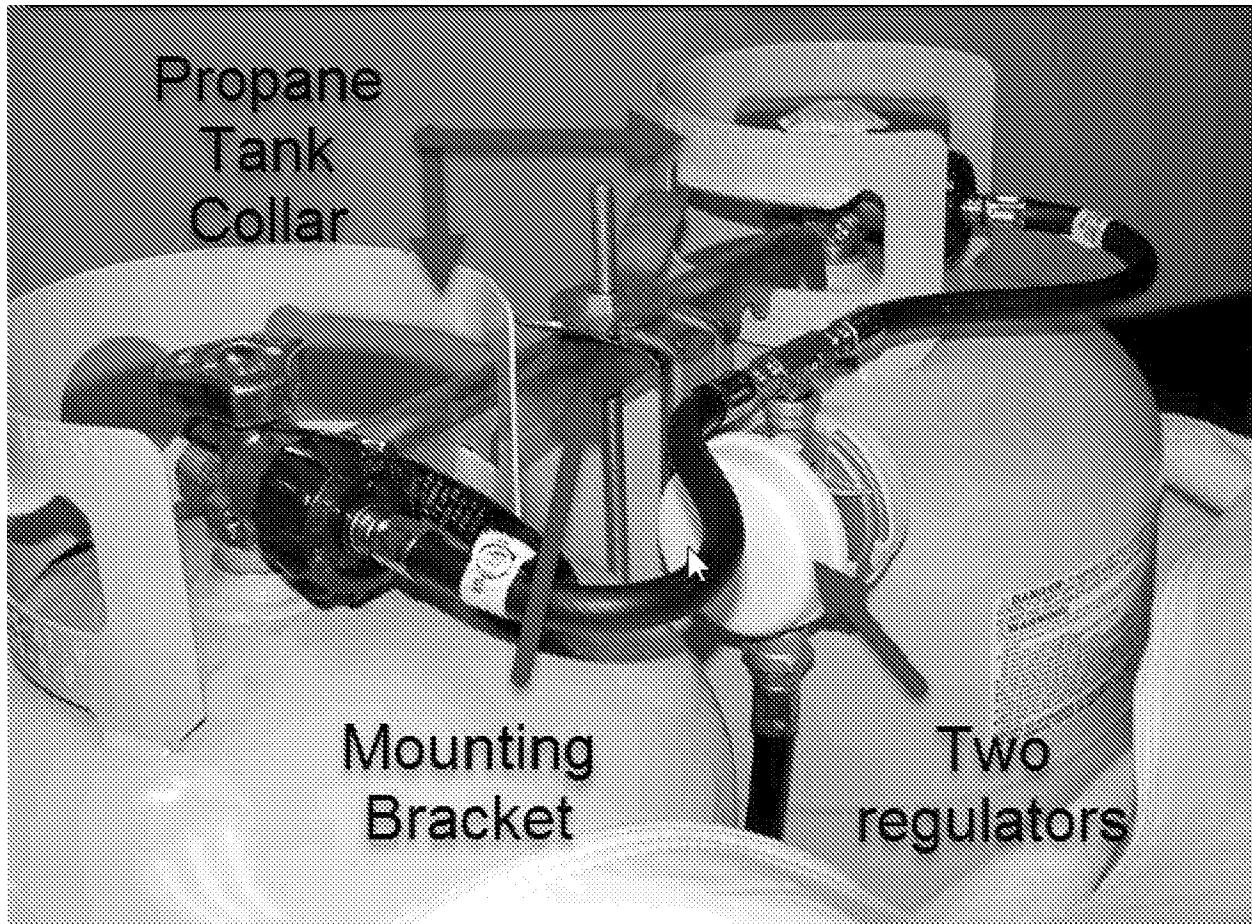
(<https://web.archive.org/web/20140927232814/http://gashosesandregulators.com/lowpressureregulators.html>), under the “Why use a twin stage regulator?” header). It notes these can “compensate for the varying tank pressures inside the propane tank and insure an even pressure on the delivery side regardless of the varying demand for gas” and “reducing the possibilities of freeze-ups.” These benefits of use not only would warrant its inclusion of the modified Pursifull, but, for the sake of argument,

would even warrant its inclusion in Sugimoto as they would supply this benefit *regardless of on-board fuel regulation*. Thus, the regulator 62 is inconsequential to the claim or the rejection.

38. This also ties into *why it is not improper hindsight*. One of ordinary skill in the art when producing the generator of the modified Pursifull, or even the generator of Sugimoto, would need to use some sort of device for 72. The *specific* device is never stated, so one must be chosen. When choosing such a device one of ordinary skill in the art would look for one that is not only common and cheap, but well-known and effective. These qualities are all supplied by the twin stage devices shown in Gashose. These devices would provide their benefits regardless of whatever on-board conditions exist in the generator in question, they would not break the system nor would they do anything other than benefit it.

39. **With regards to d.:** The pressure reducing device 72 of Sugimoto is specific in its usage within the system of Sugimoto, but the actual *specific* device is never stated. Not only is, once again, the entirety of Sugimoto not wholly relevant in this instance, but even in this case the device 72 being a dual stage regulator would not harm Sugimoto or alter its system in any way. Essentially, appellant is arguing against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

40. **With regard to e.:** It is noted the claims make no claim to a single collar or propane tank being absolute, there can be more propane tanks and collars included, so whether or not the propane tank is alone is irrelevant. Further, the picture of Nooutage.com is provided and annotated to show exactly the claims.



41. The tanks have collars, there is a mounting bracket sitting on the collars and attaching the regulators to them wherein the regulators exist “adjacent each other” (and would be even if they were of the type from Gashose), and “along an outer periphery of the collar” wherein the collar is shown having a “periphery” and the regulators are “along it” as this does not include them having to be physically attached to it (this is performed by the mounting bracket). Note that the regulators shown in the pictures are at nearly the same height as the bracket and are in line with the two collars existing between them. Further, while the mounting bracket “rests” on the collars, would be considered “secured” by gravity and friction: there is no specification that being “secured” requires anything more than this. No fasteners or other system are specified in the claims. If the device is maintaining attachment then it is “securing” it.

Art Unit: 3747

42. It is noted that appellants own disclosure simply shows regulators existing mounted on brackets which are spaced outwardly from the collar and in its peripheral area.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/KEVIN A LATHERS/

Conferees:

/LINDSAY M LOW/

Supervisory Patent Examiner, Art Unit 3747

/NATHANIELE WIEHE/

Supervisory Patent Examiner, Art Unit 3700

Requirement to pay appeal forwarding fee. In order to avoid dismissal of the instant appeal in any application or ex parte reexamination proceeding, 37 CFR 41.45 requires payment of an appeal forwarding fee within the time permitted by 37 CFR 41.45(a), unless appellant had timely paid the fee for filing a brief required by 37 CFR 41.20(b) in effect on March 18, 2013.

<i>Notice of References Cited</i>	Application/Control No. 16/191,503	Applicant(s)/Patent Under Reexamination Sarder et al.	
	Examiner KEVIN A LATHERS	Art Unit 3747	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
	A					
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	Q					
	R					
	S					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Champion Power Equipment, "How-To: Dual Fuel Generator Start-Up," https://www.youtube.com/watch?v=CMW2nxPnWpE , Jun 1st, 2014 (Year: 2014)
	V	Chuck Webb, "Yamaha ef2000is running on the propane quick connect pulling the Coleman air conditioner." https://www.youtube.com/watch?v=L6TB9nqbqtg , Sep. 24th, 2017 (Year: 2017)
	W	Bassguitarist1985 (Bassguitarist1985, "Yamaha EF2000iS Tri-Fuel Kit: Final Assembly & Gasoline Break-In," https://youtu.be/dTawH4CoK2o , Jan. 4th, 2014 (Year: 2014)
	X	Bigredd110, "Sportsman 7500 Watt Dual Fuel Generator with Electric Start," https://www.youtube.com/watch?v=5RQRgUG8OeQ , Feb. 23rd, 2014 (Year: 2014)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Index of Claims</i> 	Application/Control No. 16/191,503	Applicant(s)/Patent Under Reexamination Sarder et al.
	Examiner KEVIN A LATHERS	Art Unit 3747

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	08/27/2019	04/22/2020	10/23/2020	06/10/2021					
	1	✓	✓	✓	✓					
	2	✓	○	✓	✓					
	3	✓	○	✓	✓					
	4	✓	○	✓	✓					
	5	✓	○	✓	✓					
	6	✓	✓	✓	✓					
	7	✓	✓	✓	✓					
	8	✓	✓	✓	✓					
	9	✓	✓	✓	✓					
	10	✓	✓	✓	✓					
	11	✓	✓	✓	✓					
	12	✓	✓	✓	✓					
	13	✓	✓	✓	✓					
	14	✓	✓	✓	✓					
	15	✓	✓	✓	✓					
	16	✓	✓	✓	✓					
	17	✓	✓	✓	✓					
	18	-	-	-	-					
	19	-	-	-	-					
	20	-	-	-	-					
	21	✓	✓	✓	✓					
	22	✓	✓	✓	✓					
	23	✓	✓	-	-					
	24			✓	✓					

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	16191503
Filing Date	2018-11-15
First Named Inventor	Mark J. Sarder et al.
Art Unit	3747
Examiner Name	Kevin A. Lathers
Attorney Docket Number	CET1090.070

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	2398437		1946-04-16	McGill et al.	
	2	3911956		1975-10-14	LeBreton et al.	
	3	4323046		1982-04-06	Barber	
	4	4375795		1983-03-08	Billingsley	
	5	4471805		1984-09-18	Solie et al.	
	6	4492207		1985-01-08	Hallberg	
	7	4750514		1988-06-14	Omori et al.	
	8	4788960		1988-12-06	Oshizawa	

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Examiner Name	Kevin A. Lathers
Attorney Docket Number	CET1090.070

9	5934320		1999-08-10	O'Reilly et al.
10	6543395	B2	2003-04-08	Green
11	6591817	B2	2003-07-15	Deutsch
12	7591257	B2	2009-09-22	Bayer et al.
13	7802562	B2	2010-09-28	Lippa et al.
14	7905469	B2	2011-03-15	Nickels et al.
15	8042569	B2	2011-10-25	Morris
16	8757139	B2	2014-06-24	Deng
17	8944027	B2	2015-02-03	Montgomery
18	9175601	B2	2015-11-03	Markoski

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20070137591	A1	2007-06-21	Sugimoto et al.	

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	1	2401704	CN	Y	2000-10-18	Zhejiang University		
	2	102006008524	DE	A1	2006-08-31	Voss Automotive GMBH		
	3	189800	GB	A	1923-10-11	Sonderegger		
	4	532903	GB	A	1941-02-03	Henderson et al.		

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	1	Multi-Power Ltd., MODELMP5500DF 13 HP Generator Owner's Manual, July 2006, pp. 1-38	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

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Filing Date	2018-11-15
First Named Inventor	Mark J. Sarder et al.
Art Unit	3747
Examiner Name	Kevin A. Lathers
Attorney Docket Number	CET1090.070

2	Winco Inc., Home Power TRI-FUEL Portable Generators Owners Manual, November 21, 2017, pp. 1-16
3	Winco Inc., HPS9000VE/E and HPS9000VE-03/A Generator Installation and Operators Manual, August 9, 2013, pp. 1-16
4	Winco Inc., Dyna ME5000VA Installation, Operation, and Maintenance Instructions, November 21, 2017, pp. 1-12
5	Winco Inc., Dyna DL9000E, DL5000H, and D3000 Portable Generators Installation, Operation, and Maintenance Instructions, November 21, 2017, pp. 1-12
6	PowerLand Industrial Tools, Powerland Tri Fuel Generator Owner's Manual, December 24, 2015, pp. 1-41
7	Winco Inc., HPS6000HE/I Bi-Fuel Generator Installation and Operators Manual, March 8, 2010, pp. 1-20

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EXAMINER SIGNATURE

Examiner Signature	/KEVIN A LATHERS/	Date Considered	06/10/2021
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First Named Inventor	Mark J. Sarder et al.
Art Unit	3747
Examiner Name	Kevin A. Lathers
Attorney Docket Number	CET1090.070

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Kevin R. Rosin/	Date (YYYY-MM-DD)	2020-12-15
Name/Print	Kevin R. Rosin	Registration Number	55584

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Customer No. 26629
Confirmation No. 6187

Patent
Attorney Docket No. CET1090.070

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Sarder et al.
Serial No. : 16/191,503
Filed : November 15, 2018
For : OFF-BOARD FUEL REGULATOR FOR GENERATOR
ENGINE
Group Art No. : 3747
Examiner : Kevin A. Lathers

CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

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APPEAL BRIEF PURSUANT TO 37 C.F.R §41.37

Dear Sir:

This Appeal Brief is being filed in furtherance of the Notice of Appeal filed on January 27, 2021.

1. **REAL PARTY IN INTEREST**

The real party in interest is Champion Power Equipment, Inc. by virtue of the Assignment recorded November 29, 2018, at reel 047681, frame 0698.

2. **RELATED APPEALS AND INTERFERENCES**

The current matter was previously appealed before the Board. In that Appeal, Appellant filed an Appeal Brief on February 28, 2020. Response thereto, the Examiner re-opened prosecution in an Office Action issued April 30, 2020. Therein, the Examiner withdrew the previous rejection of independent claims 1, 11, and 21 over Pursifull et al. (US Pub. 2011/0168133 – hereinafter “Pursifull”) in view of Sugimoto et al. (US Pub. 2007/0137591 – hereinafter “Sugimoto”). In the Office Action mailed April 30, 2020, independent claims 1, 11 and 21 were newly rejected under 35 U.S.C. §103 as being unpatentable over Pursifull in view of Sugimoto and GasHoseandRegulators (May 17th, 2014, <https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/> - hereinafter “GasHose”).

The undersigned is Appellant’s legal representative in this Appeal. Champion Power Equipment, Inc., the Assignee of the above-referenced application, as evidenced by the documents mentioned above, will be directly affected by the Board’s decision in the pending appeal.

3. **SUMMARY OF CLAIMED SUBJECT MATTER**

The following is a summary of the claimed subject matter of independent claims 1, 11, and 21, as disclosed in the specification with supporting citations to reference numerals and page and line numbers in accordance with 37 C.F.R. §41.37(c)(1)(iii).

Claim 1 calls for a dual fuel generator (20) and fuel delivery system (22) that includes a dual fuel generator (20) configured to operate on a liquid fuel supplied from a liquid fuel source (28) through a liquid fuel line (66) and a gaseous fuel supplied from a pressurized fuel source (30) through a gaseous fuel line (70). *Specification*, ¶¶[0021], [0038]; FIGS. 1-3, 4A, 4B. The dual fuel generator (20) and fuel delivery system (22) also includes a fuel regulator system (39) located off board the dual fuel generator (20). *Specification*, ¶[0023]; FIG. 1. The fuel regulator system (39) includes a primary

pressure regulator (42) coupled to a service valve (40) of the pressurized fuel source (30) and configured to regulate the fuel supplied from the pressurized fuel source (30) to a reduced pressure and a secondary pressure regulator (44) coupled to the primary pressure regulator (42) and configured to regulate the gaseous fuel supplied from the primary pressure regulator (42) to a desired pressure for delivery through the gaseous fuel line (70) to operate the dual fuel generator (20). *Specification*, ¶¶[0023], [0038]; FIG. 1., 4A, 4B. The fuel regulator system (39) also includes a mechanical fuel valve (54) actuatable between a first position (38a) and a second position (38b) to selectively control fuel flow to the dual fuel generator (20) from the liquid fuel source (28) through the liquid fuel line (66) and the pressurized fuel source (30) through the gaseous fuel line (70). *Specification*, ¶[0028]; FIGS. 2, 3, 4A, 4B.

Claim 11 calls for a dual fuel generator (20) and fuel delivery system (22) that includes a dual fuel generator (20) configured to operate on a liquid fuel supplied from a liquid fuel source (28) through a liquid fuel line (66) and a gaseous fuel supplied from a pressurized fuel source (30) through a gaseous fuel line (70). *Specification*, ¶¶[0021], [0038]; FIGS. 1-3, 4A, 4B. The dual fuel generator (20) and fuel delivery system (22) also includes a fuel regulator system (39) located off board the dual fuel generator (20), the fuel regulator system (39) configured to regulate the gaseous fuel supplied from the pressurized fuel source (30) in a first stage (42), the gaseous fuel regulated down to a reduced pressure in the first stage (42), and regulate the reduced pressure gaseous fuel in a second stage (44), the reduced pressure gaseous fuel from the first stage (42) regulated down to a desired pressure in the second stage (44) for delivery through the gaseous fuel line (70) to operate the dual fuel generator (20). *Specification*, ¶¶[0023], [0038]; FIG. 1., 4A, 4B. The dual fuel generator (20) and fuel delivery system (22) further includes a mechanical fuel valve (54) actuatable between a first position (38a) and a second position (38b) to selectively control fuel flow to the dual fuel generator (20) from the liquid fuel source (28) through the liquid fuel line (66) and the pressurized fuel source (30) through the gaseous fuel line (70). *Specification*, ¶[0028]; FIGS. 2, 3, 4A, 4B.

Claim 21 calls for a generator (2) and fuel delivery system (22) that includes a generator (20) configured to operate on a gaseous fuel supplied from a pressurized fuel source (30) through a gaseous fuel line (70). *Specification*, ¶¶[0021], [0038]; FIGS. 1-3,

4A, 4B. The generator (20) and fuel delivery system (22) also includes a fuel regulator system (39) located off-board the generator (20), the fuel regulator system (39) configured to regulate the gaseous fuel supplied from the pressurized fuel source (30) in a first stage (42), the gaseous fuel regulated down to a reduced pressure in the first stage (42), and regulate the reduced pressure gaseous fuel in a second stage (44), the reduced pressure gaseous fuel from the first stage (42) regulated down to a desired pressure in the second stage (44) for delivery through the gaseous fuel line (70) to operate the generator (20). *Specification*, ¶¶[0023], [0038]; FIG. 1., 4A, 4B.

4. **ARGUMENTS**

Rejection under 35 U.S.C. §103 over Pursifull in view of Sugimoto and GasHose **Claims 1, 11, and 21**

Introduction

The Examiner rejected claims 1, 11, and 21 under 35 U.S.C. §103 as being unpatentable over Pursifull (US Pub. 2011/0168133) in view of Sugimoto (US Pub. 2007/0137591) and GasHose.

In rejecting claims 1, 11, and 21, the Examiner asserted that Pursifull discloses the claimed “a dual fuel generator” and “mechanical fuel valve,” but admitted that “Pursifull fails to disclose a fuel regulator system located off board the dual fuel generator” that comprises a primary pressure regulator and secondary pressure regulator (claim 1) and/or a first stage and second stage (claims 11 and 21). *Final Office Action*, 10/28/2020, *supra* at 5. The Examiner thus cited to Sugimoto as teaching these claim elements, with the Examiner stating that “Sugimoto discloses a dual fuel engine and delivery system (Fig. 1, as shown) wherein the system includes an off-board gaseous fuel system (Fb) which includes an off-board pressure regulator 72 which feeds fuel into an engine system 1 which includes another pressure regulator 62.” *Id.* at 6. The Examiner thus concluded that “it would have been obvious to one of ordinary skill in the art before the filing date of the invention to modify the device of Pursifull with the pressure regulators and gaseous fuel system methods of Sugimoto.” *Id.* In continuing to set forth the rejection, the Examiner further indicated that “Sugimoto does not disclose the exact details of its

off-board fuel system, such as the type of tank and regulator it contains,” but that “Gashose discloses making use of twin stage regulators (i.e., two regulators in series) for usage with off-board fuel systems” and that “it would have been obvious to one of ordinary skill in the art to modify the generator system of the modified Pursifull with a dual-regulator system such as disclosed in Gashose because doing so would allow for a more even output and a reduction in freeze-ups from an off-board fuel system (such as a propane tank).” *Id.* at 6-7.

Appellant respectfully disagrees with the rejection and believes claims 1, 11, and 21 to be patentably distinct from that which is disclosed in Pursifull, Sugimoto and GasHose. As set forth in MPEP §2142, “[t]he examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness.” MPEP §2142. “With regard to rejections under 35 U.S.C. 103, the examiner must provide evidence which as a whole shows that the legal determination sought to be proved (i.e., the reference teachings establish a *prima facie* case of obviousness) is more probable than not.” *Id.* (emphasis in original). As will be set forth in detail here below, the combination of Pursifull, Sugimoto, and GasHose does not teach or suggest the claimed invention, nor would one skilled in the art be motivated to combine the references in the manner done so by the Examiner. Accordingly, the Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. §103(a) with respect to claims 1, 11, and 21.

Prior Art – Pursifull and Sugimoto

Pursifull discloses an engine system 100 that includes an internal combustion engine 102 having one or more cylinders 104 that may receive fuel from one or more fuel injectors 106 that inject fuel in proportion to a pulse width of a signal received from a controller 128. *Pursifull*, ¶[0021]. Fuel may be delivered to the fuel injector 106 from a fuel rail 108 by a fuel system 110. *Pursifull*, ¶[0021]. The fuel system 110 may include a fuel tank 112 and a fuel pump 114 operable by controller 128 to pump fuel from the fuel tank 112 to the fuel rail 108. *Pursifull*, ¶[0022]. A delivery check valve 116 may be positioned downstream of the fuel pump 114 to force fuel pumped from the fuel pump at a predetermined pressure to the fuel rail 108 so that fuel does not return along the same path to the fuel pump. *Pursifull*, ¶[0023]. A first solenoid valve 118 may be positioned

downstream of delivery check valve 116 to control the flow of fuel to fuel rail 108 or from the fuel rail to a return line 119. *Pursifull*, ¶[0023]. In some embodiments, fuel system 110 may be what is known as a multi-fuel system that selectively provides a plurality of different types of fuel to the fuel rail 108 based on the mode of operation, such as gasoline and/or liquid propane. *Pursifull*, ¶[0024]. A three-way valve 120 may be positioned upstream of the fuel rail 108 and downstream of the first solenoid valve 118 and the return line 119 to selectively control the flow of a desired type of fuel to the fuel rail 108. *Pursifull*, ¶[0025]. The state of the three-way valve 120 may be controlled by controller 128 to vary which type of fuel is delivered to the fuel rail 108. *Pursifull*, ¶[0025]. Fuel in the fuel rail 108 may be returned to the fuel tank 112 via the return line 119, with an ejector 124 positioned in the return line 119 to provide a single fuel rail evacuation stage. *Pursifull*, ¶[0026]. A return check valve 122 is positioned in the return line 119 downstream of the ejector 124 to force fuel returning from the fuel rail 108 at a predetermined pressure to ejector 124 so that fuel is evacuated from the fuel rail 108. *Pursifull*, ¶[0027]. A second solenoid valve 126 is positioned upstream of the outlet of the ejector 124 and downstream of the fuel tank 112 that may be controlled by controller 128 evacuate the fuel rail 108. *Pursifull*, ¶[0028].

In a method for controlling a multi-fuel system as described in *Pursifull*, the method may include operating in the fuel rail pressurization mode where a determination is made if a first fuel from a first fuel stage or a second fuel from a second fuel is selected for delivery to the fuel rail 108. *Pursifull*, ¶[0066]. If the first fuel is selected, operating in the fuel rail pressurization mode may include, switching the three-way valve 120 to the first fuel stage, opening the solenoid valve 118 positioned downstream of the fuel pump 114 and upstream of the fuel rail 108, closing the solenoid valve 126 positioned upstream of the ejector 124 and downstream of the fuel tank 112, and operating the fuel pump 114 to deliver the first fuel from the fuel tank to the fuel rail. *Pursifull*, ¶[0066]. If the second fuel is selected, operating in the fuel rail pressurization mode may include switching the three-way valve 120 to the second fuel stage, and, operating the fuel pump 136 to deliver the second fuel from the fuel tank 134 to the fuel rail 108. *Pursifull*, ¶[0066].

Sugimoto discloses an engine operated generator 1 that includes an engine 30 that powers an electric generator 40. *Sugimoto*, ¶¶[0041], [0042]. A fuel system F for supplying the fuel gas to the engine 30 has an internal fuel system Fa (fuel bottles 61) and an external fuel system Fb (external fuel bottle 71) disposed outside the case C of the generator. *Sugimoto*, ¶[0070]. The fuel supply system Fa includes a fuel pressure regulator 62, a fuel system selector valve 12, a connector 14, and a fuel cutoff valve 63. *Sugimoto*, ¶[0071]. The fuel pressure regulator 62 reduces the pressure of the fuel gas supplied from fuel bottles 61 and the external fuel bottle 71 and regulates the pressure of the fuel gas so that the fuel gas may be supplied to a carburetor 18b at fuel supply rate varying in proportion to load on the engine 30. *Sugimoto*, ¶[0071]. The fuel system selector valve 12 is placed on the operating panel 5e and is operated to select a fuel supply line. *Sugimoto*, ¶[0071]. The fuel pipes interconnect the fuel bottles 61, the fuel pressure regulator 62 and the carburetor 18b. The fuel cutoff valve 63 stops the flow of the fuel gas from the fuel system F to the engine 30. *Sugimoto*, ¶[0071].

In the fuel supply system Fa, a first fuel system for supplying the first fuel gas from the fuel bottles 61 to the engine 30 is constituted by the fuel bottles 61, a pipe A1 connecting the fuel bottles 61 to the fuel system selector valve 12, a pipe A2 connecting the fuel system selector valve 12 to the fuel pressure regulator 62, the fuel pressure regulator 62, a pipe connecting the fuel pressure regulator 62 to the carburetor 18b, and the fuel cut-off valve 63 placed in the pipe A3. *Sugimoto*, ¶[0079]. A second fuel system for supplying the second fuel gas from the external fuel bottle 71 to the engine 30 is constituted by a pipe A4 connecting the connector 14 to the fuel cutoff valve 12, the pipe A2 connecting the fuel system selector valve 12 to the fuel pressure regulator 62, the fuel pressure regulator, the pipe A3 connecting the fuel pressure regulator 62 to the carburetor 18b, and the fuel cutoff valve 63. *Sugimoto*, ¶[0079].

The fuel cutoff valve 63, namely, a fuel cutoff means, is, for example, a normally-open solenoid valve which closes when energized. *Sugimoto*, ¶[0081]. The ECU 89 controls the fuel cutoff valve 63 on the basis of the pressure of the first fuel gas. *Sugimoto*, ¶[0081]. More specifically, the fuel pressure regulator 62 is provided with a pressure sensor 73 for measuring the pressure of the first fuel gas flowing from the fuel bottle 61 to the fuel pressure regulator 62. *Sugimoto*, ¶[0081]. When the pressure of the

first fuel gas measured by the pressure sensor 73 is higher than an upper limit pressure P1, the ECU 89 closes the fuel cutoff valve 63 to disconnect the common fuel system from the fuel bottle 61. *Sugimoto*, ¶[0081]. The fuel system selector valve 12 connects either the first fuel system that supplies the first fuel gas to the engine 30 or the second fuel system that supplies the second gas to the engine 30 selectively to the fuel pressure regulator 62. *Sugimoto*, ¶[0082]. The fuel system selector valve 12 can be set in a first position, where the knob of the fuel system selector valve 12 is at a first position marked with "Internal fuel" to connect the first fuel system to the engine 30 to supply the first fuel gas to the engine 30, and in a second position, where the knob of the fuel system selector valve 12 is at a second position marked with "External fuel" to connect the second fuel system to the engine 30 to supply the second fuel gas to the engine 30. *Sugimoto*, ¶[0082].

Failure of Pursifull, Sugimoto, and GasHose to teach Claims 1, 11, and 21

With regard to the claimed limitations, there is no disclosure provided by the combination of cited references of a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising a primary pressure regulator configured to regulate the fuel supplied from the pressurized fuel source to a reduced pressure and a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to a desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator (claim 1), and/or a fuel regulator system located off board the dual fuel generator, the fuel regulator system configured to: regulate the gaseous fuel down to a reduced pressure and regulate the reduced pressure gaseous fuel in a second stage down to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the dual fuel generator (claim 11), and/or a generator free of any pressure regulator with a fuel regulator system located off-board the generator that regulates gaseous fuel supplied from a pressurized fuel source down to a reduced pressure in a first stage and regulates the reduced pressure gaseous fuel down to a desired pressure in a second stage (claim 21).

Regarding Pursifull, the Examiner admits that the reference fails to teach a fuel regulator system as called for in claims 1, 11, and 21.

Regarding Sugimoto, there is no teaching therein of a fuel regulator system located off board the dual fuel generator – i.e., of both the primary pressure regulator and secondary pressure regulator being located off board the dual fuel generator (claim 1) and/or both a first stage and second stage being located off board the dual fuel generator (claims 11 and 21). That is, while pressure reducing device 72 of Sugimoto is included as part of external fuel system Fb that is off-board generator 1, *Sugimoto*, ¶[0073], the fuel pressure regulator 62 referenced by the Examiner is on-board generator 1 – as the fuel pressure regulator 62 is located between pipe A2 and pipe A3 on generator 1, as can be clearly seen in FIG. 1 of Sugimoto. *See Sugimoto*, FIG. 1. As fuel pressure regulator 62 is located on-board the generator 1, the arrangement of the “fuel regulator system” in Sugimoto (collectively comprising pressure reducing device 72 and fuel pressure regulator 62) is different from what is called for in claims 1, 11, and 21 where an entirety of a fuel regulator system (primary and second regulators (claim 1) or first and second stages (claims 11 and 21) of a fuel regulator system) is located off board the generator.

In maintaining the rejection, the Examiner further stated that “Sugimoto discloses that off-board pressure regulation systems both exist and are included within its structures” and that “[t]he proposed modification is such that the off-board fuel system of Sugimoto could be used as the gaseous fuel system of Pursifull, not that the entire system of Sugimoto is replacing all of Pursifull.” *Final Office Action*, supra at 10. Appellant does not disagree that “off-board pressure regulation systems [] exist,” however, Sugimoto (alone or in combination with Pursifull) does not teach or suggest that which is specifically called for in the claims regarding an entirety of a fuel regulator system (primary and second regulators (claim 1) or first and second stages (claims 11 and 21) of a fuel regulator system) is located off board the generator. The fact that Sugimoto only discloses pressure reducing device 72 being off-board generator 1 – with fuel pressure regulator 62 on-board the generator 1 – is clear evidence that the proposed combination of Sugimoto with Pursifull still provides no teaching or suggestion of a fuel regulator system (primary and second regulators (claim 1) or first and second stages (claims 11 and 21) of a fuel regulator system) located off board the generator, as called for in the claims.

Regarding the combination of GasHose with Pursifull and Sugimoto, Appellant believes that one skilled in the art would not look to GasHose to modify Pursifull and

Sugimoto in order to include “a dual-pressure regulator in the off-board fuel system,” as asserted by the Examiner. With regard to Sugimoto, which the Examiner has cited to for teaching “a dual fuel engine and delivery system (Fig. 1, as shown) wherein the system includes an off-board gaseous fuel system (Fb) which includes an off-board pressure regulator 72 which feeds fuel into an engine system 1 which includes another pressure regulator 62,” *Final Office Action*, supra at 6. Appellant believes that one skilled in the art would not simply modify the arrangement of pressure regulator 62 and pressure reducing device 72 to include multiple pressure regulators in the off-board fuel system (Fb), as asserted by the Examiner. That is, the engine operated generator 1 of Sugimoto includes a fuel system F that has an internal fuel system Fa (gaseous fuel bottles 61) and an external fuel system Fb (external gaseous fuel bottle 71) disposed outside the case C of the generator. *Sugimoto*, ¶[0070]; FIGS. 1 and 2. As Sugimoto includes gaseous fuel bottles 61 that are an internal fuel system Fa onboard the generator, Sugimoto necessarily requires a fuel pressure regulator 62 that is also onboard the generator. The fuel pressure regulator 62 could not simply be removed from the generator 1 and combined with pressure reducing device 72 as part of a dual-stage off-board regulator for gaseous fuel bottle 71, as the Examiner seems to suggest, as there would then be no pressure regulator on/in generator 1 that would regulate gas from fuel bottles 61.

