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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/191,503	12/20/2022	11530654	CET1090.070	6187

26629 7590 11/30/2022

ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
136 S WISCONSIN ST
PORT WASHINGTON, WI 53074

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 113 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Mark J. Sarder, Waukesha, WI;
Aleko D. Sotiriades, Cedarburg, WI;
James J. Dehn, Brookfield, WI;
Leigh Jenison, Hartland, WI;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Champion Power Equipment, Inc., Santa Fe Springs, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	**11/15/2022 03:25:33 PM ET**	**CET1090.070**

Title of Invention

OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	6187	FILED BY	Robyn Templin
PATENT CENTER #	61182218	FILING DATE	11/15/2018
CUSTOMER #	26629	FIRST NAMED INVENTOR	Mark J. Sarder
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Timothy Ziolkowski

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2022.11.15 Issue Fee.pdf	1	Issue Fee Payment (PTO-85B)	199 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2022.11.15 Issue Fee.pdf	334F2BABA8A19D11DAB6AAB26DE5A2FA5142E4608B3283F45 D96D206729C272D53D698DDF5EA0AC7B3CF65ACF8CB913A9 7731048F6833D2CD0963C8FF2FBF3A4

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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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	11/15/2022 03:25:33 PM ET	CET1090.070

Title of Invention

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CUSTOMER #	26629	FILING DATE	11/15/2018
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Mark J. Sarder

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 4529	E2022AEF27044106	Robyn Templin

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2501	UTILITY ISSUE FEE	600.00	1	600.00
			TOTAL AMOUNT:	$600.00

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.

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

26629 7590 09/29/2022

ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
136 S WISCONSIN ST
PORT WASHINGTON, WI 53074

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Robyn L. Templin	(Typed or printed name)
/Robyn L. Templin/	(Signature)
November 15, 2022	(Date)

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

TITLE OF INVENTION: OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	12/29/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
LATHERS, KEVIN ANTHONY	3747	123-575000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Ziolkowski Patent Solutions Group, SC
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Champion Power Equipment, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Sante Fe Springs, CA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Timothy J. Ziolkowski/ Date November 15, 2022

Typed or printed name Timothy J. Ziolkowski Registration No. 38,368

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16/191,503	11/15/2018	Mark J. Sarder	CET1090.070	6187

26629 7590 10/05/2022

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
10/05/2022	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
lje@zpspatents.com

Corrected ***Notice of Allowability***	**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--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to terminal disclaimer filed 09/08/2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 2-10,22 and 24 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/KEVIN A LATHERS/
Primary Examiner, Art Unit 3747

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	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	09/21/2022				
	1	✓	✓	✓	✓	-				
1	2	✓	O	✓	✓	=				
6	3	✓	O	✓	✓	=				
7	4	✓	O	✓	✓	=				
8	5	✓	O	✓	✓	=				
2	6	✓	✓	✓	✓	=				
3	7	✓	✓	✓	✓	=				
4	8	✓	✓	✓	✓	=				
5	9	✓	✓	✓	✓	=				
9	10	✓	✓	✓	✓	=				
	11	✓	✓	✓	✓	-				
	12	✓	✓	✓	✓	-				
	13	✓	✓	✓	✓	-				
	14	✓	✓	✓	✓	-				
	15	✓	✓	✓	✓	-				
	16	✓	✓	✓	✓	-				
	17	✓	✓	✓	✓	-				
	18	-	-	-	-	-				
	19	-	-	-	-	-				
	20	-	-	-	-	-				
	21	✓	✓	✓	✓	-				
11	22	✓	✓	✓	✓	=				
	23	✓	✓	-	-	-				
10	24			✓	✓	=				

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	3747

CPC								
Symbol							**Type**	**Version**
F02D	/	19	/	0613			F	2013-01-01
F02D	/	19	/	0605			I	2013-01-01
F02D	/	19	/	0647			I	2013-01-01
F02D	/	19	/	0673			I	2013-01-01
Y02T	/	10	/	30			A	2013-01-01

CPC Combination Sets								
Symbol							**Type**	**Set**	**Ranking**	**Version**
	/		/							

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	11	
/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	30 September 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	2	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220930

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 10

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	3747

INTERNATIONAL CLASSIFICATION					
CLAIMED					
F02D19/06	/	19	/	06	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	11	
/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	30 September 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	2	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220930

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	3747

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1	9	10		19										
1	2		11		20										
6	3		12		21										
7	4		13	11	22										
8	5		14		23										
2	6		15	10	24										
3	7		16												
4	8		17												
5	9		18												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	11	
/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	30 September 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	2	1

U.S. Patent and Trademark Office

Part of Paper No.: 20220930

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 12

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NOTICE OF ALLOWANCE AND FEE(S) DUE

26629 7590 09/29/2022

ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
136 S WISCONSIN ST
PORT WASHINGTON, WI 53074

EXAMINER
LATHERS, KEVIN ANTHONY

ART UNIT	PAPER NUMBER
3747	

DATE MAILED: 09/29/2022

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

TITLE OF INVENTION: OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	12/29/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
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(Typed or printed name)
(Signature)
(Date)

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

TITLE OF INVENTION: OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	12/29/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
LATHERS, KEVIN ANTHONY	3747	123-575000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

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 09/29/2022

ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
136 S WISCONSIN ST
PORT WASHINGTON, WI 53074

EXAMINER	
LATHERS, KEVIN ANTHONY	
ART UNIT	PAPER NUMBER
3747	

DATE MAILED: 09/29/2022

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. 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 30 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

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.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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 inspection 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.

Notice of Allowability	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--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to claims filed 08/11/2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☐ The allowed claim(s) is/are _____ . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/KEVIN A LATHERS/
Primary Examiner, Art Unit 3747

DETAILED ACTION

Notice of Pre-AIA or AIA Status

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

Allowable Subject Matter

2. Claims 2-10, 22, and 24 are allowed.

Conclusion

3. 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 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 published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KEVIN A LATHERS/
Primary Examiner, Art Unit 3747

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	3747

CPC								
Symbol							**Type**	**Version**
F02D	/	19	/	0613			F	2013-01-01
F02D	/	19	/	0605			I	2013-01-01
F02D	/	19	/	0647			I	2013-01-01
F02D	/	19	/	0673			I	2013-01-01
Y02T	/	10	/	30			A	2013-01-01

CPC Combination Sets								
Symbol							**Type**	**Set**	**Ranking**	**Version**
	/		/							

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	11	
/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	21 September 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	2	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220921

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 20

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	3747

INTERNATIONAL CLASSIFICATION					
CLAIMED					
F02D19/06	/	19	/	06	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	11	
/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	21 September 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	2	1

U.S. Patent and Trademark Office — Part of Paper No.: 20220921

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 21

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	3747

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1	9	10		19										
1	2		11		20										
6	3		12		21										
7	4		13	11	22										
8	5		14		23										
2	6		15	10	24										
3	7		16												
4	8		17												
5	9		18												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	11	
/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	21 September 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	2	1

U.S. Patent and Trademark Office Part of Paper No.: 20220921

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 22

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	Art Unit
	KEVIN A LATHERS	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.	09/21/2022	/K.L./

/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	

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

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
F02D	19/0613, 19/0605, 19/0647	09/21/2022	/K.L./

/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 24

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	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	09/21/2022				
	1	✓	✓	✓	✓	-				
1	2	✓	O	✓	✓	=				
6	3	✓	O	✓	✓	=				
7	4	✓	O	✓	✓	=				
8	5	✓	O	✓	✓	=				
2	6	✓	✓	✓	✓	=				
3	7	✓	✓	✓	✓	=				
4	8	✓	✓	✓	✓	=				
5	9	✓	✓	✓	✓	=				
9	10	✓	✓	✓	✓	=				
	11	✓	✓	✓	✓	-				
	12	✓	✓	✓	✓	-				
	13	✓	✓	✓	✓	-				
	14	✓	✓	✓	✓	-				
	15	✓	✓	✓	✓	-				
	16	✓	✓	✓	✓	-				
	17	✓	✓	✓	✓	-				
	18	-	-	-	-	-				
	19	-	-	-	-	-				
	20	-	-	-	-	-				
	21	✓	✓	✓	✓	-				
11	22	✓	✓	✓	✓	=				
	23	✓	✓	-	-	-				
10	24			✓	✓	=				

Bibliographic Data

Application No: 16/191,503

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /KEVIN A LATHERS/ Examiner's Signature | Initials

Title: OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/15/2018	123	3747	
RULE			

APPLICANTS

Champion Power Equipment, Inc., Santa Fe Springs, CA, UNITED STATES

INVENTORS

Mark J. Sarder, Waukesha, WI, UNITED STATES

Aleko D. Sotiriades, Cedarburg, WI, UNITED STATES

James J. Dehn, Brookfield, WI, UNITED STATES

Leigh Jenison, Hartland, WI, UNITED STATES

CONTINUING DATA

This application is a CON of 14738060 06/12/2015 PAT 10221780

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

12/04/2018

**** SMALL ENTITY ****

STATE OR COUNTRY

UNITED STATES

ADDRESS

FILING FEE RECEIVED

$785

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

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	4287908		1981-09-08	Storgard	
	2	4364370		1982-12-21	Smith et al.	
	3	4416244		1983-11-22	McDonald	
	4	5555873		1996-09-17	Nolen	
	5	7954479	B2	2011-06-07	Kojima et al.	
	6	9523497	B2	2016-12-20	Deng	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.A.L/

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

	1	20070215223	A1	2007-09-20	Morris	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	1826377	EP	A2	2007-08-29	Rotarex Star		
	2	2510660	FR	A1	1983-02-04	Stetter SA		
	3	H0466743	JP	A	1992-03-03	Suzuki Motor Co		
	4	1999001659	WO	A1	1999-01-14	Bailey		
	5	2007048633	WO	A1	2007-05-03	Dirnhofer		
	6	2220679	FR	A1	1974-10-04	Servequip		

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

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]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.A.L/

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

	1	Yamaha EF2000iS Tri Fuel Conversion: Overview & Installation Tips, January 3, 2014, https://www.youtube.com/watch?v=caZawwDaRQg

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

EXAMINER SIGNATURE

Examiner Signature	/KEVIN A LATHERS/	Date Considered	09/16/2022

*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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.A.L/

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

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	/Andrew C. Stark/	Date (YYYY-MM-DD)	2022-08-11
Name/Print	Andrew C. Stark	Registration Number	65742

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.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.A.L/

Privacy Act Statement

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.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.A.L/

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	1434	F02D19/0613.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO, JP, EP, KR); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/09/21 09:17 PM
L3	7269	F02D19/0647.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO, JP, EP, KR); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/09/21 09:17 PM
L4	2144	F02D19/0605.cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, EP, FR, JP, KR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/09/21 09:17 PM
L5	0	(dual ADJ fuel ADJ generator AND pressure ADJ regualtor AND fuel ADJ valve AND mechanical).clm.	(US-PGPUB; USPAT; USOCR; FIT (CN, EP, FR, JP, KR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/09/21 09:18 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N2	306	F02D19/0605.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/21 09:18 PM
N3	922	F02D19/0647.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/21 09:18 PM
N4	143	F02D19/0613.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/21 09:18 PM
N5	3	(dual ADJ fuel ADJ generator AND pressure ADJ regulator AND fuel ADJ valve AND mechanical).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/21 09:18 PM

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UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/191,503	11/15/2018	3747	785	CET1090.070	20	3

CONFIRMATION NO. 6187

CORRECTED FILING RECEIPT

26629
ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
136 S WISCONSIN ST
PORT WASHINGTON, WI 53074

OC000000136356804

Date Mailed: 09/22/2022

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Mark J. Sarder, Waukesha, WI;
Aleko D. Sotiriades, Cedarburg, WI;
James J. Dehn, Brookfield, WI;
Leigh Jenison, Hartland, WI;

Applicant(s)

Champion Power Equipment, Inc., Santa Fe Springs, CA;

Power of Attorney: The patent practitioners associated with Customer Number 26629

Domestic Priority data as claimed by applicant

This application is a CON of 14/738,060 06/12/2015 PAT 10221780

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 12/04/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/191,503**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

Preliminary Class

123

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 36

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/191,503	11/15/2018	3747	785	CET1090.070	20	3

CONFIRMATION NO. 6187

CORRECTED FILING RECEIPT

26629
ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
136 S WISCONSIN ST
PORT WASHINGTON, WI 53074

OC000000136296232

Date Mailed: 09/19/2022

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Inventor(s)

Mark J. Sarder, Waukesha, WI;
Aleko D. Sotiriades, Cedarburg, WI;
James J. Dehn, Brookfield, WI;
Leigh Jenison, Hartland, WI;

Applicant(s)

Champion Powe Equipment, Inc., Santa Fe Springs, CA;

Assignment For Published Patent Application

Champion Powe Equipment, Inc., Santa Fe Springs, CA

Power of Attorney: The patent practitioners associated with Customer Number 26629

Domestic Priority data as claimed by applicant

This application is a CON of 14/738,060 06/12/2015 PAT 10221780

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 12/04/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/191,503**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

Preliminary Class

123

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/191,503	11/15/2018	Mark J. Sarder	CET1090.070

CONFIRMATION NO. 6187

POA ACCEPTANCE LETTER

26629
ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
136 S WISCONSIN ST
PORT WASHINGTON, WI 53074

OC000000136296230

Date Mailed: 09/19/2022

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/08/2022.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/rmohamed/

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

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 09/14/2022

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
09/14/2022	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
lje@zpspatents.com

Applicant-Initiated Interview Summary	**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: 07 September 2022

Issues Discussed:

Other

Applicant's Terminal Disclaimer was denied. Examiner and Attorney discussed ways to overcome the issues presented in a timely manner.

/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.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
* 16/191,503 *	16/191,503	Sarder et al.	
	Examiner	**Art Unit**	
	LATHERS, KEVIN ANTHONY	3747	

Document Code - DISQ	**Internal Document - DO NOT MAIL**

TERMINAL DISCLAIMER	☑ APPROVED	☐ DISAPPROVED
Date Filed: **08 September 2022**	**This patent is subject to a Terminal Disclaimer**	

Approved/Disapproved by:

/TRINA STEPTOE/

Technology Center: OPLC

Telephone: (571)272-2577

10,221,780

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	**09/08/2022 03:16:24 PM ET**	**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 #	60949719	FILING DATE	11/15/2018
CUSTOMER #	26629	FIRST NAMED INVENTOR	Mark J. Sarder
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Andrew Stark

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2022.09.08 ADS.pdf	9	Application Data Sheet	1619 KB
Warning: This is not a USPTO supplied ADS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
2022.09.08 POA Transmittial.pdf	1	Power of Attorney	151 KB
2022.09.08 General POA.pdf	1	Power of Attorney	532 KB
2022.09.08 Request to Correct Applicant.pdf	2	Request under 37CFR1.46(c) to correct, update, change applicant	189 KB

2022.09.08 Statement Under 37 CFR 3.73c.pdf	3	Assignee showing of ownership per 37 CFR 3.73	124 KB
2022.09.08 Terminal Disclaimer.pdf	1	Terminal Disclaimer Filed	90 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2022.09.08 ADS.pdf	7E2D6937627ADD2CE80189493719288C259558574D62DEA3A4FA266A3B41690F9BC92E80EFD20AFF7D82B17DEB943BB43C0909655A8264F4A74CEB99AB398B2
2022.09.08 POA Transmittal.pdf	727FA98E32C71266FEF3A8986F22ACABE6ED221D9BC109C82A183884DB2D7596A6EC21D2F227075F9F583A4E42108B8488382F3EB81194F1CE3DB4F0A7AB046B
2022.09.08 General POA.pdf	EEE57956C00EA36439F3ECE88A916468E3E89FD7148120590BEA9FD6029EA56802800079ABA1694B6C5ACAAE418CC56202680338D97979D157FAA73230CFFEB7
2022.09.08 Request to Correct Applicant.pdf	A01B82E12F0D2317F4BC76B092B54FE1A96C8245B8F310551A193CD37BCD28D6D1DFA4354C427DE3CA9DC0BDB1AB450C43AF7A8F9922074857CC27E6EA3A97B3
2022.09.08 Statement Under 37 CFR 3.73c.pdf	B96BC8262BD799901D90E7203200BF731EFAE9C3D64E91B6DF8A770A97BE0FF1419A7D54FCC857EC75AD4D97B41D02C56B7DA8820CF343A10B730B51C574C8CB
2022.09.08 Terminal Disclaimer.pdf	E4B2E0E976609A2D988E380ED26467539071E8C868390CE1A8CC9F36BD8E4D9032BEC05AA1E369280973053A50CEE3CE200923F6B5DC791029B9FB8C25A34271

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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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) CET1090.070

In re Application of: Sarder, et al.

Application No.: 16/191,503

Filed: 11/15/2018

For: OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

The applicant, Champion Power Equipment, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term **prior patent** No. 10,221,780 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby knowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 65742

/Andrew C. Stark/ — Signature
September 8, 2022 — Date

Andrew C. Stark — Typed or printed name

Attorney — Title
(262) 268-8100 — Telephone Number

☐ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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.

This collection of information is required by 37 CFR 1.321. 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 and 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CET1090.070
	Application Number	16/191,503
Title of Invention	~~DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE~~ OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Mark	J.	Sarder	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Waukesha	State/Province	WI	Country of Residence	US

Mailing Address of Inventor:

Address 1	W245 N5551 Corporate Circle		
Address 2			
City	Sussex	State/Province	WI
Postal Code	53089	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Aleko	D.	Sotiriades	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Cedarburg	State/Province	WI	Country of Residence	US

Mailing Address of Inventor:

Address 1	W245 N5551 Corporate Circle		
Address 2			
City	Sussex	State/Province	WI
Postal Code	53089	Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James	J.	Dehn	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CET1090.070
	Application Number	16/191,503
Title of Invention	~~DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE~~ OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE	

City	Brookfield	State/Province	WI	Country of Residence	US

Mailing Address of Inventor:

Address 1	W245 N5551 Corporate Circle		
Address 2			
City	Sussex	State/Province	WI
Postal Code	53089	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Leigh		Jenison	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Hartland	State/Province	WI	Country of Residence	US

Mailing Address of Inventor:

Address 1	W245 N5551 Corporate Circle		
Address 2			
City	Sussex	State/Province	WI
Postal Code	53089	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	26629		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	~~DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE~~ OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE		
Attorney Docket Number	CET1090.070	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CET1090.070
	Application Number	16/191,503
Title of Invention	~~DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE~~ OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	26629		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	~~Pending~~		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	~~Continuation of~~	~~14738060~~	~~2015-06-12~~

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CET1090.070
	Application Number	16/191,503
Title of Invention	~~DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE~~ OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE	

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation of	14738060	2015-06-12	10221780	2019-03-05

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CET1090.070
	Application Number	16/191,503
Title of Invention	~~DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE~~ OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CET1090.070
	Application Number	16/191,503
Title of Invention	~~DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE~~ OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	~~Champion Engine Technology, LLC~~ Champion Power Equipment, Inc.		
Mailing Address Information For Applicant:			
Address 1	~~W245 N5551 Corporate Circle~~ 12039 Smith Avenue		
Address 2			
City	~~Sussex~~ Santa Fe Springs	**State/Province**	~~WI~~ CA
Country US		Postal Code	~~53089~~ 90670
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CET1090.070
	Application Number	16/191,503
Title of Invention	~~DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE~~ OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Andrew Stark/			Date (YYYY-MM-DD)	2022-09-08
First Name	Andrew	Last Name	Stark	Registration Number	65742

Additional Signature may be generated within this form by selecting the Add button.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	CET1090.070
	Application Number	16/191,503
Title of Invention	~~DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE~~	OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

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 CooperationTreaty.

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.

Doc Code: R46C.REQ
Document Description: Request under 37 CFR 1.46(c) to correct, update or change the applicant.

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REQUEST TO CORRECT OR UPDATE THE NAME OF THE APPLICANT UNDER 37 CFR 1.46(c)(1), OR CHANGE THE APPLICANT UNDER 37 CFR 1.46(c)(2)
(FOR USE ONLY IN APPLICATIONS FILED ON OR AFTER SEPTEMBER 16, 2012)

Application Number	16/191,503
Filing Date	November 15, 2018
First Named Inventor	Mark J. Sarder
Art Unit	3747
Examiner Name	Kevin A. Lathers
Practitioner Docket Number	CET1090.070

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

Applicant hereby **requests that the name of the applicant be corrected or updated under 37 CFR 1.46(c)(1), or that the applicant be changed under 37 CFR 1.46(c)(2),** in the above-identified application. **Requests under 37 CFR 1.46(c)(1) or (c)(2) cannot be submitted after payment of the issue fee or if the application has been patented.**

Please check the applicable box(es) below.

☐ 1. This request is to **correct or update the name of the applicant** (**under 37 CFR 1.46(c)(1)**) and includes:

☐ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) with the corrected or updated information shown with markings (*e.g.*, underlining for insertions, strikethrough for deletions). A Corrected Web-based ADS may be used.

Note: Requests under 37 CFR 1.46(c)(1) may be filed to correct typographical errors in the name of the § 1.46 applicant, or for updating the name of the § 1.46 applicant (*i.e.*, where there is no change in the applicant itself but just in the applicant's name). See the Manual of Patent Examining Procedure (MPEP) section 605.01.

■ 2. This request is to **change the applicant** (**under 37 CFR 1.46(c)(2)**) and includes:

■ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) that identifies the changes with proper markings (underlining for insertions and strikethrough for deletions). A Corrected Web-based ADS may be used.

■ A Statement Under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent). See MPEP 325.

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
Date September 8, 2022

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. *Juristic entities must be represented by a patent practitioner (See 37 CFR 1.31, applicable to any paper filed on or after September 16, 2012 that is presented on behalf of a juristic entity, regardless of application filing date). 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 1.36. 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 and 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

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.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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 inspection 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.

PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Champion Power Equipment, Inc.

Application No./Patent No.: 16/191,503 Filed/Issue Date: November 15, 2018

Titled: OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

Champion Power Equipment, Inc., a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Mark J. Sarder To: Champion Engine Technology, LLC

   The document was recorded in the United States Patent and Trademark Office at
   Reel 047507, Frame 0658, or for which a copy thereof is attached.

2. From: Aleko D. Sotiriades To: Champion Engine Technology, LLC

   The document was recorded in the United States Patent and Trademark Office at
   Reel 047507, Frame 0658, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). 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 and 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

3. From: James J. Dehn To: Champion Engine Technology, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 047507, Frame 0658, or for which a copy thereof is attached.

4. From: Leigh Jenison To: Champion Engine Technology, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 047507, Frame 0658, or for which a copy thereof is attached.

5. From: Champion Engine Technology, LLC To: Champion Power Equipment, Inc.

The document was recorded in the United States Patent and Trademark Office at
Reel 047681, Frame 0698, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Andrew C. Stark/	September 8, 2022
Signature	Date
Andrew C. Stark	65,742
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

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.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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 inspection 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.