Additionally, one skilled in the art would not modify Sugimoto in view of GasHose to provide a dual-stage off-board regulator for gaseous fuel bottle 71 – i.e., to modify pressure reducing device 72 from a single-stage regulator to a dual-stage regulator – as such a modification would be unnecessary and duplicative in Sugimoto. That is, the fuel pressure regulator 62 and pressure reducing device 72 already provide a two-stage pressure regulation of gas from gaseous fuel bottle 71, with it recognized that (1) one could simply not replace the fuel pressure regulator 62 with another offboard regulator (for reasons discussed in detail above), and (2) adding a dual-stage regulator offboard the generator 1 (for gaseous fuel bottle 71) in addition to the fuel pressure regulator 62 would only add additional cost and complexity to the generator 1, without providing any additional benefit – since two stage pressure regulation is already provided by fuel pressure regulator 62 and a single stage pressure reducing device 72. Thus, one skilled in the art would not look to GasHose to modify the modified system of Pursifull

and Sugimoto, with the Examiner's only motivation for doing so being that which is disclosed in the present invention (i.e., improper hindsight).

Responsive to Appellant's argument that one skilled in the art would not modify the arrangement of pressure regulator 62 and pressure reducing device 72 to include multiple pressure regulators in the off-board fuel system (Fb), the Examiner said "Why?" and asserted that "[p]ressure reducing device 72 would benefit from being a dual-stage regulator of GasHose." *Advisory Action*, 12/07/2020, p. 7. As stated above, Sugimoto already provides a two-stage pressure regulation of gas from gaseous fuel bottle 71 using fuel pressure regulator 62 and pressure reducing device 72. Since Sugimoto specifically requires fuel pressure regulator 62 to provide two-stage pressure regulation with pressure reducing device 72, one skilled in the art would not modify this arrangement to include multiple pressure regulators in the off-board fuel system (Fb). Thus, contrary to the Examiner's assertion, one skilled in the art would not look to a dual-stage fuel pressure regulator of GasHose and would not "seek them out when searching for an off-board fuel system Fb disclosed in Sugimoto." *Quoting Advisory Action*, p. 7.

In maintaining the rejection, the Examiner further stated that "[t]he modification of Pursifull and Sugimoto with GasHose is not one of simply duplicative inclusion of regulators, but rather of modifying the generalized and basically disclosed 'pressure reduction device 72' which is being modified from Sugimoto into the system of Pursifull to have a more specific GasHose dual-stage regulator and the benefits such an inclusion would entail." *Final Office Action*, supra at 10. Appellant respectfully disagrees with the Examiner's combination of GasHose with Sugimoto and Pursifull and believes the combination to be nothing more than the use of improper hindsight. "When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself." *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143 (Fed. Cir. 1985). Thus, in arriving at a conclusion of obviousness, "impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art." *MPEP* §2142. As previously indicated above, there is nothing suggested by the construction of generator 1 in Sugimoto that would lead one skilled in the art to modify the fuel pressure regulator 62 (and/or the single stage pressure reducing device 72

of the fuel pressure regulator 62) in view of the teachings of GasHose. The fuel pressure regulator 62 and pressure reducing device 72 in Sugimoto are a very specific structure/arrangement that provide fuel pressure regulation for a fuel system F that includes an internal fuel system Fa (fuel bottles 61) and an external fuel system Fb (external fuel bottle 71) disposed outside the case C of the generator, *Sugimoto*, ¶[0070], with the fuel pressure regulator 62 located between pipe A2 and pipe A3 on/in generator 1, as can be clearly seen in FIG. 1 of Sugimoto. There is no motivation provided by GasHose to modify this very specific construction of fuel pressure regulator 62 / pressure reducing device 72 in Sugimoto to achieve the present invention, as alleged by the Examiner – and any such proposed modifications appears to be nothing more than the result of improper hindsight.

Further, the Examiner asserted that substituting Sugimoto's pressure reducing device 72 with a dual-stage fuel pressure regulator from GasHose is not improper hindsight in part because the "particulars of the regulator 72 are not disclosed." *Advisory Action*, p. 7. As stated above, however, the fuel pressure regulator 62 and pressure reducing device 72 in Sugimoto are a very specific structure/arrangement that provide fuel pressure regulation for a fuel system F that includes an internal fuel system Fa and an external fuel system Fb. Further, the Examiner must view Sugimoto "in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." See *MPEP* §2141.02(VI) (emphasis original) (citing *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983)). While the Examiner acknowledged that "Pursifull as modified by Sugimoto requires an off-board fuel system with an off-board fuel pressure regulation device...this is both required (the device must have one to function)" (*Advisory Action*, p. 7), the teachings of Sugimoto also require that two-stage pressure regulation is provided using fuel pressure regulator 62 located on-board a generator. Thus, one skilled in the art would not look to GasHose to modify the modified system of Pursifull and Sugimoto absent improper hindsight gleaned from the present application.

Conclusion

In light of at least the above, the Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. §103 with respect to claims 1, 11, and 21. The

combination of Pursifull, Sugimoto, and GasHose fails to teach or suggest that which is called for in claims 1, 11, and 21. Additionally, one skilled in the art would not be motivated to modify the system(s) of Pursifull and Sugimoto in the manner done so by the Examiner in order to achieve the present invention. Each of claims 1, 11, and 21 is thus believed to be patentably distinct from the cited references, and Appellant therefore respectfully requests reversal of the rejection of claims 1, 11, and 21 and the claims dependent therefrom.

Rejection under 35 U.S.C. §103 over Pursifull in view of Sugimoto, GasHose, and Nooutage.com

Claims 9 and 15

The Examiner rejected dependent claims 9 and 15 under 35 U.S.C. §103 as being unpatentable over Pursifull in view of Sugimoto, GasHose, and further in view of Nooutage.com (Aug. 27th, 2006,

<http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm>).

Claims 9 and 15 call for a pressurized fuel container having a collar; and wherein a regulator mounting device secures to the collar so that primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

In rejecting claims 9 and 15, the Examiner admitted that Pursifull, Sugimoto, and GasHose fail to disclose such an arrangement but asserted that “Nooutage discloses a regulation system for a gaseous off-board fuel tank system for a generator (as shown and listed as ‘dual-mode generator’ having a ‘propane quick connect kit’).” *Final Office Action*, supra at 8. According to the Examiner, “the system of Nooutage is shown with a mounting bracket on the collar of the propane tanks supporting the regulator (‘Hose Connections to Portable Tanks’ picture), the bracket being similar to the one disclosed in GasHose (the ‘universal mounting bracket’ and the vertical bracket shown on the ‘Dual Tank Automatic Changeover Low Pressure Regulator Assembly’).” *Id.* The Examiner concluded that “it would have been obvious...to modify the modified Pursifull with the mounting brackets of Nooutage as the system already discloses similar mounting brackets and fuel tanks with collars.” *Id.*

Contrary to the Examiner assertion, the Examiner has provided no indication of any prior art that suggests an arrangement as called for in claims 9 and 15 where a regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar. The Examiner admitted that each of Pursifull and Sugimoto fail to disclose this arrangement called for in claims 9 and 15. *See Final Office Action*, supra at 8. Additionally, neither GasHose nor Nooutage.com teaches the arrangement called for in claims 9 and 15 – as instead these references teach (at best) a single primary pressure regulator positioned between (and shared by) a pair of pressurized fuel containers and that is attached to the containers via a connecting rod extending between the collars. *See GasHose and Nooutage.com*. That is, the Examiner admitted that GasHose does not disclose that the “universal mounting bracket” mounts to a propane tank collar. *Final Office Action*, supra at 8. Further, Nooutage.com does not disclose that a regulator mounting device secures to a collar of a single pressurized fuel container since the connecting rod disclosed by Nooutage.com simply rests on the pair of pressurized fuel containers to hold the single primary pressure regulator therebetween. Also, neither GasHose nor Nooutage.com has been shown to disclose a regulator mounting device that secures to a collar so that separate primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar, as called for in claims 9 and 15.

In light of at least the above, the Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. § 103 with respect to claims 9 and 15. Sugimoto, Pursifull, GasHose, Nooutage.com, and any resulting combination thereof, does not teach or suggest that which is called for in claims 9 and 15. Appellant therefore respectfully requests reversal of the rejection of claims 9 and 15 under 35 U.S.C. §103.

Double Patenting Rejection

Claims 1-17 and 21-22

The Examiner rejected claims 1-17 and 21-22 on the ground of non-statutory double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 10,221,780.

Appellant notes that the double patenting rejection is not the only remaining rejection in the present application. The Examiner has also applied rejections under 35 U.S.C. §103 in the Final Office Action. Appellant, therefore, has previously requested that the double patenting rejection be held in abeyance by the Examiner pending resolution of the other rejections.

5. **CONCLUSION**

For at least the reasons set forth above, that which is called for in claims 1-17, 21-22, and 24 is not taught or suggested in the art of record or a combination thereof.

As such, Appellant believes that claims 1-17, 21-22, and 24 are patentably distinct over the art of record.

Appellant appreciates the Board's consideration of these Remarks and respectfully requests timely issuance of a Notice of Allowance.

Respectfully submitted,

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CLAIMS APPENDIX

1. (Original) A dual fuel generator and fuel delivery system comprising:
 - a dual fuel generator configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;
 - a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising:
 - a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the fuel supplied from the pressurized fuel source to a reduced pressure; and
 - a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to a desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator; and
 - a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line.
2. (Original) The dual fuel generator and fuel delivery system of claim 1 further comprising a fuel lockout apparatus coupled to the mechanical fuel valve; and
 - wherein when the mechanical fuel valve is in the first position, the fuel lockout apparatus communicates the liquid fuel source to the dual fuel generator and prevents the pressurized fuel source from coupling to the dual fuel generator, and actuation of the mechanical fuel valve to the second position causes the fuel lockout apparatus to permit the pressurized fuel source to couple to the dual fuel generator, and interrupts the liquid fuel source communication with the dual fuel generator.
3. (Original) The dual fuel generator and fuel delivery system of claim 1, wherein mechanical fuel valve opens and closes the liquid fuel line to selectively control fuel flow from the liquid fuel source to the dual fuel generator; and further comprises:

a fuel lockout apparatus coupled to the mechanical fuel valve and configured to prevent the pressurize fuel source from coupling to the gaseous fuel line while the mechanical fuel valve opens the liquid fuel line, and permit the pressurized fuel source to couple to the gaseous fuel line while the mechanical fuel valve closes the liquid fuel line.

4. (Original) The dual fuel generator and fuel delivery system of claim 3, wherein the fuel lockout apparatus is further configured to prevent the mechanical fuel valve from opening the liquid fuel line while the dual fuel generator receives fuel from the pressurized fuel source.

5. (Original) The dual fuel generator and fuel delivery system of claim 3, wherein the fuel lockout apparatus further comprises a fuel inlet cover that actuates with the mechanical fuel valve to cover an inlet of the gaseous fuel line while the mechanical fuel valve opens the liquid fuel line and to uncover mechanical fuel lockout switch the inlet of the gaseous fuel line when the mechanical fuel valve closes the liquid fuel line.

6. (Original) The dual fuel generator and fuel delivery system of claim 1, further comprising:

a first end of a quick-connect hose coupling coupled to an outlet of the secondary pressure regulator; and

a second end of the quick-connect hose coupling coupled to an inlet of the gaseous fuel line to mate with the first end of the quick-connect hose coupling to couple the secondary pressure regulator to the gaseous fuel line.

7. (Original) The dual fuel generator and fuel delivery system of claim 1, further comprising a regulator mounting device secured to the pressurized fuel source with at least the secondary pressure regulator mounted on the regulator mounting device.

8. (Original) The dual fuel generator and fuel delivery system of claim 7, wherein the primary pressure regulator is mounted on the regulator mounting device.

9. (Original) The dual fuel generator and fuel delivery system of claim 8, wherein the pressurized fuel source comprises a pressurized fuel container having a collar; and

wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

10. (Original) The dual fuel generator and fuel delivery system of claim 1, wherein the primary and secondary pressure regulators are integral components of a dual stage pressure regulator.

11. (Original) A dual fuel generator and fuel delivery system comprising:

a dual fuel generator configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;

a fuel regulator system located off board the dual fuel generator, the fuel regulator system configured to:

regulate the gaseous fuel supplied from the pressurized fuel source in a first stage, the gaseous fuel regulated down to a reduced pressure in the first stage; and

regulate the reduced pressure gaseous fuel in a second stage, the reduced pressure gaseous fuel from the first stage regulated down to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the dual fuel generator; and

a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line.

12. (Original) The dual fuel generator and fuel delivery system of claim 11 wherein the first stage comprises a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the gaseous fuel supplied from the pressurized fuel source to the reduced pressure; and

wherein the second stage comprises a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to the desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator.

13. (Original) The dual fuel generator and fuel delivery system of claim 12 further comprising:

a first end of a quick-connect hose coupling coupled to an outlet of the secondary pressure regulator; and

a second end of the quick-connect hose coupling coupled to an inlet of the gaseous fuel line to mate with the first end of the quick-connect hose coupling to couple the secondary pressure regulator to the gaseous fuel line.

14. (Original) The dual fuel generator and fuel delivery system of claim 12, further comprising a regulator mounting device secured to the pressurized fuel source with at least one of the primary pressure regulator and the secondary pressure regulator mounted on the regulator mounting device.

15. (Original) The dual fuel generator and fuel delivery system of claim 14, wherein the pressurized fuel source comprises a pressurized fuel container having a collar; and

wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

16. (Original) The dual fuel generator and fuel delivery system of claim 11 wherein the first and second stages comprise a dual stage regulator configured to regulate

the gaseous fuel supplied from the pressurized fuel source and regulate the reduced pressure gaseous fuel.

17. (Original) The dual fuel generator and fuel delivery system of claim 16 wherein the dual stage regulator is mounted directly onto the pressurized fuel source.

18-20. (Canceled)

21. (Previously Presented) A generator and fuel delivery system comprising:
a generator configured to operate on a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;

a fuel regulator system located off-board the generator, the fuel regulator system configured to:

regulate the gaseous fuel supplied from the pressurized fuel source in a first stage, the gaseous fuel regulated down to a reduced pressure in the first stage;
and

regulate the reduced pressure gaseous fuel in a second stage, the reduced pressure gaseous fuel from the first stage regulated down to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the generator.

22. (Previously Presented) The generator and fuel delivery system of claim 21 wherein the first and second stages comprise a dual stage regulator configured to regulate the gaseous fuel supplied from the pressurized fuel source and regulate the reduced pressure gaseous fuel, wherein the dual stage regulator is mounted directly onto the pressurized fuel source, off-board from the generator.

23. (Canceled)

24. (Previously Presented) The generator and fuel delivery system of claim 21 wherein the generator is free of any pressure regulator.

EVIDENCE APPENDIX:

-- None --

RELATED PROCEEDINGS APPENDIX:

-- None --



ELECTRONIC ACKNOWLEDGEMENT RECEIPT

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CET1090.070

Title of Invention

DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE

Application Information

APPLICATION TYPE Utility - Nonprovisional Application
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 6187

FILED BY Robyn Templin

PATENT CENTER # 60166953

FILING DATE 11/15/2018

CUSTOMER # 26629

FIRST NAMED
INVENTOR Mark J. Sarder

CORRESPONDENCE
ADDRESS -

AUTHORIZED BY Andrew Stark

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2021.03.29 Appeal Brief.pdf	22	Appeal Brief Filed	207 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2021.03.29 Appeal Brief.pdf	3AB5BD9EB7A22DCC4D2AE6F8840B443F2FB3804D3B2E57D6 FB86E2033D42F37D90515135DDA5B12DC4A7C83A05B141CAB 82FDB86C0D90A585FBD9779C7B30E17

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Petitioner MWE Investments, LLC, et al.
Exhibit 1003, Page 488

described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

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**NOTICE OF APPEAL FROM THE EXAMINER TO
THE PATENT TRIAL AND APPEAL BOARD**

Docket Number (Optional)
CET1090.070

I hereby certify that this correspondence is being facsimile transmitted to the USPTO, EFS-Web transmitted to the USPTO, or deposited with the United States Postal Service with sufficient postage in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)]

On January 27, 2021

Signature /Robyn L. Templin/

Typed or printed name Robyn L. Templin

In re Application of
Sarder et al.

Application Number
16/191,503

Filed
11/15/2018

For **OFF-BOARD FUEL REGULATOR FOR GENERATOR
ENGINE**

Art Unit
3747

Examiner
Kevin A. Lathers

Applicant hereby **appeals** to the Patent Trial and Appeal Board from the last decision of the examiner.

The fee for this Notice of Appeal is (37 CFR 41.20(b)(1))

\$ 20.00

- ☒ Applicant has previously filed a Notice of Appeal and Appeal Brief in the above-captioned matter. Accordingly, Applicant has once paid all of the requisite fees associated with filing a Notice of Appeal for this Application. However, the Notice of Appeal fee has increased since it was previously paid and thus Applicant is paying the difference between the current fee and the amount previously paid.
- ☐ A check in the amount of the fee is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment To Deposit Account No. 50-2623.
- ☐ Payment made via EFS-Web.
- ☐ A petition for an extension of time under 37 CFR 1.136(a) (PTO/AIA/22 or equivalent) is enclosed.
For extensions of time in reexamination proceedings, see 37 CFR 1.550.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant

☒ attorney or agent of record
Registration number 65742

☐ attorney or agent acting under 37 CFR 1.34
Registration number _____

Signature /Andrew C. Stark/

Typed or printed name Andrew C. Stark

Telephone number (262) 268-8100

Date January 27, 2021

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☒ * Total of 1 forms are submitted.

This collection of information is required by 37 CFR 41.20(b)(1) and 41.31. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION #
16/191,503

RECEIPT DATE / TIME
01/27/2021 12:42:37 PM ET

ATTORNEY DOCKET #
CET1090.070

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CORRESPONDENCE ADDRESS -

AUTHORIZED BY Andrew Stark

Documents

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DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2021.01.27 Notice of Appeal-2nd.pdf	1	Notice of Appeal Filed	108 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2021.01.27 Notice of Appeal-2nd.pdf	5529771B56B7E1038DF6B6BD39548D5F2F74A4CF3CF8796105 03D15BB182559AFA946DDE8CAD791D61465E29087FFF0AE87 9B43F786E9E1D1F9DB02DEE12730A

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16191503
	Filing Date		2018-11-15
	First Named Inventor	Mark J. Sarder et al.	
	Art Unit	3747	
	Examiner Name	Kevin A. Lathers	
	Attorney Docket Number	CET1090.070	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	2398437		1946-04-16	McGill et al.	
	2	3911956		1975-10-14	LeBreton et al.	
	3	4323046		1982-04-06	Barber	
	4	4375795		1983-03-08	Billingsley	
	5	4471805		1984-09-18	Solie et al.	
	6	4492207		1985-01-08	Hallberg	
	7	4750514		1988-06-14	Omori et al.	
	8	4788960		1988-12-06	Oshizawa	

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STATEMENT BY APPLICANT**
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Art Unit	3747	
Examiner Name	Kevin A. Lathers	
Attorney Docket Number	CET1090.070	

9	5934320		1999-08-10	O'Reilly et al.
10	6543395	B2	2003-04-08	Green
11	6591817	B2	2003-07-15	Deutsch
12	7591257	B2	2009-09-22	Bayer et al.
13	7802562	B2	2010-09-28	Lippa et al.
14	7905469	B2	2011-03-15	Nickels et al.
15	8042569	B2	2011-10-25	Morris
16	8757139	B2	2014-06-24	Deng
17	8944027	B2	2015-02-03	Montgomery
18	9175601	B2	2015-11-03	Markoski

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Examiner Name	Kevin A. Lathers
Attorney Docket Number	CET1090.070

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20070137591	A1	2007-06-21	Sugimoto et al.	

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	1	2401704	CN	Y	2000-10-18	Zhejiang University		
	2	102006008524	DE	A1	2006-08-31	Voss Automotive GMBH		
	3	189800	GB	A	1923-10-11	Sonderegger		
	4	532903	GB	A	1941-02-03	Henderson et al.		

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Multi-Power Ltd., MODELMP5500DF 13 HP Generator Owner's Manual, July 2006, pp. 1-38	

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Attorney Docket Number	CET1090.070

2	Winco Inc., Home Power TRI-FUEL Portable Generators Owners Manual, November 21, 2017, pp. 1-16
3	Winco Inc., HPS9000VE/E and HPS9000VE-03/A Generator Installation and Operators Manual, August 9, 2013, pp. 1-16
4	Winco Inc., Dyna ME5000VA Installation, Operation, and Maintenance Instructions, November 21, 2017, pp. 1-12
5	Winco Inc., Dyna DL9000E, DL5000H, and D3000 Portable Generators Installation, Operation, and Maintenance Instructions, November 21, 2017, pp. 1-12
6	PowerLand Industrial Tools, Powerland Tri Fuel Generator Owner's Manual, December 24, 2015, pp. 1-41
7	Winco Inc., HPS6000HE/I Bi-Fuel Generator Installation and Operators Manual, March 8, 2010, pp. 1-20

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

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Examiner Name	Kevin A. Lathers
Attorney Docket Number	CET1090.070

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

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See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Kevin R. Rosin/	Date (YYYY-MM-DD)	2020-12-15
Name/Print	Kevin R. Rosin	Registration Number	55584

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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12/15/2020 11:40:04 AM ET

ATTORNEY DOCKET #
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CORRESPONDENCE ADDRESS -

AUTHORIZED BY Kevin Rosin

Documents

TOTAL DOCUMENTS: 12

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2020.12.15 Supp IDS.pdf	6	Information Disclosure Statement (IDS) Form (SB08)	984 KB
FPD1-CN2401704Y.pdf	6	Foreign Reference	1808 KB
FPD2-DE102006008524A1.pdf	16	Foreign Reference	2597 KB
FPD3-GB189800A.pdf	4	Foreign Reference	690 KB
FPD4-GB532903A.pdf	5	Foreign Reference	1211 KB
NPL1-Multi-Power MODELMP5500DF 13 HP	38	Non Patent Literature	23502 KB

Generator Owner's Manual.pdf			
NPL2-Winco Home Power TRI-FUEL Portable Generators Owners Manual.pdf	16	Non Patent Literature	730 KB
NPL3-Winco HPS9000VEE and HPS9000VE-03A Manual.pdf	16	Non Patent Literature	1961 KB
NPL4-Winco Dyna ME5000VA.pdf	12	Non Patent Literature	118 KB
NPL5-Dyna Portable Generators.pdf	12	Non Patent Literature	104 KB
NPL6-PowerLand Tri Fuel Generator Owner's Manual.pdf	41	Non Patent Literature	7016 KB
NPL7-Winco HPS6000HEI Manual.pdf	20	Non Patent Literature	8337 KB

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FUEL Portable Generators
Owners Manual.pdf

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HPS9000VE-03A Manual.pdf

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NPL4-Winco Dyna
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NPL5-Dyna Portable
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NPL6-PowerLand Tri Fuel
Generator Owner's Manual.pdf

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NPL7-Winco HPS6000HEI
Manual.pdf

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Espacenet

Bibliographic data: GB189800 (A) — 1923-10-11

Improvements in or relating to internal combustion engines

Inventor(s):

Applicant(s): ARNOLD SONDEREGGER ± (ARNOLD SONDEREGGER)

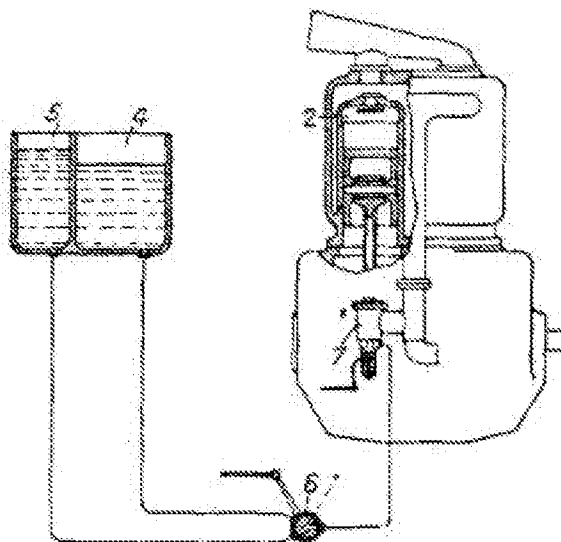
Classification: - **international:** *F02M1/00*
- **cooperative:** *F02M1/00 (EP); F02M2700/4316 (EP)*

Application number: GB19220032868 19221201

Priority number(s): *CHX189800 19211202*

Abstract of GB189800 (A)

189,800. Sonderegger, A. Dec. 2, 1921, [Convention date]. Spray carburettors - Either light fuel from the compartment 5 of the fuel tank, or a mixture of light and heavy fuel from the compartment 4, according to the position of the three-way cock 6, is supplied to the carburetting apparatus 7, the jet of which is adjustable and may be interconnected with the cock 6 to compensate automatically for the change of fuel. The light fuel may be petrol and it may be used with an equal quantity of naphtha or other raw oil. Cylinders receiving liquid fuel.-Plates 2 for vaporizing the fuel are provided in the combustion space.



PATENT SPECIFICATION



Convention Date (Switzerland): Dec. 2, 1921.

189,800

Application Date (in United Kingdom): Dec. 1, 1922. No. 32,868/22.

Complete Accepted: Oct. 11, 1923.

COMPLETE SPECIFICATION.

Improvements in or relating to Internal Combustion Engines.

I, ARNOLD SONDEREGGER, of 30, Rotstrasse, Zurich, Switzerland, a citizen of the Swiss Confederation, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to internal combustion engines more especially for motor cars, the main object of the invention being to provide means whereby the engines can be run on liquid fuel of two different qualities, say ordinary petrol and petrol mixed with a heavier or cheaper fluid which latter would in an ordinary way not be suitable alone (although it may in some cases be used without the petrol) in conjunction with means for preheating.

The preheating means is of that kind in which hot plates or equivalents are arranged in the combustion chambers of the engine said heater being used also with the petrol if so desired.

Briefly the invention consists in providing a double tank having outlets to a valve through which the contents of either tank can be allowed to pass to the carburetter of the engine both the said valve and the carburetter being capable of adjustment to select the desired fuel and to suit the fuel selected.

A suitable valve is one having two inlets and one outlet and provided with a plug or the like by turning which either inlet can be put into communication with the outlet, or of course the valve can be closed. The valve and the variation or adjustment of the carburetter can be effected by suitable mechanism, say levers and links of the kind operated from the dash board of the engine of the vehicle to which the invention is applied.

By means of the device operating in accordance with the method above

[Price 1/-]

described it is possible with a constant or even increased efficiency of the engine to operate the engine by means of a mixture of petrol and raw oil, for example 50% raw naphtha, and thus to effect a considerable saving in working expenses, and to obtain an almost smokeless combustion. It is also possible when travelling through localities where there are restrictions as to the emission of the fumes of heavy oils, to operate the engine with petrol by changing over the supply of fuel to the carburetter so as to obviate the trouble which is caused by the exhaust gases from the mixtures of petrol and raw oil.

The heating body for heating the fuel is preferably of the kind which consists of heating plates which are secured in the interior of the cylinder head and which are of such dimensions that they do not heat the mixture right up to the ignition point.

In the accompanying drawing is shown by way of example a form of construction of the subject of the invention, the example being a two cylinder engine, one cylinder being shown in section whilst the fuel tank together with the piping connecting this with the engine and the change-over cock are shown diagrammatically.

In the compression space of the cylinder 1 are provided heating plates 2 which are secured in the interior of the cylinder head. These heating plates store a portion of the heat of combustion and thus heat the freshly incoming mixture to a high temperature below the ignition temperature, whereupon after the completion of the compression stroke the ignition is effected by the usual ignition plug. The two part fuel tank 3 contains in the compartment 4 a mixture of petrol and any kind of raw or heavy oil and in the com-

partment 5 pure petrol. The fuel supply
pipes of both compartments are connected
by a single pipe by the change over cock
6, which is operated from the driver's
5 seat by suitable link work and from which
a pipe leads to the carburettor 7. The
carburettor illustrated is an apparatus of
the known type having an adjustable jet
for the fuel and the opening thereof is
10 controlled from the driver's seat by link-
work. For changing over from petrol to
the mixture and *vice versa* it suffices to
operate the cock 6 and simultaneously to
regulate the carburettor 7, these, for sim-
15 plicity, being coupled together or even
combined as a unit. The latter construc-
tion has the advantage that it is im-
possible to effect an incorrect adjustment.
In the linkwork for the cock and for the
20 carburettor adjusting mechanisms may be
provided so as to enable a very fine
adjustment to be made.

Having now particularly described and
ascertained the nature of my said inven-
25 tion and in what manner the same is to

be performed, I declare that what I
claim is:—

1. An internal combustion engine of
the kind provided with heaters in the
combustion chambers in combination with 30
two fuel tanks connected to a valve so
that the contents of either tank can be
allowed to pass through the valve to the
carburettor of the engine said carburettor
being adjustable for use with different 35
liquid fuels.

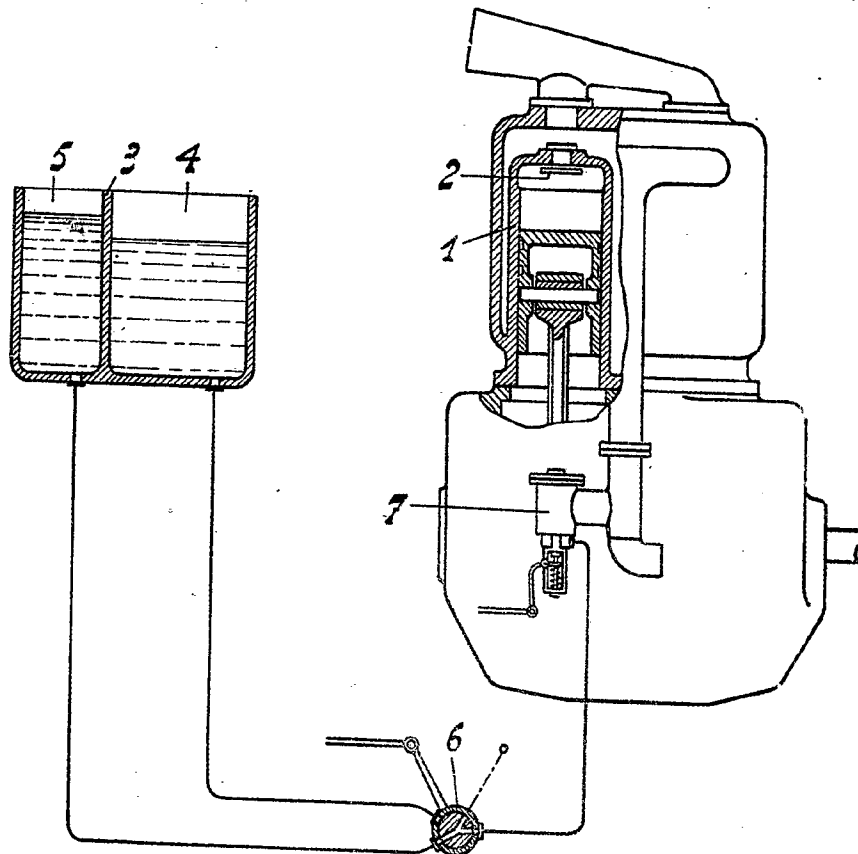
2. In combination with the engine
having two fuel tanks and a valve accord-
ing to Claim 1 means whereby the two
tanks can be selectively connected to the 40
carburettor of the engine and in which
the carburettor can be adjusted to suit
either fuel, the said selection and the said
adjustment being made by suitable
mechanism such as links and levers, sub- 45
stantially as herein described.

Dated this 1st day of December, 1922.

HY. FAIRBROTHER,
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Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1923.

[This Drawing is a reproduction of the Original on a reduced scale.]



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Espacenet

Bibliographic data: DE102006008524 (A1) — 2006-08-31

Multi-way valve arrangement for use as fuel tank-change-over-valve, has valve device including two multi-way partial valves, which are symmetrical and co-operating with one another, where partial valves are designed as gate valves

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Abstract of DE102006008524 (A1)

The arrangement has valve device provided such that supply-tank connections (A1, B1) are alternatively connected with supply-engine connection (M1) and return-tank connections (A2, B2) are alternatively connected with return-engine connection (M2). The valve device includes a two multi-way partial valves (V1, V2), which are symmetrical and co-operating with one another. The partial valves are designed as gate valves.



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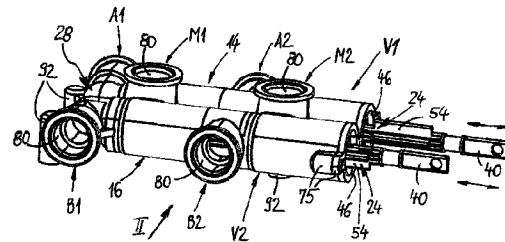
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Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

(54) Bezeichnung: **Mehrwege-Ventilanordnung**

(57) Zusammenfassung: Die Erfindung betrifft eine Mehrwege-Ventilanordnung (1) zur Verwendung als Kraftstoff-tank-Umschaltventil zwischen mindestens zwei Kraftstoff-tanks (A, B) und einem Motor (M) in einem Kraftfahrzeug, mit mindestens zweimal zwei Tankanschlüssen (A1, A2, B1, B2) jeweils für Vorlauf und Rücklauf und zwei Motoranschlüssen (M1, M2) für Vorlauf und Rücklauf sowie mit einer Ventileinrichtung, derart, dass die Vorlauf-Tankanschlüsse (A1, B1) alternativ oder gemeinsam mit dem Vorlauf-Motoranschluss (M1) und die Rücklauf-Tankanschlüsse (A2, B2) alternativ oder gemeinsam mit dem Rücklauf-Motoranschluss (M2) verbindbar sind. Die Ventileinrichtung besteht aus mindestens zwei zusammenwirkenden, schalttechnisch symmetrischen Mehrwege-Teilventilen (V1, V2), insbesondere 4/2-Wege-Ventilen, die insbesondere als zusammenwirkende Schieberventile (14, 16) ausgebildet sind.



Beschreibung

[0001] Die vorliegende Erfindung betrifft eine Mehrwege-Ventilanordnung zur Verwendung als Kraftstofftank-Umschaltventil zwischen zwei Kraftstofftanks und einem Motor in einem Kraftfahrzeug, mit zweimal zwei Tankanschlüssen jeweils für Vorlauf und Rücklauf und zwei Motoranschlüssen für Vorlauf und Rücklauf sowie mit einer Ventileinrichtung derart, dass die Vorlauf-Tankanschlüsse alternativ oder gemeinsam mit dem Vorlauf-Motoranschluss und die Rücklauf-Tankanschlüsse alternativ oder gemeinsam mit dem Rücklauf-Motoranschluss verbindbar sind.

Stand der Technik

[0002] In bestimmten Regionen der Erde, beispielsweise in den U.S.A., werden im Fernverkehr mit Lastkraftwagen große Strecken zwischen Gebieten mit hohen Durchschnittstemperaturen und Gebieten mit sehr niedrigen Temperaturen zurückgelegt. Da LKW's üblicherweise mit Diesel-Kraftstoff betrieben werden, tritt dabei das Problem auf, dass "Normal-Diesel" bei etwa -15°C einfriert. Deshalb müssen Diesel-Fahrzeuge bei niedrigeren Temperaturen mit einem anderen, speziellen Kraftstoff betrieben werden, dem sogenannten "Arktic-Diesel", der auch bei Temperaturen bis -40°C noch flüssig bleibt. Arktic-Diesel ist allerdings um ca. 10 % bis 15 % teurer als Normal-Diesel und verursacht zudem auch einen um etwa 10 % bis 15 % höheren Kraftstoff Verbrauch. Deshalb soll vermieden werden, das Fahrzeug nur, d. h. auch in wärmeren Regionen, mit Arktic-Diesel zu betreiben. Allerdings ist es nicht praktikabel und auch nicht rentabel, das gesamte Kraftstoffsystem mit Tanks und Leitungen bei einem Wechsel zwischen warmen und kalten Regionen umzustellen, d. h. vollständig zu entleeren und neu zu befüllen.

[0003] Schwere LKW's sind heute üblicherweise mit (mindestens) zwei Kraftstofftanks ausgerüstet. Daraus ergibt sich die Möglichkeit, je nach Einsatzfall die Tanks mit gleicher oder unterschiedlicher Kraftstoffart zu betanken. Mit Hilfe einer Ventilanordnung der eingangs beschriebenen Art können dann die Tanks einzeln oder gemeinsam mit dem Motor verbunden werden.

[0004] Eine bekannte Ventilanordnung der genannten, gattungsgemäßen Art ist als Mehrfachventil aus Metall ausgebildet und besteht aus vielen miteinander verschraubten Einzelteilen, und zwar aus vier 2/2-Wege-Ventilen, die über zwei T-Verteiler verbunden sind. Jedes Einzelventil ist als Kugelventil ausgebildet und wird mechanisch über Zug/Schub-Stangen bedient. Dabei treten einige bedeutende Nachteile auf:

- lange Betätigungswege der Hebel-Gestänge (150 bis 160 mm)
- hohes Gewicht (ca. 2, 5 kg)

- verschraubte Anschlüsse sind nicht oder nur schwer richtungsverstellbar (bezüglich der Verlaufsrichtung von angeschlossenen Leitungen)
- hoher Material- und Montageaufwand
- hohe Betätigungskraft
- nur direkte manuelle Betätigung möglich, wozu der Fahrer anhalten und das Führerhaus verlassen muß.

Aufgabenstellung

[0005] Der vorliegenden Erfindung liegt die Aufgabe zugrunde, eine zur Vermeidung der beschriebenen Nachteile verbesserte Mehrwege-Ventilanordnung der genannten Art zu schaffen, die sich insbesondere durch reduzierten Material- und Montageaufwand, geringes Gewicht und geringe Betätigungskraft mit der daraus resultierenden Möglichkeit einer automatischen (Fern-) Betätigung auszeichnet.

[0006] Erfindungsgemäß wird dies durch die Merkmale des Anspruchs 1 erreicht. Vorteilhafte Ausgestaltungen der Erfindung sind in den abhängigen Ansprüchen enthalten.

[0007] Demnach besteht die Ventileinrichtung erfindungsgemäß aus (mindestens) zwei schaltungstechnisch bezüglich der vorhandenen Anschlüsse symmetrischen Teilventilen, die insbesondere als 4/2-Wege-Ventile beliebiger Bauart, bevorzugt aber als Schieberventile ausgebildet sind. Somit handelt es sich vorzugsweise um ein Doppel-Schieberventil mit zwei zusammenwirkenden Schieberventilen. Dies stellt eine kostengünstige Lösung dar, die mit minimalem Aufwand alle Funktionen der bekannten Ventilanordnung erfüllt, dabei aber aus sehr wenigen Einzelkomponenten besteht. Daraus resultiert auch ein geringer Herstellungs- und Montageaufwand. Der Einsatz von Schieberventilen ist auch bezüglich der Durchflusseigenschaften sehr vorteilhaft, weil große Strömungsquerschnitte realisiert werden können. So müssen keine Dichtungen umströmt werden, so dass die Strömungsquerschnitte innerhalb der Ventilanordnung sogar um etwa 20 % größer sein können, als in den angeschlossenen Leitungen, und dies sogar ohne größere Einbaumaße der Ventilanordnung. Die zur Betätigung notwendigen Schaltwege können kleiner als 30 mm gehalten werden.

[0008] Die Betätigungskräfte sind derart gering, dass auch ein Schalten mit automatischen Mitteln, insbesondere elektromagnetisch oder pneumatisch, möglich ist. Zudem kann gegenüber der bekannten Ausführung eine Gewichtsreduzierung von mindestens 50 % (bei manueller Betätigung) bzw. von mindestens 20 % (bei automatischer Betätigung) erreicht werden. Schließlich können alle Anschlüsse auf recht einfache Weise, insbesondere durch Verwendung von Steckverbindungen, richtungseinstellbar, ausgelegt sein.

[0009] Jedes Teilventil weist zwei Tankanschlüsse für Vor- und Rücklauf und zwei Motoranschlüsse für Vor- und Rücklauf auf, wobei die Vorlauf-Motoranschlüsse der Teilventile miteinander zu einem gemeinsamen Vorlauf-Motoranschluss sowie die Rücklauf-Motoranschlüsse der Teilventile miteinander zu einem gemeinsamen Rücklauf-Motoranschluss verbunden sind.

[0010] Es sei an dieser Stelle bemerkt, dass das bevorzugte Doppel-Schieberventil grundsätzlich auch unabhängig von der speziellen Anwendung eingesetzt werden kann, und zwar als 6/3- bzw. 6/4-Wege-Ventil.

Ausführungsbeispiel

[0011] Anhand von in der Zeichnung veranschaulichten, bevorzugten Ausführungsbeispielen soll die Erfindung genauer erläutert werden. Dabei zeigen:

[0012] Fig. 1 eine Perspektivansicht einer erfindungsgemäßen Ventilanordnung (ohne endseitige Deckelemente),

[0013] Fig. 2 eine Seitenansicht der Ventilanordnung in Pfeilrichtung II gemäß Fig. 1,

[0014] Fig. 3 einen Axialschnitt in der Ebene III-III gemäß Fig. 2,

[0015] Fig. 4 einen weiteren Axialschnitt in der zur Ansicht nach Fig. 3 senkrechten Schnittebene IV-IV gemäß Fig. 3,

[0016] Fig. 5 eine Ausschnittvergrößerung des Bereichs V in Fig. 4,

[0017] Fig. 6 eine vergrößerte Ansicht eines Deckelementes in Pfeilrichtung VI gemäß Fig. 7,

[0018] Fig. 7 einen Schnitt in der Ebene VII-VII in Fig. 6,

[0019] Fig. 8 eine teilweise geschnittene Seitenansicht eines Einzelteils, und zwar eines Schiebers, der erfindungsgemäßen Ventilanordnung,

[0020] Fig. 9 einen Querschnitt in der Ebene IX-IX gemäß Fig. 8,

[0021] Fig. 10 bis Fig. 13 Darstellungen analog zu Fig. 3 in verschiedenen Schaltstellungen der erfindungsgemäßen Ventilanordnung,

[0022] Fig. 14 eine Seitenansicht der Ventilanordnung in einer vorteilhaften Ausgestaltung mit einer Druckmittel-Betätigungseinrichtung,

[0023] Fig. 15 einen Axialschnitt in der Ebene

XV-XV in Fig. 14,

[0024] Fig. 16 eine vergrößerte Darstellung des Bereichs XVI der Betätigungseinrichtung in Fig. 15,

[0025] Fig. 17 eine vergrößerte Axialschnittansicht eines Einzelteils, und zwar eines Betätigungskolbens, der Betätigungseinrichtung gemäß Fig. 15 bzw. Fig. 16,

[0026] Fig. 18 eine Stirnansicht des Betätigungskolbens in Pfeilrichtung XVIII gemäß Fig. 17,

[0027] Fig. 19 eine Seitenansicht in Pfeilrichtung XIX in Fig. 18,

[0028] Fig. 20 einen weiteren Axialschnitt in der Ebene XX-XX in Fig. 18,

[0029] Fig. 21 eine weitere Ansicht eines Deckelementes in einer gegenüber Fig. 6 alternativen Ausführung,

[0030] Fig. 22 einen Teilschnitt der Ventilanordnung entsprechend der Schnittlinie XII-XII in Fig. 15 mit zusätzlicher Darstellung von Anschlußsteckern und

[0031] Fig. 23 ein vereinfachtes Schaltbild der erfindungsgemäßen Ventilanordnung als Umschaltventil zwischen zwei Kraftstofftanks und einem Motor, beispielhaft in einer Schaltstellung wie in Fig. 13.

[0032] In den verschiedenen Figuren der Zeichnung sind gleiche Teile stets mit den gleichen Bezugszeichen versehen.

[0033] Wie sich zunächst aus Fig. 23 ergibt, wird eine erfindungsgemäße Mehrwege-Ventilanordnung 1 insbesondere als Kraftstofftank-Umschaltventil zwischen zwei Kraftstofftanks A und B und einem nur schematisch angedeuteten Motor M in einem Kraftfahrzeug (LKW) eingesetzt. Die Ventilanordnung 1 weist dazu zweimal zwei Tankanschlüsse A1, A2 für den Tank A und B1, B2 für den Tank B auf, wobei die Anschlüsse A1 und B1 als Vorlauf-Tankanschlüsse für je eine vom Tank A bzw. B zur Ventilanordnung 1 führende Tank-Saugleitung 2, 4 und die Anschlüsse A2 und B2 als Rücklauf-Tankanschlüsse für je eine zurück in Richtung Tank A bzw. B führende Rücklaufleitung 6, 8 fungieren. Ferner weist die Ventilanordnung 1 zwei Motoranschlüsse M1 und M2 auf, wobei der Anschluss M1 als Vorlauf-Motoranschluss für eine zum Motor M führende Vorlaufleitung 10 und der Anschluss M2 als Rücklauf-Motoranschluss für eine vom Motor M kommende Rücklaufleitung 12 vorgesehen sind. Die Ventilanordnung 1 weist weiterhin eine Ventileinrichtung derart auf, dass die Vorlauf-Tankanschlüsse A1, B1 alternativ oder gemeinsam mit dem Vorlauf-Motoranschluss M1 und die Rücklauf-Tankanschlüsse A2, B2 alternativ oder ge-

meinsam mit dem Rücklauf-Motoranschluss M2 verbindbar sind. Dadurch kann alternativ entweder der Tank A oder der Tank B mit dem Motor verbunden werden, oder es können beide Tanks A und B parallel mit dem Motor verbunden werden. Vorzugsweise ist noch eine vierte Schaltstellung vorgesehen, wobei beide Tanks A und B vom Motor M getrennt, d. h. abgesperrt sind. Diese vierte Schaltstellung (siehe [Fig. 10](#)) kann beispielsweise – durch eine geeignete Steuerung betätigt – den Kraftstoff zwangsweise absperren, um als Wegfahrsperrung zu dienen oder als Sicherheitsventil bei einem Unfall einen ungewollten Kraftstoffaustritt aus beschädigten Leitungen oder Aggregaten zu verhindern. In [Fig. 23](#) ist beispielhaft die Schaltstellung dargestellt, wobei der Tank B mit dem Motor M verbunden ist, während der andere Tank A abgesperrt ist. Zu den anderen Schaltstellungen wird bereits an dieser Stelle auf die [Fig. 10](#) bis [Fig. 13](#) verwiesen.

[0034] Erfindungsgemäß besteht nun die Ventileinrichtung 1 aus zwei zusammenwirkenden, Mehrwege-Teilventilen V1, V2, insbesondere Schieberventilen 14 und 16. Jedes Teilventil V1, V2 bzw. Schieberventil 14, 16 ist als 4/2-Wege-Ventil ausgebildet und weist zwei der Tankanschlüsse, und zwar einerseits A1 und A2 und andererseits B1 und B2, für Vor- und Rücklauf auf. Die Motoranschlüsse M1 und M2 sind mit beiden Schieberventilen 14, 16 verbunden. Daraus resultiert insgesamt ein Aufbau als 6/3- oder 6/4-Wege-Ventil mit sechs Anschlüssen und mindestens drei, vorzugsweise vier Schaltstellungen.

[0035] Jedes Schieberventil 14, 16 weist ein Ventilgehäuse 18 und einen in einem länglichen, zylinderartigen Schieberraum 20 innerhalb des Ventilgehäuses 18 in Richtung einer Schieberachse 22 kolbenartig zwischen (mindestens) zwei Schaltstellungen längsverschiebbaren Schieber 24 auf (vgl. hierzu auch die gesonderte Darstellung in [Fig. 8](#)). Jeder Schieberaum 20 weist an axial, d. h. in Richtung der Schieberachse 22 versetzten Stellen vier Steueröffnungen 26 auf, die jeweils mit einem der Tankanschlüsse A1, A2 bzw. B1, B2 bzw. einem der Motoranschlüsse M1 bzw. M2 verbunden sind. Je nach Stellung der Schieber 24 können die Steueröffnungen 26 paarweise verbunden oder gegeneinander abgesperrt werden.

[0036] In der bevorzugten Ausführung sind die zwei Schieberventile 14, 16 direkt benachbart und bezüglich ihrer Schieberachsen 22 parallel zueinander angeordnet. In weiterer vorteilhafter Ausgestaltung sind dabei die beiden Ventilgehäuse 18 zu einem monolithisch einstückigen Gehäuse-Formteil 28 zusammengefasst. Dieses Formteil 28 ist insbesondere als Kunststoff-Spritzteil oder als Druckgussteil beispielsweise aus Aluminium oder Zink ausgebildet. Auch dies trägt zu einer wirtschaftlichen Herstellung bei. Grundsätzlich kann aber das Formteil 28 auch aus

Vollmaterial durch eine spanende Bearbeitung hergestellt werden.

[0037] Das einstückige Gehäuse-Formteil 28 mit den beiden Ventilgehäusen 18 ist bezüglich einer mittigen Symmetrieebene 30 spiegelsymmetrisch ausgebildet. Dabei erstrecken sich die Tankanschlüsse A1, A2 und B1 und B2 jeweils mit zur Symmetrieebene 30 paralleler oder senkrechter Verlaufsrichtung von dieser weg nach außen. Die Motoranschlüsse M1, M2 sind mittig mit einer der Symmetrieebene 30 entsprechenden Verlaufsrichtung angeordnet. Somit liegen die Motoranschlüsse M1, M2 mittig zwischen den beiden Schieberventilen 14, 16. Jeder Motoranschluss M1, M2 geht in einen Kanal über, der zur Bildung der zugehörigen Steueröffnungen 26 die Schieberräume 20 beider Schieberventile 14, 16 anschnidet. Dadurch sind auf einfache Weise die Motoranschlüsse M1, M2 mit beiden Schieberventilen 14 und 16 verbunden.

[0038] Jeder Schieber 24 weist an axial beabstandeten Stellen Umfangsdichtungen 32 auf, die mit inneren Dichtflächen des jeweiligen Ventilgehäuses 18 zusammenwirken. Dabei besteht jeder Schieber 24 – siehe insbesondere [Fig. 8](#) – aus einem zentrischen, axialen Kern 36 und mehreren, in der dargestellten Ausführung vier, radialen tellerartigen Ventilscheiben 38 sowie einem einseitig aus dem jeweiligen Ventilgehäuse 18 nach außen geführten Betätigungsende 40. Jede Ventilscheibe 38 trägt auf ihrem Außenumfang vorzugsweise in einer Ringnut 42 eine der Umfangsdichtungen 32. Die Umfangsdichtungen 32 können von elastischen O-Ringen gebildet sein. Gemäß [Fig. 8](#) ist es vorteilhaft, wenn die Ventilscheiben 38 im Bereich radial zwischen dem Kern 36 und dem äußeren Umfang axiale Hinterschnidungen 44 aufweisen. Bei einer bevorzugten Herstellung der Schieber 24 als einstückige Kunststoff-Formteile werden durch die Hinterschnidungen 44 vorteilhafterweise Materialanhäufungen und damit ein Verzug vermieden. Diese Hinterschnidungen 44 werden bei der Fertigung durch eine sogenannte Springkerntechnik entformt.

[0039] In weiterer vorteilhafter Ausgestaltung der Erfindung ist hierbei vorgesehen, dass die Umfangsdichtungen 32 bezüglich ihrer Außendurchmesser D1, D2, D3 (siehe hierzu [Fig. 8](#)) sowie die Dichtflächen 34 bezüglich ihrer Innendurchmesser D'1, D'2 und D'3 (siehe [Fig. 4](#)) in Anpassung aneinander derart ausgelegt sind, dass jede Umfangsdichtung 32, die sich bei einem Schaltvorgang axial über den Bereich einer der Steueröffnungen 26 hinweg bewegt (im dargestellten Beispiel sind dies die Dichtungen 32b und 32d; siehe [Fig. 4](#) und [Fig. 8](#)), in ihrem sich axial über die jeweilige Steueröffnungen 26 hinweg erstreckenden Bewegungsbereich radial im Wesentlichen unverpresst ist und erst in einem jeweils axial zwischen zwei voneinander zu trennenden Steueröffnungen 26 liegenden Dichtbereich radial verpresst

wird. Durch diese vorteilhafte Maßnahme wird vermieden, dass eine der Umfangsdichtungen **32** bei ihrer Bewegung über eine seitlich in den Schieberaum **20** mündende Steueröffnung **26** hinweg beschädigt werden könnte, denn in einem verpressten Zustand könnte sich die Dichtung in die Steueröffnung **26** hinein ausdehnen und bei der weiteren Bewegung am Öffnungsrand hängenbleiben und so beschädigt werden. Dies wird durch die erfindungsgemäße Maßnahme vermieden. Konkret ist bei der bevorzugten Ausführung vorgesehen, dass der Schieberaum **20** jedes Ventilgehäuses **18** ausgehend von einem für das Betätigungsende **40** des Schiebers **24** offenen Ende **46** mehrere axial über konische Übergänge **48** ineinander übergehende, im Wesentlichen zylindrische Dichtflächen **34a** bis **c** aufweist, deren Innendurchmesser $D'1$ bis $D'3$ sich sukzessive über die konischen Übergänge **48** verkleinern (siehe nochmals [Fig. 4](#)). Es sei bemerkt, dass die Dichtflächen **34** auch jeweils schwach konisch, d. h. mit einem kleinen Konuswinkel $\leq 1^\circ$, ausgebildet sein können. Dies ermöglicht eine vereinfachte Entformbarkeit bei der Herstellung als Spritz- oder Druckgussteil. Die Auslegung der Durchmesser muss dabei in Relation zu den zugehörigen Umfangsdichtungen natürlich so sein, dass jede Umfangsdichtung **32** in ihrer Dichtstellung im Bereich der zugehörigen Dichtfläche **34** eine sichere Abdichtung gewährleistet. Was den Schieber **24** betrifft (siehe [Fig. 8](#)), so weist die – ausgehend vom Betätigungsende **40** – erste Umfangsdichtung **32a** einen Durchmesser $D1$ auf, der an den Innendurchmesser $D'1$ der ersten Dichtfläche **34a** so angepasst ist, dass diese Umfangsdichtung **32a** zur Abdichtung verpresst ist. Damit dient diese erste Umfangsdichtung **32a** zur ständigen Abdichtung des Schieberaums **20** nach außen in Richtung des offenen Endes **46**. Die nächste, zweite Umfangsdichtung **32b** weist demgegenüber einen reduzierten Durchmesser $D2$ auf, so dass diese zweite Umfangsdichtung **32b** im Bereich der ersten Dichtfläche **34a** nicht oder zumindest nicht vollständig radial verpresst ist. Dadurch kann sie sich über den Bereich der ersten Steueröffnung **26** hinweg schadlos bewegen. Im Anschluss daran wird diese zweite Umfangsdichtung **32b** über den konischen Übergang **48** radial verpresst, bis sie dann dichtend auf der zweiten Dichtfläche **34b** mit dem Innendurchmesser $D'2$ anliegt. In analoger Weise verhält sich dies auch mit der dritten und vierten Umfangsdichtung **32**. So liegt die dritte Umfangsdichtung **32c** in jeder Stellung radial verpresst und dadurch dichtend an der Dichtfläche **34b** an. Ihr Durchmesser $D2$ entspricht demgemäß etwa dem Innendurchmesser $D'2$. Die vierte und letzte Umfangsdichtung **32d** weist einen weiter reduzierten Durchmesser $D3$ auf, so dass sie folglich im Bereich dieser Dichtfläche **34b** mit dem Innendurchmesser $D'2$ nicht oder nur unwesentlich radial verpresst ist. Sie kann sich dadurch über den Bereich der weiteren Steueröffnung **26** schadlos hinweg bewegen und wird dann über den weiteren konischen Übergang **48**

radial verpresst, und zwar entsprechend dem Innendurchmesser $D'3$ der sich anschließenden Dichtfläche **34c**.

[0040] Es ist zweckmäßig, wenn die Ventilgehäuse **18** an ihren offenen Enden **46** mit einem Deckelelement **50** verschlossen bzw. verschließbar sind. Vorzugsweise dient das Deckelelement **50** auch zur Führung des Betätigungsendes **40** des jeweiligen Schiebers **24**. Dazu weist das Deckelelement **50** jeweils eine Führungsöffnung **52** mit einer dem Querschnitt des Kerns **36** bzw. eines zusätzlichen Führungsabschnittes **54** entsprechenden Öffnungskontur auf. Im dargestellten Beispiel handelt es sich um einen von der Kreisform abweichenden, insbesondere etwa kreuzförmigen Querschnitt, siehe insbesondere [Fig. 6](#), so dass auch eine Führung gegen Verdrehen um die Schieberachse **22** erreicht wird. Durch eine spezielle, insbesondere gegeneinander „verdrehte“ Anordnung der Führungsöffnungen **52** (vgl. [Fig. 6](#) und [Fig. 21](#)) wird eine definierte Einbaulage der Schieber **24** zur Korrektur von eventuellen, herstellungsbedingten Formabweichungen im Gehäuse **18** erreicht. Hierzu kann der Schieber **24** in der Form dem Gehäuse und dessen Formabweichung angepasst werden. Es ist dabei zudem vorteilhaft, wenn die einzelnen Deckelelemente **50** der beiden Ventilgehäuse **18** über einen Verbindungsabschnitt **56** zu einem einstückigen Teil, insbesondere einem einstückigen Kunststoff-Formteil, zusammengefasst sind.

[0041] In weiterer bevorzugter Ausgestaltung ist jeder Schieber **24** in jeder von zwei Schaltstellungen insbesondere über Rastmittel **58** kraftformschlüssig fixiert. Wie sich insbesondere aus [Fig. 5](#) ergibt, kann als Rastmittel **58** jeweils ein Rastarm **60** im Bereich der Führungsöffnung **52** des Deckelelementes **50** vorgesehen sein, der mit einer Rastnase jeweils in eine Rastausnehmung **62** des Schiebers **24** bzw. des Führungsabschnittes **54** eingreift.

[0042] Wie nur in [Fig. 3](#) stark schematisch angedeutet ist, ist es weiterhin vorteilhaft, wenn zur Schmutzabdichtung zwischen dem Betätigungsende **40** jedes Schiebers **24** und dem Ventilgehäuse **18** bzw. dem damit verbundenen Deckelelement **50** eine faltenbalgartig längenvariable Hülle **64** angeordnet ist.

[0043] In den Ausführungen gemäß [Fig. 1](#) bis [Fig. 13](#) sind die Schieber **24** manuell, insbesondere über nicht dargestellte mechanische Verbindungen, wie Gestänge oder Seilzüge, betätigbar.

[0044] Alternativ oder auch zusätzlich kann eine Betätigungseinrichtung **66** zur motorischen, insbesondere pneumatischen oder hydraulischen oder elektromagnetischen Betätigung der Schieber **24** vorgesehen sein.

[0045] Hierzu wird auf das Ausführungsbeispiel gemäß Fig. 14 bis Fig. 16 verwiesen, wobei die Ventilgehäuse **18** auf der Seite der Betätigungsenden **40** der Schieber **24** – vorzugsweise zusätzlich zu dem Deckelelement **50** – mit jeweils einem Zylindergehäuse **68** verbunden sind. Die Schieber-Betätigungsenden **40** sind mit jeweils einem in dem Zylindergehäuse **68** geführten Betätigungskolben **70** verbunden. Jedes Zylindergehäuse **68** weist einen Steuerdruckanschluß S1 bzw. S2 auf. Dadurch kann der jeweilige Betätigungskolben **70** auf der Seite eines Arbeitsraums **71** mit einem Druckmittel beaufschlagt werden, um den zugehörigen Schieber **24** insbesondere gegen die Rückstellkraft einer Rückstellfeder **72** zu verschieben. Vorzugsweise ist dabei jeder Betätigungskolben **70** über Rastmittel **74** mit dem Betätigungsende **40** des zugehörigen Schiebers **24** verbunden. Hierzu wird auch auf die gesonderten Darstellungen des Betätigungskolbens **70** in Fig. 17 bis Fig. 20 hingewiesen. Um auf der dem Arbeitsraum **71** gegenüberliegenden Seite des Betätigungskolbens **70** bei der Druck-Betätigung innerhalb des Zylindergehäuses **68** einen Überdruck zu vermeiden bzw. abzubauen, weist das/jedes Zylindergehäuse **68** in diesem Bereich (mindestens) eine Lüftungsöffnung **67** auf, die vorzugsweise außen von einer membranventilartigen, ringbandförmigen Schmutzdichtung **69** überdeckt ist (siehe insbesondere Fig. 16).

[0046] Weiterhin ist es vorteilhaft, wenn die beiden Zylindergehäuse **68** der Betätigungseinrichtung **66** zu einem einstückigen Formteil zusammengefasst sind. Dieses Zylinder-Formteil wird bevorzugt im Bereich von seitlichen Montageansätzen **75** mit dem Gehäuse-Formteil **28** verschraubt, und zwar unter Zwischenlage des einteiligen Deckelelementes **50**. Dieses weist dann gemäß Fig. 21 korrespondierende Montageansätze **75** mit Schraubenlöchern **76** auf. Zur Positionierung und Montagehilfe sind bevorzugt im Anlagebereich zwischen der Betätigungseinrichtung **66** und dem Deckelelement **50** sowie zwischen letzterem und dem Gehäuse **18** bzw. dem Gehäuse-Formteil **28** Positionsansätze **77** vorgesehen, die in korrespondierende Öffnungen eingreifen (siehe insbesondere Fig. 16). Durch eine unterschiedliche Anordnung und/oder Form, z.B. unterschiedliche Durchmesser, der Positionseinsätze **77** können die Teile nur korrekt und lagerichtig miteinander verbunden werden, so dass vorteilhafterweise eine Fehlmontage praktisch ausgeschlossen ist.

[0047] Bei der Alternative gemäß Fig. 2 bis Fig. 13 ist das Deckelelement **50** gemäß Fig. 6 über Rastmittel **78** mit den Ventilgehäusen **18** bzw. dem Gehäuse-Formteil **28** verrastbar.

[0048] Dabei kann auch die Betätigungseinrichtung **66** über Rastmittel befestigt werden (nicht dargestellt).

[0049] Es ist weiterhin zweckmäßig, wenn alle vorgesehenen Anschlüsse A1/2, B1/2, M1/2 und S1/2 als Kupplungsteile zum insbesondere richtungsvariablen Steckanschluss von Leitungen ausgebildet sind. Hierzu wird auf Fig. 22 verwiesen, wonach jeder Anschluss als muffenartige Aufnahmeöffnung **80** zum Einstecken eines Steckerteils **82** ausgebildet ist. Dabei sind zudem geeignete Arretiermittel **84** zum lösbaren Arretieren des eingesteckten Steckerteils **82** vorgesehen. Im dargestellten Beispiel weist jeder Anschluss im Mündungsbereich der Aufnahmeöffnung **80** einen radial nach außen ragenden Umfangsrand **86** auf, der im eingesteckten Zustand von äußeren, sich axial erstreckenden Rastarmen **88** des jeweiligen Steckerteils **82** rastend übergriffen wird. Zum Lösen können die Rastarme **88** radial nach außen gespreizt werden. Vorteil dieser Anschlussart ist, dass die Verlaufsrichtung der angeschlossenen Leitung (selbst nicht dargestellt) variabel ist, weil sich die Steckerteile **82** relativ zu den Anschlüssen verdrehen lassen. Im dargestellten Beispiel gemäß Fig. 22 weist jedes Steckerteil **82** zum Leitungsanschluss einen üblichen Anschlussdorn **90** auf.

[0050] Die Bestandteile der erfindungsgemäßen Ventilanordnung **1**, und zwar insbesondere die Ventilgehäuse **18** bzw. das einstückige Gehäuse-Formteil **28**, die Schieber **24** und vorzugsweise auch die Deckelelemente **50** und optional die Zylindergehäuse **68** und die Betätigungskolben **70**, bestehen vorzugsweise aus dem gleichen Material, und zwar insbesondere aus einem faserverstärkten Kunststoff, wie PA12-GF50. Dieses bevorzugte Material weist eine geringe Wasseraufnahme auf und eignet sich gut zur Anwendung mit Kraftstoffen, insbesondere Diesel. Durch Verwendung von gleichen Materialien für die Bestandteile werden Undichtigkeiten, die durch thermische Dehnung entstehen könnten, vermieden.