Doc Code: PA..
Document Description: Power of Attorney

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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	16/191,503
Filing Date	November 15, 2018
First Named Inventor	Mark J. Sarder
Title	OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE
Art Unit	3747
Examiner Name	Kevin A. Lathers
Attorney Docket Number	CET1090.070

SIGNATURE of Applicant or Patent Practitioner

Signature	/Andrew C. Stark/	Date (Optional)	2022-09-08
Name	Andrew C. Stark	Registration Number	65742
Title (if Applicant is a juristic entity)	Patent Practitioner		
Applicant Name (if Applicant is a juristic entity)	Champion Power Equipment, Inc.		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. 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 and 1.14. This collection is estimated to take 3 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 26629

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	01-05-2019
Name	Dennis Trine		
Title	Chief Executive Officer, Champion Power Equipment, Inc.		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. 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 and 1.14. This collection is estimated to take 3 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
* 16/191,503 *	16/191,503	Sarder et al.	
	Examiner	**Art Unit**	
	LATHERS, KEVIN ANTHONY	3747	

Document Code - DISQ	**Internal Document - DO NOT MAIL**

TERMINAL DISCLAIMER	☐ APPROVED	☑ DISAPPROVED
Date Filed: 11 August 2022	**This patent is subject to a Terminal Disclaimer**	

Approved/Disapproved by:

/KIMBERLY R WHITE/

Technology Center: OPLC

Telephone: (571)272-6179

See Continuation Sheet

Continuation of Approved/Disapproved Comments:

The title listed on the TD form doesn't match what's listed on the ADS. POA is missing No additional fee is required with resubmission.

The person who signed th terminal disclaimer (only for applications filed on or after September 16, 2012
- is not the applicant, patentee or an attorney or agent of record. 37 CFR I.321(a) and (b). (See FP 14.26.08)

- failed to state his/her capacity to sign for the juristic entity, and he/she has not been established as being authorized to act on behalf of the applicant. (See FP 14.26.09).

(Note: PoA can be given to customer number, wherein all practitioners listed under the customer number have PoA. If PoA is given to a list of practitioners by registration number, the list may not comprise more than 10 practitioners or a separate paper signed by a 37 CFR 1.33(b) party must be in the record identifying which of the practitioners, up to 10, are recognized as having established that the representative is a party authorized to act on behalf of the applicant.)

The terminal disclaimer i entities a party who is not the applicant (only for applications filed on or after September 16, 2012; See FP 14.26. I 0).

PTO/AIA/26 (04-14)
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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) CET1090.070

In re Application of: Sarder, et al.

Application No.: 16/191,503

Filed: 11/15/2018

For: OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

The applicant, Champion Power Equipment, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term **prior patent** No. 10,221,780 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby knowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 65742

/Andrew C. Stark/ — Signature
August 11, 2022 — Date

Andrew C. Stark — Typed or printed name

Attorney — Title
(262) 268-8100 — Telephone Number

☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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.

This collection of information is required by 37 CFR 1.321. 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 and 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Espacenet

Bibliographic data: JPH0466743 (A) — 1992-03-03

TWO-SORT FUEL ENGINE

Inventor(s): MAEDA TADAMASA ± (MAEDA TADAMASA)

Applicant(s): SUZUKI MOTOR CO ± (SUZUKI MOTOR CORP)

Classification: **- international:** ***F02D19/06; F02D41/14;*** (IPC1-7): F02D19/06; F02D41/14

- cooperative:

Application number: JP19900180942 19900709

Priority number(s): JP19900180942 19900709

Abstract of JPH0466743 (A)

PURPOSE:To realize a control suitable for the properties of fuels in a simple system by using a whole scope air-fuel ratio sensor, and feedback-controlling the air-fuel ratio, the ignition timing, and the like, of the other side fuel while making one side fuel as a standard, in an engine to select and use the fuel from two sorts of different fuels. CONSTITUTION:The first fuel tank 1 and the second fuel tank 2 to store the first fuel (LPG) and the second fuel (LNG) separately are provided, and at the outlets of the fuel tanks 1 and 2, the first and the second electromagnetic valves 4 and 5 converted by a manual changeover switch 3 (S1) are provided respectively. A fuel passage 6 downstream of the electromagnetic valves 4 and 5 is linked to a two-way electromagnetic valve 8 interlocked with the change-over switch 3 through a vaporizer 7, and regulators 9 and 10 to regulate the pressure of the fuels are connected to the two parts of the two-way solenoid valve 8. These regulators 9 and 10 are connected to an injector 16 through a fuel passage 13. And the output signal of a whole scope air-fuel ratio sensor S2 provided at an exhaust passage 20 are input to the ECU 24, and the control is carried out to correct the other side fuel making one side fuel as a standard.

⑲日本国特許庁（JP）　⑪特許出願公開

⑫公開特許公報（A）　平4－66743

⑤1Int.Cl.⁵	識別記号	庁内整理番号
F 02 D 41/14	310 D	9039－3G
19/06	B	6502－3G

⑬公開　平成4年(1992)3月3日

審査請求　未請求　請求項の数 1　（全4頁）

⑤4発明の名称　2種燃料エンジン

⑳特　願　平2－180942
㉒出　願　平2(1990)7月9日

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明　細　書

1．発明の名称

2種燃料エンジン

2．特許請求の範囲

2種の燃料タンクと、燃料の選択により各燃料タンクから選択的に燃料を供給する切換弁と、選択された燃料を調圧してエンジンの燃焼室へ燃料を供給する燃料通路と、エンジンの排気系に設けられた全領域空燃比センサと、一方の燃料を基準として他方の燃料の最適値にセッティングしたROMとを有し、前記センサの出力信号により使用燃料による空燃比を制御するようにしたことを特徴とする2種燃料エンジン。

3．発明の詳細な説明

（産業上の利用分野）

本発明は、2種の燃料を切換えて使用する2種燃料エンジンに関する。

（従来の技術）

例えば、LPG（液化石油ガス）とLNG（液化天然ガス）、LPGとH_2、H_2とLNG（またはCNG）のように2種の異なる燃料を切換えて使用するエンジンがある。

このように2種類の燃料を使用する場合、一般に両燃料ともエンジンの負圧により吸入するキャブレタ方式を採用するか、あるいは一方の燃料はインジェクションを用いて制御し、他方の燃料はキャブレタ方式を用いて制御することが多い。

また、両燃料を電子制御する場合は、既存のO_2センサを用いて制御するようにしている。このO_2センサは、試験管状のジルコニア素子の内外面に薄い白金をメッキして電極とし、素子の内外の酸素濃度差に応じて起動力が発生するようにしたものである。

（発明が解決しようとする課題）

しかるに上記の従来技術では、一方の燃料について最適に電子制御しても、他方の燃料はあくまで緊急用としてしかとらえられていないためこれ

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 69

を最適空燃比に制御することはなされていず、またO_2センサを用いたものは、双方の燃料によってエンジンの回転数、負荷に応じた理論空燃比以外の空燃比にフィードバック制御することができなかった。

本発明はこれに鑑み、同一の全領域空燃比センサを用い、エンジンの負荷に応じた空燃比のフィードバック制御および点火時期制御を、各々セッティングされたマップおよび補正係数を使い分けて最適な空燃比制御を可能とする２種燃料エンジンを提供することを目的としてなされたものである。

（課題を解決するための手段）

上記従来技術が有する問題点を解決するため、本発明は、２種の燃料タンクと、燃料の選択により各燃料タンクから選択的に燃料を供給する切換弁と、選択された燃料を調圧してエンジンの燃焼室へ燃料を供給する燃料通路と、エンジンの排気系に設けられた全領域空燃比センサと、一方の燃料を基準として他方の燃料の最適値にセッティングしたＲＯＭとを有し、前記センサの出力信号により使用燃料による空燃比を制御するようにしたことを特徴とするものである。

（作　用）

手動切換スイッチを切換えて燃料を選択すると、選択された燃料が調圧されて燃料通路を通じエンジンの燃焼室に送られる。このとき全領域での排気中のO_2量の検出結果に基づき他方の燃料の空燃比に補正がかけられてその燃料の最適空燃比が決定される。したがって全領域の空燃比を測定するので、負荷により適切な空燃比が違ってもそれぞれの燃料に対し適切なマップ制御ができる。

（実施例）

以下、本発明を図面に示す実施例を参照して説明する。

図示の実施例はインジェクション方式のエンジンに適用した場合を示し、燃料としてＬＰＧとＬＮＧの２種の燃料を選択使用する場合を示している。すなわち第１燃料（ＬＰＧ）と第２燃料（ＬＮＧ）を別個に収納する第１燃料タンク１と第２燃料タンク２を有し、これら第１，第２燃料タンク１，２の出口部には、運転席の手動切換スイッチ３（S_1）により切換え作動され緊急遮断弁を兼ねる切換弁としての第１電磁弁４および第２電磁弁５がそれぞれ設けられている。

これら電磁弁４，５より後流側の燃料通路６はベーパーライザ７を経て前記切換スイッチ３に連動する２方電磁弁８に至り、この２方電磁弁８の一方のポートには第１燃料を整圧するレギュレータ９が接続され、他方のポートには第２燃料を整圧するレギュレータ１０が接続されており、これらレギュレータ９，１０はそれぞれ逆止弁１１，１２を介して燃料通路１３に接続され、この燃料通路１３はエンジン１４の燃焼室１５に燃料を噴射するインジェクタ１６に接続されている。前記各レギュレータ９，１０はダイヤフラム式のものが用いられ、その加圧室９ａ，１０ａにはエンジン１４の吸気通路１７の吸気圧が導入通路１８，１９を通じて導入されるようになっている。

エンジン１４の排気通路２０には、エンジン１４の回転の全領域においてO_2量を検出することのできる全領域空燃比センサS_2が設けられている。このセンサS_2は、例えば理論空燃比検出センサとジルコニア素子イオン伝導性を利用した酸素ポンプとの組合せからなっている。

第１図においてS_3は燃料通路１３に設けられた燃料温度センサ、S_4は燃料圧センサであり、またS_5は吸気通路１７に設けられた吸気圧センサ、S_6は同じく吸気通路１７に設けられた吸気温センサ、S_7は水温センサ、S_8はスロットルセンサである。また第２図において２１はディストリビュータであり、S_9はその気筒判別センサ、S_{10}はクランク角センサを示し、さらに２２はバッテリ、２３はイグニッションスイッチを示している。

ＥＣＵ２４は、全領域空燃比センサS_2により燃料の違いによる実際の空燃比から他方の燃料の空燃比センサ出力信号に補正をかけるためのＲＯＭを有している。この補正は、一方の燃料を基準とし、他方の燃料を補正するようにしている。

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 70

いま、運転席の手動切換スイッチ3（S_1）を切換えて第1または第2燃料のいずれかを選択すると、選択された燃料の燃料タンク1または2の電磁弁4または5が開き、その燃料は燃料通路6、ベーパーライザ7を通ってその燃料用のレギュレータ9または10を通り、こゝで整圧されて燃料通路13へ流れ、インジェクタ16からエンジン14の燃焼室15へ噴射される。このときの基本噴射量は、吸気圧センサS_5、気筒判別センサS_9により定められ、燃料温度センサS_3、スロットルセンサS_8、水温センサS_7、吸気温センサS_6、燃料圧センサS_7等により補正され、噴射量が決定される。またこれと併せてディストリビュータ21の点火時期の決定がなされる。これらの補正は、全領域空燃比センサS_2の検出信号に基づきＥＣＵ24により行なわれる。

そのフローは、第3図に示すように、全領域空燃比センサS_2の出力を読込み、燃料が第1燃料か否かが判断され、第1燃料であれば、その空燃比を算出し、第2燃料である場合には補正がかけられる。ついで吸気圧センサS_4、気筒判別センサS_9のデータを読込み、ブースト圧、エンジン回転数に応じ第1燃料、第2燃料それぞれの目標空燃比の選定、点火進角マップ、各種補正が行なわれ、インジェクタ操作量が決定される。

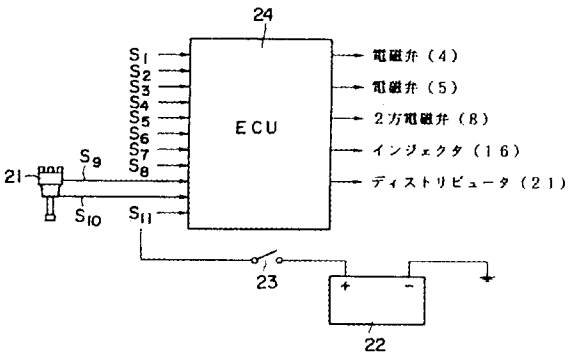
〔発明の効果〕

以上説明したように本発明によれば、2種の異なる燃料を選択して用いるエンジンにおいて、全領域空燃比センサを用い、一方の燃料を基準として他方の燃料の空燃比、点火時期等をフィードバック制御するようにしたので、各センサ、アクチュエータ等は同一で各燃料にセッティングしたマップ、補正係数を燃料切換スイッチの信号によって切換使用することが可能となり、簡単なシステムによりそれぞれの燃料の特性に合った空燃比、点火時期を決定することができる。

4．図面の簡単な説明

第1図は本発明を適用した2種燃料エンジンのシステム図、第2図は同ＥＣＵの入出力信号を示す説明図、第3図は同フローチャートである。

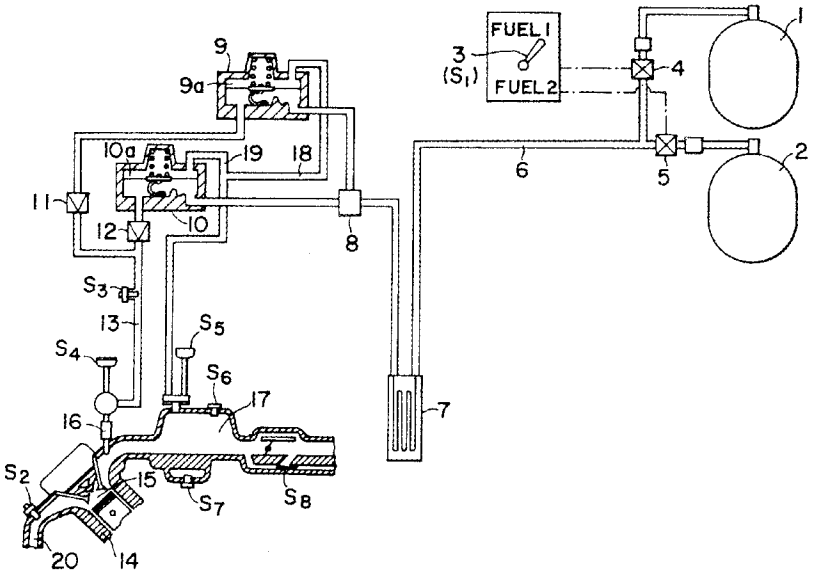
1…第1燃料タンク、2…第2燃料タンク、3（S_1）…燃料切換スイッチ、4，5…電磁弁、6，13…燃料通路、7…ベーパーライザ、8…2方切換弁、9，10…レギュレータ，14…エンジン、15…燃焼室、16…インジェクタ、17…吸気通路、20…排気通路、21…ディストリビュータ、S_2全領域空燃比センサ、S_3…燃料温度センサ、S_4…燃料圧センサ、S_5…吸気圧センサ、S_6…吸気温センサ、S_7…水温センサ、S_8…スロットルセンサ、S_9…気筒判別センサ、S_{10}…クランク角センサ。



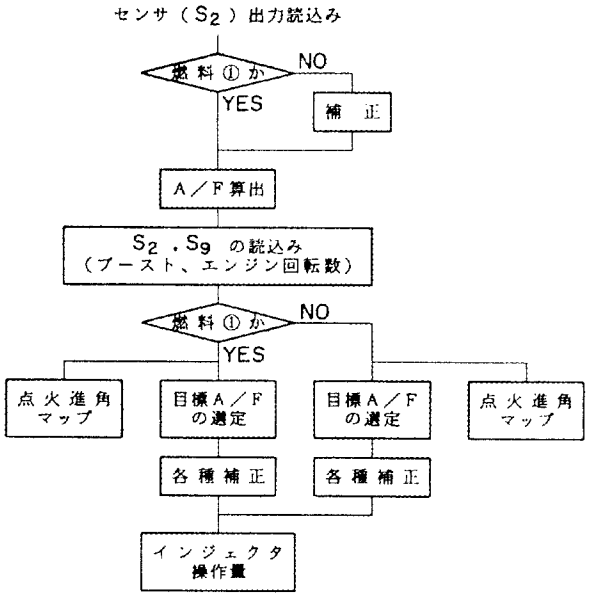
第2図

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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 71



第１図



第３図

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 72

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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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	2	4364370		1982-12-21	Smith et al.	
	3	4416244		1983-11-22	McDonald	
	4	5555873		1996-09-17	Nolen	
	5	7954479	B2	2011-06-07	Kojima et al.	
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	Examiner Name	Kevin A. Lathers
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	1	20070215223	A1	2007-09-20	Morris	

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	1	1826377	EP	A2	2007-08-29	Rotarex Star		
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	5	2007048633	WO	A1	2007-05-03	Dirnhofer		
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	Art Unit	3747
	Examiner Name	Kevin A. Lathers
	Attorney Docket Number	CET1090.070

	1	Yamaha EF2000iS Tri Fuel Conversion: Overview & Installation Tips, January 3, 2014, https://www.youtube.com/watch?v=caZawwDaRQg

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	Examiner Name	Kevin A. Lathers
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Name/Print	Andrew C. Stark	Registration Number	65742

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Internationales Büro

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10 2006 000 621.6 2. Januar 2006 (02.01.2006) DE

(71) **Anmelder und**
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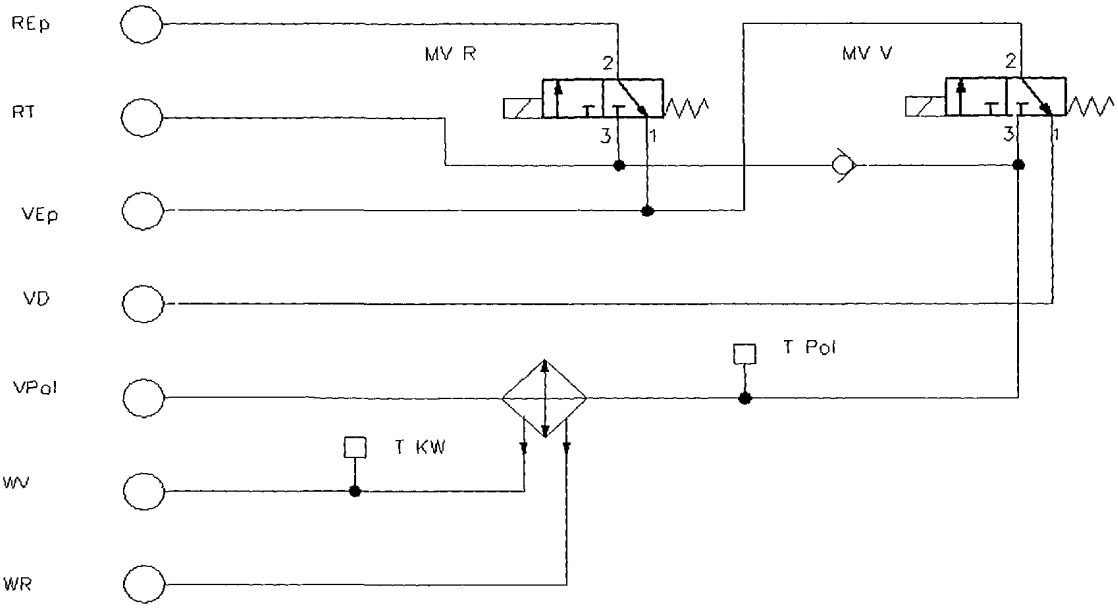
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[Fortsetzung auf der nächsten Seite]

(54) Title: RAPE/DIESEL VALVE

(54) Bezeichnung: RAPS-/DIESELVENTIL



(57) **Abstract:** In an internal combustion engine which is designed for Operation with a plurality of fuels, the entire fuel supply from at least two tanks for fuels having different flow properties is controlled in a Single valve control block. One of the fuels can be used without problems only at higher temperatures than the other one and therefore has to be heated first of all. The valve control block is arranged firstly close to the engine block of the internal combustion engine and secondly in the vicinity of a heat exchanger. As a result of the compact design, the ease of both maintenance and installation of the fuel supply System is improved and the fuel which is to be heated can be heated more rapidly.

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WO 2007/048633 A1

EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Veröffentlicht:

— *mit internationalem Recherchenbericht*

— *mit geänderten Ansprüchen*

Zur Erklärung der Zweibuchstaben Codes und der anderen Abkurzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT Gazette verwiesen

(57) Zusammenfassung: In einer für den Betrieb mit mehreren unterschiedlichen Kraftstoffen ausgelegten Brennkraftmaschine wird die gesamte Kraftstoff zufuhr aus mindestens zwei Tanks für Kraftstoffe mit unterschiedlichen Fließeigenschaften in einem einzigen Ventilsteuerblock gesteuert Einer der Kraftstoffe kann erst bei höheren Temperaturen als der andere problemlos eingesetzt und muss daher zunächst aufgeheizt werden Der Ventilsteuerblock ist einerseits eng am Motorblock der Brennkraftmaσhine und andererseits in der Nahe eines Wärmetauschers angeordnet Durch den kompakten Aufbau kann sowohl die Wartungs und Monta gefreundlichkeit der Kraftstof fversorgungsanlage verbessert als auch der aufzuheizende Kraftstoff schneller aufgeheizt werden

Raps-/Dieselventil

Die Erfindung betrifft eine Kraftstoffversorgungsanlage für einen Verbrennungsmotor, der wahlweise mit unterschiedlichen Kraftstoffen betreibbar ist. Kraftstoff 1 ist der vom Hersteller vorgesehene Kraftstoff, beispielsweise Diesel, für den das Fahrzeug konstruiert wurde. Kraftstoff 2 ist ein alternativer Kraftstoff (zumeist Pflanzenöl) , der bedingt durch seine physikalischen und chemischen Eigenschaften nur dann problemlos zum Einsatz kommen kann, wenn man bestimmte Betriebszustände mit Kraftstoff 1 abdeckt.

Insbesondere betrifft die Erfindung eine Kraftstoffversorgungsanlage mit einer Ventilvorrichtung zum Umschalten zwischen herkömmlichem Dieselkraftstoff und aus nachwachsenden Rohstoffen erzeugtem Kraftstoff wie Rapsöl oder anderen pflanzlichen Ölen.

Im Stand der Technik sind Vorrichtungen bekannt, um einen Motor mit unterschiedlichen Kraftstoffen, zum Beispiel Diesel und Rapsöl, zu betreiben. Würde ein herkömmlicher Selbstzündermotor nur mit Rapsöl betrieben, träte unter anderem das Problem auf, dass Rapsöl erst bei höheren Temperaturen dünnflüssig genug ist, um in einem solchen Motor in den Brennraum gefördert zu werden. Weiterhin ist das Einspritzsystem herkömmlicher Dieselmotoren nicht für zähflüssigen Kraftstoff konzipiert. Zudem gelangt, wenn der Motor kalt ist, mehr Treibstoff in das Motoröl, weil die Spaltmaße von Kolbenringen noch nicht perfekt passen-. Pflanzenöl verdampft dann aber – im Gegensatz zu Diesel – nicht mehr, so dass das Motoröl beeinträchtigt werden kann. Bei kalten Kolbenaußenwänden ist die Verbrennung schlechter. Es könnten sich bedingt durch Pflanzenöl vermehrt Ablagerungen bilden.

Erst bei einer Kraftstofftemperatur von mindestens ungefähr 60°C sind die Fließ- und Verbrennungseigenschaften von Rapsöl als einem Beispiel für pflanzliche Kraftstoffe mit denen von Diesel vergleichbar. Daher werden herkömmliche Rapsölmotoren beim Starten mit Diesel aus einem ersten Tank betrieben, bis sie warmgelaufen sind. Gleichzeitig wird mit der Abwärme der Motoren über einen Wärmetauscher ein zweiter Tank, der Rapsöl enthält, sowie die Zuführleitungen vom zweiten Tank zum Motor aufgewärmt, beispielsweise indem das Kühlwasser vom Motor den Tank und die Zuführleitungen aufheizt. Sobald die Temperatur des Rapsöls hoch genug ist, beispielsweise bei ungefähr 60°C liegt, wird die Versorgung des Motors mit Diesel gestoppt und der Motor stattdessen mit Rapsöl versorgt. Diese Umschaltung von Diesel auf Rapsöl kann von Hand vorgenommen werden, indem ein entsprechendes Ventil in der Zuführung umgelegt wird. In modernen Anlagen wird die Umschaltung automatisch durchgeführt, sobald der pflanzliche Kraftstoff aufgeheizt ist.

Neben der Fließfähigkeit ändern sich beispielsweise auch die Verbrennungseigenschaften abhängig von der Betriebstemperatur des pflanzlichen Kraftstoffes. Daher reicht es nicht aus, lediglich den Kraftstoff vorzuheizen, sondern der Motor muss zunächst mit dem Kraftstoff auf Betriebstemperatur gebracht werden, für den er ursprünglich ausgelegt wurde. Dann sind alle Bestandteile auf ideale und materialschonende Betriebsbereitschaft gebracht, und das Umschalten kann erfolgen, ohne dem Motor oder anderen Bauteilen Schaden zuzufügen.

In Fahrzeugen mit derartigen für wechselnde Kraftstoffe vorgesehenen Motoren, wie beispielsweise in der DE 38 00585 A1 oder der DE 101 54 455 A1 beschrieben, werden die Kraftstoffe über getrennte Zuleitungen mög-

liehst bis an das Einspritzsystem herangeführt. Dadurch wird eine Vermischung der Kraftstoffe weitgehend vermieden. Lediglich die Einspritzpumpe selbst und eine sehr kurze gemeinsame Zuführung zu der Pumpe muss von beiden Kraftstoffen genutzt werden. Beim Abschalten des Motors wird diese gemeinsame Zuführung wieder mit Dieselkraftstoff gespült bzw. gefüllt, um sicherzustellen, dass beim nächsten Kaltstart kein zähflüssiges Rapsöl in diesem Bereich den Durchfluss von Diesel behindert .

Speziell nach der DE 101 54 455 A1, die als nächstkommender Stand der Technik angesehen wird, gegen die der Anspruch 1 der Erfindung abgegrenzt ist, wird versucht, beide Kraftstoffe möglichst weitgehend in separaten Leitungen bis zu den Einspritzdüsen zu führen. Dies soll so weit gehen, dass für jeden Kraftstoff ein Einspritzsystem inklusive Einspritzdüse pro Zylinder vorgesehen ist, um jederzeit ohne Probleme zwischen den Kraftstoffen umschalten zu können und so das Spülen der Motoren mit Diesel nach dem eigentlichen Abschalten zu unterbinden.

Falls wie üblicherweise nur ein Einspritzsystem pro Zylinder vorhanden ist, werden die Kraftstoffe über getrennte Leitungen zu einem oder mehreren Umschaltventilen zugeführt. Von den Umschaltventilen führt eine (kurze) gemeinsame Leitung zu dem Einspritzsystem je Zylinder, wie oben beschrieben. Daher müssen für jeden Motoraufbau die Ventilanordnung, Kraft Stoff leitungen und eventuelle Steuerleitungen für die automatische Umstellung der Ventile angepasst und eingebaut werden; idealerweise werden sogar zwei Einspritzsysteme pro Zylinder vorgesehen. Dies führt zu weitgehender Neukonzeption des Motors oder zumindest zu hohem Umbauaufwand. Zudem ist von Nachteil, dass derartige Systeme in der Regel mit flexiblen Schläuchen aufgebaut sind, die mehrere Zwischenstücke erforder-

lieh machen, die - zumindest bei automatisierter Montage - aufwändig zu montieren und abzudichten sind.

Daher ist es eine Aufgabe der vorliegenden Erfindung, eine Kraftstoffversorgungsanlage zu schaffen, die mindestens zwei verschiedene Kraftstoffe sicher zuführt und hilft, Leckageverluste zu vermeiden. Zudem soll der Montageaufwand deutlich reduziert werden.

Erfindungsgemäß wird diese Aufgabe dadurch gelöst, dass ein Ventilsteuerblock vorgesehen wird, in den Kraftstoff Zuleitungen von den Tanks münden und der die Kraftstoffe über weitere Leitungen an die Einspritzdüsen verteilt. Alle Ventile zum Umschalten zwischen den zwei Kraftstoffen, beispielsweise von Diesel- auf Pflanzenölbetrieb, sind in diesen Block integriert.

Dadurch wird die Anzahl der Übergänge und Schlauchanschlüsse für die Kraftstoffe deutlich reduziert, so dass die Leckagegefahr durch Risse in Schläuchen und undichte Übergänge deutlich reduziert ist.

Besonders bevorzugt wird der Ventilsteuerblock mit einer Steuerung kombiniert . Diese Steuerung kann dann die Kraftstoffversorgung automatisch steuern, wie nachstehend noch genauer erläutert wird. Wenn alle Ventile zur Umschaltung zwischen den Kraftstoffen in dem stabilen Ventilsteuerblock integriert sind, kann die Steuerung über mehr oder weniger fest verlegte Leitungen die Ventile ansteuern. Besonders bevorzugt sind auch die wesentlichen Elemente der Steuerung wie eine programmierbare Rechenеinheit mit Speichereinheiten mit dem Ventilsteuerblock verbunden. Diese Recheneinheit kann in der Fahrgastzelle angeordnet bzw. mit Ein- und Ausgabeeinheiten in der Fahrgastzelle verbunden sein. Hier können dem Fahrzeugführer eventuell relevante Daten angezeigt werden, beispielsweise, mit welchem Kraftstoff er gerade fährt, die

Kraftstofftemperatur, die bisherige Fahrtdauer mit diesem Kraftstoff usw. Dadurch erhält man eine sehr kompakte und sehr zuverlässige Steuerung, bei der zudem die gesamte Verdrahtung zwischen der Steuereinheit und den Ventilen in einem einzigen Kabelbaum geführt werden kann, was ebenfalls zur Montagefreundlichkeit beiträgt.

Nach einer weiter bevorzugten Ausführungsform wird der Ventilsteuerblock aus wärmeleitendem Material, beispielsweise aus Metall, hergestellt.

Durch den Ventilsteuerblock fließen, wie vorstehend erläutert, beide Kraftstoffe. Wenn der Ventilsteuerblock möglichst nahe am Motor angebracht wird, kann die Abwärme des Motors den Block aufheizen. Wenn dieser die Wärme gut leitet, heizt er folglich auch den darin befindlichen Kraftstoff auf. Dadurch wird das Aufheizen beschleunigt und es kann schneller auf den weniger fließfähigen Kraftstoff umgeschaltet werden. Ferner kann der weniger fließfähige Kraftstoff mit einer geringeren Temperatur bis zum Ventilsteuerblock gefördert werden. Dies ist möglich, weil die Zuleitungen vor dem Ventilsteuerblock größere Querschnitte aufweisen als die Zuleitungen zu den Zylindern und insbesondere in den Einspritzdüsen nach dem Steuerblock, so dass eine Verstopfung weniger wahrscheinlich ist als in den Zuleitungen zu den Zylindern und zudem diese Zuleitungen bereits beim Umrüsten auf den zweiten Kraftstoff entsprechend ausgelegt werden können.

Nach einer weiter bevorzugten Ausführungsform ist der Ventilsteuerblock möglichst nahe bei einem Wärmetauscher angeordnet, der die Aufgabe hat, den weniger fließfähigen Kraftstoff zu erwärmen.

Standardmäßig werden in Motoren zur Verbrennung weniger fließfähiger nachwachsender Rohstoffe Wärmetauscher

eingebaut, die über das Kühlwasser des Motors den Tank mit dem weniger fließfähigen Stoff vorwärmen.

Bei der vorteilhaften Ausführungsform der Erfindung findet dieses Vorwärmen direkt an dem Ventilsteuerblock und daher teilweise auch mit dessen Abwärme statt. Da der Block bereits nach kurzer Betriebszeit aufgewärmt ist, verkürzt sich die Aufwärmzeit für den Kraftstoff weiter und es kann schneller auf den weniger fließfähigen Kraftstoff umgeschaltet werden.

Nach einer weiter bevorzugten Ausführungsform weist die Kraftstoffversorgungsanlage mindestens einen Temperatursensor auf.

Wenn eine Steuerung vorhanden ist, kann diese nach einer vorab festgelegten Zeit des Warmfahrens vom Diesel- in den Rapsölbetrieb umschalten. Allerdings muss dann diese Zeit so lange bemessen sein, dass das Rapsöl auch unter ungünstigsten Bedingungen (z.B. im Winter) aufgewärmt ist. Wird dagegen die Temperatur des Kraftstoffes gemessen, kann bei günstigen Bedingungen früher und bei ungünstigen Bedingungen später umgeschaltet werden, so dass möglichst wenig Dieselkraftstoff benötigt wird. Darüber hinaus wird die Temperatur des zweiten Kraftstoffs dann ideal ermittelt, wenn sie nicht direkt im Tank, sondern erst in den Zuführleitungen, möglichst kurz vor dem Ventilsteuerblock, geprüft wird. Sobald die Prüfung ergibt, dass die Kraftstoff- (und ebenso die Motor-) Temperatur die gewünschte Temperatur erreicht hat, kann umgeschaltet werden. Dadurch reduziert man (in Verbindung mit den anderen genannten Maßnahmen wie kurzen Wegen etc. die Betriebszeit mit dem ersten Kraftstoff. Dies trägt zur schnelleren Amortisation der Anlage bei. Ist dagegen keine automatische Steuerung vorhanden, kann dem Fahrer über

den Temperatursensor signalisiert werden, dass ein Umschalten möglich ist.

Noch weiter bevorzugt kann die Kraftstoffanlage automatisch in zwei Modi, nämlich einem Modus mit geschlossenem und einem Modus mit offenem Kreislauf mit Pflanzenöl betrieben werden.

Grundsätzlich werden Benzin- und Dieselmotoren herkömmlich in einem offenen Kreislauf betrieben, das heißt, Kraftstoff wird aus dem (drucklosen) Tank von einer Pumpe unter einem geringen Druck in einen Umlauf gefördert, aus dem der benötigte Kraftstoff entnommen wird. Der nicht benötigte Kraftstoff fließt wieder in den Tank zurück und führt dabei zusätzlich etwas Wärme aus dem Motor ab. Rapsölmotoren, die auf eine gute Erwärmung des Kraftstoffes angewiesen sind, werden dagegen herkömmlich in einem geschlossenen Kreislauf betrieben. Dabei zirkuliert das Pflanzenöl in einer Leitung im Motor, und nur das verbrauchte Öl wird von der Kraftstoffpumpe in diesen Kreislauf zugeführt. Dadurch erwärmt sich das Öl im Kreislauf sicher auf die benötigte Temperatur; das Pflanzenöl im Tank wird dagegen nur durch den Wärmetauscher erwärmt . Allerdings besteht bei dem geschlossenen Kreislauf die Gefahr, dass an undichten Stellen Luft in den Kreislauf gelangt, was zu Zündaussetzern und schließlich zum Liegenbleiben des Fahrzeugs führt. Durch Spülen des Kreislaufes muss in einem solchen Fall die Luft ersetzt werden.

Erfindungsgemäß wird der Motor beim Umschalten in den Pflanzenölbetrieb ebenfalls zunächst im geschlossenen Kreislauf betrieben. Aufgrund der vorstehend beschriebenen Effekte bezüglich Wärmeleitung, Kompaktheit und Integration wird jedoch erfindungsgemäß der Kraftstoff besser als im Stand der Technik erwärmt. Zudem wird die Tem-

peratur des Kraftstoffs im Umlauf gemessen. Daher kann automatisch auf den offenen Umlauf umgeschaltet werden, wenn die Pflanzenöltemperatur ausreichend hoch, d.h. um einen Sicherheitsfaktor höher als der Wert für die Fahrt mit Öl im geschlossenen Umlauf ist. Dadurch wird das Öl im Tank erwärmt, und der (ebenfalls Leistung benötigende) Wärmetauscher kann eventuell abgestellt werden. Fällt die Öltemperatur durch diese Maßnahmen zu stark, wird (automatisch) im geschlossenen Kreislauf weitergefahren. Durch die Fahrt im offenen Kreislauf wird zuverlässig Luft aus dem System entfernt, so dass die Zuverlässigkeit höher wird.

Nach einer weiter bevorzugten Ausführungsform weist die Kraftstoffversorgungsanlage starre Kraftstoffleitungen zwischen dem Ventilsteuerblock und der Brennkraftmaschine auf, die noch weiter bevorzugt eng am Zylinderblock anliegend angeordnet sind.

Während im Stand der Technik kurze, flexible Leitungen zwischen den einzelnen Ventilen und den Zylindern sowie lange, flexible Leitungen von den Tanks zu den Zylindern verwendet werden, wird nach dieser bevorzugten Ausführungsform der Erfindung mit festen Rohren gearbeitet, die idealerweise am Motorblock oder am Zylinderkopf anliegen. Die festen, beispielsweise aus Metall gefertigten Rohre können die Wärme des Motors gut aufnehmen. Zudem sind sie eng am Motor anliegend gegen Fahrtwind und andere kühlende Einflüsse geschützt. Dadurch wird der Kraftstoff in den Rohren schnell erwärmt. Dies wurde im Stand der Technik bisher aus zwei Gründen nicht verwirklicht: Zum einen werden herkömmlich flexible Kunststoffschlauche verwendet, um bei einer Nachrüstung von Hand mehrere ähnliche Motoren umrüsten zu können, wobei die Automatisierbarkeit keine Rolle spielt, dafür aber mit ähnlichen Bauteilen unterschiedliche Abstände zwischen

Teilen des Einspritzsystems realisiert werden können, und zum zweiten ist vor allem von Ottomotoren bekannt, dass der in zu heißen Zuleitungen befindliche Kraftstoff Gasblasen bildet, die die Versorgung des Motors behindern können. Diese Gefahr besteht jedoch bei den hier bevorzugt verwendeten Kraftstoffen Rapsöl und Diesel nicht, so dass eine effektive Aufheizung des Kraftstoffs möglich ist. Die festen Rohre sind bei automatisierter Montage, beispielsweise bei einem serienmäßigen Einbau, deutlich einfacher handhabbar und praktisch wartungsfrei, da die bei Schläuchen möglichen Leckstellen weitgehend vermieden werden .

Wie vorstehend beschrieben, arbeitet die erfindungsgemäße Kraftstoffversorgungsanlage idealerweise gemeinsam mit einer Steuervorrichtung.

Nach einer bevorzugten Ausführungsform übernimmt die Steuervorrichtung der Kraftstoffanlage den kompletten Betrieb zum Umschalten von einem Kraftstoff auf den anderen. Insbesondere veranlasst die Steuervorrichtung, dass die Kraftstoffleitungen beim Abstellen des Motors nach Betrieb mit dem weniger fließfähigen Kraftstoff mit dem fließfähigen Kraftstoff gespült werden, um sicherzustellen, dass der Motor beim darauffolgenden Kaltstart problemlos starten kann.

Nach einer weiter bevorzugten Ausführungsform kann das Spülen wie im Stand der Technik durch den Fahrer ausgelöst werden, der einen Wahlschalter in der Fahrerkabine betätigt .

Wenn der Fahrer beabsichtigt, demnächst eine längere Rast einzulegen, bei der der Motor abkühlt, kann er die Spülung rechtzeitig selbst auslösen. Dann können die Zuleitungen noch während der Fahrt gespült werden, so dass

keine Nachlaufzeit des Motors zu diesem Zweck nötig ist. Dazu kann dem Fahrer ein einbauspezifischer Wert, wie lange Diesel durchgespült werden muss, mitgeteilt werden. Stellt der Fahrer das Fahrzeug ohne vorheriges (oder nach nicht ausreichendem) Spülen ab, sorgt die Steuerung dafür, dass der Motor weiterläuft, bis das System gespült ist und problemlos wieder starten kann.

Umgekehrt kann es auch zweckmäßig sein, wenn der Fahrer veranlassen kann, dass das Spülen beim Abstellen des Motors unterdrückt wird, wenn nur eine kurze Pause zu erwarten ist, beispielsweise an einem geschlossenen Bahnübergang. Daher kann der Fahrer nach einer weiter bevorzugten Ausführungsform der Kraftstoffversorgungsanlage über einen Wahlschalter das Spülen (zunächst) umgehen.

Nach einer noch weiter bevorzugten Ausführungsform überwacht dabei die Steuerung die Kraftstofftemperatur und führt das Spülen trotz der Unterdrückung selbständig durch, falls die Temperatur unter einen bestimmten Wert fällt, d.h. die Gefahr besteht, dass sich die Fließfähigkeit verschlechtert, so dass der Motor nicht mehr gestartet werden kann.

Vorteilhafte Weiterbildungen finden sich in weiteren Unteransprüchen .

Die Erfindung wird nachfolgend anhand eines Ausführungsbeispiels unter Bezugnahme auf die Zeichnung näher erläutert .

Fig. 1 zeigt einen Hydraulikschaltplan für das Ausführungsbeispiel der Erfindung.

Fig. 2 zeigt ein Ablaufdiagramm einer bevorzugten Ausführungsforms der erfindungsgemäßen Steuerung.

Die Figuren 3 bis 9 zeigen Ablaufpläne von Unterprogrammen des Hauptprogramms nach Fig. 2.

Als Ausführungsbeispiel wird, wie vorstehend erwähnt, ein Fahrzeug mit Dieselmotor verwendet, das zum Betrieb mit Rapsöl als Alternativkraftstoff umgerüstet wurde.

Beim Start des Fahrzeugs sind beide Ventile zunächst stromlos. Dadurch fließt Diesel vom Tankanschluss VD des Ventilsteuerblocks über die Anschlüsse 1 und 3 des MV V und den Anschluss VEp des Ventilsteuerblocks in Richtung des Einspritzsystems bzw. der Einspritzpumpe. Wie im Stand der Technik wird der Einspritzpumpe über diesen Vorlauf eine größere Menge an Diesel angeboten, als sie benötigt. Der überschüssige Dieselkraftstoff fließt aus dem Rücklauf des Einspritzsystems sowie die Anschlüsse 2 und 1 des MV R im sogenannten „geschlossenen Kreislauf" über den Anschluss REp des Ventilsteuerblocks.

Wenn der Motor betriebswarm ist, wird das MV V umgeschaltet (bestromt). Dadurch wird die Zufuhr von Dieselkraftstoff gestoppt und die Zufuhr von Rapsöl im „geschlossenen Kreislauf" (über die Anschlüsse 3 und 2 des MV V zu VEp, von dort zurück über REp und die Anschlüsse 2 und 1 des MV R) gestartet. Da das Rapsöl zu diesem Zeitpunkt in vorgewärmten Leitungen auf bereits warmen Dieselkraftstoff trifft, den es nach und nach ersetzt, erwärmt sich auch die vergleichsweise kleine Menge an Rapsöl bei stromlosem MV R im Vor- und Rücklauf des Einspritzsystems schnell in ausreichendem Maße. Das nicht verbrauchte Rapsöl zirkuliert weiter und kann daher das nachgeförderte Rapsöl, das das verbrannte Öl ersetzt, ebenfalls erwärmen. Damit steht während der Fahrt stets ausreichend warmes Rapsöl zur Verfügung.

Erhöht sich die Temperatur des Rapsöls im Ventilsteuerblock während der Fahrt weiter, kann das MV R umgeschaltet (bestromt) werden. Dann fließt das von dem Einspritzsystem nicht verbrauchte Rapsöl im „offenen Kreislauf" über die Anschlüsse 2 und 3 des MV R zurück in den Rapsöltank. Dadurch wird das im Tank befindliche Rapsöl schneller aufgeheizt als bei der alleinigen Heizung durch den Wärmetauscher. Zudem können Luftansammlungen, die durch Undichtigkeiten im vorstehend erörterten geschlossenen Kreislauf dazu führen können, dass Luft in den Zulauf zum Einspritzsystem gelangt, im offenen Kreislauf in den Tank zurückgegeben werden. Geschieht dies nicht, könnte es bei zu großen Luftblasen aufgrund einer Undichtigkeit im geschlossenen Kreislauf geschehen, dass das Einspritzsystem Luft statt Kraftstoff ansaugt und das Fahrzeug deshalb liegenbleibt.

Wenn erkannt wird, dass die Kraftstoff anläge gespült werden muss (weil der Fahrer den Motor abstellt oder einen entsprechenden Schalter der Steuerung betätigt, um anzuzeigen, dass der Motor demnächst abgestellt wird) , wird das MV V stromlos geschaltet und Diesel fließt wie vorstehend beschrieben vom Anschluss 1 des MV V über den Anschluss 2 in den Umlauf zur Einspritzpumpe (Anschlüsse VEp und REp) , um diesen zu spülen. Über die Anschlüsse 2 und 3 des noch bestromten MV R wird zudem der Rücklauf zum Rapstank (RT) mit Diesel gespült .

Das vorstehend erläuterte Grundprinzip kann je nach Auslegung des Motors modifiziert werden. Beispielsweise ist es möglich, das Rapsöl durch eine (nicht gezeigte) elektrische Hilfspumpe zirkulieren zu lassen, bevor das Fahrzeug startet, beispielsweise um es mittels einer (ebenfalls nicht gezeigten) Heizwendel aufzuwärmen. In diesem Fall wird das Rapsöl vom Anschluss VPöl durch den Ventilsteuerblock über das gezeigte Rückschlagventil zum

Anschluss RT gepumpt, ohne in den Umlauf des Einspritz - Systems zu gelangen, während der Umlauf mit Diesel ge¬ spült wird (beide MV stromlos) .

Falls eine solche Maßnahme bei einem gegebenen Motor nicht notwendig erscheint (weil z.Bsp. der zweite Kraft- stoff im Steuerblock ausreichend erwärmt wird) , kann die Leitung über das Rückschlagventil deaktiviert bleiben bzw. einfach weggelassen werden.

Im folgenden werden mögliche Steuerungsprogramme für den vorstehend erläuterten Ventilsteuerblock anhand der Figuren 2 bis 7 erörtert.

Figur 2 zeigt den allgemeinen Ablauf der Motorüberwa- chung. Sobald der Fahrschalter eingeschaltet ist (S200) , wird zunächst (S300) geprüft, ob alle Bauteile der Kraft- stoffVersorgung normal arbeiten. Falls nicht, wird dem Fahrer im Schritt S400 eine Fehlfunktion gemeldet, bei- spielsweise über ein Display, eine Warnlampe und/oder ein akustisches Signal und das Programm geht wieder an den Anfang zurück .

Falls zunächst keine Fehlfunktion festgestellt wird, wird in Schritt S500 ein (nicht gezeigtes) Programm zur Drehzahlüberwachung gestartet. Dieses Programm prüft wäh- rend einer vorab festgelegten Zeit, ob die Motordrehzahl über einen festgelegten Wert steigt, d.h. ob der Motor innerhalb dieser Zeit gestartet wird. Falls nicht, geht die Steuerung zum Schritt S400, um einen Fehler zu mel¬ den, und anschließend wieder wie vorstehend beschrieben zurück .

Anschließend wird der Motor im Schritt S600 auf her- kömmliche Weise gestartet. Wie aus der nachfolgenden Be¬ schreibung der Steuerung, insbesondere der Fig. 9, noch

klar wird, startet der Motor stets mit Dieselkraftstoff, d.h. beide Magnetventile sind ausgeschaltet.