[0051] Das Gehäuse-Formteil **28** weist zur Montagebefestigung an einem nicht dargestellten Träger in einem Kraftfahrzeug mindestens zwei, bevorzugt drei außen angeformte Befestigungselemente **92** auf, die insbesondere derart gegenüber den Bereichen der Dichtflächen **34** axial und/oder radial versetzt angeordnet sind, dass bei der Montage ein Verzug des Formteils und daraus resultierende Formveränderungen im Bereich der Dichtflächen **34** weitgehend ausgeschlossen sind. Dies gewährleistet eine gute Funktionsfähigkeit und dauerhafte Dichtwirkung im Bereich der Umfangsdichtungen **32** und Dichtflächen **34**.

[0052] Die Funktion der erfindungsgemäßen Ventilanordnung **1** dürfte durch die obigen Erläuterungen des konstruktiven Aufbaus bereits hinreichend klar sein. Ergänzend wird auf die Darstellungen in den Fig. 10 bis Fig. 13 verwiesen. In Fig. 10 ist eine optionale Absperrstellung dargestellt, in der alle vorhandenen Anschlüsse voneinander getrennt sind.

Fig. 11 zeigt die Ventilstellung zur Verbindung des Tanks A mit dem Motor M, indem A1 mit M1 und A2 mit M2 verbunden sind. Der Tank B ist vom Motor M abgesperrt. Die umgekehrte Schaltstellung ist in Fig. 13 dargestellt, wobei der Tank A abgesperrt und der Tank B mit dem Motor M verbunden ist. Schließlich zeigt Fig. 12 eine Stellung, in der beide Tanks A und B mit dem Motor M verbunden sind. Diese Schaltstellung ist vorgesehen für den Fall, dass beide Tanks mit dem selben Kraftstoff befüllt sind.

[0053] Die Absperrstellung gemäß Fig. 10 kann als Prüfstellung zur Dichtheitsprüfung vorgesehen sein. Dabei bilden sich im Ventil zwei Prüfkammern, die über die beiden Motoranschlüsse M1 und M2 mit einem Prüfdruck beaufschlagt werden können. Diese Prüfkammern werden von den Umfangsdichtungen **32** der Schieber **24** gedichtet. Im Falle eines gemessenen Druckabfalls des Prüfdruckes kann auf eine beschädigte oder gar fehlende Umfangsdichtung geschlossen werden.

[0054] Durch die beschriebene Ausgestaltung der Ventilanordnung **1** bzw. der beiden Schieberventile **14**, **16** werden Vor- und Rücklauf eines Tanks stets nur gemeinsam geschaltet. Dadurch sind Vertauschungen ausgeschlossen.

[0055] Es sei nochmals bemerkt, dass ein Schieberventil **14** bzw. **16** der beschriebenen Art bzw. ein Doppel-Schieberventil der bevorzugten Art auch unabhängig von der beschriebenen, speziellen Anwendung als Tank-Umschaltventil als allgemeines 4/2-bzw. 6/3- oder 6/4-Wege-Ventil verwendet werden kann.

[0056] Im Übrigen ist die Erfindung ohnehin nicht auf die beschriebenen Ausführungsbeispiele beschränkt, sondern erstreckt sich auch auf gleichwirkende Ausführungen. Ferner ist die Erfindung bislang auch noch nicht auf die im jeweils unabhängigen Anspruch definierte Merkmalskombination beschränkt, sondern kann auch durch jede beliebige andere Kombination von bestimmten Merkmalen aller insgesamt offenbarten Einzelmerkmalen definiert sein. Dies bedeutet, daß grundsätzlich praktisch jedes Einzelmerkmal des jeweils unabhängigen Anspruchs weggelassen bzw. durch mindestens ein an anderer Stelle der Anmeldung offenes Einzelmerkmal ersetzt werden kann. Insofern sind die Ansprüche lediglich als ein erster Formulierungsversuch für eine Erfindung zu verstehen.

Patentansprüche

1. Mehrwege-Ventilanordnung (**1**) zur Verwendung als Kraftstofftank-Umschaltventil zwischen mindestens zwei Kraftstofftanks (A, B) und einem Motor (M) in einem Kraftfahrzeug, mit mindestens zweimal zwei Tankanschlüssen (A1, A2; B1, B2). jeweils für

Vorlauf und Rücklauf und zwei Motoranschlüssen (M1, M2) für Vorlauf und Rücklauf sowie mit einer Ventileinrichtung derart, dass die Vorlauf-Tankanschlüsse (A1, B1) alternativ oder gemeinsam mit dem Vorlauf-Motoranschluss (M1) und die Rücklauf-Tankanschlüsse (A2, B2) alternativ oder gemeinsam mit dem Rücklauf-Motoranschluss (M2) verbindbar sind, **dadurch gekennzeichnet**, dass die Ventileinrichtung aus mindestens zwei zusammenwirkenden, schalttechnisch symmetrischen Mehrwege-Teilventilen (V1, V2), insbesondere 4/2-Wege-Ventilen, besteht.

2. Ventilanordnung nach Anspruch 1, dadurch gekennzeichnet, dass die Teilventile (V1, V2) als zusammenwirkende Schieberventile (**14**, **16**) ausgebildet sind.

3. Ventilanordnung nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass jedes Teilventil (V1, V2) zwei Tankanschlüsse (A1 und A2 bzw. B1 und B2) für Vor- und Rücklauf und zwei Motoranschlüsse für Vor- und Rücklauf aufweist, wobei die Vorlauf-Motoranschlüsse der Teilventile (V1, V2) miteinander zu einem gemeinsamen Vorlauf-Motoranschluss (M1) sowie die Rücklauf-Motoranschlüsse der Teilventile (V1, V2) miteinander zu einem gemeinsamen Rücklauf-Motoranschluss (M2) verbunden sind.

4. Ventilanordnung nach Anspruch 2 oder 3, dadurch gekennzeichnet, dass jedes Schieberventil (**14**, **16**) ein Ventilgehäuse (**18**) und einen in einem zylinderartigen Schieberraum (**20**) innerhalb des Ventilgehäuses (**18**) in Richtung einer Schieberachse (**22**) kolbenartig zwischen mindestens zwei Schaltstellungen längsverschiebbaren Schieber (**24**) aufweist, wobei jeder Schieberraum (**20**) an axial versetzten Stellen vier Steueröffnungen (**26**) aufweist, die jeweils mit einem der Tankanschlüsse (A1, A2 bzw. B1, B2) bzw. einem der Motoranschlüsse (M1 bzw. M2) verbunden sind.

5. Ventilanordnung nach einem der Ansprüche 2 bis 4, dadurch gekennzeichnet, dass die Schieberventile (**14**, **16**) direkt benachbart und bezüglich ihrer Schieberachsen (**22**) parallel zueinander angeordnet sind.

6. Ventilanordnung nach Anspruch 4 oder 5, dadurch gekennzeichnet, dass die Ventilgehäuse (**18**) der Schieberventile (**14**, **16**) zu einem monolithisch einstückigen Formteil (**28**) zusammengefasst sind.

7. Ventilanordnung nach Anspruch 6, dadurch gekennzeichnet, dass das Formteil (**28**) als Kunststoff-Spritzteil oder als Druckgussteil z.B. aus Aluminium oder Zink oder als spanend bearbeitetes Metall- oder Kunststoffteil ausgebildet ist.

8. Ventilanordnung nach einem der Ansprüche 4

bis 7, dadurch gekennzeichnet, dass die Ventilgehäuse (18) bezüglich einer mittigen Symmetrieebene (30) spiegelsymmetrisch ausgebildet sind, wobei sich die Tankanschlüsse (A1, A2; B1, B2) jeweils mit zur Symmetrieebene (30) senkrechter oder paralleler Verlaufsrichtung von dieser weg nach außen erstrecken, und wobei die Motoranschlüsse (M1, M2) mittig mit einer der Symmetrieebene (30) entsprechenden Verlaufsrichtung angeordnet sind.

9. Ventilanordnung nach Anspruch 8, dadurch gekennzeichnet, dass jeder Motoranschluss (M1, M2) einen Kanal aufweist, der zur Bildung der zugehörigen Steueröffnungen (26) die Schieberräume (20) beider Schieberventile (14, 16) anschneidet.

10. Ventilanordnung nach einem der Ansprüche 4 bis 9, dadurch gekennzeichnet, dass jeder Schieber (24) axial beabstandete Umfangsdichtungen (32a–d) aufweist, die mit inneren Dichtflächen (34) des jeweiligen Ventilgehäuses (18) zusammenwirken.

11. Ventilanordnung nach Anspruch 10, dadurch gekennzeichnet, dass jeder Schieber (24) aus einem zentrischen, axialen Kern (36) und mehreren, insbesondere vier, radialen, tellerartigen Ventilscheiben (38) sowie einem einseitig aus dem Ventilgehäuse (18) nach außen geführten Betätigungsende (40) besteht, wobei jede Ventilscheibe (38) auf ihrem Außenumfang in einer Ringnut (42) eine der Umfangsdichtungen (32a–d) trägt.

12. Ventilanordnung nach Anspruch 10 oder 11, dadurch gekennzeichnet, dass die Umfangsdichtungen (32a–d) bezüglich ihrer Außendurchmesser (D1–D3) sowie die Dichtflächen (34a–c) bezüglich ihrer Innendurchmesser (D'1–D'3) in Anpassung aneinander derart ausgelegt sind, dass jede Umfangsdichtung (32b, d), die sich bei einem Schaltvorgang axial über den Bereich einer der Steueröffnungen (26) bewegt, in ihrem sich axial über die Steueröffnung (26) hinweg erstreckenden Bewegungsbereich radial unverpresst und erst in einem jeweils axial zwischen zwei Steueröffnungen (26) liegenden Dichtbereich radial verpresst ist.

13. Ventilanordnung nach Anspruch 12, dadurch gekennzeichnet, dass der Schieberraum (20) jedes Ventilgehäuses (18) ausgehend von einem offenen Ende (46) mehrere axial über konische Übergänge (48) ineinander übergehende, zylindrische oder schwach konische Dichtflächen (34a–c) aufweist, deren Innendurchmesser (D'1 bis D'3) sich sukzessive über die konischen Übergänge (48) verkleinern.

14. Ventilanordnung nach einem der Ansprüche 4 bis 13, dadurch gekennzeichnet, dass die Ventilgehäuse (18) an ihren offenen Enden (46) mit einem Deckelelement (50) verschließbar sind, wobei vor-

zugsweise das Deckelelement (50) auch zur Führung des Betätigungsendes (40) des jeweiligen Schiebers (24) dient.

15. Ventilanordnung nach Anspruch 14, dadurch gekennzeichnet, dass das Deckelelement (50) jeweils eine Führungsöffnung (52) für einen Führungsabschnitt (54) des jeweiligen Schiebers (24) aufweist, wobei vorzugsweise eine bestimmte Drehlage mit Sicherung gegen Verdrehen der Schieber (24) vorgegeben ist.

16. Ventilanordnung nach einem der Ansprüche 4 bis 15, dadurch gekennzeichnet, dass jeder Schieber (24) in jeder von zwei Schaltstellungen insbesondere über Rastmittel (58) kraftformschlüssig fixiert ist.

17. Ventilanordnung nach einem der Ansprüche 4 bis 16, dadurch gekennzeichnet, dass zur Schmutzabdichtung zwischen dem Betätigungsende (40) jedes Schiebers (24) und dem Ventilgehäuse (18) bzw. dem damit verbundenen Deckelelement (50) eine faltenbalgartige Hülle (64) angeordnet ist.

18. Ventilanordnung nach einem der Ansprüche 4 bis 17, gekennzeichnet durch eine den Schiebern (24) zugeordnete Betätigungseinrichtung (66) zur manuellen oder motorischen, insbesondere pneumatischen oder hydraulischen oder elektromagnetischen Betätigung der Schieber (24).

19. Ventilanordnung nach einem der Ansprüche 3 bis 18, dadurch gekennzeichnet, dass die Ventilgehäuse (18) auf der Seite der Betätigungsenden (40) der Schieber (24) mit jeweils einem Zylindergehäuse (68) sowie die Schieber-Betätigungsenden (40) mit jeweils einem Betätigungskolben (70) verbunden bzw. verbindbar sind, wobei jedes Zylindergehäuse (68) einen zur Druckbeaufschlagung des Betätigungskolbens (70) in einen Arbeitsraum (71) mündenden Steuerdruckanschluss (S1, S2) aufweist.

20. Ventilanordnung nach Anspruch 19, dadurch gekennzeichnet, dass jedes Zylindergehäuse (68) auf der dem Arbeitsraum (71) gegenüberliegenden Seite des Betätigungskolbens (70) mindestens eine vorzugsweise mit einer ventilartigen Schmutzdichtung (69) ausgestattete Lüftungsöffnung (67) aufweist.

21. Ventilanordnung nach einem der Ansprüche 1 bis 20, dadurch gekennzeichnet, dass alle vorgesehenen Anschlüsse (A, B, M, S) als Kupplungsteile zum Steckanschluss von Leitungen ausgebildet sind, wobei vorzugsweise jeder Anschluss als muffenartige Aufnahmeöffnung (80) zum Einstecken eines Steckerteils (82) ausgebildet ist und Arretiermittel (84) zum lösbaren Arretieren des eingesteckten Steckerteils (82) vorgesehen sind.

22. Ventilanordnung nach einem der Ansprüche 4 bis 21, dadurch gekennzeichnet, dass die Ventilgehäuse (18) bzw. das einstückige Formteil (28) und die Schieber (24) aus dem gleichen Material bestehen, insbesondere aus einem faserverstärkten Kunststoff, wie PA12-GF50.

23. Ventilanordnung nach einem der Ansprüche 4 bis 22, dadurch gekennzeichnet, dass die Ventilgehäuse (18) bzw. das Gehäuse-Formteil (28) mindestens zwei, insbesondere drei Befestigungselemente (92) aufweisen/aufweist, die insbesondere derart außerhalb der Bereiche der Dichtflächen (34) angeordnet sind, dass bei der Montage und/oder beim Herstellprozess verzugsbedingte Verformungen im Bereich der Dichtflächen (34) vermieden werden.

24. Ventilanordnung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass im Verbindungsbereich zwischen dem Deckelelement (50) und dem Ventilgehäuse (18) bzw. dem Gehäuse-Formteil (28) und/oder im Verbindungsbereich zwischen der Betätigungseinrichtung (66) und dem Deckelelement (50) in korrespondierende Öffnungen eingreifende Positionsansätze (77) insbesondere derart vorgesehen sind, dass nur eine korrekte, lage-richtige Montage möglich ist.

25. Schieberventil (14, 16) insbesondere für eine Ventilanordnung (1) nach einem der Ansprüche 1 bis 24, bestehend aus einem Ventilgehäuse (18) und einem in einem zylinderartigen Schieberaum (20) innerhalb des Ventilgehäuses (18) in Richtung einer Schieberachse (22) kolbenartig zwischen mindestens zwei Schaltstellungen längsverschiebbaren Schieber (24), der axial beabstandete Umfangsdichtungen (32) aufweist, die mit inneren Dichtflächen (34) des Schieberaums (20) zusammenwirken, um in den Schieberaum (20) mündende Steueröffnungen (26) und damit verbundene Anschlüsse (A1, A2, B1, B2, M1, M2) entweder zumindest paarweise zu verbinden oder gegeneinander abzusperrern, dadurch gekennzeichnet, dass die Umfangsdichtungen (32a-d) bezüglich ihrer Außendurchmesser (D1-D3) sowie die Dichtflächen (34a-c) bezüglich ihrer Innendurchmesser (D'1-D'3) in Anpassung aneinander derart ausgelegt sind, dass jede sich bei einem Schaltvorgang axial über eine der Steueröffnungen (26) hinweg bewegendes Umfangsdichtung (32b, d) in ihrem sich über die Steueröffnung (26) hinweg erstreckenden Bewegungsbereich radial unverpresst und erst in einem jeweils axial zwischen zwei Steueröffnungen (26) liegenden Dichtbereich radial verpresst ist.

26. Schieberventil nach Anspruch 25, dadurch gekennzeichnet, dass der Schieberaum (20) des insbesondere als einstückiges Formteil ausgebildeten Ventilgehäuses (18) ausgehend von einem offenen Ende (46) mehrere axial über konische Übergänge

(48) ineinander übergehende, zylindrische oder schwach konische Dichtflächen (34a-c) aufweist, deren Innendurchmesser (D'1 bis D'3) sich sukzessive über die konischen Übergänge (48) verkleinern.

27. Schieberventil-Anordnung, gekennzeichnet durch zwei direkt benachbart und bezüglich ihrer Schieberachsen (22) parallel zueinander angeordnete Schieberventile (14, 16) nach Anspruch 25 oder 26.

28. Schieberventil-Anordnung nach Anspruch 27, dadurch gekennzeichnet, dass die beiden Ventilgehäuse (18) der Schieberventile (14, 16) zu einem monolithisch einstückigen Formteil (28), insbesondere einem Kunststoff-Spritzteil oder einem Druckgussteil z.B. aus Aluminium oder Zink oder einem spanend bearbeiteten Metall- oder Kunststoffteil, zusammengefasst sind.

29. Schieberventil-Anordnung nach Anspruch 27 oder 28, dadurch gekennzeichnet, dass die Ventilgehäuse (18) bezüglich einer mittigen Symmetrieebene (30) spiegelsymmetrisch ausgebildet sind, wobei sich je zwei separate Anschlüsse (A1, A2; B1, B2) jeweils mit zur Symmetrieebene (30) senkrechter oder paralleler Verlaufsrichtung von dieser weg nach außen erstrecken, und wobei zwei gemeinsame Anschlüsse (M1, M2) mittig mit einer der Symmetrieebene (30) entsprechenden Verlaufsrichtung angeordnet sind.

30. Schieberventil nach Anspruch 25 oder 26 oder Anordnung nach einem der Ansprüche 27 bis 29, gekennzeichnet durch mindestens ein weiteres Merkmal der Ansprüche 1 bis 24.

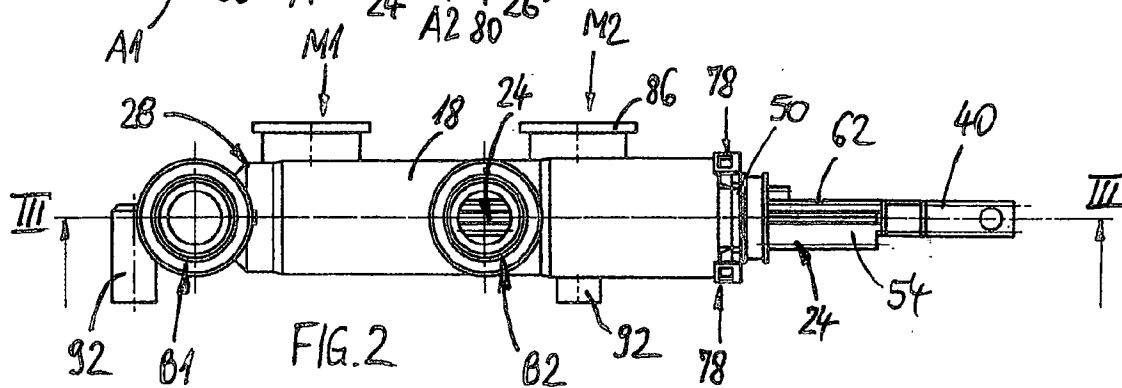
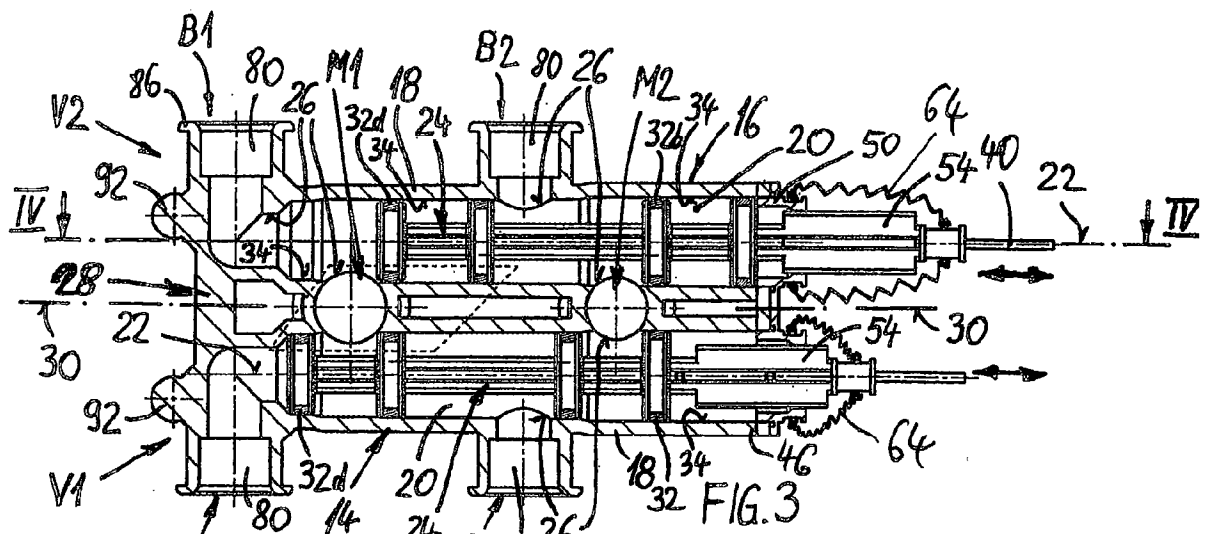
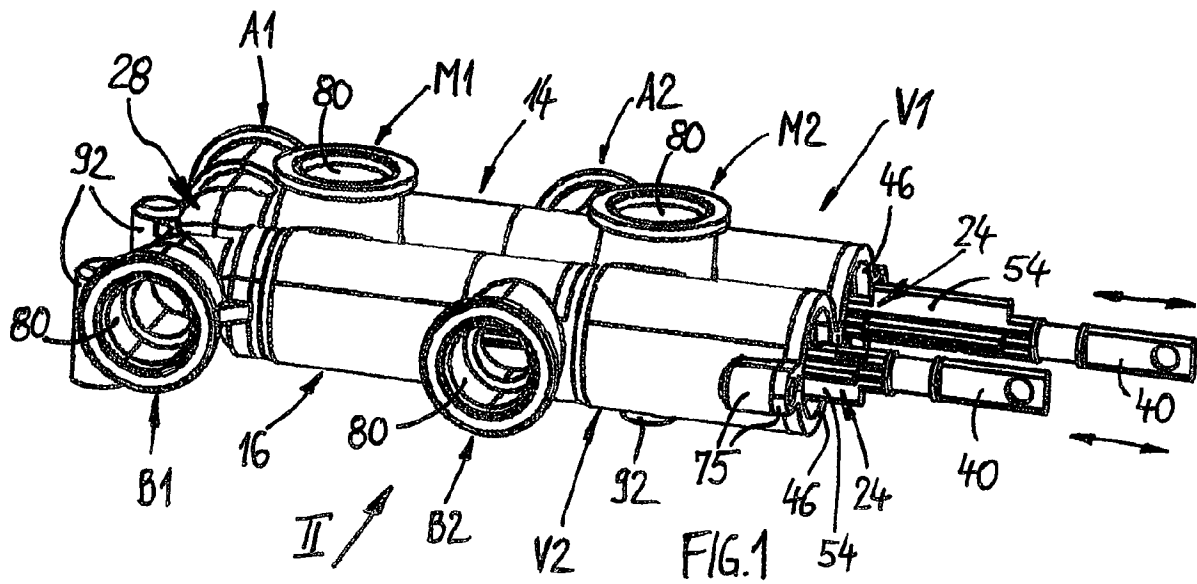
31. Ventilgehäuse (18) für eine Ventilanordnung (1) nach einem der Ansprüche 1 bis 24 oder für ein Schieberventil (14, 16) nach Anspruch 25 oder 26 oder 30.

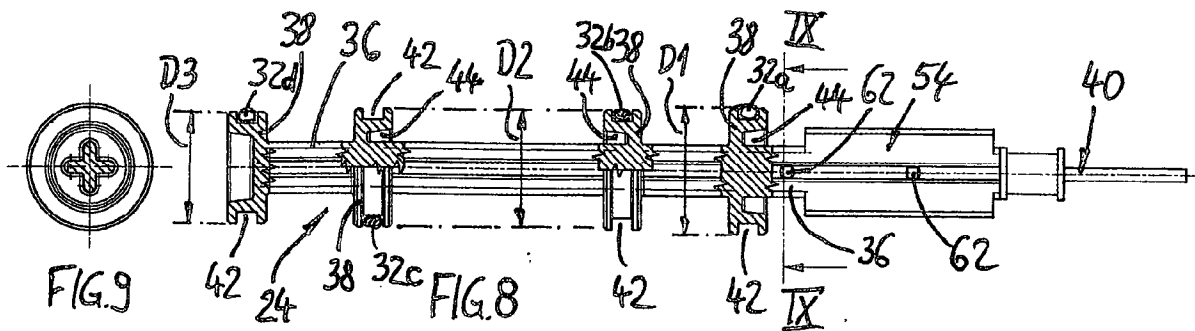
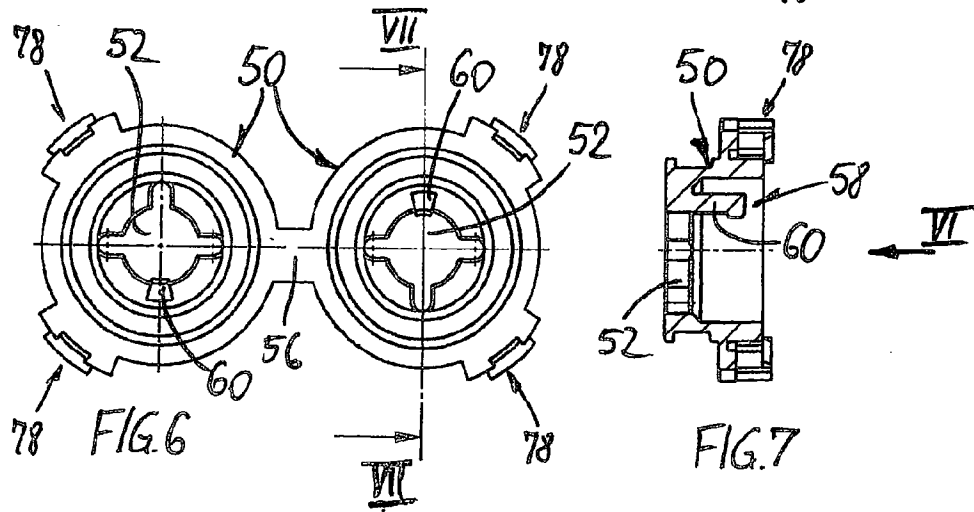
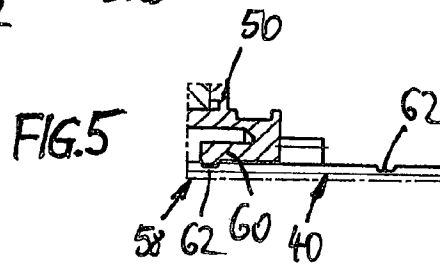
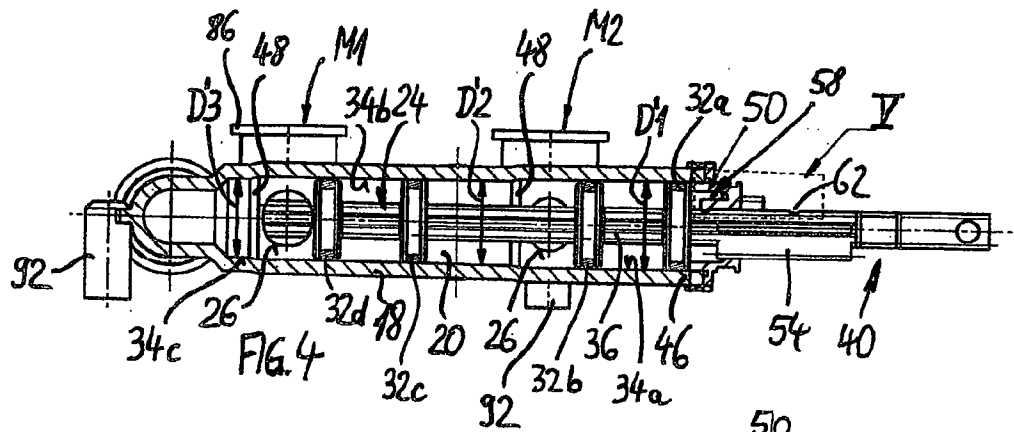
32. Gehäuse-Formteil (28) für eine Ventilanordnung (1) nach einem der Ansprüche 1 bis 24 oder für eine Schieberventil-Anordnung nach einem der Ansprüche 27 bis 30.

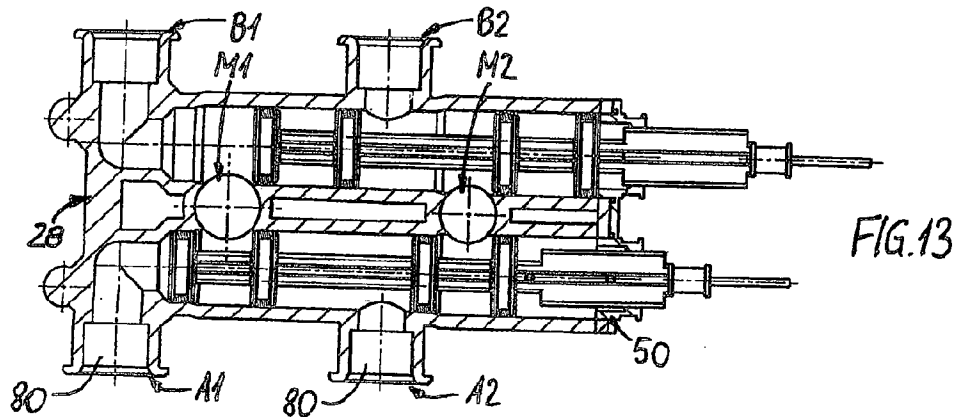
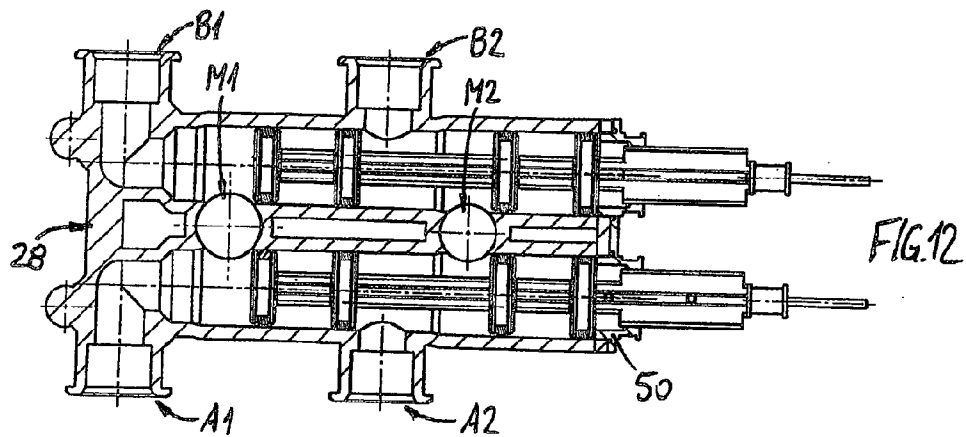
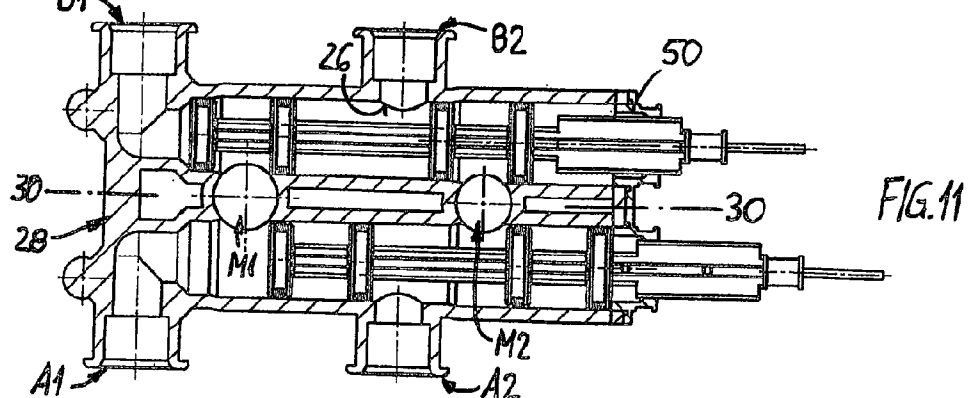
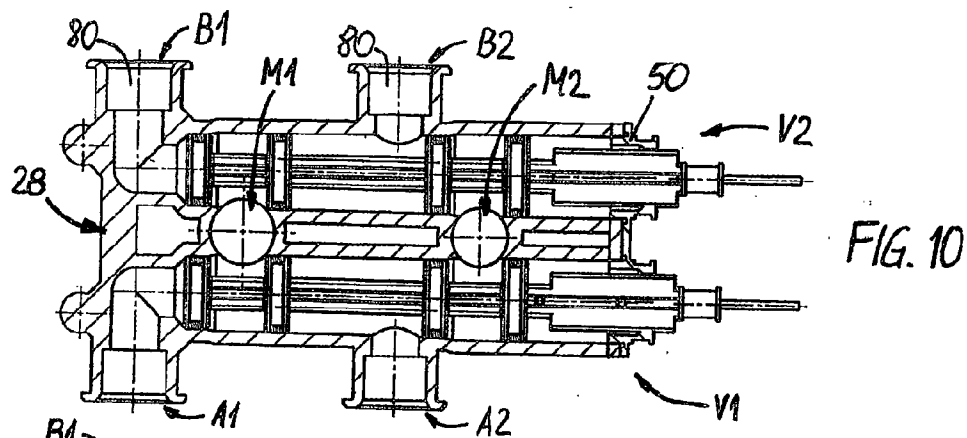
33. Schieber (24) für eine Ventilanordnung (1) nach einem der Ansprüche 1 bis 24 oder für ein Schieberventil (14, 16) nach Anspruch 25, 26 oder 30 oder für eine Schieberventil-Anordnung nach einem der Ansprüche 27 bis 30.