Nach dem erfolgreichen Starten des Motors geht die Steuerung im Schritt S700 zum in Figur 3 gezeigten Unterprogramm zum Umschalten zwischen Kurzstrecken- und Automatikbetrieb. Dabei prüft das Programm, ob der Fahrer eine Taste „P/D" („Pflanzenöl/Diesel") der Steuerung gedrückt hat, um die Steuerung vom automatischen Umschalten auf Pflanzenöl abzuhalten, weil beispielsweise nur eine kurze Strecke zu fahren ist. Ist die Taste nicht gedrückt, geht das Programm zurück und fährt in der derzeitigen Betriebsart fort. Ist die Taste gedrückt, wird die Betriebsart in den Schritten S720 bis S740 in die jeweils andere Betriebsart umgeschaltet.

Ist im Schritt S710 beispielsweise die P/D-Taste gedrückt und wird im S720 festgestellt, dass die Steuerung im Automatikbetrieb ist, schaltet die Steuerung in den Kurzstreckenbetrieb. Dieses Umschalten wird anhand der Fig. 4 näher erläutert.

Im Schritt S731 der Fig. 4 werden beide Magnetventile MV_V, MV_R des Ventilsteuerblocks stromlos geschaltet. Wie vorstehend erläutert, wird der Motor daher ausschließlich mit Dieselkraftstoff versorgt. Im Schritt S732 wird geprüft, ob ein Umschalten auf Pflanzenölbetrieb möglich ist. Dazu wird (hier nicht gezeigt) der beim Automatikbetrieb erläuterte Programmschritt S742 durchgeführt. Wenn dieser Schritt ergibt, dass ein Betrieb mit Pflanzenöl möglich ist, wird im Schritt S732 jedoch nicht unmittelbar in den Pflanzenölbetrieb umgeschaltet, sondern lediglich der Fahrer beispielsweise optisch oder akustisch daran erinnert, dass ein solcher Betrieb möglich ist. Der Fahrer kann dann durch Drücken der „P/D"-Taste in den Automatikbetrieb umschalten, wie mit

Bezug auf Fig. 3 beschrieben. Im Schritt S733 geht die Steuerung zurück zum „Umschalt "-Programm.

Wird bei gedrückter P/D-Taste im Schritt S720 festgestellt, dass die Steuerung im Kurzstreckenbetrieb ist, schaltet die Steuerung in den Automatikbetrieb. Dieses Umschalten wird anhand der Fig. 5 näher erläutert.

In Fig. 5 wird im Schritt S7410 zunächst geprüft, ob die Bedingungen für Nebenantrieb oder Nurdieselbetrieb vorliegen. Diese Bedingungen liegen vor, wenn entweder ein ungünstiges Drehzahl -/Drehmomentverhältnis vorliegt („Nebenantrieb") oder beide Tanks mit Diesel gefüllt sind („Nurdieselantrieb") .

Es ist bei einem Dieselmotor zu bevorzugen, den Motor auch dann nicht im gesamten Leistungsbereich mit Pflanzenöl zu betreiben, wenn er warmgefahren ist, da sich die Verbrennungstemperaturen und damit die Verbrennungseigenschaften des Pflanzenöls ändern. Daher ist die Steuerung so angepasst, dass der Motor nur in einem für die Verbrennung von Pflanzenöl optimalen Bereich mit dem Öl betrieben wird, während er ansonsten mit Diesel betrieben wird. Beispielsweise liegt bei einem Motor zur Verbrennung von Diesel und Pflanzenöl dieser optimale Bereich der sauberen Verbrennung, besten Kompression und optimalen Haltbarkeit bei 40 bis 85 Prozent der Nennlast. Wird der Motor dagegen (im Stau oder ausschließlich zum Betrieb von Nebenaggregaten) mit minimaler Last oder (z.B. an Steigungen) mit hoher Last betrieben, ist es von Vorteil, in diesen Betriebzuständen ausschließlich mit Diesel zu fahren.

Daher prüft die Steuerung im Unterprogramm „Nebenantrieb" zunächst (Schritt *S1I1)* , ob die Drehzahl oder das Drehmoment in dem vorstehend genannten für den Pflan-

zenöleinsatz ungünstigen Bereich liegen. Dies kann durch direkten Abgriff der Daten aus dem Motormanagement erfolgen. Falls nicht, geht die Steuerung zum Schritt S7410 (Fig. 5) zurück. Liegen Drehzahl und/oder Drehmoment im genannten ungünstigen Bereich, werden im Schritt S772 beide Magnetventile ausgeschaltet. Dadurch wird der Motor mit Dieselkraftstoff versorgt. Ferner wird im Schritt S773 geprüft, ob ausreichend Pflanzenöl im Tank ist. Falls ja, wälzt die Pflanzenölpumpe das Öl um (Schritt S774), damit es warm bleibt bzw. wird, bis die ungünstigen Verbrennungsbedingungen nicht mehr vorliegen. Wenn nicht (Schritt S775), wird die Pflanzenölpumpe abgeschaltet. Anschließend kehrt das Programm zum Schritt S7410 zurück.

Ferner kann es sein, dass bei geringem Angebot an Pflanzenöl, beispielsweise bei Fahrten ins Ausland mit geringerer Dichte an Pflanzenöltankstellen oder schlicht anderen (steuerlichen) Gegebenheiten im Ausland nur mit Diesel gefahren werden soll. Für diesen Fall kann auch der (vergleichsweise große) für Pflanzenöl ausgelegte Tank mit Dieselkraftstoff befüllt werden. Diese Dieselbefüllung wird der Steuerung mitgeteilt, beispielsweise über einen Schalter am Pflanzenöltank.

Falls die beiden Tanks mit Diesel gefüllt sind, geht die Steuerung über die Schritte S7410, S7420 zum nachstehend mit Bezug auf Fig. 8 beschriebenen Nurdieselbetrieb (Schritt S780). Dieser unterscheidet sich vom „Nebenantrieb" dadurch, dass der Dieselkraftstoff aus dem für Pflanzenöl vorgesehenen Tank zugeführt wird. Daher kann auf die Vorwärmung für den Pflanzenöltank verzichtet werden. Zunächst wrd geprüft, ob der Motor abgeschaltet ist.

Ist jedoch sowohl Pflanzenöl im Tank als auch eine für den Pflanzenölbetrieb geeignete Motorlast (Dreh-

zahl/Drehmoment) vorhanden, geht die Steuerung zum Schritt S741 weiter, in dem zunächst beide Ventile MV V, MV R des Ventilsteuerblocks stromlos geschaltet sind, so dass der Motor mit Diesel läuft. Im Schritt S742 wird dann geprüft, ob die Kühlwasser temperatur KW eine Umschalttemperatur Ums, beispielsweise 60^0C (zuzüglich eines eventuellen Sicherheitszuschlags Ws, beispielsweise 5^0C) überschritten hat, mit anderen Worten, ob der Motor bereits warmgefahren ist. So lange die Kühlwassertemperatur zu niedrig ist, wird diese Abfrage wiederholt, d.h. das Programm geht zum Schritt S7410 zurück. Steigt die Kühlwassertemperatur über den genannten Wert, so wird im Schritt S743 das MV V eingeschaltet, d.h. Pflanzenöl wird in den Kreislauf der Einspritzpumpe zugeführt und verdrängt allmählich den zugeführten Dieselkraftstoff, wobei es weiter erwärmt wird. Im Schritt S744 prüft die Steuerung, ob eine vorab festgelegte Zeit VentzeitRü verstrichen ist, nach der nur Pflanzenöl im Einspritzsystem sein sollte. Wenn diese Zeit noch nicht verstrichen ist (JA im Schritt S744) geht das Programm zum Schritt S742 zurück, um zu prüfen, ob die Temperatur des Pflanzenöls ausreichend hoch bleibt. Bleibt die Temperatur hoch genug, bis VentzeitRü abgelaufen ist, („NEIN" im Schritt S744) geht das Programm zum Schritt S7450 und somit zum Unterprogramm „Reiner Pflanzenölbetrieb" weiter, das in Fig. 6 erläutert ist.

Im Schritt S7451 in Fig. 6 wird das MV R eingeschaltet, so dass nun Rapsöl im Zulauf der Einspritzpumpe zirkuliert. Im Schritt S7452 wird geprüft, ob die Temperatur an der Einspritzpumpe größer als eine Temperatur TRückauto zum automatischen Rückschalten in den Dieselbetrieb ist. Dies kann beispielsweise der Fall sein, wenn bei niedriger Last und hoher Wärmeabfuhr die Temperatur der Einspritzpumpe sinkt. Bei einem positiven Ergebnis dieser Abfrage wird in den in Fig. 7 beschriebenen Nebenantrieb

(Schritt S770) geschaltet, d.h. der Motor wird wie bei geringer Auslastung ausschließlich mit Diesel betrieben. Bleibt die Temperatur der Einspritzpumpe hoch genug, wird im Schritt S7453 geprüft, ob die P/D-Umschalttaste gedrückt ist, d.h., ob auf Wunsch des Fahrers in den Dieselbetrieb umgeschaltet werden soll . Der Fahrer kann dies beispielsweise wünschen, um ein späteres Spülen zu vermeiden. Ist die Taste gedrückt, geht das Programm zum Schritt S730 (Fig. 4); ansonsten geht es im S7454 zum Automatikbetrieb nach Fig. 5 zurück.

In Fig. 5 prüft das Programm dann im Schritt S746, ob der Motor auf Wunsch des Fahrers auszuschalten ist. Wenn nicht, geht das Programm zum Schritt S7450 zurück und wiederholt den Ablauf für den reinen Pflanzenölbetrieb.

Soll der Motor ausgeschaltet werden, geht das Programm im Schritt S7460 der Fig. 5 zum in Fig. 9 gezeigten Unterprogramm. In diesem Programm wird zunächst im Schritt S7461 geprüft, ob der Motor bereits ausreichend lange (ca. 1 min) im Dieselbetrieb arbeitet. Wenn ja, wird der Motor abgestellt (Schritt S7466) und das Programm beendet .

Wenn der Motor noch nicht lange genug mit Diesel betrieben wird, werden zunächst (Schritte S7462, S7463) die Pflanzenöl -Umlaufpumpe und die Magnetventile abgeschaltet, so dass dem Einspritzsystem nur noch Dieselkraftstoff zugeführt wird. Anschließend wird das Einspritzsystem für ca. eine Minute mit Dieselkraftstoff gespült (Schritt S7464) , so dass kein Pflanzenöl im Einspritzsystem mehr vorhanden ist, und anschließend der Motor abgestellt (Schritt S7464) . Danach (Schritt S7467) wird geprüft, ob die „Kurzstop" -Taste gedrückt wurde, d.h. der Fahrer beabsichtigt, in Kürze mit warmem Motor weiterzufahren. Falls ja, startet der Motor im Automatikbetrieb

neu, d.h. , wenn die Voraussetzungen (Wärme, Belastung etc.) erfüllt sind, wird wieder in den reinen Pflanzenölbetrieb geschaltet. Wenn dagegen die „Kurzstop"-Taste nicht gedrückt wurde, wird das Programm beendet, d.h. der Motor startet beim nächsten Anfahren in dem herkömmlichen Steuermodus .

Weiterhin kann die Steuerung so ausgelegt sein, dass sie die Kraftstoffversorgung auf den vom Hersteller vorgesehenen Kraftstoff, beispielsweise Diesel, umschaltet, wenn die Motorlast für eine vorab bestimmte Zeit unterhalb einer vorab bestimmten Last bleibt (und/oder umgekehrt auch so, dass umgeschaltet wird, wenn die Motorlast für eine vorab bestimmte Zeit eine maximale Last überschreitet) . Statt der Motorlast, die man aus Daten eines Motormanagements erhalten kann, ist es bei einer einfacheren Ausführungsform auch möglich, ausgehend von der Motordrehzahl umzuschalten. Ein Diesel fährt am besten mit einer konstanten Last von 40-85 %, dabei hält er mit Abstand am längsten, weist die besten Verbrennungswerte, eine saubere Kompression usw. auf. Bei einer geringen Motordrehzahl, wenn beispielsweise nur Nebenaggregate des Fahrzeugs wie Klimaanlagen, Silopumpen, Betonmischer, hydraulische Anlagen usw. betrieben werden, können sich verstärkt Ablagerungen durch unvollständige Verbrennung bilden. Dies kann vermieden oder zumindest stark reduziert werden, wenn unter solchen Umständen auf den vom Hersteller vorgesehenen Kraftstoff umgeschaltet wird. Fig. 7 zeigt ein Beispiel eines Unterprogramms zu diesem Zweck. Zunächst wird von der Steuerung entweder über zusätzliche Sensoren oder über direkten Zugriff auf Motormanagementdaten festgestellt, ob die Motorlast in einem ungünstigen Bereich liegt, d.h. Drehzahl und/oder Drehmoment außerhalb des o.g. Bereichs liegen (Schritt S771) . Falls ja, werden beide Magnetventile abgeschaltet (Schritt S772) . Anschließend wird geprüft, ob mindestens

eine bestimmte Menge, beispielsweise rund 10 Prozent einer Tankfüllung an Pflanzenöl im Tank ist (Schritt S773). Falls ja, wird das Öl umgewälzt, um es mit der Abwärme des Motors aufzuwärmen (Schritt *S1lA)*. Ist die Ölmenge jedoch gering, wird die Pumpe abgeschaltet, um nicht eventuelle Verunreinigungen am Boden des Tanks aufzuwirbeln und zu fördern (Schritt S775). Anschließend kehrt das Programm zum Hauptprogramm zurück.

Natürlich ist der vorstehend beschriebene Aufbau nicht auf das Umschalten von Raps- oder anderem Pflanzenöl auf Diesel beschränkt, sondern kann bei entsprechender Anpassung für alle denkbaren Kraftstoffpaarungen eines Zweistoffmotors verwendet werden. Beispiele für weitere Kraftstoffpaarungen sind Benzin / Ethanol, Benzin / Flüssiggas, Benzin / Flüssigwasserstoff oder Flüssigwasserstoff / Flüssiggas. Obwohl bei diesen Paarungen die Probleme unterschiedlich von den hier beschriebenen sind (so muss beispielsweise wahrscheinlich nicht bei jeder dieser Paarungen gespült werden), kann das gezeigte Konzept eines Ventilsteuerblocks, in den alle zum Umschalten nötigen Ventile integriert sind und der von einer Steuereinheit angesteuert wird, vorteilhaft für verschiedene Kraftstoffpaarungen verwendet werden.

Ansprüche

1. Kraftstoffversorgungsanlage zur Versorgung einer Brennkraftmaschine über verschiedene Kraftstoffleitungen mit wahlweise einem Kraftstoff A oder einem Kraftstoff B, mit einer steuerbaren Ventilanordnung zur Umschaltung zwischen den Kraftstoffen,
gekennzeichnet durch
einen Ventilsteuerblock, in den die Ventilanordnung integriert ist.

2. Kraftstoffversorgungsanlage nach Anspruch 1, dadurch gekennzeichnet, dass der Ventilsteuerblock aus einem wärmeleitenden Material hergestellt ist.

3. Kraftstoffversorgungsanlage nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass der Ventilsteuerblock benachbart zu einem Wärmetauscher zum Aufheizen eines der Kraftstoffe angeordnet ist.

4. Kraftstoffversorgungsanlage nach einem der vorhergehenden Ansprüche, gekennzeichnet durch eine Steuereinrichtung, welche die Kraftstoffversorgung durch Ansteuern des Ventilsteuerblocks steuert.

5. Kraftstoffversorgungsanlage nach Anspruch 4, dadurch gekennzeichnet, dass die Steuervorrichtung zumindest eine Ein-/Ausgabeeinheit aufweist, die in der Fahrgastzelle angeordnet ist.

6. Kraftstoff Versorgungsanlage nach Anspruch 4 oder 5, dadurch gekennzeichnet, dass die Steuervorrichtung veranlasst, dass mindestens eine der Kraftstoffzuleitungen vor einem endgültigen Abstellen der Brennkraftmaschine mit dem anderen Kraftstoff gespült werden.

7. Kraftstoff Versorgungsanlage nach Anspruch 6, dadurch gekennzeichnet, dass eine Spülung auch durch Drücken eines Wahlschalters in der Fahrerkabine auslösbar ist.

8. Kraftstoff Versorgungsanlage nach Anspruch 6 oder 7, dadurch gekennzeichnet, dass das Spülen durch Drücken eines Wahlschalters in der Fahrerkabine unterdrückbar ist.

9. Kraft StoffVersorgungsanlage nach Anspruch 8, dadurch gekennzeichnet, dass die Unterdrückung des Spülen automatisch aufgehoben und das Spülen durchgeführt wird, wenn ein Sensor meldet, dass die Temperatur eines der Kraftstoffe unter einen vorab festgelegten Wert gefallen ist.

10. Brennkraftmaschine mit einer Kraftstoffversorgungsanlage nach einem der vorhergehenden Ansprüche, gekennzeichnet durch mindestens einen Temperatursensor zum Feststellen der Temperatur mindestens eines Mediums, das eine Aussage über den Betriebszustand der Brennkraftmaschine zulässt.

11. Brennkraftmaschine mit einer Kraftstoffversorgungsanlage nach einem der vorhergehenden Ansprüche, gekennzeichnet durch starre Kraftstoffleitungen zwischen dem Ventilsteuerblock und der Brennkraftmaschine.

12. Brennkraftmaschine mit einer Kraftstoffversorgungsanlage nach Anspruch 11, dadurch gekennzeichnet, dass die Kraftstoffleitungen zumindest für einen der Kraftstoffe eng an einem Motorblock und/oder Zylinderkopf der Brennkraftmaschine entlang geführt werden

13. Steuervorrichtung für eine Kraftstoffversorgungsanlage nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, dass die Steuervorrichtung die Kraftstoffversorgungsanlage abhängig von der Last des Motors steuert.

14. Steuervorrichtung nach Anspruch 13, dadurch gekennzeichnet, dass die Steuervorrichtung die Last des Motors abschätzt und veranlasst, dass die Kraftstoff Versorgung umschaltet, wenn die Last des Motors für eine vorab bestimmte Zeit unterhalb einer vorab bestimmten Last liegt.

15. Steuervorrichtung nach Anspruch 13, dadurch gekennzeichnet, dass sie die Last des Motors aufgrund von Motormanagementdaten ermittelt und die Kraftstoffversorgungsanläge aufgrund der ermittelten Werte umschaltet.

16. Steuervorrichtung nach einem der Ansprüche 13 bis 15, dadurch gekennzeichnet, dass sie die Kraftstoffversorgungsanlage umschaltet, wenn nur Nebenaggregate laufen.

17. Steuervorrichtung nach einem der Ansprüche 13 bis 16, dadurch gekennzeichnet, dass sie durch Öffnen eines in der Ventilanordnung angeordneten Rücklaufventils (MV R) veranlasst, dass im Betrieb mit Kraftstoff B von der Einspritzpumpe nicht verbrauchter Kraftstoff in den entsprechenden Tank zurückgeführt wird.

18. Steuervorrichtung nach einem der Ansprüche 13 bis 17, dadurch gekennzeichnet, dass sie einem Bediener eine Möglichkeit bietet, manuell auf Kraftstoff A umzuschalten bzw. die Umschaltung auf Kraftstoff B manuell zu verhindern.

19. Steuervorrichtung nach Anspruch 18, gekennzeichnet durch eine Vorrichtung, um den Bediener daran zu erinnern, dass mit Kraftstoff B gefahren werden könnte, wenn die dafür erforderlichen Bedingungen vorliegen, der Bediener die Umschaltung auf Kraftstoff B jedoch manuell verhindert hat.

20. Steuervorrichtung nach einem der Ansprüche 13 bis 19, dadurch gekennzeichnet, dass sie zunächst ein in der Ventilanordnung angeordnetes Vorlaufventil (MV V) einschaltet, sobald ein Merkmal des Kraftstoffs B einen ersten vorab

festgelegten Wert aufweist oder überschreitet, und später das in der Ventilanordnung angeordnete Rücklaufventil (MV R) des Ventilsteuerblocks einschaltet, sobald das Merkmal des Kraftstoffs B einen zweiten vorab festgelegten Wert aufweist oder überschreitet .

21. Steuervorrichtung nach Anspruch 20, dadurch gekennzeichnet, dass sie das Umschalten des Rücklaufventils rückgängig macht, sobald das Merkmal des Kraftstoffs B den ersten vorab festgelegten Wert wieder unterschreitet.

GEÄNDERTE ANSPRÜCHE
beim Internationalen Büro eingegangen am 10 April 2007 (10.04.2007)

1. Kraftstoffversorgungsanlage zur Versorgung einer Brennkraftmaschine über verschiedene Kraftstoffl θitungen mit wahlweise einem Kraftstoff aus einem ersten Tank oder einem Kraftstoff aus einem zweiten Tank,

mit einer steuerbaren Ventilanordnung zur Umschaltung zwischen den Kraftstoffen aus dem ersten Tank und aus dem zweiten Tank,

einem Ventilsteuerblock, in den die Ventilanordnung integriert ist, und in den Kraftstoffzuleitungen von den Tanks münden und der die Kraftstoffe über weitere Leitungen an die Einspritzanlage verteilt, und

einer Steuervorrichtung zur Steuerung der Kraftstoffversorgungsanlage durch Steuern der Ventilanordnung abhängig von der Belastung des Motors, dadurch gekennzeichnet, dass

die Steuervorrichtung so aufgebaut ist, dass sie zunächst ein in der Ventilanopdnung angeordnetes Vorlaufventil (MV V) einschaltet, sobald ein Merkmal des Kraftstoffs aus dem zweiten Tank einen ersten vorab festgelegten Wert aufweist oder überschreitet, und später das in der Ventilanordnung angeordnete Rücklaufventil (MV R) des Vβntilsteuerblocks einschaltet, sobald das Merkmal des Kraftstoffs aus dem zweiten Tank einen zweiten vorab festgelegten Wert aufweist oder überschreitet.

2. Kraftstoffversorgungsanlage nach Anspruch 1, dadurch gekennzeichnet, dass sie das in der Ventilanordnung angeordnete Vorlaufventil (MV V) wieder ausschaltet, sobald ein Merkmal des Kraftstoffs aus dem zweiten Tank den ersten vorab festgelegten Wert wieder unterschreitet.

3. Kraftstoffversorgungsanlage nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass die Steuervorrichtung so aufgebaut ist, dass sie das Umschalten des Rücklaufventils (MV R) rückgängig macht, sobald das Merkmal des Kraftstoffs aus dem zweiten Tank den zweiten vorab festgelegten Wert wieder unterschreitet

4. Kraftstoffversorgungsanlage nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass der Ventilsteuerblock benachbart zu einem Wärmetauscher zum Aufheizen eines der Kraftstoffe angeordnet ist.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 104

5. Kraftstoffversorgungsanlage nach einem der vorhergehenden Ansprüche, gekennzeichnet durch eine Steuereinrichtung, welche die Kraftstoffversorgung und den Ventilsteuerblock automatisch steuert.

6. Kraftstoffversorgungsanlage nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Steuervorrichtung zumindest eine Ein-/Ausgabeeinheit mit einem Display aufweist, die in der Fahrgastzelle angeordnet ist.

7. Kraftstoffversorgungsanlage nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Steuervorrichtung veranlasse dass mindestens das Motor-Einspritzsystem vor einem endgültigen Abstellen der Brennkraftmaschine mit dem anderen Kraftstoff gespült wird.