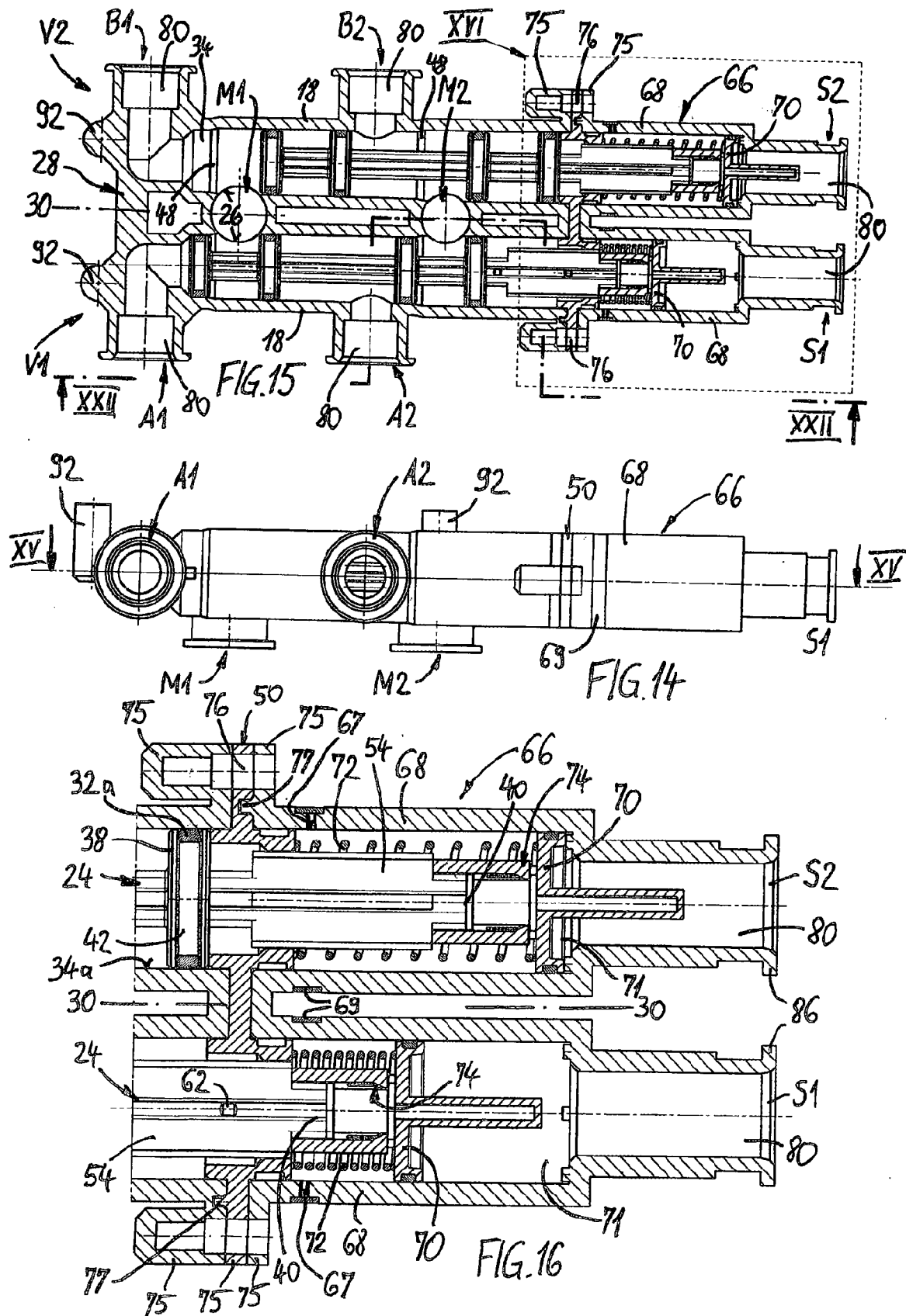
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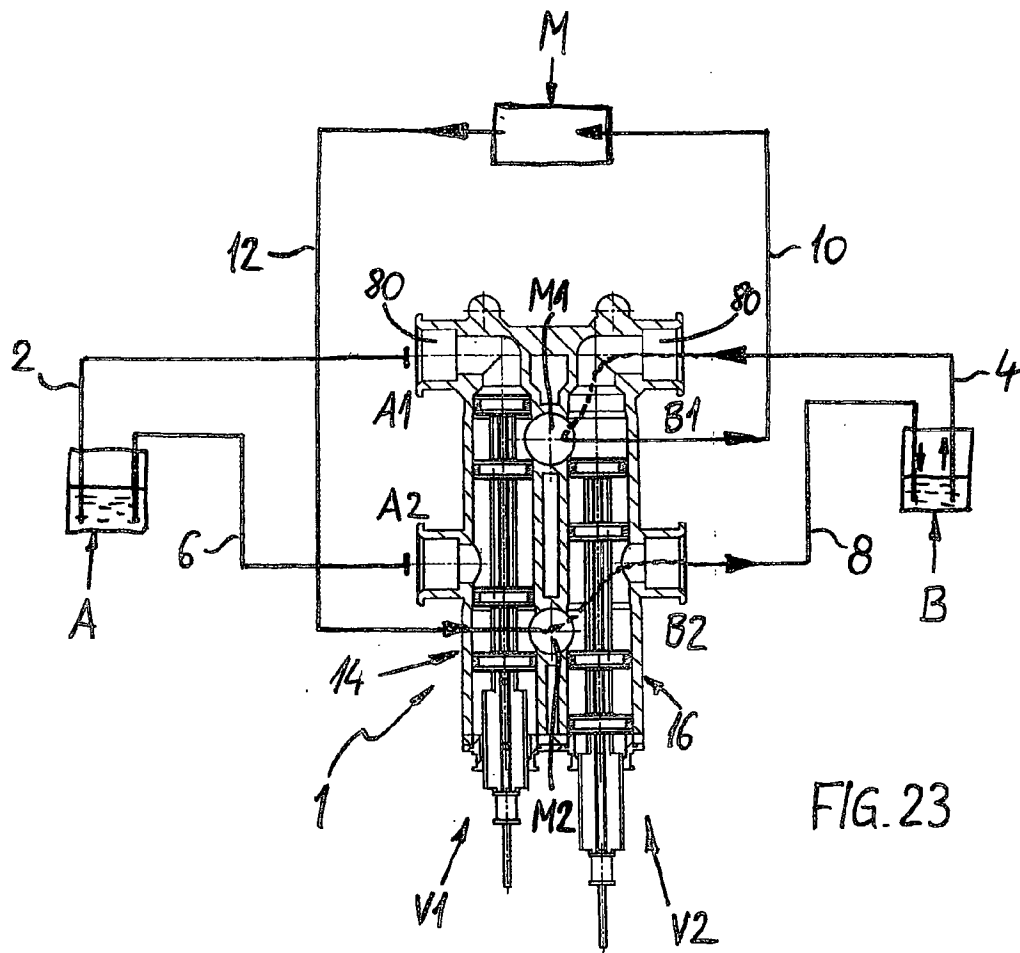
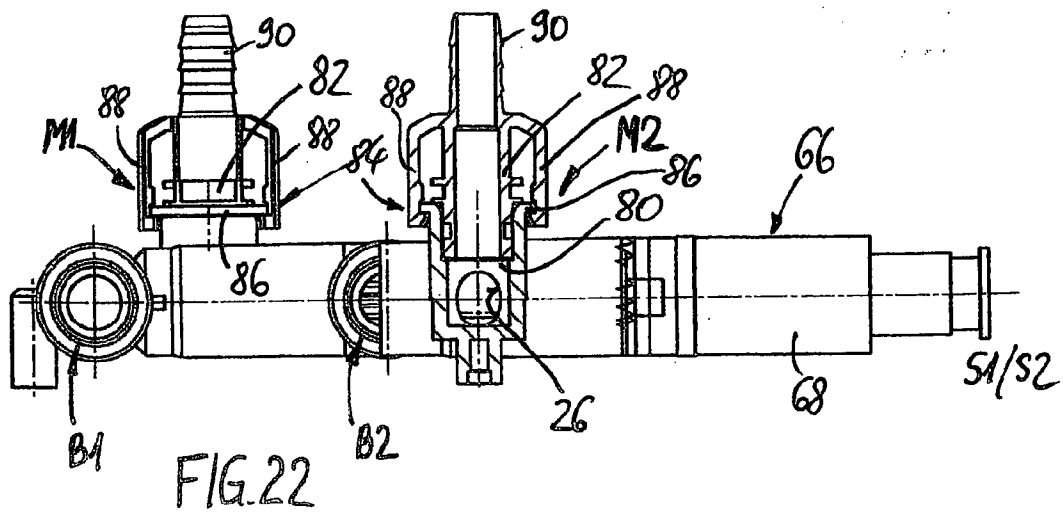
Anhängende Zeichnungen













Espacenet

Bibliographic data: CN2401704 (Y) — 2000-10-18

Gas power booster for dual-fuel gasoline engine

Inventor(s): XIA LAIQING [CN]; XIONG SHUSHENG [CN]; WANG JUNPEI [CN]
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Applicant(s): UNIV ZHEJIANG [CN] ± (ZHEJIANG UNIV)

Classification: - international: *F02M43/00*; (IPC1-7): F02M43/00
- cooperative:

Application number: CN19992050994U 19991123

Priority number(s): CN19992050994U 19991123

Abstract of CN2401704 (Y)

The utility model discloses a gas power booster for a double-fuel gasoline engine. A gasoline cut-off electromagnetic valve of the original double-fuel engine is connected in parallel with an electromagnetic valve for controlling the flow quantity of gasoline, and meanwhile, a throttle valve of a carburetor of the original engine is provided with a travel switch, wherein the on-off of the travel switch is automatically controlled by the opening degree of the throttle valve of the carburetor, and the travel switch is used for controlling to open and close the electromagnetic valve. The utility model has the advantages that the structure is simple and reliable, the power of the double-fuel gasoline engine when in the combustion of gas can be close to or even reach the level when in the combustion of fuel by using the gas power booster, and the good exhaust performance and the economic performance index of the engine when in the combustion of gas can not be affected.

[19]中华人民共和国国家知识产权局

[51]Int. Cl⁷

F02M 43/00

[12] 实用新型专利说明书

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[21]申请号 99250994.7

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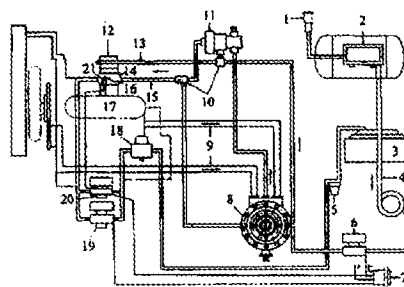
代理人 张法高

权利要求书 1 页 说明书 2 页 附图页数 1 页

[54]实用新型名称 双燃料汽油发动机燃气动力提高装置

[57]摘要

本实用新型公开了一种双燃料汽油发动机燃气动力提高装置。它在原双燃料发 动机汽油截断电磁阀上,并联一个控制汽油流量的电磁阀,同时在原发动机化 油器节气门上,设置一个通断由化油器节气门的开度自动控制的,并用来控制 电磁阀启闭的行程开关。本实用新型的优点:结构简便可靠,使用它能使双燃 料发动机燃气时的动力接近,甚至达到燃油时的水平,而不影响发动机 燃气时 的良好排放性能及经济性能指标。



ISSN 1000-8427 4

权利要求书

1. 一种双燃料汽油发动机燃气动力提高装置，其特征在于在原双燃料发动机汽油截断电磁阀[19]上，并联一个控制汽油流量的电磁阀[20]，同时在原发动机化油器[14]节气门[16]上，设置一个通断由化油器节气门的开度自动控制的，并用来控制电磁阀启闭的行程开关[21]。

2. 根据权利要求 1 所述的一种双燃料汽油发动机燃气动力提高装置，其特征在于控制汽油流量的电磁阀[20]，其负极接到行程开关的活动端上，正极与电磁阀[6]的正极相连。

3. 根据权利要求 1 或 2 所述的一种双燃料汽油发动机燃气动力提高装置，其特征在于所说的行程开关[21]为柱塞型行程开关，该开关的活动端与控制汽油流量的电磁阀[20]的负极相连，固定端搭铁。

说明书

双燃料汽油发动机燃气动力提高装置

本实用新型涉及一种双燃料汽油发动机燃气动力提高装置。

如图所示，原双燃料供给系统有一汽油—LPG（或 CNG）转换开关 7，当发动机燃用气体燃料时，汽油电磁阀 19 关闭，所有的气体燃料电磁阀打开。利用 LPG 容器内的压力压出液态的石油气，通过过滤器滤除杂质，经过电磁阀 6 进入减压阀 8，在此减压、气化、调压（对 CNG 需要经过三级减压）后，成为具有一定压力的气体燃料，在混合器 12 里和空气混合后进入发动机燃烧室。

现在普遍使用的 LPG（或 CNG）—汽油双燃料发动机供气系统，使得发动机在燃用气体燃料时，动力下降显著，大大影响双燃料发动机汽车的行驶性能。其主要原因是：气体燃料比汽油要占据的体积大，相同发动机排量下，影响发动机的充量，以及气体燃料的体积热值低，燃烧速度慢等。

本实用新型的目的是提供一种结构简便可靠，使用它能使双燃料发动机燃气时的动力接近，甚至达到燃油时水平的双燃料汽油发动机燃气动力提高装置。

为了达到上述目的，本实用新型采取下列措施：

在原双燃料发动机汽油截断电磁阀上，并联一个控制汽油流量的电磁阀，同时在原发动机化油器节气门上，设置一个通断由化油器节气门的开度自动控制的，并用来控制电磁阀启闭的行程开关。

本实用新型的优点：结构简便可靠，使用它能使双燃料发动机燃气时的动力接近，甚至达到燃油时的水平，而不影响发动机燃气时的良好排放性能及经济性能指标。

下面结合附图作详细说明：

附图是车用双燃料供给装置结构示意图。

图中，加气口 1、组合阀 2、汽油箱 3、高压铜管 4、汽油滤清器 5、LPG 或 CNG 电磁阀 6、LPG/汽油转换开关 7、减压阀 8、水箱水管 9、三通 10、怠速器 11、混合器 12、燃气软管 13、化油器 14、真空管 15、节气门 16、发动机 17、汽油泵 18、汽油电磁阀 19、控制汽油流量电磁阀 20、柱塞型行程开关 21。

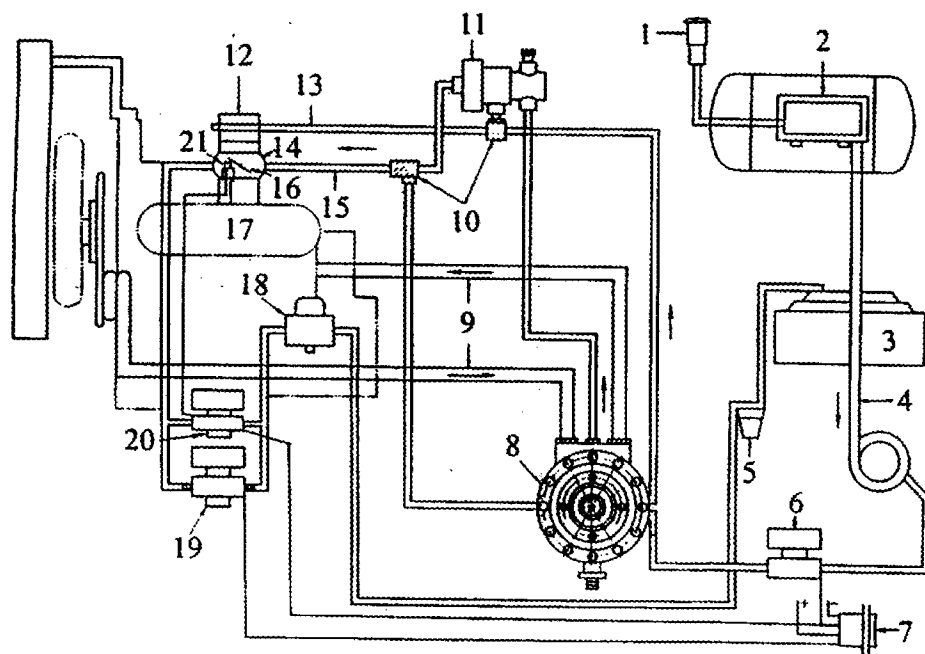
双燃料汽油发动机燃气动力提高装置，它在原双燃料发动机汽油截断电磁阀 19 上，并联一个控制汽油流量的电磁阀 20，同时在原发动机化油器 14 节气门 16 上，设置一个通断由化油器节气门的开度自动控制的，并用来控制电磁

阀启闭的行程开关 21。控制汽油流量的电磁阀 20，其负极接到行程开关的活动端上，正极与电磁阀 6 的正极相连。行程开关 21 为柱塞型行程开关，该开关的活动端与控制汽油流量的电磁阀 20 的负极相连，固定端搭铁。

当发动机燃用气体燃料时，汽油电磁阀 19 关闭，所有的气体燃料电磁阀打开。利用 LPG 容器内的压力压出液态的石油气，通过过滤器滤除杂质，经过电磁阀 6 进入减压阀 8，在此减压、气化、调压（对 CNG 需要经过三级减压）后，成为具有一定压力的气体燃料，在混合器 12 里和空气混合后进入发动机燃烧室。本实用新型在汽油电磁阀 19 上并联一个常闭的控制汽油流量电磁阀 20，使得发动机在高速或大负荷时，可以有一小部分特定时的汽油通过该电磁阀，经化油器 14，进入发动机 17，实现两种燃料联供、燃气掺烧汽的目的，从而大大提高发动机燃气时的动力。而低负荷和怠速时，通过设置在化油器 14 上的一个行程开关 21，及时将这一小部分特定量的汽油切断。该行程开关的活动端与控制汽油流量电磁阀 20 的负极相连，固定端搭铁。行程开关的通断完全由节气门 16 控制。当节气门 16 开度变小到一定程度，即发动机过渡到低负荷或怠速时，触及行程开关的柱塞，使行程开关断开，控制汽油流量电磁阀 20 断电，额外汽油的供给切断，发动机 17 处于完全燃气状态；而高转速或大负荷时，节气门 16 开度变大，行程开关 21 自动导通，控制汽油流量电磁阀 20 通电导通，一小部分特定流量的汽油便通过该电磁阀进入发动机与燃气共烧，从而大大提高发动机的动力。

当发动机工作在燃油状态时，LPG（或 CNG）电磁阀 6 的正极没有电压，而控制汽油流量电磁阀 20 的正极是与 LPG（或 CNG）电磁阀 6 的正极相连的，所以控制汽油流量电磁阀 20 上也没有电流输入，不管节气门 16 上的特种行程开关 21 如何动作，控制汽油流量电磁阀 20 都不导通，这与原供给系统燃油时状况完全一致，对发动机燃油时的性能不会产生任何影响。

说明书附图





Espacenet

Bibliographic data: GB532903 (A) — 1941-02-03

Improvements relating to fuel control mechanism for internal combustion engines using alternative fuels

Inventor(s):

Applicant(s): ALEXANDER HENDERSON; FREDERICK ERNEST REBECK +
(ALEXANDER HENDERSON, ; FREDERICK ERNEST REBECK)

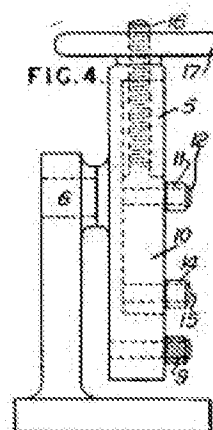
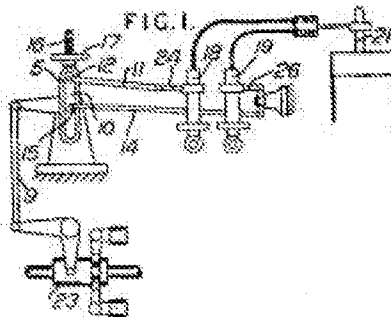
Classification: - **international:** *F02D19/08; F02D19/10*
- **cooperative:** *F02D19/0607 (EP); F02D19/0684 (EP); F02D19/08 (EP); F02D19/10 (EP); Y02T10/30 (EP)*

Application number: GB19390026528 19390923

Priority number(s): GB19390026528 19390923

Abstract of GB532903 (A)

532,903. Regulating. HENDERSON, A., and REBECK, F. E. Sept 23, 1939, No. 26528. [Class 7 (vi)] The alternative supply of two fuels to an engine is regulated by means of a link 5 pivoted at 6 and in which slides a block 10 connected at 12, 15 to rods 11, 14 leading to the regulating- means of the two fuels, the block being adjustable along the link to vary the proportions of the two fuels. As shown in Fig; 1, the rods 11, 14 actuate the controlling-rods 24, 26 of two fuel



pumps 18, 19 supplying an injector 21 or separate injectors ; but one of the fuel pumps may be replaced by a throttle valve in a pipe supplying gaseous fuel to the engine. The block 10 is adjusted by means of a screw 16 and hand-wheel 17, and is arranged so that when the block is at one end of the link 5 one of the rods 11 and 14 is inoperative, and when the block is at the other end of the link the other rod is inoperative ; in intermediate positions, both rods operate to adjust the supplies of both fuels. The link 5 may be connected by a link 9 to a hand control; or to an automatic regulator such as a speed governor 23. If one fuel is to be ignited by spark ignition, this may be automatically brought into operation when the block 10 is moved to its extreme position for supplying the fuel.

PATENT SPECIFICATION

532.903



Application Date: Sept. 23, 1939. No. 26528/39.

Complete Specification Accepted: Feb. 3, 1941.

COMPLETE SPECIFICATION

Improvements relating to Fuel Control Mechanism for Internal Combustion Engines using Alternative Fuels

We, ALEXANDER HENDERSON, of 133, Marlborough Avenue, Broomhill, Glasgow, W.1, and FREDERICK ERNEST REBECK, of Harland and Wolff, Limited, Queen's Island, Belfast, both British Subjects, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improved mechanism for controlling the supply of fuel to the cylinders of internal combustion engines constructed for use with alternative fuels, which may be different liquid fuels, or liquid fuel and gaseous fuel, or liquid fuel and a mixture of liquid and gaseous fuel, such as, for example, compression - ignition internal combustion engines adapted to use alternative liquid fuels, or adapted for the alternative use of liquid fuel and gaseous fuel, with or without admixture of the gaseous fuel with liquid fuel to assist combustion.

The invention is concerned with an engine according to the preceding paragraph provided with two fuel supply devices, one for supplying one fuel and the other for separately supplying another fuel to the engine cylinder or cylinders, each fuel supply device being controlled by transmission members connected to a slide element slidable on an oscillatory link or like member adapted to be oscillated about a fixed pivotal axis, the amplitude of oscillation being variable to vary the movement of said transmission members and thus to vary the amount of fuel supplied to the engine without varying the proportions of the fuels, and the slide element being manually adjustable on the link to move one transmission member relatively to the other, thereby to vary the proportions of the fuels supplied by the two fuel supply devices. An engine conforming to the preceding statement is hereinafter referred to as an engine "of the character described".

Such mechanism enables the change of fuel to be effected without stopping the engine and also provides for the control of the supply of both fuels at all times.

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It further provides a means whereby the amount of the charge of fuel supplied to the engine can be regulated either automatically by the engine speed governor or by actuation of a fuel supply regulator, while further providing control means for the control of the relative proportions of the two fuels when a mixture of fuels is supplied to the engine.

Heretofore an engine of the character described had the two transmission members connected one to each pump plunger of a pair of fuel pumps and the link carrying the adjustable slide element was oscillated by articulating it to the end of an eccentric rod reciprocated by an eccentric on a shaft driven by the engine; consequently a continuous oscillatory movement of constant amplitude was imparted to the link during the running of the engine, thus continuously reciprocating either or both of the transmission members and pump plungers to supply fuel to the engine; in order to vary the total amount of fuel supplied to the engine, the amplitude of oscillation of the link could be varied by varying the point of articulation of the link to the engine-driven eccentric rod either by hand or by means of a governor, without varying the proportions of the fuels supplied by the two pumps. To vary the proportions of the fuels, the strokes of the transmission members were varied relatively to one another by adjusting the slide element on the link in order to vary the pump strokes; alternatively, the transmission members were arranged to control by-pass passages in the pumps in order to vary the effective action of the pumps.

According to the present invention an engine of the character described has the oscillatory link or like member oscillated only by the movement of a regulating member and only when the latter is actuated by hand or by an engine speed governor or by a mechanically or electrically-controlled engine regulator, so that the oscillatory link or like member and the transmission members remain stationary at any constant engine speed. The invention is further characterized by the feature that the fuel supply is effected

either through independently driven fuel pumps or through fuel supply pipes controlled by valves, the supply of fuel through said pumps or valves being varied by any movement of the said transmission members. If the engine is adapted for using liquid fuel and gaseous fuel alternatively, one of the transmission members will be operatively connected to the liquid fuel pump or other means for controlling the liquid fuel supply to the engine and the other transmission member will be operatively connected to the means for controlling the gaseous fuel supply to the engine.

The invention will be more clearly understood by reference to the accompanying drawings whereon Fig. 1 is a diagrammatic illustration of the application of one form of the invention to the control of alternative liquid fuel supplies to the fuel injection nozzle of an engine cylinder. Fig. 2 is a similarly diagrammatic illustration of another form of the invention for the control of alternative liquid and gaseous fuel supplies to an engine cylinder. Figs. 3 and 4 are views taken at right angles to one another showing a slightly modified form of linkage to a larger scale than Figs. 1 and 2.

Referring firstly to Figs. 3 and 4, the linkage there shown comprises a slotted link 5 at the back of which is a pin 6 for pivotally mounting the link 5 on a fixed bracket 7. The link 5 is pivotally attached at 8 to one end of an actuating rod 9. Slidable in the slot in the link 5 is a slide block 10. A rod 11 is attached by a pivot pin 12 to one end of the block 10 and a similar rod 14 is attached by a pivot pin 15 to the other end of the block, which is of such a length that, when the block is at either end of the slot in the link 5, one or other of the pivot pins 12 and 15 is in a neutral position on the link and is coaxial with the axis of the pin 6, which is the axis about which the link 5 is free to swivel on the bracket 7. The slide block 10 is attached to a screw-threaded spindle 16 upon which is fitted an internally screw-threaded hand wheel 17. It will be apparent that the hand wheel 17 serves to adjust the slide block in the link.

With the slide block in its lower extreme position shown in Figs. 3 and 4, any longitudinal movement of the actuating rod 9 will result in corresponding movement of the rod 14, but the rod 11 will remain motionless, since the pivot pin 12 is coaxial with the axis about which the link 5 is adapted to swivel. If the slide block 10 is moved upwards and locked in its other extreme position by rotation of the hand wheel 17 until the latter again abuts against the upper end of the link 5,

the pivot pin 15 will be brought into the position in which it is coaxial with the axis about which the link swings: in this position, longitudinal movement of the actuating rod 9 will transmit no movement to the rod 14, while the rod 11 will move with the rod 9.

If the slide block 10 is moved to a position between the two extreme positions above-mentioned, the rod 9 will transmit motion to both rods 11 and 14 and the displacement of the rods 11 and 14 will depend upon the distances of their pivot pins 12 and 15 from the axis of swing of the link 5.

Fig. 1 of the drawings shows a somewhat similar linkage for controlling either or both of two alternative liquid fuels supplied by separate fuel pumps 18 and 19 through a non-return valve chest 20 to a fuel injection nozzle 21 arranged to inject fuel into the combustion space 22 of an internal combustion engine cylinder. In Fig. 1 the link 5, instead of being directly attached to an actuating rod 9 as in Figs. 1 and 2, has a lateral arm 5a to which the actuating rod 9 is attached and the latter is pivotally attached at its other end to and controlled by any known type of centrifugal engine speed governor 23. The rod 11 of the linkage is attached to a pump control rod 24 which controls the pump 18, and the rod 14 of the linkage is connected through the medium of a rocking arm 25 to a pump control rod 26 which controls the pump 19. The fuel-injection pumps 18 and 19 are driven in known manner from the engine, as by means of engine-driven cams 27.

Displacement of the governor 23, due to engine speed variation, will transmit motion through the rod 9 to the link 5 and from thence to either or both of the rods 11 and 14 according to the position of the slide block 10 in the link 5, and will thus control either or both of the liquid fuel pumps 18 and 19 to control the liquid fuel supply to the engine. In either extreme position of the slide block 10, one or other of the rods 11 and 14 will remain motionless, so that the fuel pump 18 or 19 to which it is connected will either supply no fuel to the valve chest 20 or only a predetermined minimum quantity, while the other rod 11 or 14 will be fully responsive to any movements of the rod 9 and will thus control the fuel pump supplying the whole or main fuel charge to the injection nozzle 21. In any intermediate position of the slide block 10, both rods 11 and 14 will move with the rod 9 and thus control the supply of fuel by both fuel pumps 18 and 19.

The fuel pumps 18 and 19 may supply fuel to two separate fuel injection nozzles

in place of the single fuel nozzle 21.

Instead of operatively connecting the link 5 to an engine speed governor as in Fig. 1, the link 5 may be connected to any known form of hand regulator lever or to a mechanically or electrically controlled regulator. Fig. 2 shows the arm 5a of the link 5 connected by the rod 9 to a hand regulator lever 28; in this case the linkage is turned through 90 degrees so that the screw-threaded spindle 16 is horizontal instead of being vertical as in Figs. 1, 3 and 4. Fig. 2 also illustrates the invention applied to an engine adapted to use either liquid or gaseous fuel or both. In this case, the rod 11 of the linkage is connected to an arm 29 on the spindle of a throttle valve 30 in a gas supply pipe 31 which opens through a mixing chamber 32 and inlet valve 33 into the combustion space 22 of the engine cylinder, air for combustion being supplied to the mixing chamber 32 through an air inlet pipe 34. The rod 14 of the linkage is connected through a bell-crank lever 35 to a pump control rod 36 which controls an engine-driven liquid fuel pump 37 supplying liquid fuel to a fuel injection nozzle 38 arranged to inject liquid fuel into the engine cylinder.

In either of the arrangements shown in Figs. 1 and 2, displacement of the sliding block 10 can be effected by turning the hand wheel 17 without stopping the engine; it is thus possible to change over from one fuel to the other while the engine is running. Moreover, the supply of either or both fuels may be at all times under the control of the engine speed governor, if the linkage is governor-controlled, so that the total quantity of fuel supplied is automatically kept within predetermined limits by the action of the governor. Similarly, if the linkage is connected to an engine regulator, other than an automatic speed governor, the supply of either or both fuels will be under the control of the engine regulator and the total quantity of fuel supplied can be controlled by actuating the engine regulator by hand or by mechanical or electrical means. When the engine is running on a mixture of two fuels, the relative proportions of the two fuels can be manually controlled by turning the hand wheel 17 to adjust the position of the slide block 10.

It is to be understood that the screw-threaded spindle 16 and hand wheel 17 are given only as an example of a convenient means of adjusting the slide block 10, and

that any other means of adjusting the slide block may be provided.

If it is desirable for one fuel to be ignited by electrical spark ignition, the slide block 10 may be arranged so that, when it is moved to its extreme position in which the fuel supplied requires electrical spark ignition, the slide block 10 will cause electrical spark ignition apparatus to come into operation, e.g. the slide block may actuate an electrical contact to complete an electrical ignition actuating circuit.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An internal combustion engine of the character described wherein the oscillatory link or like member is oscillated only by the movement of a regulating member and only when the latter is actuated by hand or by an engine speed governor or by a mechanically or electrically-controlled engine regulator, so that the oscillatory member and the transmission members remain stationary at any constant engine speed.

2. An engine as claimed in claim 1 in which the fuel supply is effected through independently driven fuel pumps or fuel supply pipes controlled by valves and the supply of fuel through said pumps or valves is varied by any movement of the transmission members.

3. An internal combustion engine according to claim 1 or 2 wherein the link or equivalent member oscillates about a fixed pivotal axis situated in the length of the link member, and the slide element is such that, in either extreme position, one of its pivotal connections to the transmission members is in a neutral position coinciding with the said pivotal axis.

4. An internal combustion engine according to claim 3 wherein the slide element is adjustable by means of a hand wheel and a screw-threaded rod, substantially as described.

5. In an internal combustion engine using alternative fuels, fuel control mechanism arranged and operating substantially as herein described with reference to the accompanying drawings.

Dated this 22nd day of September, 1939.

JOHNSONS,

Chartered Patent Agents,

41, St. Vincent Place, Glasgow, C.1, and
10, Stafford Street, Edinburgh, 3.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1941.

[This Drawing is a reproduction of the Original on a reduced scale.]

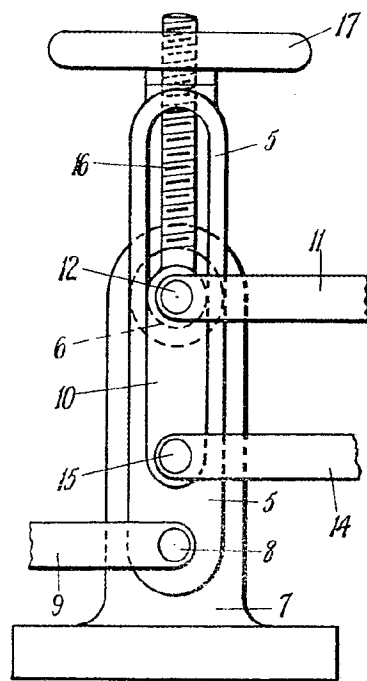
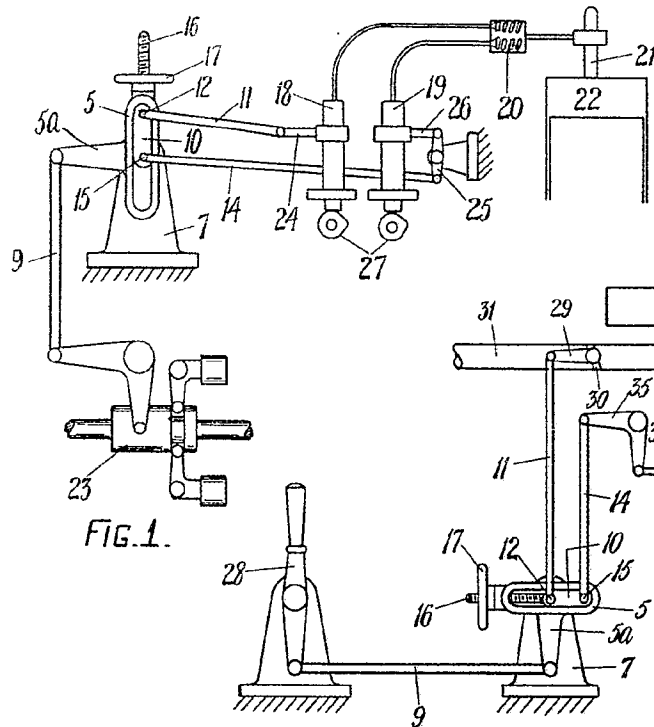


FIG. 3.

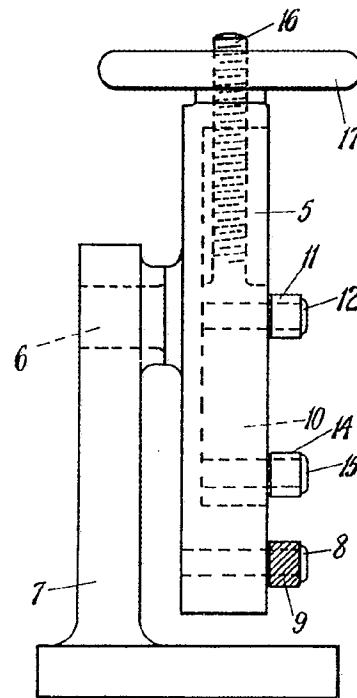


FIG. 4.

Malby & Sons, Photo-Lith.



ELECTRONIC PAYMENT RECEIPT

APPLICATION #
16/191,503

RECEIPT DATE / TIME
12/15/2020 11:40:04 AM ET

ATTORNEY DOCKET #
CET1090.070

Title of Invention

DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE

Application Information

APPLICATION TYPE Utility - Nonprovisional Application
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 6187

FILED BY Robyn Templin

PATENT CENTER # 60119776

AUTHORIZED BY Kevin Rosin

CUSTOMER # 26629

FILING DATE 11/15/2018

CORRESPONDENCE
ADDRESS -

FIRST NAMED
INVENTOR Mark J. Sarder

Payment Information

PAYMENT METHOD
CARD / 4529

PAYMENT TRANSACTION ID
E2020BEB41256751

PAYMENT AUTHORIZED BY
Robyn Templin

FEE CODE	DESCRIPTION	ITEM PRICE(\$)	QUANTITY	ITEM TOTAL(\$)
2806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	130.00	1	130.00
TOTAL AMOUNT:				\$130.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/191,503	11/15/2018	Mark J. Sarder	CET1090.070	6187
26629	7590	12/07/2020		
ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)			EXAMINER	
136 S WISCONSIN ST			LATHERS, KEVIN ANTHONY	
PORT WASHINGTON, WI 53074				
			ART UNIT	PAPER NUMBER
			3747	
			NOTIFICATION DATE	DELIVERY MODE
			12/07/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

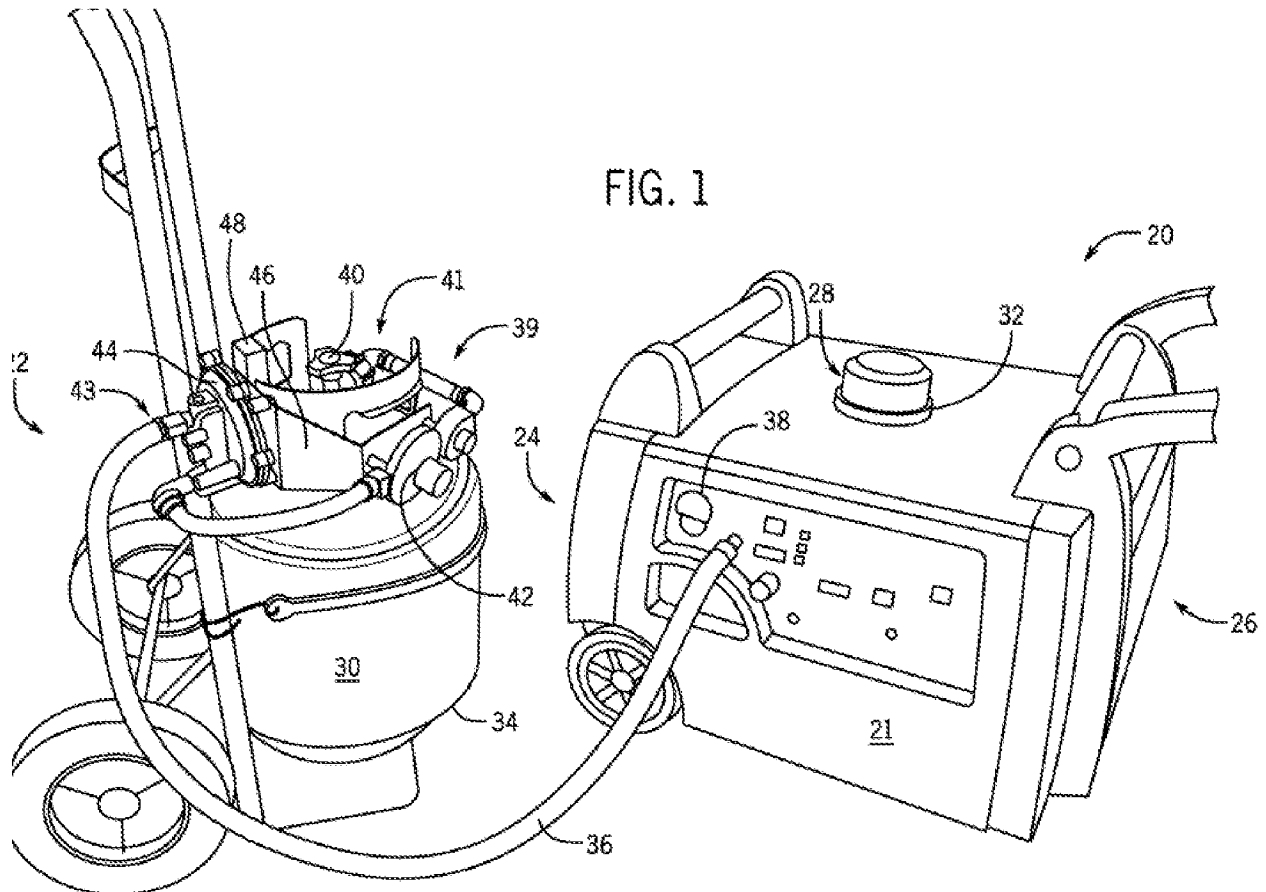
Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

info@zpspatents.com
jmf@zpspatents.com

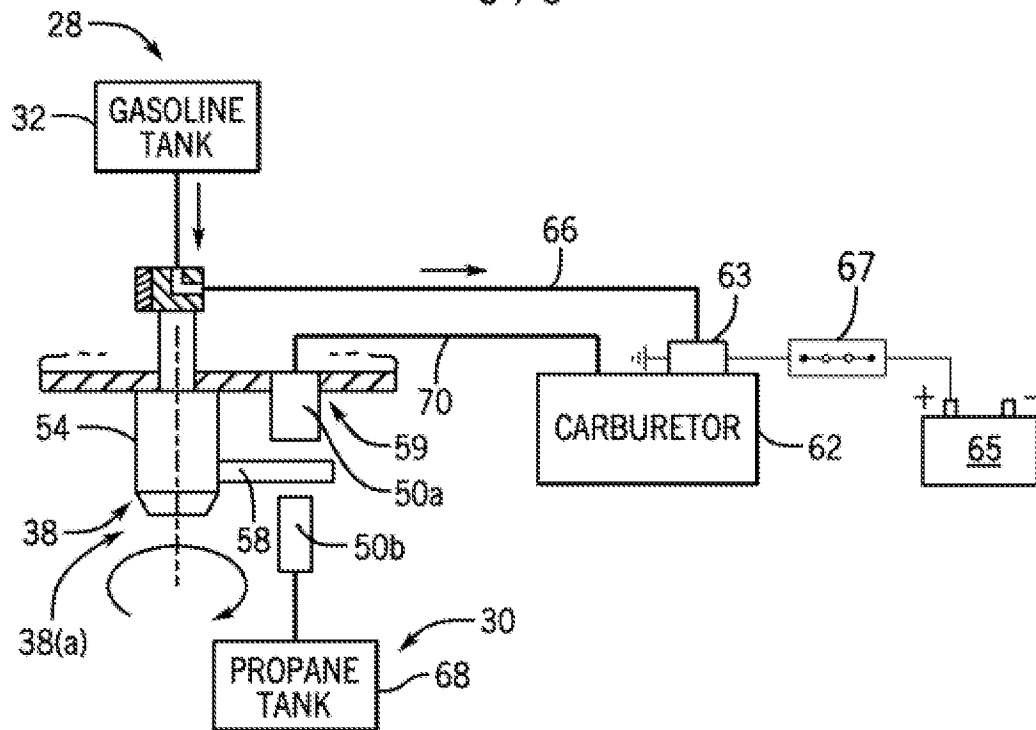
DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 11/25/2020 have been fully considered but they are not persuasive.
2. Firstly a visual of the claimed invention is shown and a discussion on what is being claimed.



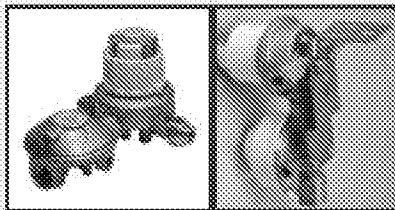
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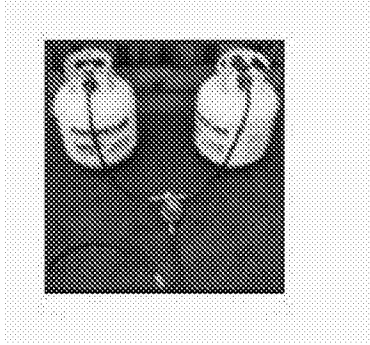
3.

4. Fig. 1 of the instant invention shows an enclosed generator device 20 being connected via a hose 36 to, what appears to be, a typical propane tank 30 by way of a dual regulator attachment containing regulators 44 and 42. This is the crux of the disclosure at hand. The generator is also claimed to be a dual-fuel type, which is important due to requiring some form of liquid fuel source (not shown) and a mechanical fuel valve which controls the fuel source (shown in Figs. 4A and 4B).

integral mounting bracket shown below which is corn
x 4 block. This is the ultimate solution to avoid running
with optional longer Low Pressure AGA hoses (see of
Free shipping.



5.



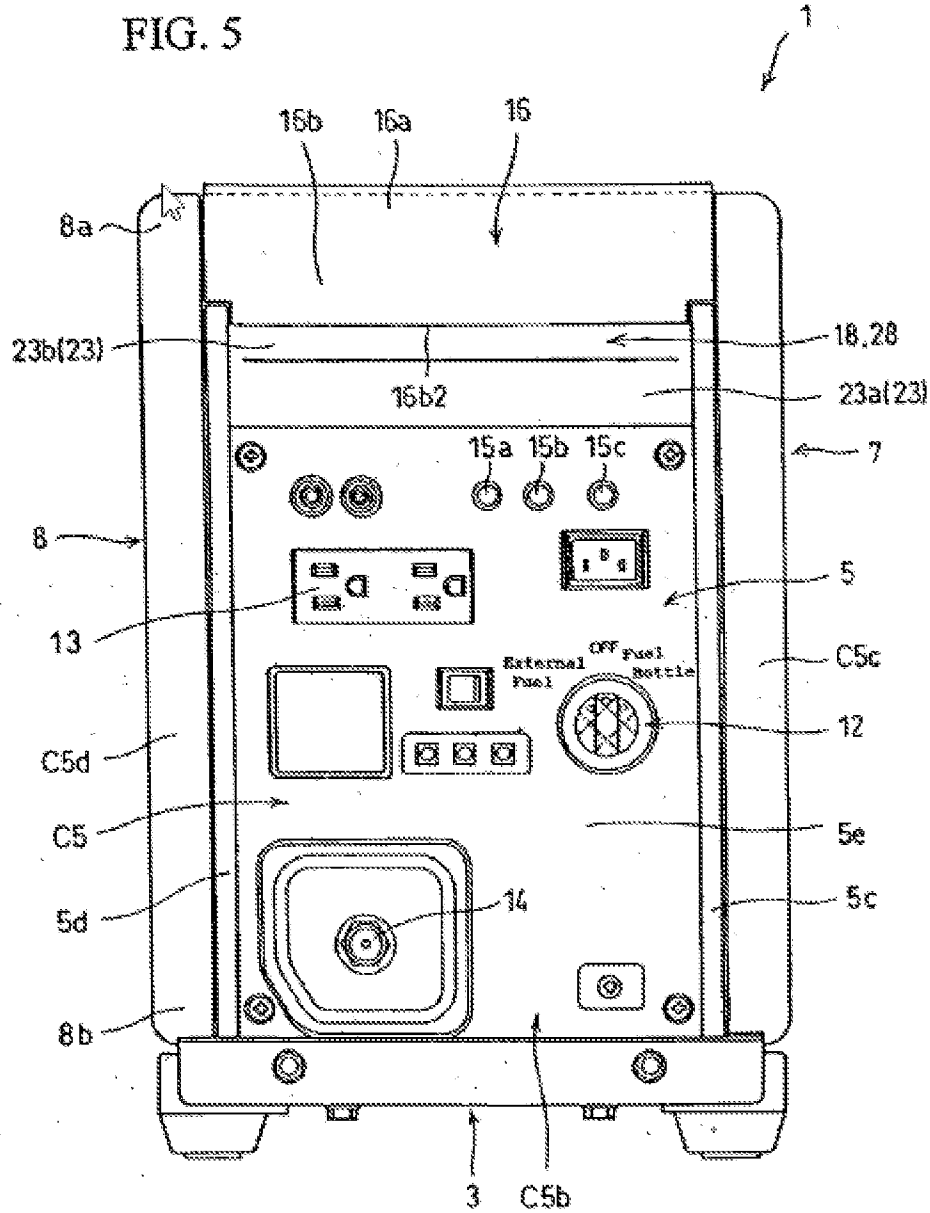
6.

7. These are pictures from GasHose showing two twin stage regulator assemblies which are designed to be equipped to a typical propane tank system which is shown in GasHose.

8. This establishes a striking similarity between the dual-regulator system of GasHose and that of the instant invention above. Shown side-by-side they appear almost identical other than the hand truck included in the instant invention's image. Both contain a typical propane tank connected by way of typical dual-stage pressure regulators.

9. So then, the question is: would it be obvious to attach this known and routine device to the modified Pursifull in view of Sugimoto. Pursifull shows stylized drawings of its device as discussed in the previous rejections. It makes no reference to what is or is not off-board or on-board and does not show a generator in a similar fashion. Rather, Pursifull is about the operational systems of the Generator system and not its physical construction (e.g. how the system would switch between gaseous and liquid fuel operation). Pursifull does not disclose the particulars of a fuel regulation system nor of a physical generator system and thus, as discussed in the previous rejection, would be modified with Sugimoto.

FIG. 5



10.

11. Sugimoto shows a generator in Fig. 5 above with a connection point 14 for a typical gas tank hose such as those of a generic propane tank (such as in GasHose). Sugimoto shows the particulars of

this generator in Fig. 1 as a design level perspective.

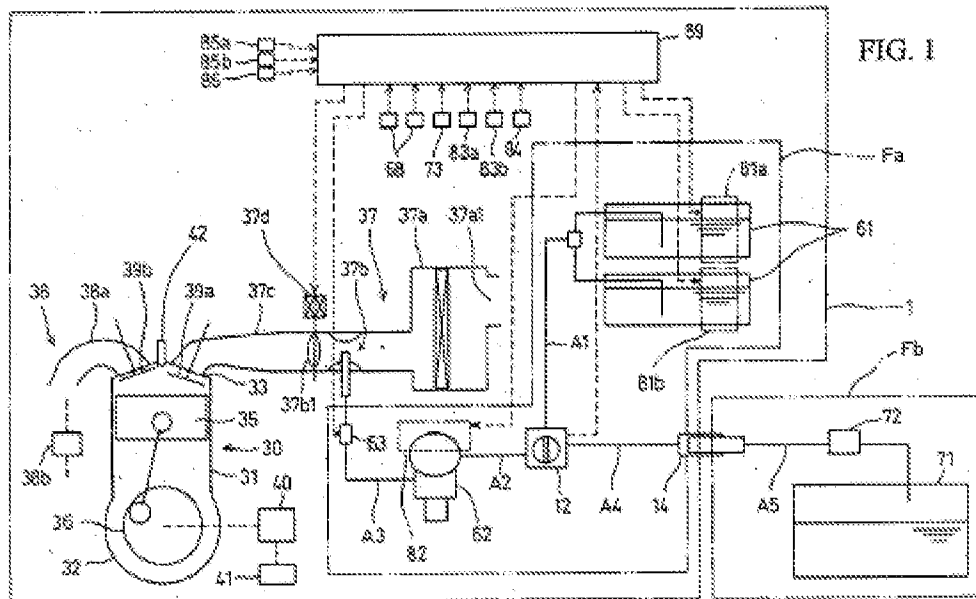


FIG. 1

Patent Application Publication June 21, 2007 Sheet 1 of 10 US 2007/017503 A1

12. Here can be seen the connection point 14 (shown above in Fig. 5) where it connects to an external fuel system Fb which contains a “pressure reduction device 72” connecting to the fuel container 71. The details of the tank 71 and pressure reduction device 72 are not disclosed, it is simply a stylized design shown.

13. This leads to a device with the operational and design characteristics of Pursifull being modified with the actual structural fuel regulation and connection systems of Sugimoto to create a device with self-contained generator having a connection point (the point 14 for connection) for an external fuel system which has a regulation system (e.g. pressure reduction device 72 in this case) of some type; its particulars not disclosed, it is simply showing that *some* off-board regulation is required for its required off-board fuel system. When viewed with GasHose it becomes clear that a generic propane tank, provided with a known and routine device of a dual-stage regulator of GasHose, would be obvious to connect to the generator in place and functioning as the fuel system device Fb shown in Sugimoto.

14. The obviousness is based on this key point: Pursifull as modified by Sugimoto requires an off-board fuel system with an off-board fuel pressure regulation device, thus one of ordinary skill in the device would seek such a device out, this is both required (the device must have one to function).

Where would one of ordinary skill in the art look for such a device? Where would they acquire it? How would it look or be designed? The obvious answer to these question is the well-known, efficient, and easily operable devices that are easily acquired and low in cost, such as generic propane tanks and their common dual-stage fuel pressure regulators as is shown in GasHose.

15. This is not improper hindsight, this is obviousness as per MPEP 2143(b) and the TSM (Teaching Suggestion Motivation) test. It is not improper hindsight to wish to modify a known device (i.e. Sugimoto and Pursifull) with a known, operable, cheap, easily acquired, and effective device such as GasHose. The particulars of the regulator 72 are not disclosed, Sugimoto simply is showing that the off-board regulation system of type is needed.

16. Applicant's points are thus addressed:

a. "One of ordinary skill in the art would not simply modify the arrangement of pressure regulator 62 and pressure reducing device 72 to include multiple pressure regulators in the off-board fuel system (Fb)." Why? Pressure reducing device 72 would benefit from being a dual-stage regulator of GasHose and there is no reason to *not* make it a cheap and easily acquired device.

b. "One skilled in the art would not look to GasHose to modify the modified system... with Examiner's only motivation for doing so being that which is disclosed in the present invention." GasHose discloses routine and known devices, one of ordinary skill in the device would be aware of such devices and seek them out when searching for an off-board fuel system Fb disclosed in Sugimoto as modified onto Pursifull.

c. “There is no motivation provided by GasHose to modify this very specific construction of fuel pressure regulator 62 / pressure reducing device 72 in Sugimoto to achieve the present invention.” Sugimoto’s “pressure reducing device 72” is anything but specific. Fig. 1 of Sugimoto shows a specific construction setup from a design perspective, but its details, its specific of structure are left unanswered and unclear. Fig. 5 shows that the connection point 14 appears to be a routine propane tank hose connection point, but beyond that not a lot of specified. One of ordinary skill in the art would thus be motivated to seek out devices to be used as fuel tank 71 and pressure reduction device 72. Known devices, such as GasHose, would be obvious candidates.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN A LATHERS whose telephone number is (571)272-1050. The examiner can normally be reached on M-F 10a-6p.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Lindsay Low can be reached on 5712721196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact

Art Unit: 3747

the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KEVINA LATHERS/

Primary Examiner, Art Unit 3747

Advisory Action Before the Filing of an Appeal Brief	Application No. 16/191,503	Applicant(s) Sarder et al.	
	Examiner KEVIN A LATHERS	Art Unit 3747	AIA (FITF) Status Yes

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 25 November 2020 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:

a) ☐ The period for reply expires ____ months from the mailing date of the final rejection.

b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires ____ months from the mailing date of the prior Advisory Action or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.

Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANTS FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because

a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);

b) ☐ They raise the issue of new matter (see NOTE below);

c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____ (See 37CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).

5. ☐ Applicants reply has overcome the following rejection(s): _____

6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

7. ☐ For purposes of appeal, the proposed amendment(s): (a) ☐ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____

9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).

10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).

11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____

13. ☐ Note the attached Information *Disclosure Statement(s)*. (PTO/SB/08) Paper No(s). _____

14. ☒ Other: See Continuation Sheet.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____

Claim(s) objected to: 24.

Claim(s) rejected: 1-17 and 21-22.

Claim(s) withdrawn from consideration: _____

/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	
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Continuation of REQUEST FOR RECONSIDERATION/OTHER 14. Other: Applicant has presented no arguments or terminal disclaimers to overcome the double patenting rejection, therefore the application remains rejected regardless of the other rejections' status.

The rejection of claim 24 under 112(a) is withdrawn as applicant has stated that the disclosure as presented is inherently providing evidence for the claim.

With regards to the 103(a) rejection of claims 1, 11, and 21, applicant's arguments at their core pertain to whether it is obvious to modify Pursifull and Sugimoto with GasHose. While examiner admits that Pursifull in view of Sugimoto alone do not disclose the claimed invention the inclusion of GasHose remedies their deficiencies.

Applicant argues that "one of ordinary skill in the art would not simply modify the arrangement of pressure regulator 62 and pressure reducing device 72 to include multiple pressure regulators in the off-board fuel system (Fb)," that "one skilled in the art would not look to GasHose to modify the modified system... with Examiner's only motivation for doing so being that which is disclosed in the present invention," and further that "there is no motivation provided by GasHose to modify this very specific construction of fuel pressure regulator 62 / pressure reducing device 72 in Sugimoto to achieve the present invention."

Please see the attached sheet for arguments pertaining to this.

Customer No. 26629
Confirmation No. 6187

Patent
Attorney Docket No. CET1090.070

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Sarder et al.
Serial No. : 16/191,503
Filed : November 15, 2018
For : OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE
Group Art No. : 3747
Examiner : Kevin A. Lathers

CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

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Date: November 25, 2020

/Robyn L. Templin/
Signature

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AFTER-FINAL
RESPONSE TO FINAL OFFICE ACTION
MAILED OCTOBER 28, 2020

Dear Sir:

Responsive to the Final Office Action mailed October 28, 2020, please consider the following remarks:

OK TO ENTER: /K.A.L./

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AFTER-FINAL
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Dear Sir:

Responsive to the Final Office Action mailed October 28, 2020, please consider the following remarks:

In the Claims

1. (Original) A dual fuel generator and fuel delivery system comprising:
 - a dual fuel generator configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;
 - a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising:
 - a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the fuel supplied from the pressurized fuel source to a reduced pressure; and
 - a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to a desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator; and
 - a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line.
2. (Original) The dual fuel generator and fuel delivery system of claim 1 further comprising a fuel lockout apparatus coupled to the mechanical fuel valve; and
 - wherein when the mechanical fuel valve is in the first position, the fuel lockout apparatus communicates the liquid fuel source to the dual fuel generator and prevents the pressurized fuel source from coupling to the dual fuel generator, and actuation of the mechanical fuel valve to the second position causes the fuel lockout apparatus to permit the pressurized fuel source to couple to the dual fuel generator, and interrupts the liquid fuel source communication with the dual fuel generator.
3. (Original) The dual fuel generator and fuel delivery system of claim 1, wherein mechanical fuel valve opens and closes the liquid fuel line to selectively control fuel flow from the liquid fuel source to the dual fuel generator; and further comprises:
 - a fuel lockout apparatus coupled to the mechanical fuel valve and configured to prevent the pressurize fuel source from coupling to the gaseous fuel line while the mechanical fuel valve opens the liquid fuel line, and permit the pressurized fuel source to couple to the gaseous fuel line while the mechanical fuel valve closes the liquid fuel line.

4. (Original) The dual fuel generator and fuel delivery system of claim 3, wherein the fuel lockout apparatus is further configured to prevent the mechanical fuel valve from opening the liquid fuel line while the dual fuel generator receives fuel from the pressurized fuel source.

5. (Original) The dual fuel generator and fuel delivery system of claim 3, wherein the fuel lockout apparatus further comprises a fuel inlet cover that actuates with the mechanical fuel valve to cover an inlet of the gaseous fuel line while the mechanical fuel valve opens the liquid fuel line and to uncover mechanical fuel lockout switch the inlet of the gaseous fuel line when the mechanical fuel valve closes the liquid fuel line.

6. (Original) The dual fuel generator and fuel delivery system of claim 1, further comprising:

a first end of a quick-connect hose coupling coupled to an outlet of the secondary pressure regulator; and

a second end of the quick-connect hose coupling coupled to an inlet of the gaseous fuel line to mate with the first end of the quick-connect hose coupling to couple the secondary pressure regulator to the gaseous fuel line.

7. (Original) The dual fuel generator and fuel delivery system of claim 1, further comprising a regulator mounting device secured to the pressurized fuel source with at least the secondary pressure regulator mounted on the regulator mounting device.

8. (Original) The dual fuel generator and fuel delivery system of claim 7, wherein the primary pressure regulator is mounted on the regulator mounting device.

9. (Original) The dual fuel generator and fuel delivery system of claim 8, wherein the pressurized fuel source comprises a pressurized fuel container having a collar; and

wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

10. (Original) The dual fuel generator and fuel delivery system of claim 1, wherein the primary and secondary pressure regulators are integral components of a dual stage pressure regulator.

11. (Original) A dual fuel generator and fuel delivery system comprising:
a dual fuel generator configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;
a fuel regulator system located off board the dual fuel generator, the fuel regulator system configured to:
regulate the gaseous fuel supplied from the pressurized fuel source in a first stage, the gaseous fuel regulated down to a reduced pressure in the first stage; and
regulate the reduced pressure gaseous fuel in a second stage, the reduced pressure gaseous fuel from the first stage regulated down to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the dual fuel generator; and
a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line.

12. (Original) The dual fuel generator and fuel delivery system of claim 11 wherein the first stage comprises a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the gaseous fuel supplied from the pressurized fuel source to the reduced pressure; and
wherein the second stage comprises a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to the desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator.

13. (Original) The dual fuel generator and fuel delivery system of claim 12 further comprising:
a first end of a quick-connect hose coupling coupled to an outlet of the secondary pressure regulator; and

a second end of the quick-connect hose coupling coupled to an inlet of the gaseous fuel line to mate with the first end of the quick-connect hose coupling to couple the secondary pressure regulator to the gaseous fuel line.

14. (Original) The dual fuel generator and fuel delivery system of claim 12, further comprising a regulator mounting device secured to the pressurized fuel source with at least one of the primary pressure regulator and the secondary pressure regulator mounted on the regulator mounting device.

15. (Original) The dual fuel generator and fuel delivery system of claim 14, wherein the pressurized fuel source comprises a pressurized fuel container having a collar; and

wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

16. (Original) The dual fuel generator and fuel delivery system of claim 11 wherein the first and second stages comprise a dual stage regulator configured to regulate the gaseous fuel supplied from the pressurized fuel source and regulate the reduced pressure gaseous fuel.