8. Kraftstoffversorgungsanlage nach Anspruch 7, dadurch gekennzeichnet, dass eine Spülung auch durch Drücken eines Wahlschalters in der Fahrerkabine auslösbar ist.

9. Kraftstoffversorgungsanlage nach Anspruch 7 oder 8, dadurch gekennzeichnet, dass das Spülen durch Drücken eines Wahlschalters in der Fahrerkabine unterdrückbar ist.

10. Kraftstoffversorgungsanlage nach Anspruch 9, dadurch gekennzeichnet, dass die Unterdrückung des Spülen automatisch aufgehoben und das Spülen durchgeführt wird, wenn ein Sensor meldet, dass die Temperatur eines der Kraftstoffe unter einen vorab festgelegten Wert gefallen ist.

11. Brennkraftmaschine mit einer Kraftstoffversorgungsa πlage nach einem der vorhergehenden Ansprüche, gekennzeichnet durch mindestens einen Temperatursensor zum Feststellen der Temperatur mindestens eines Mediums, das eine Aussage über den Betriebszustand der Brennkraftmaschine zulässt

12. Steuervorrichtung zur Steuerung der Kraftstoffversorgungsanlage nach einem der Ansprüche 1 bis 10, dadurch gekennzeichnet, dass die Steuervorrichtung die Last des Motors abschätzt und veranlasst, dass die Kraftstoffversorgung umschaltet, wenn die Last des Motors für eine vorab bestimmte Zeit unterhalb einer vorab bestimmten Last liegt.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 105

13. Steuervorrichtung nach Anspruch 12, dadurch gekennzeichnet, dass sie die Last des Motors aufgrund von Motorrnanagementdaten ermittelt und die Kraftstoffversorgungsanlage aufgrund der ermittelten Werte umschaltet.

14. Steuervorrichtung nach einem der Ansprüche 12 oder 13, dadurch gekennzeichnet, dass sie die Kraftstoffversorgungsa πlage umschalten kann, wenn nur Nebenaggregate laufen.

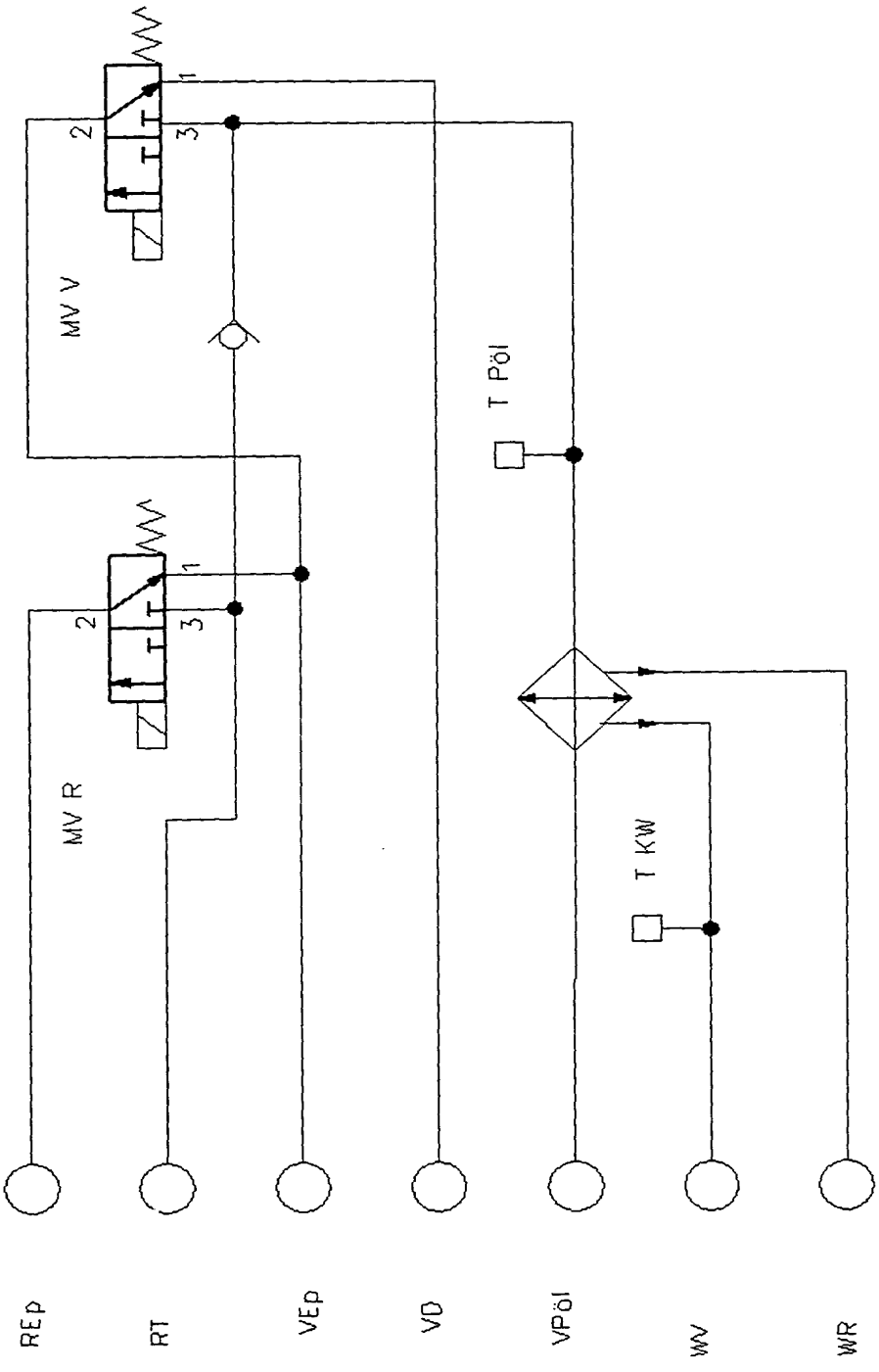
15. Steuervorrichtung nach einem der Ansprüche 12 bis 14, dadurch gekennzeichnet, dass sie durch Öffnen eines in der Ventilanordnung angeordneten Rücklaufventils (MV R) veranlasst, dass im Betrieb mit Kraftstoff aus dem zweiten Tank von der Einspritzpumpe nicht verbrauchter Kraftstoff in den entsprechenden Tank zurückgeführt wird.

16. Steuervorrichtung nach einem der Ansprüche 12 bis 15, dadurch gekennzeichnet, dass sie einem Bediener eine Möglichkeit bietet, manuell auf Kraftstoff aus dem ersten Tank umzuschalten bzw. die Umschaltung auf Kraftstoff aus dem zweiten Tank manuell zu verhindern.

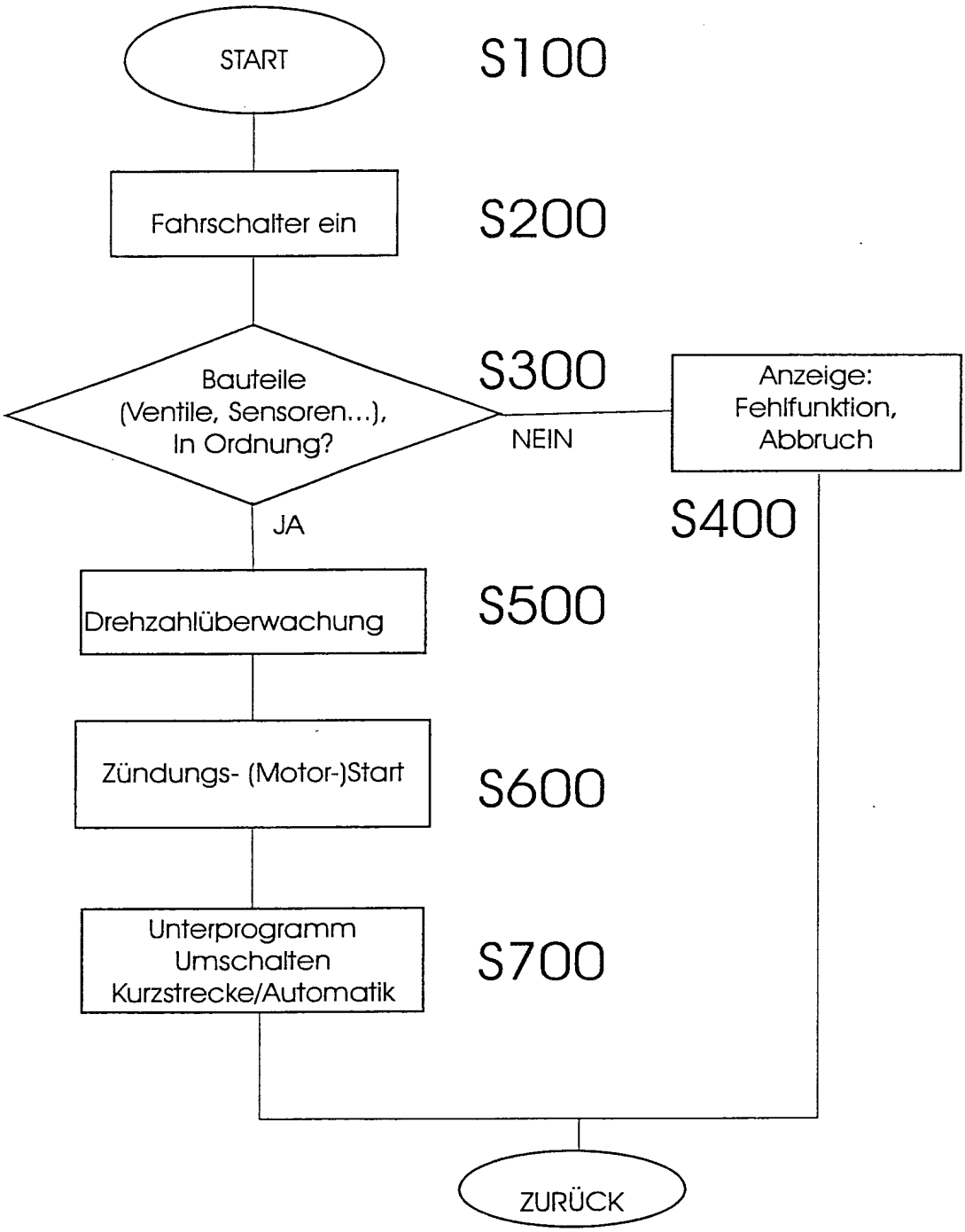
17. Steuervorrichtung nach Anspruch 16, gekennzeichnet durch eine Vorrichtung, um den Bediener daran zu erinnern, dass mit Kraftstoff aus dem zweiten Tank gefahren werden könnte, wenn die dafür erforderlichen Bedingungen vorliegen, der Bediener die Umschaltung auf Kraftstoff aus dem zweiten Tank jedoch manuell verhindert hat.

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Exhibit 1002-Part 1, Page 106

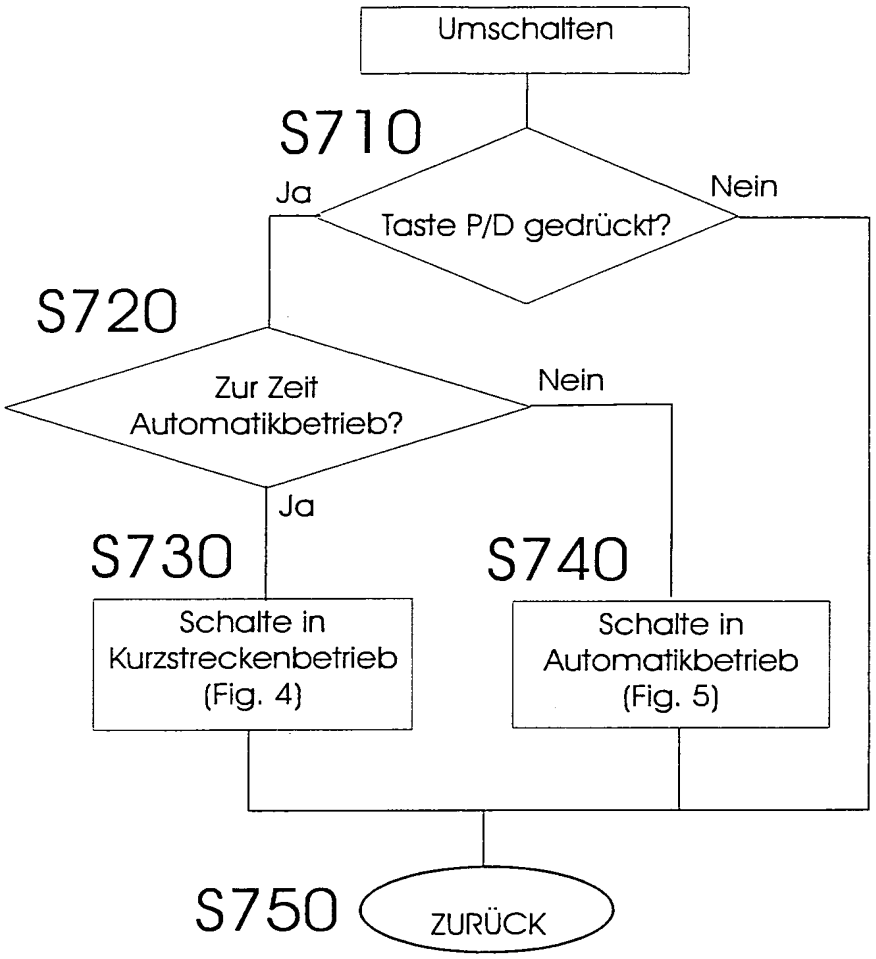
Figur 1



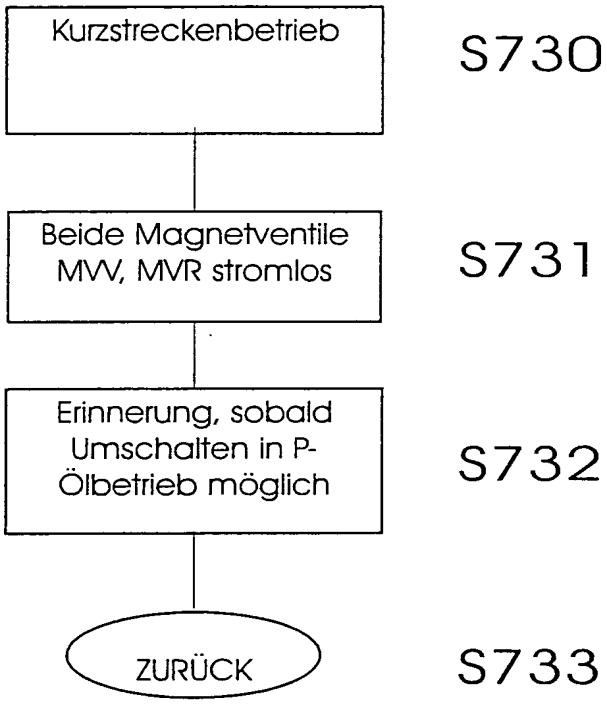
FIGUR 2


START
S100
Fahrschalter ein
S200
Bauteile (Ventile, Sensoren...), In Ordnung?
S300
NEIN
Anzeige: Fehlfunktion, Abbruch
S400
JA
Drehzahlüberwachung
S500
Zündungs- (Motor-)Start
S600
Unterprogramm Umschalten Kurzstrecke/Automatik
S700
ZURÜCK

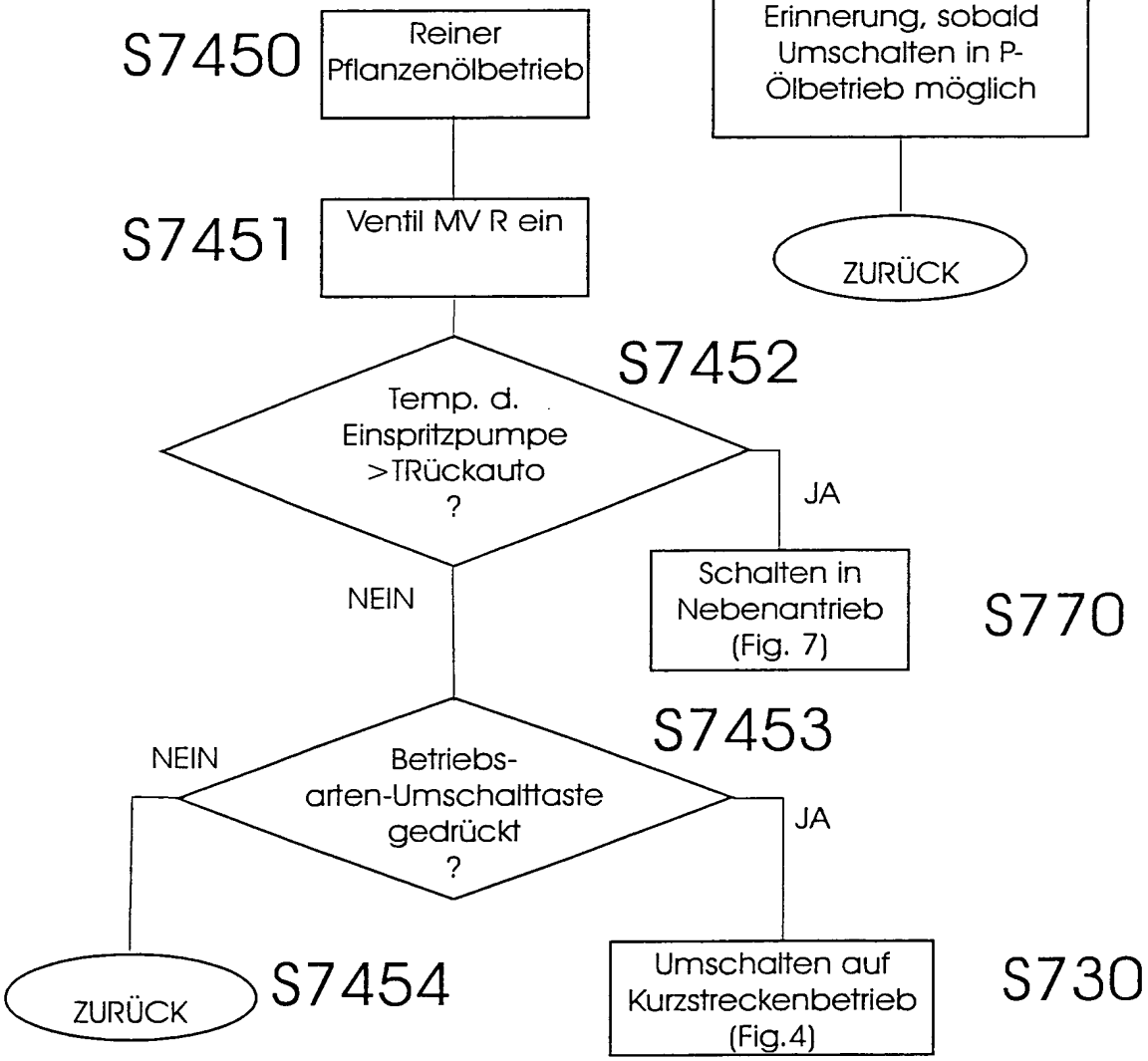
FIGUR 3


Umschalten
S710
Ja
Taste P/D gedrückt?
Nein
S720
Zur Zeit Automatikbetrieb?
Nein
Ja
S730
Schalte in Kurzstreckenbetrieb (Fig. 4)
S740
Schalte in Automatikbetrieb (Fig. 5)
S750
ZURÜCK