17. (Original) The dual fuel generator and fuel delivery system of claim 16 wherein the dual stage regulator is mounted directly onto the pressurized fuel source.

18-20. (Canceled)

21. (Previously Presented) A generator and fuel delivery system comprising:
a generator configured to operate on a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;

a fuel regulator system located off-board the generator, the fuel regulator system configured to:

regulate the gaseous fuel supplied from the pressurized fuel source in a first stage, the gaseous fuel regulated down to a reduced pressure in the first stage; and

regulate the reduced pressure gaseous fuel in a second stage, the reduced pressure gaseous fuel from the first stage regulated down to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the generator.

22. (Previously Presented) The generator and fuel delivery system of claim 21 wherein the first and second stages comprise a dual stage regulator configured to regulate the gaseous fuel supplied from the pressurized fuel source and regulate the reduced pressure gaseous fuel, wherein the dual stage regulator is mounted directly onto the pressurized fuel source, off-board from the generator.

23. (Canceled)

24. (Previously Presented) The generator and fuel delivery system of claim 21 wherein the generator is free of any pressure regulator.

REMARKS

Claims 1-17, 21, 22, and 24 are pending in the present application. In the Final Office Action mailed October 28, 2020, the Examiner rejected claims 1-17, 21, and 22 on the ground of nonstatutory double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 10,221,780. The Examiner next rejected claim 24 under 35 U.S.C. §112(a) or 35 U.S.C. §112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. Claims 1, 6, 10-13, 16, and 21 were rejected under 35 U.S.C. §103 as being unpatentable over Pursifull et al. (US Pub. 2011/0168133) in view of Sugimoto et al. (US Pub. 2007/0137591) and further in view of GasHoseandRegulators (May 17th, 2014, <https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/> -- hereinafter “GasHose”). Claims 7-9, 14, 15, 17, and 22 were rejected under 35 U.S.C. §103 as being unpatentable over Pursifull et al. in view of Sugimoto et al. and GasHose, and further in view of NoOutage.com (Aug. 27th, 2006, <http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm>).

Claims 2-5 were indicated as containing allowable subject matter. Such indication is appreciated.

Status of Claim 24

As claim 24 was not indicated as being rejected over the cited prior art, Applicant believes claim 24 to be directed to patentable subject matter pending resolution of the rejection under 35 U.S.C. §112, first paragraph. If claim 24 is in fact rejected over any prior art, Applicant requests clarification of such in another Final Office Action. Otherwise, Applicant respectfully requests indication that claim 24 is directed to patentable subject matter.

Double Patenting Rejection

The Examiner rejected claims 1-17 and 21-22 on the ground of non-statutory double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 10,221,780.

Applicant notes that the double patenting rejection is not the only remaining rejection in the present application. The Examiner has also applied rejections under 35 U.S.C. §103 in the current Office Action. Applicant, therefore, requests that the double patenting rejection be held in abeyance pending resolution of the other rejections.

Rejection under 35 U.S.C. §112(a) or 35 U.S.C. §112 (pre-AIA), first paragraph

The Examiner rejected claim 24 under 35 U.S.C. §112(a) or 35 U.S.C. §112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. In rejecting the claim, the Examiner asserted that “[c]laim 24 pertains to a negative limitation that the ‘generator is free

of any pressure regulator’,” that “the disclosure does not have support for a generator which must not have any sort of internal fuel regulation,” that “[t]he disclosure makes no mention of the generator being free of it, the drawings do not show it, and the original claims do not contain it,” and that “[t]he disclosure pertains to the attachment method to the generator and the external fuel tank and its associated fuel regulators, it does not disclose or pertain to the construction and any hypothetically included or disallowed parts.” *Final Office Action*, October 28, 2020, p. 4. Applicant respectfully disagrees with the rejection.

As set forth in MPEP §2163, “[t]o comply with the written description requirement of 35 U.S.C. 112(a) or pre-AIA 35 U.S.C. 112, para. 1,... each claim limitation must be expressly, implicitly, or inherently supported in the originally filed disclosure” and that “[w]hen an explicit limitation in a claim ‘is not present in the written description whose benefit is sought it must be shown that a person of ordinary skill would have understood, at the time the patent application was filed, that the description requires that limitation’.” MPEP §2163 further sets forth that “[t]o establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill” and that “[u]nder the doctrine of inherent disclosure, when a specification describes an invention that has certain undisclosed yet inherent properties, that specification serves as adequate written description to support a subsequent patent application that explicitly recites the invention’s inherent properties.” (*citing Yeda Research and Dev. Co. v. Abbott GMBH & Co.*, 837 F.3d 1341, 120 USPQ2d 1299 (Fed. Cir. 2016) and *Kennecott Corp. v. Kyocera Int’l, Inc.*, 835 F.2d 1419, 1423 (Fed. Cir. 1987)).

In the present case, while there is no express disclosure that the “generator is free of any pressure regulator,” the Specification makes clear that it is desirable to provide all pressure regulators that regulate gaseous fuel to be located off-board the generator. For example, the Specification makes clear that it is desirable to locate the fuel regulator system 39 (that includes secondary pressure regulator 44 and primary pressure regulator 42) off-board the generator in order to “reduce size and cost of the generator,” especially since it is possible for the generator to function as a gasoline only generator. In particular, the Specification sets forth that “[h]ere, since generator 20 can be used as a gasoline only generator, secondary pressure regulator 44 is mounted off-board the generator to reduce size and cost of the generator,” *Specification*, ¶[0024], and “[i]n accordance with an exemplary embodiment of the invention, fuel regulator system 39 includes both the primary and secondary regulators, or a custom single regulator, but in any case is located remotely, or off-board, from dual fuel generator 20.” *Specification*, ¶[0025]. Additionally, FIGS. 4A and 4B clearly show that no pressure regulator is located onboard the generator 20, while FIGS. 1, 5, and 6 clearly

show that any/all pressure regulators are all located off-board the generator, such that the generator is free of any pressure regulator, as called for in claim 24.

In light of at least the above, a person of ordinary skill would have understood, at the time the patent application was filed, that the description inherently describes that the generator is free of any pressure regulator. Accordingly, the limitations of claim 24 should be understood to be “expressly, implicitly, or inherently supported in the originally filed disclosure,” such that claim 24 complies with the requirements of 35 U.S.C. §112, first paragraph. Applicant therefore respectfully requests withdrawal of the rejection of claim 24.

Rejection under 35 U.S.C. §103 over Pursifull et al. in view of Sugimoto et al.

Claims 1, 11, and 21

Introduction

The Examiner rejected claims 1, 11, and 21 under 35 U.S.C. §103 as being unpatentable over Pursifull et al. (US Pub. 2011/0168133) in view of Sugimoto et al. (US Pub. 2007/0137591) and GasHose.

In rejecting claims 1, 11, and 21, the Examiner asserted that Pursifull discloses the claimed “a dual fuel generator” and “mechanical fuel valve,” but admitted that “Pursifull fails to disclose a fuel regulator system located off board the dual fuel generator” that comprises a primary pressure regulator and secondary pressure regulator (claim 1) and/or a first stage and second stage (claims 11 and 21). *Final Office Action*, supra at 5. The Examiner thus cited to Sugimoto as teaching these claim elements, with the Examiner stating that “Sugimoto discloses a dual fuel engine and delivery system (Fig. 1, as shown) wherein the system includes an off-board gaseous fuel system (Fb) which includes an off-board pressure regulator 72 which feeds fuel into an engine system 1 which includes another pressure regulator 62.” *Id.* at 6. The Examiner thus concluded that “it would have been obvious to one of ordinary skill in the art before the filing date of the invention to modify the device of Pursifull with the pressure regulators and gaseous fuel system methods of Sugimoto.” *Id.* In continuing to set forth the rejection, the Examiner further indicated that “Sugimoto does not disclose the exact details of its off-board fuel system, such as the type of tank and regulator it contains,” but that “Gashose discloses making use of twin stage regulators (i.e., two regulators in series) for usage with off-board fuel systems” and that “it would have been obvious to one of ordinary skill in the art to modify the generator system of the modified Pursifull with a dual-regulator system such as disclose[d] in Gashose because doing so would allow for a more even output and a reduction in freeze-ups from an off-board fuel system (such as a propane tank).” *Id.* at 6-7. Applicant respectfully disagrees with the rejection.

Prior Art – Pursifull and Sugimoto

Pursifull discloses an engine system 100 that includes an internal combustion engine 102 having one or more cylinders 104 that may receive fuel from one or more fuel injectors 106 that inject fuel in proportion to a pulse width of a signal received from a controller 128. *Pursifull*, ¶[0021]. Fuel may be delivered to the fuel injector 106 from a fuel rail 108 by a fuel system 110. *Pursifull*, ¶[0021]. The fuel system 110 may include a fuel tank 112 and a fuel pump 114 operable by controller 128 to pump fuel from the fuel tank 112 to the fuel rail 108. *Pursifull*, ¶[0022]. A delivery check valve 116 may be positioned downstream of the fuel pump 114 to force fuel pumped from the fuel pump at a predetermined pressure to the fuel rail 108 so that fuel does not return along the same path to the fuel pump. *Pursifull*, ¶[0023]. A first solenoid valve 118 may be positioned downstream of delivery check valve 116 to control the flow of fuel to fuel rail 108 or from the fuel rail to a return line 119. *Pursifull*, ¶[0023]. In some embodiments, fuel system 110 may be what is known as a multi-fuel system that selectively provides a plurality of different types of fuel to the fuel rail 108 based on the mode of operation, such as gasoline and/or liquid propane. *Pursifull*, ¶[0024]. A three-way valve 120 may be positioned upstream of the fuel rail 108 and downstream of the first solenoid valve 118 and the return line 119 to selectively control the flow of a desired type of fuel to the fuel rail 108. *Pursifull*, ¶[0025]. The state of the three-way valve 120 may be controlled by controller 128 to vary which type of fuel is delivered to the fuel rail 108. *Pursifull*, ¶[0025]. Fuel in the fuel rail 108 may be returned to the fuel tank 112 via the return line 119, with an ejector 124 positioned in the return line 119 to provide a single fuel rail evacuation stage. *Pursifull*, ¶[0026]. A return check valve 122 is positioned in the return line 119 downstream of the ejector 124 to force fuel returning from the fuel rail 108 at a predetermined pressure to ejector 124 so that fuel is evacuated from the fuel rail 108. *Pursifull*, ¶[0027]. A second solenoid valve 126 is positioned upstream of the outlet of the ejector 124 and downstream of the fuel tank 112 that may be controlled by controller 128 evacuate the fuel rail 108. *Pursifull*, ¶[0028].

In a method for controlling for controlling a multi-fuel system as described in Pursifull, the method may include operating in the fuel rail pressurization mode where a determination is made if a first fuel from a first fuel stage or a second fuel from a second fuel is selected for delivery to the fuel rail 108. *Pursifull*, ¶[0066]. If the first fuel is selected, operating in the fuel rail pressurization mode may include, switching the three-way valve 120 to the first fuel stage, opening the solenoid valve 118 positioned downstream of the fuel pump 114 and upstream of the fuel rail 108, closing the solenoid valve 126 positioned upstream of the ejector 124 and downstream of the fuel tank 112, and operating the fuel pump 114 to deliver the first fuel from the fuel tank to the fuel

rail. *Pursifull*, ¶[0066]. If the second fuel is selected, operating in the fuel rail pressurization mode may include switching the three-way valve 120 to the second fuel stage, and, operating the fuel pump 136 to deliver the second fuel from the fuel tank 134 to the fuel rail 108. *Pursifull*, ¶[0066].

Sugimoto discloses an engine operated generator 1 that includes an engine 30 that powers an electric generator 40. *Sugimoto*, ¶[0041], [0042]. A fuel system F for supplying the fuel gas to the engine 30 has an internal fuel system Fa (fuel bottles 61) and an external fuel system Fb (external fuel bottle 71) disposed outside the case C of the generator. *Sugimoto*, ¶[0070]. The fuel supply system Fa includes a fuel pressure regulator 62, a fuel system selector valve 12, a connector 14, and a fuel cutoff valve 63. *Sugimoto*, ¶[0071]. The fuel pressure regulator 62 reduces the pressure of the fuel gas supplied from fuel bottles 61 and the external fuel bottle 71 and regulates the pressure of the fuel gas so that the fuel gas may be supplied to a carburetor 18b at fuel supply rate varying in proportion to load on the engine 30. *Sugimoto*, ¶[0071]. The fuel system selector valve 12 is placed on the operating panel 5e and is operated to select a fuel supply line. *Sugimoto*, ¶[0071]. The fuel pipes interconnect the fuel bottles 61, the fuel pressure regulator 62 and the carburetor 18b. The fuel cutoff valve 63 stops the flow of the fuel gas from the fuel system F to the engine 30. *Sugimoto*, ¶[0071].

In the fuel supply system Fa, a first fuel system for supplying the first fuel gas from the fuel bottles 61 to the engine 30 is constituted by the fuel bottles 61, a pipe A1 connecting the fuel bottles 61 to the fuel system selector valve 12, a pipe A2 connecting the fuel system selector valve 12 to the fuel pressure regulator 62, the fuel pressure regulator 62, a pipe connecting the fuel pressure regulator 62 to the carburetor 18b, and the fuel cut-off valve 63 placed in the pipe A3. *Sugimoto*, ¶[0079]. A second fuel system for supplying the second fuel gas from the external fuel bottle 71 to the engine 30 is constituted by a pipe A4 connecting the connector 14 to the fuel cutoff valve 12, the pipe A2 connecting the fuel system selector valve 12 to the fuel pressure regulator 62, the fuel pressure regulator, the pipe A3 connecting the fuel pressure regulator 62 to the carburetor 18b, and the fuel cutoff valve 63. *Sugimoto*, ¶[0079].

The fuel cutoff valve 63, namely, a fuel cutoff means, is, for example, a normally-open solenoid valve which closes when energized. *Sugimoto*, ¶[0081]. The ECU 89 controls the fuel cutoff valve 63 on the basis of the pressure of the first fuel gas. *Sugimoto*, ¶[0081]. More specifically, the fuel pressure regulator 62 is provided with a pressure sensor 73 for measuring the pressure of the first fuel gas flowing from the fuel bottle 61 to the fuel pressure regulator 62. *Sugimoto*, ¶[0081]. When the pressure of the first fuel gas measured by the pressure sensor 73 is higher than an upper limit pressure P1, the ECU 89 closes the fuel cutoff valve 63 to disconnect the common fuel system from the fuel bottle 61. *Sugimoto*, ¶[0081]. The fuel system selector valve

12 connects either the first fuel system that supplies the first fuel gas to the engine 30 or the second fuel system that supplies the second gas to the engine 30 selectively to the fuel pressure regulator 62. *Sugimoto*, ¶[0082]. The fuel system selector valve 12 can be set in a first position, where the knob of the fuel system selector valve 12 is at a first position marked with "Internal fuel" to connect the first fuel system to the engine 30 to supply the first fuel gas to the engine 30, and in a second position, where the knob of the fuel system selector valve 12 is at a second position marked with "External fuel" to connect the second fuel system to the engine 30 to supply the second fuel gas to the engine 30. *Sugimoto*, ¶[0082].

Failure of Pursifull, Sugimoto, and GasHose to teach Claims 1, 11, and 21

With regard to the claimed limitations, there is no disclosure provided by the combination of cited references of a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising a primary pressure regulator configured to regulate the fuel supplied from the pressurized fuel source to a reduced pressure and a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to a desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator (claim 1), and/or a fuel regulator system located off board the dual fuel generator, the fuel regulator system configured to: regulate the gaseous fuel down to a reduced pressure and regulate the reduced pressure gaseous fuel in a second stage down to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the dual fuel generator (claim 11), and/or a generator free of any pressure regulator with a fuel regulator system located off-board the generator that regulates gaseous fuel supplied from a pressurized fuel source down to a reduced pressure in a first stage and regulates the reduced pressure gaseous fuel down to a desired pressure in a second stage (claim 21).

Regarding Pursifull, the Examiner admits that the reference fails to teach a fuel regulator system as called for in claims 1, 11, and 21.

Regarding Sugimoto, there is no teaching therein of a fuel regulator system located off board the dual fuel generator – i.e., of both the primary pressure regulator and secondary pressure regulator being located off board the dual fuel generator (claim 1) and/or both a first stage and second stage being located off board the dual fuel generator (claims 11 and 21). That is, while pressure reducing device 72 of Sugimoto is included as part of external fuel system Fb that is off-board generator 1, *Sugimoto*, ¶[0073], the fuel pressure regulator 62 referenced by the Examiner is on-board generator 1 - as the fuel pressure regulator 62 is located between pipe A2 and pipe A3 on generator 1, as can be clearly seen in FIG. 1 of Sugimoto. See *Sugimoto*, FIG. 1. As fuel pressure

regulator 62 is located on-board the generator 1, the arrangement of the “fuel regulator system” in Sugimoto (collectively comprising pressure reducing device 72 and fuel pressure regulator 62) is different from what is called for in claims 1, 11, and 21 where an entirety of a fuel regulator system (primary and second regulators (claim 1) or first and second stages (claims 11 and 21) of a fuel regulator system) is located off board the generator.

In maintaining the rejection, the Examiner further stated that “Sugimoto discloses that off-board pressure regulation systems both exist and are included within its structures” and that “[t]he proposed modification is such that the off-board fuel system of Sugimoto could be used as the gaseous fuel system of Pursifull, not that the entire system of Sugimoto is replacing all of Pursifull.” *Final Office Action*, supra at 10. Applicant does not disagree that “off-board pressure regulation systems [] exist,” however, Sugimoto (alone or in combination with Pursifull) does not teach or suggest that which is specifically called for in the claims regarding an entirety of a fuel regulator system (primary and second regulators (claim 1) or first and second stages (claims 11 and 21) of a fuel regulator system) is located off board the generator. The fact that Sugimoto only discloses pressure reducing device 72 being off-board generator 1 – with fuel pressure regulator 62 on-board the generator 1 – is clear evidence that the proposed combination of Sugimoto with Pursifull still provides no teaching or suggestion of a fuel regulator system (primary and second regulators (claim 1) or first and second stages (claims 11 and 21) of a fuel regulator system) located off board the generator, as called for in the claims.

Regarding the combination of GasHose with Pursifull and Sugimoto, Applicant believes that one skilled in the art would not look to GasHose to modify Pursifull and Sugimoto in order to include “a dual-pressure regulator in the off-board fuel system,” as asserted by the Examiner. With regard to Sugimoto, which the Examiner has cited to for teaching “a dual fuel engine and delivery system (Fig. 1, as shown) wherein the system includes an off-board gaseous fuel system (Fb) which includes an off-board pressure regulator 72 which feeds fuel into an engine system 1 which includes another pressure regulator 62,” *Final Office Action*, supra at 6, Applicant believes that one skilled in the art would not simply modify the arrangement of pressure regulator 62 and pressure reducing device 72 to include multiple pressure regulators in the off-board fuel system (Fb), as asserted by the Examiner. That is, the engine operated generator 1 of Sugimoto includes a fuel system F that has an internal fuel system Fa (gaseous fuel bottles 61) and an external fuel system Fb (external gaseous fuel bottle 71) disposed outside the case C of the generator. *Sugimoto*, ¶[0070]; FIGS. 1 and 2. As Sugimoto includes gaseous fuel bottles 61 that are an internal fuel system Fa onboard the generator, Sugimoto necessarily requires a fuel pressure regulator 62 that is also onboard the generator. The fuel pressure regulator 62 could not simply be removed from the generator 1 and

combined with pressure reducing device 72 as part of a dual-stage off-board regulator for gaseous fuel bottle 71, as the Examiner seems to suggest, as there would then be no pressure regulator on/in generator 1 that would regulate gas from fuel bottles 61.

Additionally, one skilled in the art would not modify Sugimoto in view of GasHose to provide a dual-stage off-board regulator for gaseous fuel bottle 71 – i.e., to modify pressure reducing device 72 from a single-stage regulator to a dual-stage regulator – as such a modification would be unnecessary and duplicative in Sugimoto. That is, the fuel pressure regulator 62 and pressure reducing device 72 already provide a two-stage pressure regulation of gas from gaseous fuel bottle 71, with it recognized that (1) one could simply not replace the fuel pressure regulator 62 with another offboard regulator (for reasons discussed in detail above), and (2) adding a dual-stage regulator offboard the generator 1 (for gaseous fuel bottle 71) in addition to the fuel pressure regulator 62 would only add additional cost and complexity to the generator 1, without providing any additional benefit – since two stage pressure regulation is already provided by fuel pressure regulator 62 and a single stage pressure reducing device 72. Thus, one skilled in the art would not look to GasHose to modify the modified system of Pursifull and Sugimoto, with the Examiner's only motivation for doing so being that which is disclosed in the present invention (i.e., improper hindsight).

In maintaining the rejection, the Examiner further stated that “[t]he modification of Pursifull and Sugimoto with GasHose is not one of simply duplicative inclusion of regulators, but rather of modifying the generalized and basically disclosed ‘pressure reduction device 72’ which is being modified from Sugimoto into the system of Pursifull to have a more specific GasHose dual-stage regulator and the benefits such an inclusion would entail.” *Final Office Action*, supra at 10. Applicant respectfully disagrees with the Examiner's combination of GasHose with Sugimoto and Pursifull and believes the combination to be nothing more than the use of improper hindsight. “When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself.” *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143 (Fed. Cir. 1985). Thus, in arriving at a conclusion of obviousness, “impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.” *MPEP* §2142. As previously indicated above, there is nothing suggested by the construction of generator 1 in Sugimoto that would lead one skilled in the art to modify the fuel pressure regulator 62 (and/or the single stage pressure reducing device 72 of the fuel pressure regulator 62) in view of the teachings of GasHose. The fuel pressure regulator 62 and pressure reducing device 72 in Sugimoto are a very specific structure/arrangement that provide fuel pressure regulation for

a fuel system F that includes an internal fuel system Fa (fuel bottles 61) and an external fuel system Fb (external fuel bottle 71) disposed outside the case C of the generator, *Sugimoto*, ¶[0070], with the fuel pressure regulator 62 located between pipe A2 and pipe A3 on/in generator 1, as can be clearly seen in FIG. 1 of *Sugimoto*. There is no motivation provided by *GasHose* to modify this very specific construction of fuel pressure regulator 62 / pressure reducing device 72 in *Sugimoto* to achieve the present invention, as alleged by the Examiner – and any such proposed modifications appears to be nothing more than the result of improper hindsight.

In light of at least the above, the combination of *Pursifull*, *Sugimoto* and *GasHose* fails to teach or suggest that which is called for in claims 1, 11, and 21. Each of claims 1, 11, and 21 is believed to be patentably distinct from the cited references, and Applicant therefore respectfully requests withdrawal of the rejection of claims 1, 11, and 21 and the claims dependent therefrom.

Conclusion

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-17, 21, 22, and 24.

Applicant appreciates the Examiner's consideration of these Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,

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Dated: November 25, 2020
Attorney Docket No.: CET1090.070

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General Authorization and Extension of Time

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-2623. Should no proper payment be enclosed herewith, as by credit card authorization being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-2623. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extensions under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-2623. Please consider this a general authorization to charge any fee that is due in this case, if not otherwise timely paid, to Deposit Account No. 50-2623.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
16/191,503

RECEIPT DATE / TIME
11/25/2020 02:54:19 PM ET

ATTORNEY DOCKET #
CET1090.070

Title of Invention

DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE

Application Information

APPLICATION TYPE Utility - Nonprovisional Application
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 6187

FILED BY Robyn Templin

PATENT CENTER # 60111418

FILING DATE 11/15/2018

CUSTOMER # 26629

FIRST NAMED INVENTOR Mark J. Sarder

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Kevin Rosin

Documents

TOTAL DOCUMENTS: 3

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
2020.11.25 Response.pdf		16	-	184 KB
2020.11.25 Response-A.NE.pdf	(1-1)	1	Response After Final Action	115 KB
2020.11.25 Response-CLM.pdf	(2-6)	5	Claims	91 KB
2020.11.25 Response-REM.pdf	(7-16)	10	Applicant Arguments/Remarks Made in an Amendment	140 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2020.11.25 Response.pdf	21154D5CF96EE2087260B163C9D733B60BD83EBBE08DDF977 3A65007ECC12257AB288582B2656F73F5AFEEB1BE7FFC36BE 8B6CEF3509F81B71F882437113516D
2020.11.25 Response-A.NE.pdf	39C2069E3CE873EE97C828EBF539964AB013D69EF1FEB2334 2C5098A9D82EC4EC422E50087086A019EA85D8F7FEB86D47F 081F4635C295FBCAD77C87647B04DC
2020.11.25 Response-CLM.pdf	176517EE4C2C973ADE69EFB061633F100D9E549CF401A1F18 9C5F5CB945B7D0746D7C44F12CA8163A8799A725C0C01817D 0B50AA2F3BF71C321C3FFD6FAA7E96
2020.11.25 Response-REM.pdf	8B78533F96E639D0E961BD103B024EB9166DEF39404D4A2899 FACE552E3FD314C29145C1EBBD21D034D9E420CF032CB5CE 6D0DC44B939442183DCE558F49147B

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If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/191,503	Filing Date 11/15/2018	☐ To be Mailed
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ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE (\$)	FEE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 = *		x \$100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 = *		x \$460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED - PART II

	AMENDMENT	11/25/2020	(Column 1) CLAIMS REMAINING AFTER AMENDMENT	Minus	(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 20		Minus	** 20	= 0	x \$100 =	0
	Independent (37 CFR 1.16(h))	* 3		Minus	*** 3	= 0	x \$480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0
	AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT	Minus	(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*		Minus	**	=	x \$0 =	
	Independent (37 CFR 1.16(h))	*		Minus	***	=	x \$0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.							LIE	
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".							/GLORIA J NORRIS/	
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".								
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.								

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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**Courtesy Reminder for
Application Serial No: 16/191,503**

Attorney Docket No: CET1090.070

Customer Number: 26629

Date of Electronic Notification: 10/28/2020

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/191,503	11/15/2018	Mark J. Sarder	CET1090.070	6187

26629 7590 10/28/2020
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EXAMINER

LATHERS, KEVIN ANTHONY

ART UNIT	PAPER NUMBER
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3747

NOTIFICATION DATE	DELIVERY MODE
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10/28/2020

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(I)(1) - 706.02(I)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

2. Claims 1-17 and 21-22 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 10,221,780. Although the claims at issue are not identical, they are not patentably distinct from each other because the limitations of claims 1-17 and 21-23 are substantially the same to an anticipatory or obvious degree as those in '780.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

(a) IN GENERAL. — The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 24 is rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications subject to pre-AIA 35 U.S.C. 112, the inventor(s),

at the time the application was filed, had possession of the claimed invention. Claim 24 pertains to a negative limitation that the “generator is free of any pressure regulator.” Applicant states that the support for this amendment is in ¶ [0024] and [0053] as well as Figs. 1, 4A, and 4B.

5. Fig. 1 shows an exterior of a generator with no indication what is inside it. Figs. 4A and 4B show a diagram of the Propane tank 68 and its attachment to the supply inlet 59 and fails to show any of the regulation devices in the system. Considering that Figs. 4A and 4B do not even show the specified external regulators, there is no reason to assume they are showing a complete and specific listing of all parts, but rather a generalized diagram of fuel flow.

6. ¶ [0024] and [0053] for their part disclose the remotely mounted fuel regulation system but do not pertain to the generator itself nor its included parts. The rest of the disclosure makes no mention of the generator’s inclusion, or lack, of any particular regulators.

7. Therefore, the disclosure does not have support for a generator which must not have any sort of internal fuel regulation. The disclosure makes no mention of the generator being free of it, the drawings do not show it, and the original claims do not contain it. The disclosure pertains to the attachment method to the generator and the external fuel tank and its associated fuel regulators, it does not disclose or pertain to the construction of the generator and any hypothetically included or disallowed parts.

Claim Rejections - 35 USC § 103

5. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

6. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 6, 10-13, 16, and 21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Pursifull et al (US 2011/0168133) in view of Sugimoto et al (US 2007/0137591), and further in view of GasHoseandRegulators (May 17th, 2014, <https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/>), hereinafter "Gashose." For the purposes of ease of finding information, the individual pages of Gashose will be attached, but the citation includes the entirety of the website.

8. Regarding claims 1, 11, 12, 16, and 21-23 Pursifull discloses a dual fuel generator and fuel delivery system, as well as a method for its operation, (Fig. 3, shown dual fuel engine) comprising:
a dual fuel generator 102 configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line (Para. [0040], the dual fuel engine comprises pressurized gaseous fuel and liquid fuel); and a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line (Para. [0025], [0028], and [0066], wherein a three-way valve and lockout apparatus determine which fuel flows to the dual fuel generator).

9. Pursifull fails to disclose a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising: a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the fuel supplied from the pressurized fuel source to a reduced pressure; and a secondary pressure regulator coupled to the primary pressure regulator and

configured to regulate the gaseous fuel supplied from the primary pressure regulator to a desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator.

10. Sugimoto discloses a dual fuel engine and delivery system (Fig. 1, as shown) wherein the system includes an off-board gaseous fuel system (Fb) which includes an off-board pressure regulator 72 which feeds fuel into an engine system 1 which includes another pressure regulator 62 – it is noted in Fig. 5 of Sugimoto that the coupling point 14 appears to be a typical propane tank pipe connector. The inclusion of pressure reduction devices for the gasification of liquid-held fuel allows for an effective cooling of the fuel system and systems (Para. [0010]) while allowing the dual fuel engine to be powered by an external fuel tank attached to it in an off board fashion such as in emergency situations (Para. [0002]).

11. Therefore, it would have been obvious to one of ordinary skill in the art before the filing date of the invention to modify the device of Pursifull with the pressure regulators and gaseous fuel system methods of Sugimoto in order to improve the cooling of the fuel system parts through pressure reduction as well as regulate the pressure from an external attached fuel tank which allows the dual fuel engine system to be used in varying situations such as emergency ones using an external fuel source.

12. With regards to the inclusion of a dual-pressure regulator in the off-board fuel system of the modified Pursifull: Sugimoto does not disclose the exact details of its off-board fuel system, such as the type of tank and regulator it contains, simply showing a diagram of such devices (Fig. 1) and a typical gaseous fuel tank connector (14 in Fig. 5). However, Gashose discloses making use of twin stage regulators (i.e. two regulators in series) for usage with off-board fuel systems (e.g. a propane tank for a fuel generator as noted in “First Stage and Second Stage Low Pressure Custom Assembly” under “Low Pressure Regulators”), wherein such regulators ensure even pressure output from the regulators and lower possibilities of freeze-ups (“Why use a twin stage regulator?” heading).

13. Therefore, it would have been obvious to one of ordinary skill in the art to modify the generator system of the modified Pursifull with a dual-regulator system such as disclosed in Gashose because

doing so would allow for a more even output control and a reduction in freeze-ups from an off-board fuel system (such as a propane tank).

14. **Regarding claims 6 and 13**, the modified Pursifull discloses the dual fuel generator and fuel delivery system of claims 1 and 11, further comprising: a first end of a quick-connect hose coupling coupled to an outlet of the secondary pressure regulator; and a second end of the quick-connect hose coupling coupled to an inlet of the gaseous fuel line to mate with the first end of the quick-connect hose coupling to couple the secondary pressure regulator to the gaseous fuel line (Fig. 1 of Sugimoto modifies Pursifull to include an external source of gaseous fuel and regulators makes use of a connection hose coupling 14, and wherein Gashose's "Propane Quick connect" notes the use of a quick-connect hose with its regulators in order for ease of connection and disconnection along with maintaining gas safety of the generators, such as those in "generator and heater hoses").

15. **Regarding claim 10**, the modified Pursifull discloses the dual fuel generator and fuel delivery system of claims 1 and 11, wherein the primary and secondary pressure regulators are integral components of a dual stage pressure regulator (as per the modifications using Gashose's regulators above, including the dual regulator twin stage regulator systems under "Low Pressure Regulators").