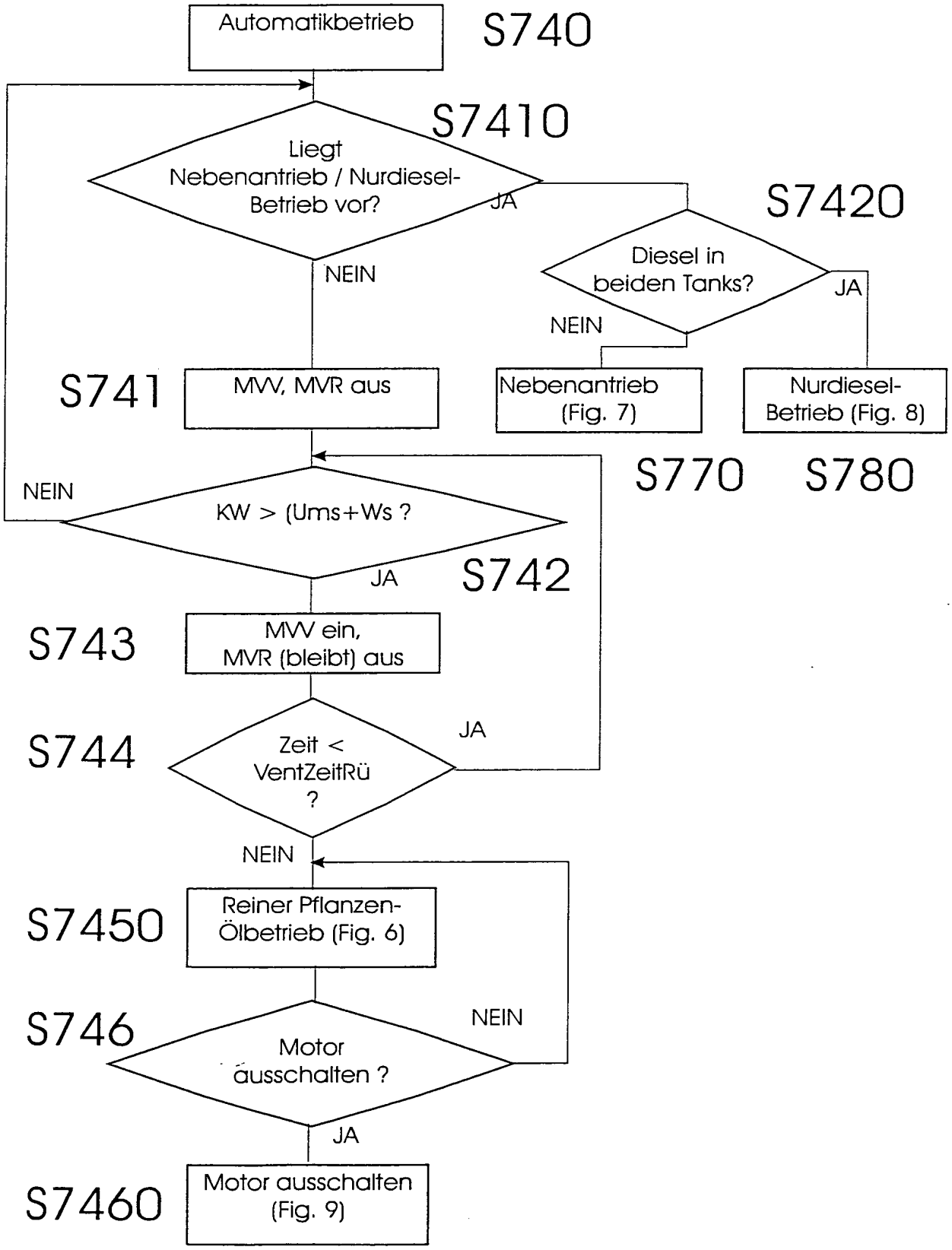
Figur 4



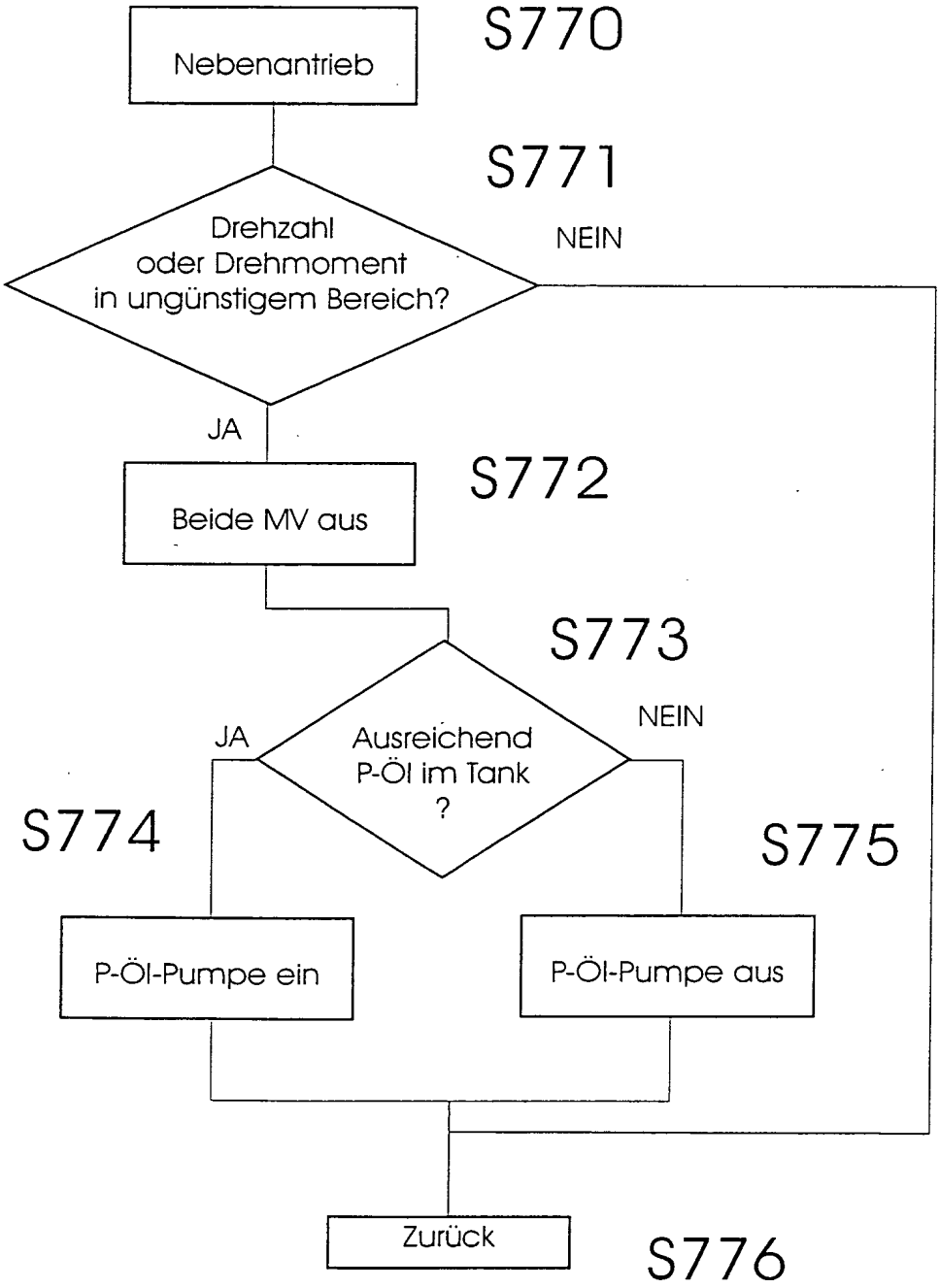
Figur 6



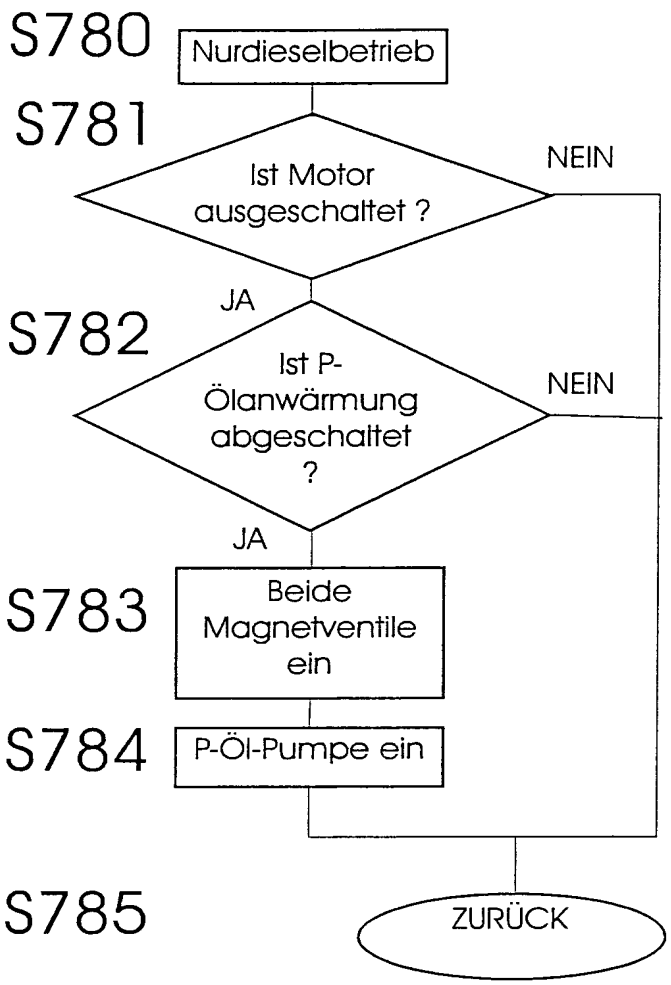
Figur 5


Automatikbetrieb
S740
S7410
Liegt Nebenantrieb / Nurdiesel-Betrieb vor?
JA
NEIN
S7420
Diesel in beiden Tanks?
JA
NEIN
S741
MVV, MVR aus
Nebenantrieb (Fig. 7)
Nurdiesel-Betrieb (Fig. 8)
S770
S780
NEIN
KW > (Ums+Ws ?
JA
S742
S743
MVV ein, MVR (bleibt) aus
S744
Zeit < VentZeitRü ?
JA
NEIN
S7450
Reiner Pflanzen-Ölbetrieb (Fig. 6)
S746
Motor ausschalten ?
NEIN
JA
S7460
Motor ausschalten (Fig. 9)

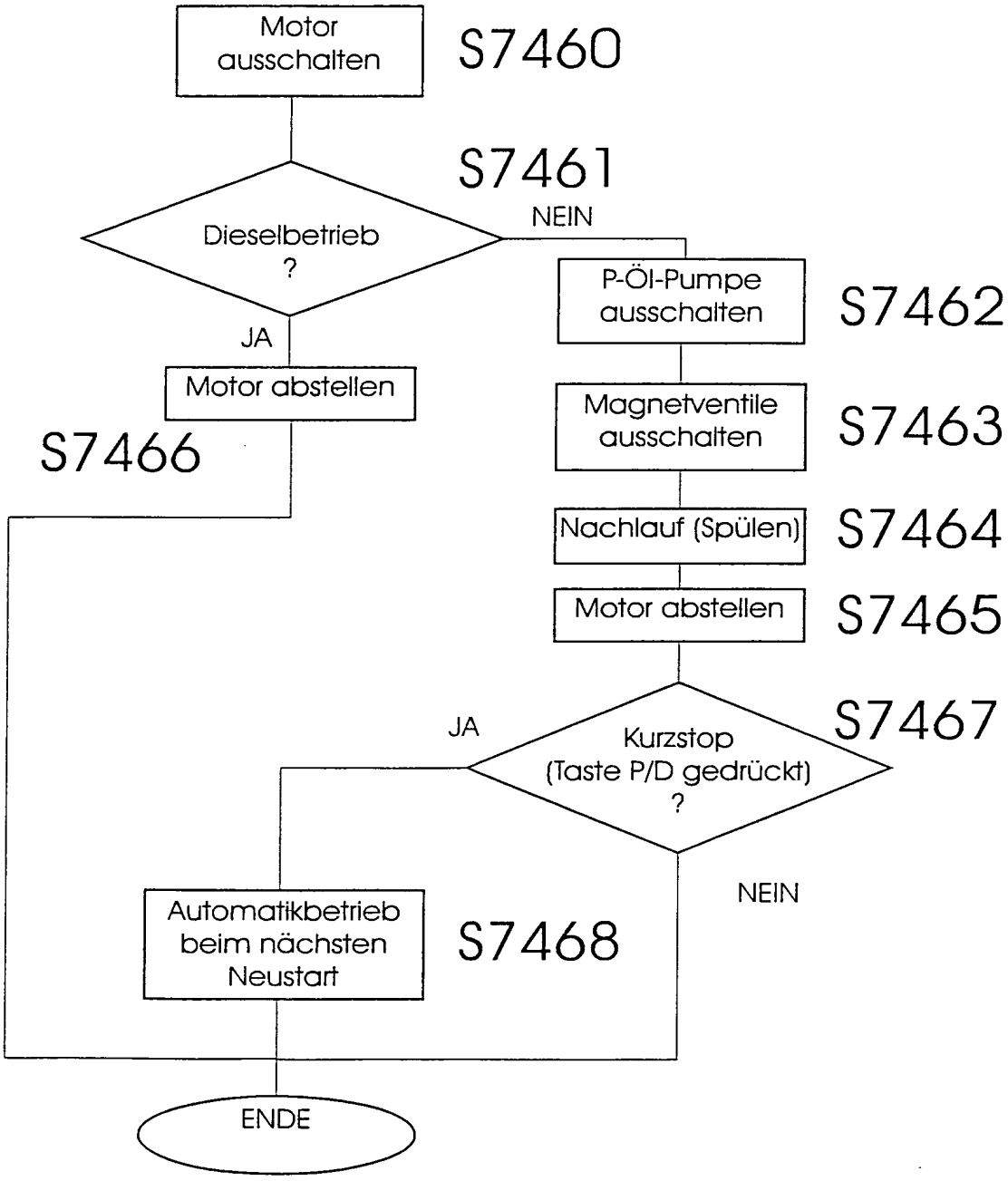
Figur 7


Nebenantrieb
S770
S771
Drehzahl
oder Drehmoment
in ungünstigem Bereich?
NEIN
JA
Beide MV aus
S772
S773
Ausreichend
P-Öl im Tank
?
NEIN
JA
S774
S775
P-Öl-Pumpe ein
P-Öl-Pumpe aus
Zurück
S776

Figur 8


S780
Nurdieselbetrieb
S781
Ist Motor ausgeschaltet ?
NEIN
JA
S782
Ist P-Ölanwärmung abgeschaltet ?
NEIN
JA
S783
Beide Magnetventile ein
S784
P-Öl-Pumpe ein
S785
ZURÜCK

Figur 9


Motor ausschalten
S7460
S7461
Dieselbetrieb ?
NEIN
JA
P-ÖI-Pumpe ausschalten
S7462
Motor abstellen
S7466
Magnetventile ausschalten
S7463
Nachlauf (Spülen)
S7464
Motor abstellen
S7465
S7467
JA
Kurzstop (Taste P/D gedrückt) ?
NEIN
Automatikbetrieb beim nächsten Neustart
S7468
ENDE

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/010380

A. CLASSIFICATION OF SUBJECT MATTER
INV. F02D19/06
ADD. F02M37/00 F02M31/16 F02M55/02

According to International Patent Classification (IPC) orto both national Classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (Classification System followed by Classification Symbols)
F02D F02M

Documontation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
X Y	US 2 984 229 A (VAUGHAN PAUL S) 16 May 1961 (1961-05-16) figures col umn 1, line 15 - line 47	1,2,4-6, 10,13,18 8,9,11, 12
A	col umn 1, line 66 - col umn 4, line 29	3,7, 14-17, 19-21
Y	DE 100 60 573 A1 (FINGER RALPH) 6 September 2001 (2001-09-06) abstract; figures col umn 2, line 16 - line 47 col umn 2, line 63 - col umn 3, line 3	8,9
A	col umn 3, line 37 - col umn 4, line 25	1-7, 10-21

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general State of the art which is not considered to be of particular relevance

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"L" document which maythrow doubts on priority claim(s) or which is cited b establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosur β, use, exhibition or other means

"P" document published priorto the international filing date but laterthan the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
7 February 2007	14/02/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswi)k Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Döring, Marcus

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/010380

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
Y	DE 12 03 046 B (WILLY SOSSIAUX) 14 October 1965 (1965-10-14) figures col umn 1, l ine 1 - l ine 51 col umn 3, l ine 20 - l ine 35	11, 12
A	col umn 4, l ine 43 - l ine 63	1-10, 13-21
X	DE 196 35 220 Al (LOHMANN GEORG) 14 May 1998 (1998-05-14) abstract ; figures	1,4-6, 10, 13
A	col umn 1, l ine 3 - col umn 3, l ine 64	2,3,7-9 , 11, 12, 14-21
X	DE 39 29 115 Al (ELSBETT LUDWIG ET AL.) 7 March 1991 (1991-03-07) abstract ; figure col umn 1, l ine 3 - col umn 2, l ine 7	1,4-7, 10, 13-15
A	col umn 2, l ine 55 - col umn 3, l ine 8	2,3,8,9 , 11, 12, 16-21
X	EP 1 462 636 A2 (AFHYMAT) 29 September 2004 (2004-09-29)	1,4-6, 10, 13, 16, 17
Y	abstract ; figures	2,3
A	col umn 3, l ine 12 - col umn 6, l ine 44	7-9, 11, 12, 14, 15, 18-21
Y	DE 44 33 500 Al (LOHMANN GEORG) 28 March 1996 (1996-03-28) abstract ; figure	2,3
A	col umn 1, l ine 19 - l ine 32	1,4-21
P, X	EP 1 647 699 A (KANGLER WOLFRAM) 19 Apri l 2006 (2006-04-19) abstract ; figures col umn 1, paragraph 1 - col umn 2, Paragraph 7 col umn 3, paragraph 14 - col umn 5, paragraph 24 col umn 6, paragraph 29 - col umn 10, paragraph 51	1,2,4, 10
A	DE 44 18 856 Al (ROBUR WERKE GMBH I. L.) 7 December 1995 (1995-12-07) abstract ; figures col umn 2, l ine 13 - l ine 54	1-21

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/010380

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	DE 101 54 455 A1 (GENTSCH DIETMAR) 15 May 2003 (2003-05-15) cited in the application abstract ; figures column 1, paragraph 4 - column 3, Paragraph 14	1-21
A	DE 38 00 585 Al (KLÖCKNER-HUMBOLDT-DEUTZ AG) 28 July 1988 (1988-07-28) cited in the application abstract; figures column 2, line 2 - line 23 column 2, line 66 - column 4, line 53	1-21

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2006/010380

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2984229 A	16-05-1961	NONE	
DE 10060573 A1	06-09-2001	NONE	
DE 1203046 B	14-10-1965	NONE	
DE 19635220 A1	14-05-1998	NONE	
DE 3929115 A1	07-03-1991	NONE	
EP 1462636 A2	29-09-2004	FR 2853013 A1	01-10-2004
DE 4433500 A1	28-03-1996	NONE	
EP 1647699 A	19-04-2006	DE 102004050601 A1 US 2006081223 A1	27-04-2006 20-04-2006
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DE 3800585 A1	28-07-1988	NONE	

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2006/010380

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
INV. F02D19/06
ADD. F02M37/00 F02M31/16 F02M55/02

Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
F02D F02M

Recherchierte, aber nicht zum Mindestprüf Stoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)
EPO-Internal , WPI Data

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
X Y A	US 2 984 229 A (VAUGHAN PAUL S) 16. Mai 1961 (1961-05-16) Abbildungen Spalte 1, Zeile 15 - Zeile 47 Spalte 1, Zeile 66 - Spalte 4, Zeile 29	1,2,4-6, 10,13,18 8,9,11, 12 3,7, 14-17, 19-21

Y A	DE 100 60 573 A1 (FINGER RALPH) 6. September 2001 (2001-09-06) Zusammenfassung; Abbildungen Spalte 2, Zeile 16 - Zeile 47 Spalte 2, Zeile 63 - Spalte 3, Zeile 3 Spalte 3, Zeile 37 - Spalte 4, Zeile 25	8,9 1-7, 10-21

	-/--	

[X] Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen [X] Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen :
"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist
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'&' Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
7. Februar 2007	14/02/2007

Name und Postanschrift der Internationalen Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL - 2280 HV RIJSWIJK Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Döring, Marcus

Formblatt PCT/ISA/210 (Blatt 2) (April 2005)

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2006/010380

C. (Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
Y	DE 12 03 046 B (WILLY GOSSIAUX) 14. Oktober 1965 (1965-10-14) Abbildungen Spalte 1, Zeile 1 - Zeile 51 Spalte 3, Zeile 20 - Zeile 35	11, 12
A	Spalte 4, Zeile 43 - Zeile 63	1-10, 13-21
X	DE 196 35 220 A1 (LOHMANN GEORG) 14. Mai 1998 (1998-05-14) Zusammenfassung; Abbildungen	1,4-6, 10, 13
A	Spalte 1, Zeile 3 - Spalte 3, Zeile 64	2,3,7-9, 11,12, 14-21
X	DE 39 29 115 A1 (ELSBETT LUDWIG ET AL.) 7. März 1991 (1991-03-07) Zusammenfassung; Abbildung Spalte 1, Zeile 3 - Spalte 2, Zeile 7	1,4-7, 10, 13-15
A	Spalte 2, Zeile 55 - Spalte 3, Zeile 8	2,3,8,9, 11,12, 16-21
X	EP 1 462 636 A2 (AFHYMAT) 29. September 2004 (2004-09-29)	1,4-6, 10, 13, 16, 17
Y	Zusammenfassung; Abbildungen	2,3
A	Spalte 3, Zeile 12 - Spalte 6, Zeile 44	7-9, 11, 12, 14, 15, 18-21
Y	DE 44 33 500 A1 (LOHMANN GEORG) 28. März 1996 (1996-03-28) Zusammenfassung; Abbildung	2,3
A	Spalte 1, Zeile 19 - Zeile 32	1,4-21
P,X	EP 1 647 699 A (KANGLER WOLFRAM) 19. April 2006 (2006-04-19) Zusammenfassung; Abbildungen Spalte 1, Absatz 1 - Spalte 2, Absatz 7 Spalte 3, Absatz 14 - Spalte 5, Absatz 24 Spalte 6, Absatz 29 - Spalte 10, Absatz 51	1,2,4, 10
A	DE 44 18 856 A1 (ROBUR WERKE GMBH I. L.) 7. Dezember 1995 (1995-12-07) Zusammenfassung; Abbildungen Spalte 2, Zeile 13 - Zeile 54	1-21
A	DE 101 54 455 A1 (GENTSCH DIETMAR) 15. Mai 2003 (2003-05-15) in der Anmeldung erwähnt Zusammenfassung; Abbildungen Spalte 1, Absatz 4 - Spalte 3, Absatz 14	1-21

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Exhibit 1002-Part 1, Page 120

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2006/010380

C. (Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	DE 38 00 585 A1 (KLÖCKNER-HUMBOLDT-DEUTZ AG) 28. Juli 1988 (1988-07-28) in der Anmeldung erwähnt Zusammenfassung; Abbildungen Spalte 2, Zeile 2 - Zeile 23 Spalte 2, Zeile 66 - Spalte 4, Zeile 53	1-21

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 121

INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen
PCT/EP2006/010380

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
US 2984229 A	16-05-1961	KEINE	
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DE 1203046 B	14-10-1965	KEINE	
DE 19635220 A1	14-05-1998	KEINE	
DE 3929115 A1	07-03-1991	KEINE	
EP 1462636 A2	29-09-2004	FR 2853013 A1	01-10-2004
DE 4433500 A1	28-03-1996	KEINE	
EP 1647699 A	19-04-2006	DE 102004050601 A1 US 2006081223 A1	27-04-2006 20-04-2006
DE 4418856 A1	07-12-1995	KEINE	
DE 10154455 A1	15-05-2003	KEINE	
DE 3800585 A1	28-07-1988	KEINE	

Customer No. 26629 Patent
Confirmation No. 6187 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: August 11, 2022 /Robyn L. Templin/
Signature

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

AMENDMENT/RESPONSE TO DECISION ON APPEAL MAILED JULY 11, 2022

Dear Sir:

Responsive to the Decision on Appeal mailed July 11, 2022, please amend the Application as follows and consider the following remarks:

In the Claims

1. (Canceled)

2. (Currently Amended) 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;

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; and

~~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. (Currently Amended) 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;

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 124

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; and

~~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. (Currently Amended) 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. (Currently Amended) The dual fuel generator and fuel delivery system of claim 2~~1~~, further comprising:

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 125

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. (Currently Amended) The dual fuel generator and fuel delivery system of claim 2~~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. (Currently Amended) The dual fuel generator and fuel delivery system of claim 3~~1~~, wherein the primary and secondary pressure regulators are integral components of a dual stage pressure regulator.

11-21. (Canceled)

22. (Currently Amended) The generator and fuel delivery system of claim 24~~1~~ 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. (Currently Amended) A generator and fuel delivery system comprising:

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 126

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; and~~The generator and fuel delivery system of claim 21~~

wherein the generator is free of any pressure regulator.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 127

REMARKS

Claims 1-17, 21, 22, and 24 are pending in the present application. In the Decision on Appeal mailed July 11, 2022, the Patent Trial and Appeal Board affirmed the Examiner's rejection of 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; affirmed the Examiner's rejection of claims 1, 6, 10-13, 16, 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 further in view of GasHoseandRegulators (May 17th, 2014, https://web.archive.org/web/20140517093401 /http://gashosesandregulators.com/ -- hereinafter "GasHose"); affirmed the Examiner's rejection of claims 7-9, 14, 15, 17, and 22 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).

In response to the Decision on Appeal, a properly executed Terminal Disclaimer is being filed concurrently herewith to obviate the nonstatutory double patenting rejection(s). The $170 Terminal Disclaimer fee under 37 CFR 120(d) is also being concurrently paid via EFS-WEB. As such, Applicant respectfully requests withdrawal of the double patenting rejection of 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.

In further response to the Decision on Appeal, Applicant has elected to cancel claims 1, 11-17, and 21 in the present response. Applicant has further elected to amend claims 2-3, 5-7, 10, and 24 in the present response. Claims 2 and 3 are currently amended to incorporate the subject matter of independent claim 1, claims 6-7 have been amended each to depend from claim 2, claim 10 has been amended to depend from claim 3, claim 24 has been amended to incorporate the subject matter of independent claim 21, and claim 22 has been amended to depend from claim 24. Claim 5 has been amended herein to correct a clerical issue by removing "mechanical fuel lockout switch". No new matter has been added.

Applicant further requests consideration of an Information Disclosure Statement (IDS) filed with the present response.

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 2-10, 22 and 24.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 128

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: August 11, 2022
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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 129

Espacenet

Bibliographic data: FR2510660 (A1) — 1983-02-04

Two-fuel reservoir system for concrete mixer trucks - uses a solenoid valve actuated by contacts on gear selector and parking brake to provide fuel source changeover

Inventor(s): DERREZ MATHIAS; LOPEZ MICHEL ± (MATHIAS DERREZ ET MICHEL LOPEZ)

Applicant(s): STETTER SA [FR] ± (STETTER SA)

Classification: **- international:** ***F02D19/06;*** (IPC1-7): B60K15/02; F02D19/06
- cooperative: **F02D19/0618 (EP)**; **F02D19/0676 (EP)**; **F02D19/0684 (EP)**; Y02T10/30 (EP)

Application number: FR19810014723 19810729

Priority number(s): FR19810014723 19810729

Abstract of FR2510660 (A1)

The fuel supply system uses two fuel tanks, each containing different fuel (1,2) and has a controller with a solenoid valve (6) which couples one of the two tanks (1,2) to the engine. The solenoid valve is operated by a relay energised through two series connected electric contacts (16,17). The two contacts are coupled to the gearbox and parking brake, so when the gear lever is placed in neutral and the parking brake engaged the fuel changeover is automatically initiated. Indicator lights (14,15) on the dashboard are supplied by auxiliary contacts (16,17) on the solenoid valve to indicate which fuel reservoir is in use.