16. **Claims 7-9, 14, 15, 17, and 22 is/are rejected under 35 U.S.C. 103 as being unpatentable over Pursifull in view of Sugimoto, Gashose, and further in view of Nooutage.com (Aug. 27th, 2006, <http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm>).**

17. **Regarding claims 7-9, 14, 15, and 17**, the dual fuel generator and fuel delivery system of claim 1, discloses the fuel source having a collar (as per Gashose modifications, the system is for a generic propane/natural gas system which include containers having collars as per "Low Pressure Regulators" wherein typical pressurized gaseous fuel tanks are shown), but fails to disclose further comprising a

regulator mounting device secured to the pressurized fuel source with at least the secondary pressure regulator mounted on the regulator mounting device, and wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

18. Pursifull and Sugimoto fail to disclose how their regulators are mounted. Gashose shows a “custom assembly” for mounting the regulators to a wall and a “Universal Mounting Bracket” which appears to be for mounting to propane tank collars but does not specifically disclose such.

19. Nooutage discloses a regulation system for a gaseous off-board fuel tank system for a generator (as shown and listed as “dual-mode generator” having a “propane quick connect kit”), wherein the system of Nooutage is shown with a mounting bracket on the collar of the propane tanks supporting the regulator (“Hose Connections to Portable Tanks” picture), the bracket being similar to the one disclosed in Gashose (the “universal mounting bracket” and the vertical bracket shown on the “Dual Tank Automatic Changeover Low Pressure Regulator Assembly”).

20. Therefore, it would have been obvious to one of ordinary skill in the art before the filing date of the invention to modify the modified Pursifull with the mounting brackets of Nooutage as the system already discloses similar mounting brackets and fuel tanks with collars, wherein the inclusion of this mounting bracket in place of or in addition to the bracket of the modified Pursifull is nothing more than a simple substitution of one known element for another, and wherein mounting to a propane tank collars would be both easy, economical, and easily performed. As both components perform functions well-known in the art (attaching and maintaining tank regulators) and the substitution would have been a predictable solution with expected results, then the modification would have been obvious to one of ordinary skill in the art. *Ruiz v. AB Chance Co.*, 357 F.3d 1270, 69 USPQ2d 1686 (Fed. Cir. 2004), MPEP 2143(B).

Allowable Subject Matter

21. Claims 2-5 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims if the Non-Statutory Double Patenting rejection presented above is also overcome.

Response to Arguments

23. Applicant's arguments filed 07/16/2020 have been fully considered but they are not persuasive.

24. It should be noted that regardless of the status of the other rejections, the Double Patenting rejection is maintained and thus the claims remain rejected.

25. Regarding the rejection of claim 1, 11, and 21 under Pursifull, in view of Sugimoto, and further in view of GasHose, applicant argues that:

a. Sugimoto fails to disclose a fuel regulator system located off-board the dual fuel generator (Examiner has already disclosed and agreed that Pursifull alone does not disclose such an off-board regulation system), and

b. one skill in the art would not look to GasHose to modify Pursifull and Sugimoto with a dual-pressure off-board fuel system, this is because applicant argues that the fuel regulator 62 of Sugimoto could not be moved on Sugimoto due to the inclusion of an internal fuel system Fa, and

c. that duplication of the fuel regulators – such as the internal regulator and an external regulator system or the external single-stage regulator to a dual-stage regulator -- would be unnecessary and duplicative, increase cost and complexity for no benefit.

26. With regards to these arguments:

a) Examiner notes that mentioning the on-board regulator 62 in rejection does not mean it was the basis of the rejection in Sugimoto. Rather, it is noted that the “pressure reducing device 72” which is shown in Fig. 1 of Sugimoto being an off-board pressure regulator (i.e. a device that regulates pressure,

such as pressure reduction devices). Therefore, Sugimoto discloses that off-board pressure regulation systems both exist and are included within its structures. Further, it should be noted that the modification of Pursifull to include Sugimoto is not for the entirety of Sugimoto to be wholesale imported into Pursifull, but rather, as noted “modify the device of Pursifull with the pressure regulators and gaseous fuel system methods of Sugimoto... to improve cooling of the fuel system parts through *pressure reduction as well as regulate pressure from an external attached fuel tank.*” The proposed modification is such that the off-board fuel system of Sugimoto could be used as the gaseous fuel system of Pursifull, not that the entire system of Sugimoto is replacing all of Pursifull. It should also be noted that Sugimoto *never discloses the device 72 being a single-stage regulator* but simply discloses that it is a “fuel pressure reduction device 72” in ¶ [0073]: it is disclosing that it is a pressure regulating device for reducing pressure but does not specify what type of a device it is (a variety of devices may accomplish this). Thus the rejection is modifying a generic device, not a specific device.

22. b) and c) The modification of Pursifull and Sugimoto with GasHose is not one of simply duplicative inclusion of regulators, but rather of modifying the generalized and basically disclosed “pressure reduction device 72” which is being modified from Sugimoto into the system of Pursifull to have a more specific GasHose dual-stage regulator and the benefits such an inclusion would entail. Essentially, the pressure reduction device is being replaced by (or perhaps, specified to be) a device which allows for more advanced control of pressurized gas output as well as a reduction in any possible freeze-ups in the pressure reduction device. This is not an additional device, but rather a replacement/modification device, both obvious using TSM test and as a simple substitution of one known element for another to obtain predictable results MPEP 2143(B). It is also noted that rejection is not simply “conclusory” but rather follows very clearly the Teaching-Suggestion-Motivation obviousness fact pattern: the base device teaches an off-board fuel regulator device, the device of GasHose teaches that off-board dual-stage regulators exist and that they impart benefits (“Why use a twin stage

regulator?" heading of Gashose), and therefore one of ordinary skill in the art would be motivated to modify the device of the modified Pursifull to include GasHose for the specified benefits.

However, that is not to say that additional pressure regulator would be unwanted. For the sake of argument this could be an obviousness rejection in view of the valve being in addition to the included valve. While additional parts inherently increase cost and complexity that *does not rule out their inclusion or obviousness*. The benefits of additional or duplicative parts (e.g. more control, fail safes, safety improvements) often outweigh the negatives of having higher cost and complexity. The allegation that one of ordinary skill in the art would never perform any modifications which increase complexity or cost has no rational underpinning both in the art and in engineering in general: often times additional cost and complexity are required to achieve the benefits or improvements a system might require or a designer may desire; in this case, additional pressure control without a valve freezing (i.e. a type of valve failure) is a benefit that would require additional costs to achieve.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN A LATHERS whose telephone number is (571)272-1050. The examiner can normally be reached on M-F 10a-6p.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lindsay Low can be reached on 5712721196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*/KEVIN A LATHERS/
Primary Examiner, Art Unit 3747*

<i>Search Notes</i> 	Application/Control No. 16/191,503	Applicant(s)/Patent Under Reexamination Sarder et al.
	Examiner KEVIN A LATHERS	Art Unit 3747

CPC - Searched*		
Symbol	Date	Examiner
F02D19/0613, 19/0605, 19/0647	03/05/2019	/K.L./
Y02T10/36	03/05/2019	/K.L./

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Google and EAST including inventor and assignee search.	03/05/2019	/K.L./
Google and EAST search.	08/27/2019	/K.L./
Google and EAST search.	04/22/2020	/K.L./
Google, EAST, IP.com search.	10/23/2020	/K.L./

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	
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<i>Index of Claims</i> 	Application/Control No. 16/191,503	Applicant(s)/Patent Under Reexamination Sarder et al.
	Examiner KEVIN A LATHERS	Art Unit 3747

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	08/27/2019	04/22/2020	10/23/2020						
	1	✓	✓	✓						
	2	✓	○	✓						
	3	✓	○	✓						
	4	✓	○	✓						
	5	✓	○	✓						
	6	✓	✓	✓						
	7	✓	✓	✓						
	8	✓	✓	✓						
	9	✓	✓	✓						
	10	✓	✓	✓						
	11	✓	✓	✓						
	12	✓	✓	✓						
	13	✓	✓	✓						
	14	✓	✓	✓						
	15	✓	✓	✓						
	16	✓	✓	✓						
	17	✓	✓	✓						
	18	-	-	-						
	19	-	-	-						
	20	-	-	-						
	21	✓	✓	✓						
	22	✓	✓	✓						
	23	✓	✓	-						
	24			✓						

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	445	F02D19/0613.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:25
S2	1,204	F02D19/0605.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:25
S3	3,408	F02D19/0647.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:25
S4	15,258	Y02T10/36.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:25
S5	808	(S1 S2 S3 S4) and (switch valve) near20 (propane natural adj gas gaseous lng cng) near20 (gasoline liquid diesel)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:28
S6	79	(S1 S2 S3 S4) and (switch valve) near20 (propane natural adj gas gaseous lng cng) near20 (gasoline liquid diesel) and (second secondary auxiliary) near5 (regulat\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:29
S7	64	(S1 S2 S3 S4) and (switch valve) near20 (propane natural adj gas gaseous lng cng) near20 (gasoline liquid diesel) and (second secondary auxiliary) adj (regulat\$3 pressure)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:44

S8	28	("5450832" "20130220274" "5325835" "5320078" "4619240" "6082323" "6453877" "5171487" "6223730" "6213083" "4489699" "5287839" "8590510" "5673670" "4450821" "5816224" "6276345" "4502453" "20130047964" "4372276" "6401685" "7905469" "2722208" "4895124" "5161496" "5379740" "5438968" "5419291" "6914342" "8342158").PN.	USPAT	OR	OFF	2017/07/27 14:45
S9	124	("5450832" "20130220274" "5325835" "5320078" "4619240" "6082323" "6453877" "5171487" "6223730" "6213083" "4489699" "5287839" "8590510" "5673670" "4450821" "5816224" "6276345" "4502453" "20130047964" "4372276" "6401685" "7905469" "2722208" "4895124" "5161496" "5379740" "5438968" "5419291" "6914342" "8342158").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:45
S10	421	(duel dual) near5 fuel near20 (engine generator) same (switch valve) near20 between	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:46
S11	0	dual adj fuel near20 engine same "switchover valve"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 15:17
S12	44	dual adj fuel near20 engine same (switch switchover) near5 valve	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 15:19
S13	49	"6591817"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 15:19
S14	63	("3799125" "4150645" "4265208" "4303049" "4305350" "4323046" "4353345" "4391251" "4398517" "4524033" "4671243" "5450832"	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 15:20

		"5524582" "5623907" "5720266" "5816224" "6035837").PN. OR ("6591817").URPN.				
S15	80	dual adj fuel near20 engine same (switch switchover select\$3) near5 valve	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 15:21
S16	30	((("SARDER") near3 ("Mark"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 15:25
S17	28	((("SOTIRIADES") near3 ("Aleko"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 15:25
S18	41	((("DEHN") near3 ("James"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 15:25
S19	15	((("JENISON") near3 ("Leigh"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 15:25
S20	16	((("CHAMPION") near3 ("ENGINE") near3 ("TECHNOLOGY") near3 ("LLC"))).AANM.	USPAT	OR	OFF	2017/07/27 15:25
S21	19	((("CHAMPION") near3 ("ENGINE") near3 ("TECHNOLOGY") near3 ("LLC"))).as.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 15:26
S22	5	("20040240141" "20060169238" "20130098349" "20130122439" "4489699").PN. OR ("9435273").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 15:42
S23	41	("1973142" "2315882" "2381304" "4068639" "4227497" "4335697").PN. OR ("4489699").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 15:43
S24	97	(dual multi multiple plural plurality) adj fuel near20 engine same (switch switchover changeover change switch\$3) near5 (valve switch)	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 16:02
S25	1	(09/813622).APP.	USPAT; USOCR	OR	OFF	2017/07/27 16:03
S26	63	("3799125" "4150645" "4265208" "4303049" "4305350" "4323046" "4353345" "4391251" "4398517" "4524033" "4671243" "5450832" "5524582" "5623907" "5720266" "5816224" "6035837").PN. OR ("6591817").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 16:03

S27	64	("4335697" "4393848" "4430978" "4606322" "4683864" "4825842" "4922862" "5379740" "5474047" "5479906" "5755211" "5775282").PN. OR ("6035837").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 16:34
S28	27	("5999888" "6543395" "4619240" "20140366577" "20120168023" "20140202430" "4463735" "5668310" "5224457").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/28 10:32
S29	0	(14/156204).APP.	USPAT; USOCR	OR	OFF	2017/07/28 11:33
S30	5	(gas gasoline liquid near5 fuel) near20 (propane natural adj gas) near20 (fill\$3 fueling) same (quick-connect connect\$3) near20 (cover flange)	USPAT; USOCR	OR	OFF	2017/07/28 11:47
S31	109	(gas gasoline liquid near5 fuel) near20 (propane natural adj gas) near20 (fill\$3 fueling) same (quick-connect connect\$3) near20 (cover flange)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/28 11:47
S32	280	(gas gasoline liquid near5 fuel) near20 (propane natural adj gas) near20 (fill\$3 fueling) same (cover flange)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/28 11:48
S33	171	(gas gasoline liquid near5 fuel) near20 (propane natural adj gas) near20 (fill\$3 fueling) same (cover flange) not S31	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/28 11:48
S34	5	"9435273"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/28 14:35
S35	1	"20070137591"	USPAT	OR	OFF	2018/02/12 15:56
S37	34	(champion near3 engine).as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/12 15:59

S38	95	dual adj fuel near20 valve near10 switch	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/12 16:19
S39	48	"4489699"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/12 16:30
S40	5	"20070137591"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/12 16:30
S41	29	"3412258"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/12 16:30
S42	3	"20100258099"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/12 16:30
S43	53	"5611312"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/12 16:30
S44	138	(S39 S40 S41 S42 S43)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/12 16:31
S45	1	(10/591304).APP.	USPAT; USOCR	OR	OFF	2018/02/12 16:45
S46	6	("6332433" "7146962").PN. OR ("7325519").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/02/12 16:46
S47	35	(US-20020014077-\$ or US- 20030168024-\$ or US-20110168133-\$	US-PGPUB; USPAT;	OR	OFF	2018/02/12 17:19

		or US-20120204835-\$ or US-20030010320-\$ or US-20160363099-\$ or US-20170037796-\$ or US-20020134362-\$ or US-20140202430-\$ or US-20160221518-\$ or US-20070137591-\$).did. or (US-5320078-\$ or US-5450832-\$ or US-5816224-\$ or US-6591817-\$ or US-5524582-\$ or US-4570605-\$ or US-4712516-\$ or US-9435273-\$ or US-4489699-\$ or US-4305350-\$ or US-4353345-\$ or US-6035837-\$ or US-6904873-\$ or US-7045916-\$ or US-5092305-\$).did. or (US-2558884-\$ or US-2470747-\$ or US-3022425-\$ or US-3451424-\$).did. or (JP-2004278332-\$).did. or (US-20080290531-\$ or US-20130047964-\$ or US-4463735-\$ or CN-203796423-\$).did.	USOCR; JPO; DERWENT			
S48	35	(US-20020014077-\$ or US-20030168024-\$ or US-20110168133-\$ or US-20120204835-\$ or US-20030010320-\$ or US-20160363099-\$ or US-20170037796-\$ or US-20020134362-\$ or US-20140202430-\$ or US-20160221518-\$ or US-20070137591-\$).did. or (US-5320078-\$ or US-5450832-\$ or US-5816224-\$ or US-6591817-\$ or US-5524582-\$ or US-4570605-\$ or US-4712516-\$ or US-9435273-\$ or US-4489699-\$ or US-4305350-\$ or US-4353345-\$ or US-6035837-\$ or US-6904873-\$ or US-7045916-\$ or US-5092305-\$).did. or (US-2558884-\$ or US-2470747-\$ or US-3022425-\$ or US-3451424-\$).did. or (JP-2004278332-\$).did. or (US-20080290531-\$ or US-20130047964-\$ or US-4463735-\$ or CN-203796423-\$).did.	US-PGPUB; USPAT; USOCR; JPO; DERWENT	OR	OFF	2018/02/13 17:40
S50	17	S48 and regulator	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/13 17:40
S56	61	("20020134362" "20040139943" "20070137591" "20100258099" "20110168133" "20110253102" "20130047964" "20130220274" "20140202430" "20140238340"	US-PGPUB; USPAT; USOCR	OR	OFF	2019/03/05 15:38

		"20140373531" "20150122230" "2722208" "3384059" "3412258" "3659574" "3718000" "3783849" "3888223" "4335697" "4372276" "4373493" "4450821" "4463735" "4480595" "4489699" "4502453" "4619240" "4628871" "4708094" "4895124" "4979480" "5092305" "5161496" "5171487" "5228423" "5287839" "5320078" "5325835" "5379740" "5419291" "5438968" "5450832" "5611312" "5673670" "5816224" "6082323" "6213083" "6223730" "6276345" "6401685" "6453877" "6591817" "6914342" "7905469" "8342158" "8590510" "9435273").PN.				
S57	37	(US-20020014077-\$ or US-20030168024-\$ or US-20110168133-\$ or US-20120204835-\$ or US-20030010320-\$ or US-20160363099-\$ or US-20170037796-\$ or US-20020134362-\$ or US-20140202430-\$ or US-20160221518-\$ or US-20070137591-\$ or US-20130047964-\$ or US-20150122230-\$).did. or (US-5320078-\$ or US-5450832-\$ or US-5816224-\$ or US-6591817-\$ or US-5524582-\$ or US-4570605-\$ or US-4712516-\$ or US-9435273-\$ or US-4489699-\$ or US-4305350-\$ or US-4353345-\$ or US-6035837-\$ or US-6904873-\$ or US-7045916-\$ or US-5092305-\$).did. or (US-2558884-\$ or US-2470747-\$ or US-3022425-\$ or US-3451424-\$).did. or (JP-2004278332-\$).did. or (US-20080290531-\$ or US-20130047964-\$ or US-4463735-\$ or CN-203796423-\$).did.	US-PGPUB; USPAT; USOCR; JPO; DERWENT	OR	OFF	2019/03/05 16:01
S58	5	S57 and (regulator and valve).clm.	USPAT	OR	OFF	2019/03/05 16:02
S59	8	S57 and (regulator and valve).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/03/05 16:02
S60	10	S57 and (pressure and valve).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2019/03/05 16:02

			DERWENT; IBM_TDB			
S61	1,423	engine same (dual multiple plural\$3 double two) near5 fuel same pressure near4 regulat\$3 same valve	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/03/05 16:03
S62	24	"10221780"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/03/05 17:48
S63	2	(dual-stage double-stage) near5 regulator near20 (fuel propane gas) same engine	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/27 13:19
S64	9	generator same (gaseous propane lpg lng natural adj gas) same (off-board offboard off adj board) near20 (regulator tank)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/26 16:21
S65	9	generator same (gaseous propane lpg lng natural adj gas) same (off-board offboard off adj board) near20 (regulator)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/26 16:21
S66	9	generator same (gaseous propane lpg lng natural adj gas) same (off-board offboard off adj board) near20 (regulator)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/26 16:21
S67	0	(14/925441).APP.	USPAT; USOCR	OR	OFF	2019/11/26 16:24
S68	43	"4489699"	USPAT; USOCR	OR	OFF	2019/11/26 16:25
S69	4	"5809979"	USPAT; USOCR	OR	OFF	2019/11/26 16:25
S70	42	(propane natural adj gaseous gaseous near2 fuel) near20 (source tank container) near20 (regulat\$3) near5 (mount\$3 attach\$4)	USPAT	OR	OFF	2020/04/22 16:15

S71	72	(propane natural adj gaseous gaseous near2 fuel) near20 (source tank container) near20 (regulat\$3) near5 (mount\$3 attach\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/04/22 16:16
S72	1,962	(engine generator) same (propane natural adj gas gaseous adj fuel) same carburetor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/20 15:53
S73	5,348	(engine generator) same (propane natural adj gas gaseous adj fuel) same (offboard off-board outside external)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/20 15:56
S74	1,619	(engine generator) same (propane natural adj gas gaseous adj fuel) same (offboard off-board outside external) near10 (tank container fuel)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/20 15:56
S75	993	(engine generator) same (propane natural adj gas gaseous adj fuel) same (offboard off-board external) near10 (tank container fuel)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/20 15:57
S76	0	(extern offboard off-board) near4 propane adj (tank container reservoir source)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/20 16:27
S77	74	(external offboard off-board) near4 propane adj (tank container reservoir source)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/20 16:27
S78	168	(external offboard off-board) near4 (gaseous adj fuel natural adj gas) adj (tank container reservoir source)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/20 16:28

S79	37	(S77 S78) and regulator	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/20 16:28
S80	3	"20110168133"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/21 16:29

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S51	88	F02D19/0613.cpc.	US-PGPUB; USPAT	OR	OFF	2018/11/20 12:06
S52	273	F02D19/0605.cpc.	US-PGPUB; USPAT	OR	OFF	2018/11/20 12:06
S53	747	F02D19/0647.cpc.	US-PGPUB; USPAT	OR	OFF	2018/11/20 12:06
S54	3,711	Y02T10/36.cpc.	US-PGPUB; USPAT	OR	OFF	2018/11/20 12:06
S55	1	(engine and lockout and fuel and first adj fuel and second adj fuel and source and switch).clm.	US-PGPUB; USPAT	OR	OFF	2018/11/20 15:47

10/23/2020 3:11:12 PM

C:\Users\klathers\Documents\EAST\Workspaces\14738060.wsp

Customer No. 26629
Confirmation No. 6187

Patent
Attorney Docket No. CET1090.070

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Sarder et al.
Serial No. : 16/191,503
Filed : November 15, 2018
For : OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE
Group Art No. : 3747
Examiner : Kevin A. Lathers

CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

I hereby certify that, on the date shown below, this correspondence is being:

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37 CFR 1.8(a)

37 CFR 1.10

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Date: July 16, 2020

/Robyn L. Templin/
Signature

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT/RESPONSE TO OFFICE ACTION
MAILED APRIL 30, 2020

Dear Sir:

Responsive to the Office Action mailed April 30, 2020, please amend the Application as follows:

In the Claims

1. (Original) A dual fuel generator and fuel delivery system comprising:
 - a dual fuel generator configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;
 - a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising:
 - a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the fuel supplied from the pressurized fuel source to a reduced pressure; and
 - a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to a desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator; and
 - a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line.
2. (Original) The dual fuel generator and fuel delivery system of claim 1 further comprising a fuel lockout apparatus coupled to the mechanical fuel valve; and
 - wherein when the mechanical fuel valve is in the first position, the fuel lockout apparatus communicates the liquid fuel source to the dual fuel generator and prevents the pressurized fuel source from coupling to the dual fuel generator, and actuation of the mechanical fuel valve to the second position causes the fuel lockout apparatus to permit the pressurized fuel source to couple to the dual fuel generator, and interrupts the liquid fuel source communication with the dual fuel generator.
3. (Original) The dual fuel generator and fuel delivery system of claim 1, wherein mechanical fuel valve opens and closes the liquid fuel line to selectively control fuel flow from the liquid fuel source to the dual fuel generator; and further comprises:
 - a fuel lockout apparatus coupled to the mechanical fuel valve and configured to prevent the pressurize fuel source from coupling to the gaseous fuel line while the mechanical fuel

valve opens the liquid fuel line, and permit the pressurized fuel source to couple to the gaseous fuel line while the mechanical fuel valve closes the liquid fuel line.

4. (Original) The dual fuel generator and fuel delivery system of claim 3, wherein the fuel lockout apparatus is further configured to prevent the mechanical fuel valve from opening the liquid fuel line while the dual fuel generator receives fuel from the pressurized fuel source.

5. (Original) The dual fuel generator and fuel delivery system of claim 3, wherein the fuel lockout apparatus further comprises a fuel inlet cover that actuates with the mechanical fuel valve to cover an inlet of the gaseous fuel line while the mechanical fuel valve opens the liquid fuel line and to uncover mechanical fuel lockout switch the inlet of the gaseous fuel line when the mechanical fuel valve closes the liquid fuel line.

6. (Original) The dual fuel generator and fuel delivery system of claim 1, further comprising:
a first end of a quick-connect hose coupling coupled to an outlet of the secondary pressure regulator; and

a second end of the quick-connect hose coupling coupled to an inlet of the gaseous fuel line to mate with the first end of the quick-connect hose coupling to couple the secondary pressure regulator to the gaseous fuel line.

7. (Original) The dual fuel generator and fuel delivery system of claim 1, further comprising a regulator mounting device secured to the pressurized fuel source with at least the secondary pressure regulator mounted on the regulator mounting device.

8. (Original) The dual fuel generator and fuel delivery system of claim 7, wherein the primary pressure regulator is mounted on the regulator mounting device.

9. (Original) The dual fuel generator and fuel delivery system of claim 8, wherein the pressurized fuel source comprises a pressurized fuel container having a collar; and

wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

10. (Original) The dual fuel generator and fuel delivery system of claim 1, wherein the primary and secondary pressure regulators are integral components of a dual stage pressure regulator.

11. (Original) A dual fuel generator and fuel delivery system comprising:
a dual fuel generator configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;

a fuel regulator system located off board the dual fuel generator, the fuel regulator system configured to:

regulate the gaseous fuel supplied from the pressurized fuel source in a first stage, the gaseous fuel regulated down to a reduced pressure in the first stage; and

regulate the reduced pressure gaseous fuel in a second stage, the reduced pressure gaseous fuel from the first stage regulated down to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the dual fuel generator; and

a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line.

12. (Original) The dual fuel generator and fuel delivery system of claim 11 wherein the first stage comprises a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the gaseous fuel supplied from the pressurized fuel source to the reduced pressure; and

wherein the second stage comprises a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator to the desired pressure for delivery through the gaseous fuel line to operate the dual fuel generator.

13. (Original) The dual fuel generator and fuel delivery system of claim 12 further comprising:

a first end of a quick-connect hose coupling coupled to an outlet of the secondary pressure regulator; and

a second end of the quick-connect hose coupling coupled to an inlet of the gaseous fuel line to mate with the first end of the quick-connect hose coupling to couple the secondary pressure regulator to the gaseous fuel line.

14. (Original) The dual fuel generator and fuel delivery system of claim 12, further comprising a regulator mounting device secured to the pressurized fuel source with at least one of the primary pressure regulator and the secondary pressure regulator mounted on the regulator mounting device.

15. (Original) The dual fuel generator and fuel delivery system of claim 14, wherein the pressurized fuel source comprises a pressurized fuel container having a collar; and
wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

16. (Original) The dual fuel generator and fuel delivery system of claim 11 wherein the first and second stages comprise a dual stage regulator configured to regulate the gaseous fuel supplied from the pressurized fuel source and regulate the reduced pressure gaseous fuel.

17. (Original) The dual fuel generator and fuel delivery system of claim 16 wherein the dual stage regulator is mounted directly onto the pressurized fuel source.

18-20. (Canceled)

21. (Previously Presented) A generator and fuel delivery system comprising:
a generator configured to operate on a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;
a fuel regulator system located off-board the generator, the fuel regulator system configured to:
regulate the gaseous fuel supplied from the pressurized fuel source in a first stage, the gaseous fuel regulated down to a reduced pressure in the first stage; and

regulate the reduced pressure gaseous fuel in a second stage, the reduced pressure gaseous fuel from the first stage regulated down to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the generator.

22. (Currently Amended) The generator and fuel delivery system of claim 21 wherein the first and second stages comprise a dual stage regulator configured to regulate the gaseous fuel supplied from the pressurized fuel source and regulate the reduced pressure gaseous fuel, wherein the dual stage regulator is mounted directly onto the pressurized fuel source, off-board from the generator.

23. (Canceled)

24. (New) The generator and fuel delivery system of claim 21 wherein the generator is free of any pressure regulator.

REMARKS

Claims 1-17 and 21-23 are pending in the present application. In the Office Action mailed April 30, 2020, the Examiner rejected claims 1-17 and 21-23 on the ground of nonstatutory double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 10,221,780. The Examiner next rejected claims 1, 6, 10-13, 16, and 21-23 under 35 U.S.C. §103 as being unpatentable over Pursifull et al. (US Pub. 2011/0168133) in view of Sugimoto et al. (US Pub. 2007/0137591) and further in view of GasHoseandRegulators (May 17th, 2014, <https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/> -- hereinafter “GasHose”). Claims 7-9, 14, 15, and 17 were rejected under 35 U.S.C. §103 as being unpatentable over Pursifull et al. in view of Sugimoto et al. and GasHose, and further in view of NoOutage.com (Aug. 27th, 2006, <http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm>).

Claims 2-5 were indicated as containing allowable subject matter. Such indication is appreciated.

Claim Amendment

Applicant has amended claim 22 in the present Response in order to incorporate the subject matter of claim 23.

Double Patenting Rejection

The Examiner rejected claims 1-17 and 21-23 on the ground of non-statutory double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 10,221,780.

Applicant notes that the double patenting rejection is not the only remaining rejection in the present application. The Examiner has also applied rejections under 35 U.S.C. §103 in the current Office Action. Applicant, therefore, requests that the double patenting rejection be held in abeyance pending resolution of the other rejections.

Rejection under 35 U.S.C. §103 over Pursifull et al. in view of Sugimoto et al.**Claims 1, 11, and 21****Introduction**

The Examiner rejected claims 1, 11, and 21 under 35 U.S.C. §103 as being unpatentable over Pursifull et al. (US Pub. 2011/0168133) in view of Sugimoto et al. (US Pub. 2007/0137591) and GasHose.

In rejecting claims 1, 11, and 21, the Examiner asserted that Pursifull discloses the claimed “a dual fuel generator” and “mechanical fuel valve,” but admitted that “Pursifull fails to disclose a

fuel regulator system located off board the dual fuel generator” that comprises a primary pressure regulator and secondary pressure regulator (claim 1) and/or a first stage and second stage (claims 11 and 21). *Office Action*, April 30, 2020, p. 4-5. The Examiner thus cited to Sugimoto as teaching these claim elements, with the Examiner stating that “Sugimoto discloses a dual fuel engine and delivery system (Fig. 1, as shown) wherein the system includes an off-board gaseous fuel system (Fb) which includes an off-board pressure regulator 72 which feeds fuel into an engine system 1 which includes another pressure regulator 62.” *Id.* at 5. The Examiner thus concluded that “it would have been obvious to one of ordinary skill in the art before the filing date of the invention to modify the device of Pursifull with the pressure regulators and gaseous fuel system methods of Sugimoto.” *Id.* In continuing to set forth the rejection, the Examiner further indicated that “Sugimoto does not disclose the exact details of its off-board fuel system, such as the type of tank and regulator it contains,” but that “Gashose discloses making use of twin stage regulators (i.e., two regulators in series) for usage with off-board fuel systems” and that “it would have been obvious to one of ordinary skill in the art to modify the generator system of the modified Pursifull with a dual-regulator system such as disclose[d] in Gashose as doing so would allow for a more even output and a reduction in freeze-ups from an off-board fuel system (such as a propane tank).” *Id.* at 6. Applicant respectfully disagrees with the rejection.

Prior Art – Pursifull and Sugimoto

Pursifull discloses an engine system 100 that includes an internal combustion engine 102 having one or more cylinders 104 that may receive fuel from one or more fuel injectors 106 that inject fuel in proportion to a pulse width of a signal received from a controller 128. *Pursifull*, ¶[0021]. Fuel may be delivered to the fuel injector 106 from a fuel rail 108 by a fuel system 110. *Pursifull*, ¶[0021]. The fuel system 110 may include a fuel tank 112 and a fuel pump 114 operable by controller 128 to pump fuel from the fuel tank 112 to the fuel rail 108. *Pursifull*, ¶[0022]. A delivery check valve 116 may be positioned downstream of the fuel pump 114 to force fuel pumped from the fuel pump at a predetermined pressure to the fuel rail 108 so that fuel does not return along the same path to the fuel pump. *Pursifull*, ¶[0023]. A first solenoid valve 118 may be positioned downstream of delivery check valve 116 to control the flow of fuel to fuel rail 108 or from the fuel rail to a return line 119. *Pursifull*, ¶[0023]. In some embodiments, fuel system 110 may be what is known as a multi-fuel system that selectively provides a plurality of different types of fuel to the fuel rail 108 based on the mode of operation, such as gasoline and/or liquid propane. *Pursifull*, ¶[0024]. A three-way valve 120 may be positioned upstream of the fuel rail