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A1

DEMANDE DE BREVET D'INVENTION

(21) **N° 81 14723**

(54) **Système d'alimentation en carburant à deux réservoirs, pour véhicule spécial à moteur unique.**

(51) Classification internationale (Int. Cl. ³). **F 02 D 19/06; B 60 K 15/02.**

(22) Date de dépôt ..... **29 juillet 1981.**

(33) (32) (31) Priorité revendiquée :

(41) Date de la mise à la disposition du public de la demande ..... B.O.P.I. — « Listes » n° 5 du 4-2-1983.

(71) Déposant : STETTER SA, société anonyme. — FR.

(72) Invention de : Mathias Derrez et Michel Lopez.

(73) Titulaire : *Idem* (71)

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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 131

Système d'alimentation en carburant à deux réservoirs, pour véhicule spécial à moteur unique.

L'invention concerne un système d'alimentation en carburant, à deux réservoirs, pour véhicule spécial à moteur unique, destiné à permettre une fonction transport avec un type de carburant et une fonction service à l'arrêt du véhicule avec un autre type de carburant.

L'invention est notamment destinée à équiper les bétonnières mobiles.

Il est connu d'utiliser, pour un même moteur, deux types de carburant au moyen de deux réservoirs et d'une commande d'inversion disposée dans le circuit d'alimentation.

De plus, on connaît des véhicules ou engins qui sont destinés à accomplir une fonction transport ou déplacement et une fonction service lorsqu'ils sont arrêtés, cette fonction étant assurée par le moteur du véhicule. C'est par exemple le cas d'une bétonnière portée par un véhicule et dont le tambour est entraîné par le moteur du véhicule.

Dans ce cas, le véhicule est une partie du temps en déplacement et une autre partie du temps sur un chantier. En déplacement, le moteur sert à la traction du véhicule et éventuellement en même temps à la rotation du tambour. Sur le chantier le véhicule est en stationnement, avec son frein de parcage actionné et sa boîte de vitesse au point mort tandis que le moteur ne sert plus alors qu'à la rotation du tambour.

Avec un double fonctionnement de ce type, il peut être avantageux d'alimenter le moteur avec des carburants différents respectivement pour la fonction transport et pour la fonction service seule. L'avantage est par exemple simplement économique, en utilisant un carburant plus lourd et moins cher pour le service seul et au contraîre plus performant pour le transport, comme par exemple respectivement du fioul et du gazole.

C'est pourquoi l'invention propose un système d'alimentation en carburant, à deux réservoirs, pour véhicule spécial à moteur unique, muni de moyens de commande pour alimenter le moteur à partir de l'un ou de l'autre desdits réservoirs et qui est remarquable en ce que les moyens de commande comportent une électro-vanne qui permet de positionner le circuit d'alimentation sur l'un ou l'autre des réservoirs et qui est actionné par un relai, lui-même commandé par les fermetures à la fois de deux

contacteurs électriques en série, lesdites fermetures étant obtenues respectivement par la mise au point mort de la boîte de vitesse du véhicule et par l'actionnement du frein de parcage de telle sorte que le moteur soit alimenté par l'un des réservoirs et un type de carburant en fonctionnement normal de transport et par l'autre réservoir et un autre type de carburant pour un fonctionnement de service seul lorsque le véhicule est à l'arrêt avec sa boîte de vitesse au point mort et son frein de parcage actionné.

Pour des raisons de sécurité il est avantageux selon l'invention que l'électro-vanne soit en position d'alimentation sur le réservoir destiné au fonctionnement transport lorsque ladite électro-vanne est au repos, c'est-à-dire non actionnée par le relais.

De préférence, dans ce cas deux témoins lumineux sont aménagés pour signaler le réservoir en fonction, ceux-ci étant électriquement alimentés par l'intermédiaire du relais qui ferme le circuit électrique du témoin destiné au réservoir de transport et ouvre le circuit électrique de l'autre témoin lorsque ledit relais est au repos, c'est-à-dire non commandé par les fermtures des contacteurs et au contraire ferme le circuit électrique du témoin destiné au réservoir de service et ouvre le circuit électrique de l'autre témoin lorsque ledit relais est excité par les fermetures en série des deux contacteurs.

L'invention sera mieux comprise à la lecture de la description qui va suivre et qui se réfère à la figure unique annexée représentant schématiquement un mode de réalisation selon l'invention pour moteur diesel.

Cette figure montre deux réservoirs 1 et 2 contenant par exemple respectivement du fioul et du gazole. De ces réservoirs partent des circuits d'alimentation munis chacun d'un préfiltre 3, 4 et pour le circuit gazole d'un dispositif anti-retour 5.

Les circuits des deux réservoirs passent par une électro-vanne 6 qui, au repos est en position d'alimentation gazole.

Après l'électro-vanne, le circuit unique parvient à la pompe d'alimentation 7 en passant par un bac de visualisation 8, visible de l'extérieur.

Après la pompe 7 le circuit aboutit aux pompes d'injection

9 après avoir traversé un filtre 10.

Comme le montre le dessin, le retour 11 des injecteurs se déverse dans le réservoir 1 de fioul et plus généralement dans le réservoir contenant le carburant le plus lourd et ceci quelque soit le réservoir sélectionné tandis que le retour 12 des pompes est recyclé en amont de la pompe d'alimentation 7.

L'électro-vanne 6 est actionnée par un relais 13 qui, au repos c'est-à-dire non excité, coupe le circuit électrique d'alimentation de l'électro-vanne qui reste alors en position d'alimentation/gazole. Dans cette position le relais ferme en outre le circuit électrique d'un témoin lumineux 14 (par exemple de couleur verte) tandis qu'il ouvre au contraîre le circuit électrique d'un autre témoin lumineux 15 (de couleur rouge par exemple).

Lorsque le relais 13 est excité comme il sera expliqué ci-après, celui-ci ferme le circuit électrique de l'électro-vanne 6 qui bascule dans sa position alimentation fioul (réservoir 1), ouvre le circuit électrique du témoin 14 qui s'éteint et ferme le circuit électrique du témoin 15 qui s'allume.

L'excitation du relais 13, comme le montre le dessin, est obtenue par la fermeture de son circuit d'alimentation électrique au moyen de deux contacteurs en série 16 et 17 qui sont combinés avec respectivement la boîte de vitesse 18 et le frein de parcage 19 du véhicule.

Les contacteurs 16 et 17 sont tels qu'ils sont ouverts lorsque respectivement la boîte de vitesse 18 est enclenchée sur une vitesse et le frein de parcage 19 n'est pas actionné et au contraîre fermés lorsque respectivement la boîte de vitesse est au point mort et le frein de parcage est actionné.

En outre l'ouverture et la fermeture du contacteur 17 entraînent respectivement l'ouverture et la fermeture du circuit électrique d'un autre témoin 20 classique de frein de parcage, de même couleur que le témoin 14.

Le fonctionnement est simple à comprendre.

En déplacement, le frein 19 n'est pas actionné et la boîte de vitesse enclenchée de telle sorte que le relais 13 n'est pas excité (les contacteurs 16 et 17 étant ouverts).

Dans ces conditions l'électro-vanne est en position

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 134

gazole, le témoin 14 est allumé et les témoins 15 et 20 éteints (conditions choisies pour le dessin). Dans ce cas, même la mise au point mort de la boîte ne change pas le type de carburant puisque le contacteur 17 reste ouvert.

Lorsque le frein 19 est actionné et que la boîte de vitesse 18 est au point mort, le relais 13 est excité de telle sorte que l'électro-vanne 6 est en position fioul tandis que le témoin 14 est éteint et les témoins 15 et 20 allumés par mise sous tension.

Cette disposition présente donc une grande sécurité et un automatisme complèt puisque les positions gazole et fioul sont automatiquement obtenues par la mise en fonction elles-mêmes, respectivement déplacement ou transport et service, le véhicule ne pouvant pas rouler sur chantier ou sur route avec du fioul (dans cet exemple). En outre en cas de défaillance électrique, les circuits restent ou passent en alimentation gazole.

Enfin, comme il a déjà été dit, l'invention est notamment destinée, mais non exclusivement, aux bétonnières portées.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 135

REVENDICATIONS

1. Système d'alimentation en carburant, à deux réservoirs (1,2), pour véhicule spécial à moteur unique, muni de moyens de commande pour alimenter le moteur à partir de l'un ou de l'autre desdits réservoirs, système caractérisé en ce que les moyens de commande comportent une électro-vanne (6) qui permet de positionner le circuit d'alimentation sur l'un ou l'autre des réservoirs (1,2) et qui est actionnée par un relais (13) lui-même commandé par les fermetures à la fois de deux contacteurs électriques en série (16,17), lesdites fermetures étant obtenues respectivement par la mise au point mort de la boîte de vitesse (18) du véhicule et par l'actionnement du frein de parcage (19) de telle sorte que le moteur soit alimenté par l'un des réservoirs (2) et un type de carburant en fonctionnement normal de transport et par l'autre réservoir (1) et un autre type de carburant pour un fonctionnement de service seul lorsque le véhicule est à l'arrêt avec sa boîte de vitesse au point mort et son frein de parcage actionné.

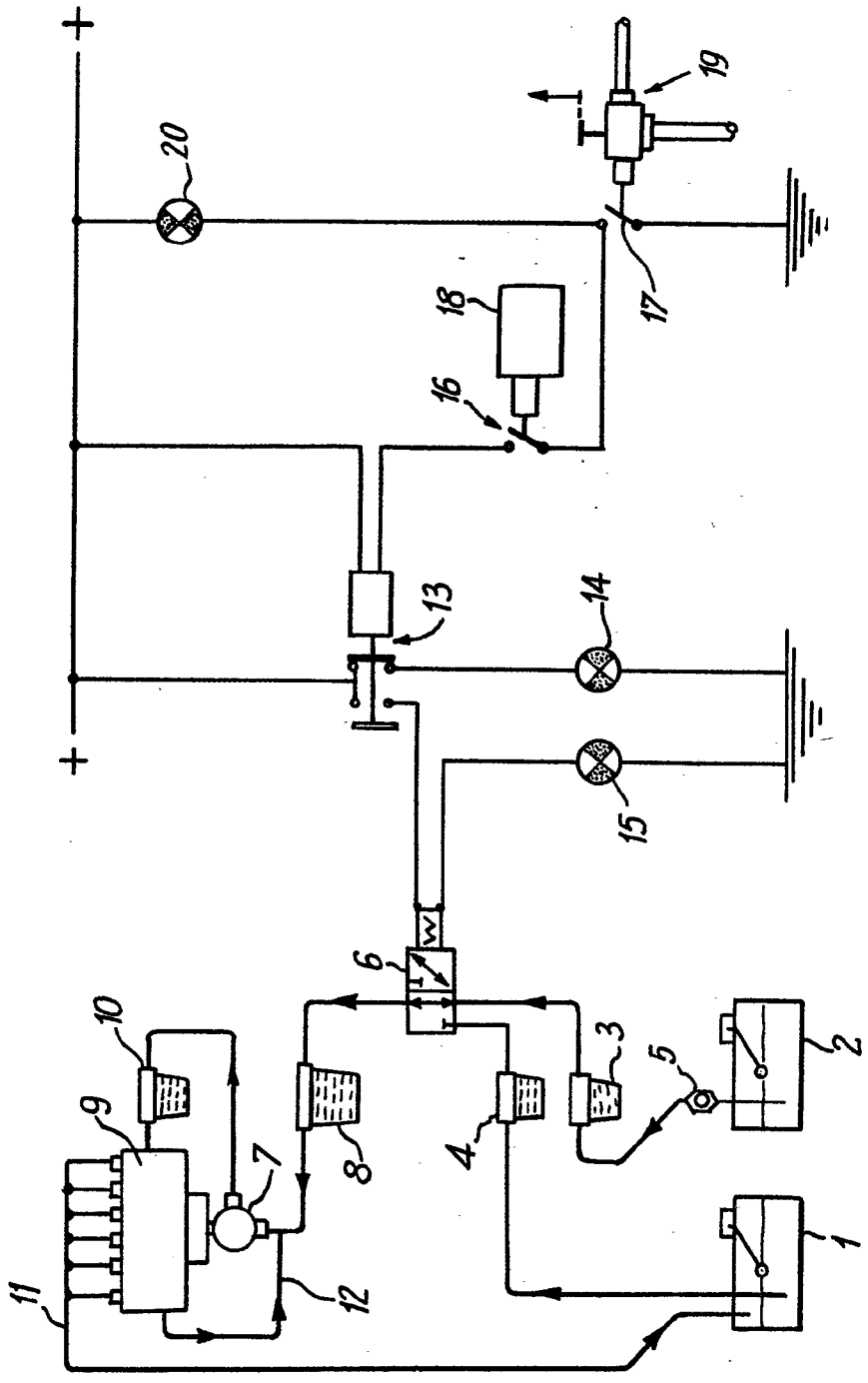
2. Système selon la revendication 1, caractérisé en ce que l'électro-vanne (6) est en position d'alimentation sur le réservoir (2) destiné au fonctionnement transport lorsque ladite électro-vanne est au repos, c'est-à-dire non actionnée par le relais (13).

3. Système selon la revendication 2, caractérisé en ce que deux témoins lumineux (14,15) sont aménagés pour signaler le réservoir en fonction, ceux-ci étant électriquement alimentés par l'intermédiaire du relais (13) qui ferme le circuit électrique du témoin (14) destiné au réservoir (2) de transport et ouvre le circuit électrique de l'autre témoin (15) lorsque ledit relais est au repos, c'est-à-dire non commandé par les fermetures des contacteurs (16,17) et au contraire ferme le circuit électrique du témoin (15) destiné au réservoir (1) de service et ouvre le circuit électrique de l'autre témoin (14) lorsque ledit relais est excité par les fermetures en série des deux contacteurs (16,17).

4. Système selon l'une des revendications 1 à 3, pour moteur diesel, caractérisé en ce que le réservoir (2) destiné à la fonction transport contient du gazole et l'autre réservoir (1) du fioul.

5. Système selon l'une des revendications 1 à 4, caractérisé en ce que le réservoir (2) de transport est muni d'un dispositif anti-retour (5), que les circuits des deux réservoirs sont munis chacun d'un préfiltre (3,4) disposé en amont de l'électro-vanne (6) et qu'un bac de visualisation (8), visible de l'extérieur est prévu dans le circuit aval de l'électro-vanne (6).

6. Système selon l'une des revendications 1 à 5 caractérisé en ce que le véhicule est une bétonnière mobile et que le moteur unique assure d'une part le déplacement du véhicule et éventuellement en même temps, la rotation du tambour lorsque ledit moteur est alimenté par le réservoir (2) de transport et d'autre part seulement la rotation du tambour lorsqu'il est alimenté par le réservoir (1) de service, c'est-à-dire lorsque ledit véhicule est en position fixe, sur chantier par exemple.


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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	08/11/2022 11:00:14 AM ET	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 #	60863142	AUTHORIZED BY	Andrew Stark
CUSTOMER #	26629	FILING DATE	11/15/2018
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Mark J. Sarder

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FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	130.00	1	130.00
2814	STATUTORY DISCLAIMER, INCLUDING TERMINAL DISCLAIMER	170.00	1	170.00
			TOTAL AMOUNT:	$300.00

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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

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.

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
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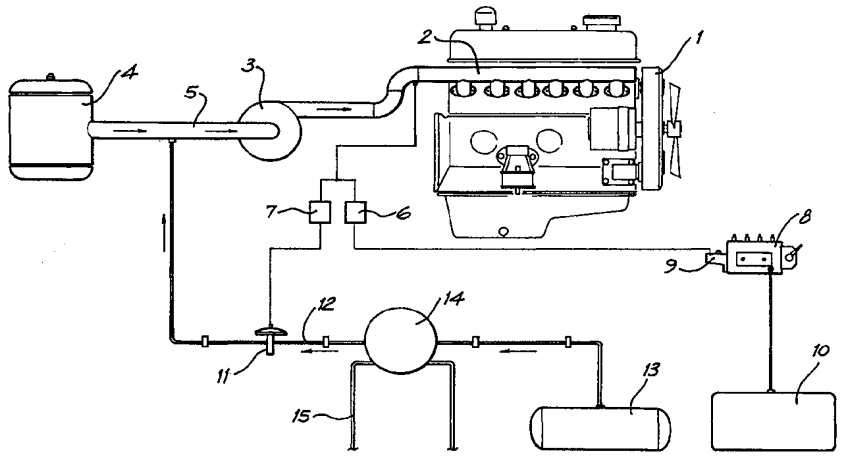
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Published
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(54) Title: A DUAL–FUEL METHOD FOR BOOST FUEL SUBSTITUTION IN TURBO–CHARGED DIESEL ENGINES

(57) Abstract

An assembly for boost fuel substitution in turbo charged diesel engines; the assembly including: a diesel engine including an inlet manifold (2) and an exhaust manifold; a turbocharger (3) in communication with said inlet manifold (2); first and second reservoirs of diesel (10) and gas (13) respectively selectively in communication with said engine; a fuel injection pump (8) including an aneroid (9) intermediate the first reservoir of diesel (10) and said inlet manifold (2); a control valve (11) intermediate the second reservoir of gas (13) and said inlet manifold (2); characterised in that the assembly includes at least two solenoids (6, 7) each capable of moving between first and second operational states; wherein a first of said solenoids (6) is located between the inlet manifold (2) and said fuel injection pump (8) and the second solenoid (7) is located between said inlet manifold (2) and said control valve (11) wherein, said first solenoid (6) responsive to a predetermined engine operating parameter moves between a first state in which pressurised air from said inlet manifold (2) communicates with said aneroid (9) and atmospheric air is isolated from the aneroid (9) and a second state in which manifold air to the fuel injection pump (8) is interrupted and atmospheric air is in communication with the aneroid (9) and pressurised air from said inlet manifold (2) terminates at said first solenoid (6); and wherein the second solenoid (7) responsive to said predetermined engine operating parameter and/or signal is located between said inlet manifold (2) and said control valve (11) and moves between a first state in which atmospheric air is in communication with said control valve (11) and second state in which pressurised air from said inlet manifold (2) is in communication with said control valve (11); wherein when the first solenoid (6) isolates said first fuel type, the second solenoid (7) operates responsive to a signal to allow boost fuel provided by said second fuel type to communicate between the second fuel source (13) and the engine.



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A DUAL-FUEL METHOD FOR BOOST FUEL SUBSTITUTION IN TURBO-CHARGED DIESEL ENGINES

BACKGROUND

The present invention relates to fuel systems and more particularly relates to a system in which a second fuel is admitted as a substitution for boost fuel in a turbo-charged diesel engine. The invention also relates to a dual fuelling system which may be retro-fitted in a simple manner to an existing single-fuel turbo-charged diesel engine.

PRIOR ART

Diesel engine operation is typically controlled by the fuel injection pump. Turbo-charged diesel engines introduce a degree of complexity to the control of the engine, over normally aspirated diesel engines due to the fact that the amount of air admitted to each cylinder for each cycle (air charge), changes as a result of the change in manifold air pressure. This change in air charge coupled to the requirement to run diesel engines lean, requires the inlet manifold pressure to be an input to any system controlling the engine. Therefore, on turbo-charged diesel engines, typically a pressure line connects the inlet manifold to an aneroid on the injection pump to facilitate the variation in fuel flow rate due to variations of inlet manifold pressure.

Other means of facilitating this variation of fuel flow rate are known. For example, one system electronically senses the manifold pressure, then the output of the electronic sensor is processed, with the output of this processor electrically driving an electromagnetic device associated with the injection pump.

US patent 4,517,928 (corresponds to Australian application 17878/83) discloses an existing system for using a gas such as LPG as a secondary boost fuel in diesel engines. According to the arrangement shown in the US patent a signal proportional to the momentary effect of fuel consumption controls the gas supply to the engine. A valve in a gas supply line is connected to a control lever of the engine governor to allow gas supply only in a load range above approximately 25% and up to a maximum of approximately 40% of the full load total fuel consumption. In the lower range, incomplete combustion

of the gas is avoided and in the high low range destination and overload are avoided and the opacity of the exhaust is improved. The consumption of liquid fuel is reduced and the exhaust gas composition is improved. An adjustable stop in the arrangement described limits the maximum injectable liquid fuel quantity when the engine is operated in a duel fuel mode. Whilst it is known to retrofit a dual fuel system incorporating diesel fuel and boost LP gas fuel as a substitution for diesel fuel, the known arrangements require considerable interference with the existing engine equipment and more particularly requires significant interference with the diesel fuel pump and aneroid. Whilst US patent 4,517,928 teaches no intervention into the inside of the fuel pump or the governor there is still required at the outside of the fuel pump a stop for a control lever. Thus, a limiter for the control rod has to be added increasing the labour in retrofitting.

Dual fuel systems used with diesel engines involve a mixture of diesel and gas wherein gas is used as boost fuel responsive to changes in a predetermined engine parameter. The principle of this system is to save diesel fuel by injecting a lesser quantity and replacing this with lower cost LPG and also to avoid diesel exhaust smoke at full load running.

This inevitably results in power loss so in order to regain the original power LPG is added to the inlet air. According to the modification is effected so that the engine will have the same power with dual fuel as if it was using a 100% diesel. At fuel engine power load about 30% diesel can be replaced. When more diesel is replaced the engine will demonstrate a phenomenon known as knocking will stop at part load where peak pressures in the cylinders are lower more diesel fuel can be replaced by LPG up to about 40%. At less than a quarter of full load of the engine no LPG may be added to the inlet system because of insufficient combustion.

INVENTION

The present invention provides an alternative boost fuel substitution system for a diesel engine which may be used in conjunction with and retro fitted to existing fuel systems.

The dual fuel system according to the present invention is characterised by the inclusion of a second fuel in place of diesel fuel which would in single fuel operation have been introduced to the engine due to an increase in the inlet manifold air pressure as a result of the turbo-charger, and an increase in throttle position, typically known as boost fuel. The system according to the present invention is particularly suitable for retro-fitting to conventional diesel engines without disassembly of the injection pump.

In one form, the invention is further characterised by the interruption of the manifold air pressure input to the injection pump, and the substitution for the variation of diesel fuel flow in dependence on manifold pressure and the metering of a second fuel in response to a chosen engine operating parameter or a combination of parameters. Suitable parameters include engine revolutions per minutes (R.P.M.), inlet manifold pressure, throttle position and diesel fuel flow rate. Preferably, the total fuel admitted to the engine is controlled so as to maintain the overall air-fuel-ratio in the lean range.

According to the present system, the signal sent to the injection pump to indicate that the manifold air pressure has increased, is interrupted. The interruption makes the injection pump behave as if the inlet manifold air pressure is close to atmospheric. This disables the ability of the injection pump to add the boost diesel fuel to the engine. The boost diesel fuel is substituted with a second fuel. The second fuel is admitted to the engine by a means other than the injection pump used for the diesel fuel. Typically, this is by a separate injection system (for direct injection) or by admission to the inlet manifold.

In one broad form the present invention comprises:

an assembly for boost fuel substitution in a turbo charged diesel engine; the assembly including;

a diesel engine including an inlet manifold and an exhaust manifold;

a turbocharger in communication with said inlet manifold;

first and second reservoirs of two alternate fuel types in communication with said engine;

a fuel injection pump including an aneroid intermediate a first reservoir of one of said two fuel types and said inlet manifold;

a control valve intermediate a second reservoir of said fuel types and said inlet manifold;

characterised in that the assembly includes at least two solenoids each capable of moving between two states of operation; wherein a first of said solenoids is located between the inlet manifold and said fuel injection pump and the second solenoid is located between said inlet manifold and said control valve;

wherein, said first solenoid responsive to a predetermined engine operating parameter moves between a first state in which pressurised air from said inlet manifold communicates with said aneroid and isolates atmospheric air and a second state in which manifold air to the fuel injection pump is interrupted and atmospheric air is in communication with the aneroid and pressurised air from said inlet manifold terminates at said first solenoid;

and wherein the second solenoid responsive to said predetermined engine operating parameter or a second parameter is located between said inlet manifold and said control valve and moves between a first state in which atmospheric air is in communication with said gas metering valve and a second state in which pressurised air from said inlet manifold is in communication with said control valve and atmospheric air is isolated from control valve;

wherein when the first solenoid isolates said first fuel type, the second solenoid operates to allow boost fuel provided by said second fuel type to communicate between the second fuel source and the engine.

Preferably the aneroid is in direct contact with pressurised air from the manifold and responds to that pressure. Alternatively, the aneroid is in electrical contact with a sensor attached at or near said inlet manifold such that the sensor after sensing the air pressure in the manifold causes a signal to be transmitted to the aneroid.

In another form the present invention comprises;

an assembly for boost fuel substitution in turbo charged diesel engines; the assembly including;

a diesel engine including an inlet manifold and an exhaust manifold;

a turbocharger in communication with said inlet manifold;

first and second reservoirs of two alternate fuel types in communication with said engine;

a fuel injection pump including an aneroid intermediate the first reservoir of one of said two fuel types and said inlet manifold;

a control valve intermediate a second reservoir of said fuel types and said inlet manifold;

characterised in that the assembly includes at least two solenoids each capable of moving between two states of operation; wherein a first of said solenoids is located between the inlet manifold and said fuel injection pump and the second solenoid is located between said inlet manifold and said control valve;

wherein, said first solenoid responsive to a predetermined engine operating parameter moves between a first state in which pressurised air from said inlet manifold communicates with said aneroid and isolates atmospheric air and a second state in which manifold air to the fuel injection pump is interrupted and atmospheric air is in communication with the aneroid and pressurised air from said inlet manifold terminates at said first solenoid;

and wherein the second solenoid responsive to said predetermined engine operating parameter or a second parameter is located between said inlet manifold and said control valve and moves between a first state in which atmospheric air is in communication with said gas metering valve and second state in which pressurised air from said inlet manifold is in communication with said control valve and atmospheric air is isolated from the control valve;

wherein when the first solenoid is in its second state, the second solenoid is in its second state such that when first fuel is isolated from the engine by operation of the first solenoid, the operation of the second solenoid allows delivery of boost fuel from the second fuel source to the engine.

In another broad form the present invention comprises:

a system for boost fuel substitution in a turbo charged diesel engine of the high speed type;

the system including a diesel engine including an inlet manifold and an exhaust manifold, a turbocharger in communication with said inlet manifold;

a first fuel reservoir of diesel fuel and a second reservoir of gas fuel each available for delivery to said engine;

a diesel fuel injection pump including an aneroid intermediate the first reservoir and the inlet manifold;

a gas control valve intermediate the second reservoir and the inlet manifold for regulating the pressure of gas supplied from the second reservoir;

wherein the system further includes first and second solenoids each capable of movement between two states of operation; wherein the first of said solenoids is located between the inlet manifold and said diesel fuel pump and the second is located between the inlet manifold and said gas control valve;

wherein the operation of each said solenoid is responsive to a predetermined engine operating parameter;

said first solenoid moves between a first operating condition in which the inlet manifold pressure is in communication with the aneroid and fuel pump and a second operating condition in which the inlet manifold pressure is isolated from said fuel pump limiting flow of diesel to the engine to a predetermined maximum and ambient air is accessible to the aneroid;

said second solenoid moves between a first operating condition in which gas fuel is isolated from the engine and ambient air is in communication with the gas control valve and a second operating condition in which gas fuel is in communication with said diesel engine wherein when the first solenoid is in its first operating state the second solenoid is in its first operating state and when the first solenoid is in its second operating state the second solenoid is in its second operating state;

wherein the solenoids are influenced by an electrical signal or signals initiated by a sensor or sensor which detects a predetermined engine operating parameter or parameters.

In another broad form the present invention comprises;

a system for boost fuel substitution in a turbo charged diesel engine; the system including;

a diesel engine including an inlet manifold and an exhaust manifold;

a turbocharger in communication with said inlet manifold;

first and second reservoirs of diesel and gas respectively selectively in communication with said engine;

a fuel injection pump including an aneroid intermediate the first reservoir of diesel and said inlet manifold;

a control valve intermediate the second reservoir of gas and said inlet manifold;

characterised in that the system includes a single solenoid capable of moving between two operational states;

wherein said single solenoid is located intermediate the inlet manifold and the fuel pump and control valve such that the solenoid is capable of allowing communication between the first or second fuel and the engine responsive to a single dictated by a predetermined engine operating parameter;

wherein said single solenoid moves between a first operational state which allows communication between pressurised air from the inlet manifold and said aneroid and isolates pressurised air access to said gas control valve and a second operational state in which communication between the inlet manifold and the aneroid of the fuel pump is isolated and communication between the inlet manifold pressurised air and the control valve is allowed;

wherein when the solenoid is in its first operational state the first fuel is delivered to the engine and when the solenoid is in its second operational state boost fuel comprising the second fuel is substituted for the first fuel wherein the solenoid operates responsive to predetermined engine operating parameters.

The advantages of the boost fuel substitution system of the present invention, when fitted to a turbo-charged diesel engine include the following:

the process of adapting a turbo-charged diesel engine to dual-fuelled operation can be achieved without disassembly of the injection pump, nor does it require any physical alteration to the internal mechanisms of the injection pump or the body of the injection pump. Because the injection pump has not been modified, any repairs or calibration of the injection pump can still be carried out according to the manufacturer's specifications.

The system can be converted back to 100% diesel operation while the engine is in operation. Through the use of a gaseous second fuel, typically liquefied petroleum gas

or natural gas, particulate emissions can be reduced. Since only the boost component of the diesel fuel is replaced with the second fuel, knock problems associated with high substitution levels of gaseous second fuels can be avoided. This occurs due to the fact that the boost fuel flow rate typically represents less than 45% of the total fuel flow rate, based on energy flow per unit time. Knock problems associated with gaseous second fuels typically occur at higher substitution levels. Rough idle problems associated with some high substitution level, duel-fuelled engines are avoided. At idle, there is no significant boost of the inlet manifold air pressure, above ambient conditions. Therefore, at idle, the engine would be operating on or very close to 100% diesel.

The present invention will now be described in more detail according to a preferred but non limiting embodiment and with reference to the accompanying illustrations:

Figure 1: shows a schematic layout of the relationship of the duel solenoid arrangement fitted to a dual fuel system;

Figure 2: shows a cross sectional elevation of a dual change over solenoid arrangement according to a preferred embodiment wherein a first solenoid prevents communication between the inlet manifold and an aneroid and the other solenoid activates boost fuel;

Figure 3: shows the arrangement of figure 2 whereby the first solenoid allows communication between the inlet manifold and the aneroid and the second solenoid allows communication between a gas control valve and ambient air thereby preventing passage of boost fuel to the engine;

Figure 4: shows an alternative to the arrangement of figures 2 and 3 with the position of the ambient air access port in the gas circuit altered and which activates the gas fuel circuit and renders the primary fuel circuit inactive;

Figure 5: shows the solenoid arrangement of figure 4 wherein the gas fuel circuit is inactivated by the second solenoid and the first solenoid allows communication between the inlet manifold and aneroid; and

Figure 6: shows a typical circuit diagram describing electrical links between the battery source and operating solenoids.

The invention will be described, by way of example only, with reference to two embodiments for interruption to the inlet manifold air pressure input to the injection pump.

The first is one in which a connection is made between the inlet manifold, downstream of the turbo-charger, and an aneroid associated with the injection pump. The second system is one in which the inlet manifold air pressure is electronically sensed, and an electrical input is made to the injection pump.

Referring to figure 1 there is shown a schematic layout of an assembly for substitution of boost fuel in a diesel engine according to one embodiment. Figure 1 shows conventional diesel engine 1 including an inlet manifold 2 in communication with turbo charger 3. Turbocharger 3 is in communication with a conventional air cleaner 4 via air line 5.

According to a preferred embodiment, the assembly comprises co-operating dual solenoids 6 and 7 the first of which is located intermediate the inlet manifold 2 and fuel pump 8. Solenoid 6 is in communication with an aneroid 9 associated with fuel pump 8 via a pressurised air line which allows according to one embodiment aneroid 8 to detect either directly or via a signal generated by a sensor at or near the inlet manifold the level of air pressure at inlet manifold 2. Fuel pump 8 is connected to a diesel fuel reservoir 10 from which diesel fuel is delivered to the engine responsive to engine operating parameters. Solenoid 7 is in communication with inlet manifold 2 and a gas metering valve 11 which regulates flow of gas along gas supply line 12 from a reservoir 13 of LP gas which comprises the second fuel. Supply line 12 further includes a conventional converter 14 wherein LP gas is converted to a vapour in a known manner. Hot water from the engine via line 15 converts the liquid to a vapour and in doing so warms the gas from stop the unit freezing as LPG when released from the liquid state to form a gaseous state. The gas travels along line 12 towards gas metering valve 11 which is operated by a switch from the foot cycle. The switch may be one of the magnetic type or alternative form of switch to suit requirements. Once the gaseous vapour engages gas metering valve 11, turbo charger 3 at this time is not generating pressure although the foot throttle switch turns the system on at the solenoid valve downstream of gas metering valve 11.

According to one form of operation, gas metering valve 11 allows LP gas to travel responsive to the action of solenoid 7 into the engine. As the LP gas is boost fuel, no gas can enter the engine until such time as the turbo charger 3 generates enough pressure to push on a diaphragm inside gas metering valve 11 which in turn activates a plunger enabling gas feed through the metering valve. If turbo pressure is low the introduction of gas into the engine is very light but as turbo pressure increases, this will have the effect of opening gas metering valve 11 in order to increase the flow rate of gas to the engine. Thus, the turbo charger does not activate until the engine is in a high torque condition at which time the turbo charger operates. When this occurs, instead of the diesel fuel pump 8 advancing boost fuel towards the engine when gas is delivered to the engine responsive to a predetermine engine operating parameter, diesel fuel cannot enter the engine. Gas cannot enter the engine until such time as turbo charger 3 starts to operate as the torque value of the engine enters its upper range. Isolating inlet manifold air pressure from aneroid 9 of fuel pump 8 isolates diesel fuel and allows LP gas to be substituted as boost fuel. Parameters employed in the interruption of the inlet manifold air pressure input to the injection pump resulting in metering of the second fuel based on some or all of the following:

engine R.P.M, inlet manifold air pressure, throttle position, flow rate of the diesel fuel and adding the second fuel to the engine.

Figures 2 to 5 describe in more detail the operation of the dual solenoid arrangement according to a preferred embodiment of the invention.

Referring to figure 2 there is shown an enlarged cross sectional view of a dual solenoid circuit 20 which establishes intermittent links between an inlet manifold of a diesel engine and two alternative fuel sources. The dual solenoid in circuit 20 to be described below corresponds to solenoids 6 and 7 of figure 1. Dual solenoid circuit 20 includes a first solenoid 21 which is placed intermediate, engine manifold 2 and fuel pump 8 with aneroid 9. Dual solenoid circuit 20 further includes second solenoid 22 disposed intermediate inlet manifold 2 and gas metering valve 11 which controls access to a second fuel from reservoir 13. First solenoid 21 controls the passage of primary diesel fuel from reservoir 10 and interrupts the primary fuel flow circuit normally responsive to

manifold air pressure such that primary fuel may be isolated responsive to a predetermined engine parameter enabling second solenoid 22 to provide substitute boost fuel to the diesel engine. In normal operation the engine is supplied with diesel fuel from fuel source 10 with the amount of fuel delivered to the engine responsive to air pressure at the inlet manifold. The dual solenoid system which also includes turbo charger 3 operates in response to increased pressure generated by the turbo charger which is delivered to the inlet manifold 2. According to one embodiment a signal is sent to the injection pump 8 to indicate that the manifold air pressure has increased. This causes interruption to the supply of diesel fuel and isolates fuel pump 8 from manifold air pressure such that ambient air is then in communication with the aneroid 9. Solenoid 21 includes solenoid body 23 having an internal chamber 24 which, subject to the position of plunger valve 25, able to communicate with air delivery line 26, chamber 27 and pressurised air chamber 28. Solenoid 21 further includes an upper body 29 housing an actuating mechanism energised by a control circuit which is linked to the control circuit via electrical linkage 30. The actuating mechanism includes biasing spring 31 which operates responsive to an electrical signal via link 30 such that plunger valve 25 moves between a location wherein gate 32 is free of orifice 33 and bears via surface 34 on shoulder 35 of orifice 36 and a second position in which plunger 25 bears via surface 37 on shoulders 38 of orifice 33. The action of plunger valve 25 is regulated by electrical signals responsive to detection of inlet manifold pressure. As shown, plunger valve 25 of first solenoid 21 restricts the flow of pressurised air along pressurised airline 39 such that pressurised air from inlet manifold is unable to travel beyond pressurised air chamber 28. This allows ambient air to enter solenoid body 23 via port 40 such that ambient air is delivered via delivery air line 26 to aneroid 9. Accordingly the configuration of first solenoid 21 and more particularly the position of plunger valve 25 indicates that boost fuel is isolated from the diesel engine from the first fuel source in favour of substitution of boost fuel from the second fuel source. Second solenoid 22 has a similar configuration to that described for first solenoid 21 but second solenoid 22 is dispersed between inlet manifold 2 and gas metering valve 11. When first solenoid 21 isolates the fuel from a first fuel source when the aneroid detects ambient air pressure, second solenoid 22 operates to establish communication between inlet manifold 2 and second fuel or boost fuel source. As shown in figure 2 second solenoid 22 is configured

similarly to first solenoid 21 and includes solenoid body 50, ambient air chamber 51 in communication with port 52 which is open to atmospheric air and orifice 53 defined by shoulder 54 which receives oscillating plunger valve 55. Plunger valve 55 includes gate 56 which when communication is open between the boost fuel source and the inlet manifold, locates on shoulder 54. Solenoid body 50 further includes pressurised air chamber 56 which is in permanent communication with inlet manifold 2. Solenoid body 55 further includes upper shoulder 57 which acts as a bearing surface for upper surface 58 of plunger 55 when pressurised air from inlet manifold is isolated from boost fuel reservoir 13. In this configuration ambient air is available via port 52 and air chamber 51 to gas metering valve 11. When that occurs, plunger valve 25 of solenoid 21 engages shoulder region 38 via surface 37 in order to open communication between inlet manifold 2 and first fuel reservoir 10 via aneroid fuel pump.

Figure 3 shows the arrangement set out in figure 2 and is numbered in accordance with the integers of figure 2. The fundamental difference between the arrangement in figure 3 and that shown in figure 2 is that in figure 3 solenoid 21 seats on shoulder 38 via gate 32 so as to enable communication between pressurised air at the inlet manifold and the first fuel source. Sealing orifice 33 prevents ambient air access to aneroid 9 which ensures that the primary diesel fuel will be delivered to the engine. Plunger valve 25 will close access to ambient air once activated by the electrical control circuit in response to inlet manifold pressure. At the same time, second solenoid 22 closes the pressurised air circuit and allows access of ambient air via chamber 51 to gas metering valve 11. Referring to figure 4 there is shown an alternative dual solenoid arrangement 50 shown in figure 4 includes solenoid 51 which is identical to solenoid 21 shown in figure 3. Furthermore, solenoid 51 operates in an identical manner to that described for solenoid 21. Where dual solenoid arrangement 50 differs from that described in figures 2 and 3 is the arrangement of solenoid 60 which is configured differently from the corresponding solenoid 22 described in the dual solenoid arrangement 20 in figure 3. Solenoid 60 includes solenoid body 61 having an internal chamber 62, which subject to the position of plunger 63 will allow communication by air delivery line 64 between gas metering valve 11 (see figure 1) and inlet manifold 2 (see figure 1). When plunger 63 is retracted there is free communication of pressurised air between inlet manifold 2 and gas metering valve

11 and in this configuration gate 65 seats on shoulder 66 of orifice 67 isolating internal chamber 68. Solenoid arrangement 50 shows solenoid 51 isolating pressurised air in pressurised air line 69 from aneroid 9. In this configuration ambient air is in direct communication with aneroid 9 preventing flow from diesel fuel to the engine. The fundamental difference between solenoid 22 and solenoid 60 is the position of the ambient air chamber and the opposite operation of valves 56 and 63 respectively in respect of their position when pressurised air is in communication with the gas moving valve and when ambient air is in communication with the gas metering valve. These differences are merely a matter of manufacturing choice or selection enabling a possible selection of solenoids which operate differently but performing a similar roll sequentially isolating or allowing access to respective fuels.

Figure 5 shows the arrangement of figure 4 this time plungers 70 and 63 respectively are both seated against corresponding orifices as distinct from opposing orifices to allow communication between inlet manifold and aneroid 9 in the case of solenoid 51 and isolate pressurised air from inlet manifold 2 to gas control valve. Figures 4 and 5 therefore illustrate an alternative configuration for the second solenoid by virtue of the alternative location of ambient air port 71.

In a more general sense one solenoid valve may be employed to control the dual fuel system. In this case a valve which has two inputs and two outputs is used whereby the inlet manifold air pressure would be connected to the one input and atmospheric pressure would be connected to the second input. This is illustrated in Figure 7. The outputs of the valve would be connected to the aneroid associated with the injection pump, and the input to the second fuel metering system. The valve could be configured in such a way that when the valve is de-energised, the inlet manifold air pressure would be connected to the injection pump aneroid, and the gas metering system would be connected to atmospheric pressure. Typically, if atmospheric pressure is input to the second fuel metering system, the second fuel would not be admitted to the engine. Therefore, with the valve in the de-energised state, the engine would be under 100% diesel operation.

When the valve is energised, the inlet manifold air pressure would be connected to the second fuel metering system and the injection pump aneroid would be connected to atmospheric pressure, and the engine would be operating in dual-fuel mode. Since the injection pump registers the manifold pressure as being atmospheric or close to atmospheric, it will behave as if there is no boost air being admitted to the engine and will not admit boost diesel fuel to the engine.

Although this embodiment has been described with only one valve, it is acknowledged that it may be achieved with more than one valve, and it may be achieved with valves with more than two inputs, and or more than two outputs. Furthermore, the valve switching may be opposite to that described above, in that the valve can be used whereby in the energised state, the inlet manifold air pressure would be connected to the injection pump aneroid. The valve would typically be electro-mechanical, such as a solenoid so that switching the valve on and off can be achieved remotely and quickly.

In the second system, the electrical connection from the manifold air pressure sensor would be interrupted as illustrated in Figure 8. A reference signal would be sent to the processor which has the electrical properties which are characteristic of the sensor output when the inlet manifold air pressure is close to ambient.

Metering of the second fuel should be constrained to maintain the overall engine operation to be lean. This is desirable to ensure that the production of particulates is not in violation of emission control legislation. The second fuel flow may be introduced to the engine in a variety of known ways, including manifold introduction (commonly referred to as fumigated introduction for gas) or by a second injection system which may or may not be direct in-cylinder injection.

The function of the system will be described below in reference to an engine that has a connection between the inlet manifold and the aneroid associated with the injection pump. The input to the injection pump could alternatively be taken from the outlet of the turbocharger compressor.

The valve is energised when some critical constraints are met. These constraints would include some or all of the following:

Sufficient fuel level in the second fuel tank
Engine oil pressure is above a present valve
Engine R.P.M. is between set limits
Throttle position is between set limits

If the valve is energised, atmospheric air pressure is exposed to the aneroid associated with the diesel injection pump and the diesel injection pump does not admit boost diesel fuel. The second fuel metering system admits the second fuel essentially to supplement the loss of the boost diesel fuel. The metering process is done according to the engine conditions as listed above. If the valve is de-energised, the diesel pump will admit the boost diesel fuel as required. This change-over between dual-fuel operation and 100% diesel fuel operation can occur with the engine in operation.

The circuit shown in figure 6 includes a power source 80 formed by a conventional battery which may be isolated by a conventional on/off switch 81. Included in the circuit is a reset switch 82 which is in electrical communication with storage reservoir 83 via actuating solenoid 84. Another part of the circuit links relays which together link the two circuits which in turn are linked to a mercury switch 85. The mercury switch is useful should a vehicle become involved in an accident altering its attitude dramatically in which case the mercury switch will immediately isolate the system immediately shutting down the flow of electricity to the solenoid 84 on gas tank 83 preventing any further flow of liquid LPG anywhere through the system. This provides a safety feature and will minimise risk in the event of a fire. In additional to the mercury switch is pressure switch 86 which enables pressure control. This switch keeps pressure from the gas bottle at a certain level and keeps the circuit open on the energising side of relays 87. If the pressure drops off by way of a ruptured line or the like or if the vehicle runs out of gas this will immediately break the circuit and will convert the relay 87 to the off position. In this position the throttle switch 88 will be isolated which in turn will shut off the solenoid on the downstream side of the gas metering valve. If the throttle switch is

not operating because there is no power to it, the system will be immediately closed down. The circuit will also close down via the coil which operates a second relay. If there is no power to the second relay such that red indicator light comes on which indicates that the gas is off and this isolates the whole system from operating. If the gas tank is full and the circuit operates relay 1 and in turn operates relay 2, this will operate change over solenoid valve 90 and 91 thus when solenoid 90 is normally open when there is no power on it the system returns from gas operation to solely diesel fuel operation. In this condition the air pressure from the turbo charger is delivered to the aneroid on the fuel pump according to normal operation. When the turbo charger is operative and pressure is on the gas tank and the on/off switch is on, this changes a relay so that a normally closed relay opens and one normally open closes. This results in air pressure from the pressure side of the turbo charger being isolated from the aneroid and being diverted back through the system and onto the metering valve of the gas. When this happens, green light 92 illuminates on the dashboard of the vehicle indicating that gas is on. Where a driver of the vehicle puts his foot on the throttle it automatically opens the shut off solenoid on the downward side of the metering valve allowing gas to flow when the turbo charger builds up enough pressure to open the metering valve. The circuit also includes reset switch 82 just in case the vehicle runs out of gas to compensate for inability to turn the gas back on as the pressure switch has opened the circuit and no power can be delivered through the line, so it is essential to have a reset button. As soon as the reset button is activated this enables power to the tank solenoid 84 which as a consequence allows liquid to flow through the line which operates pressure switch 86. Once the operator's finger is removed from the reset button the circuit remains open because relay number 1 and number 2 are activated creating an opposite circuit effect.

It will be recognised by persons skilled in the art that numerous variations and modifications may be made tot he invention as broadly described herein without departing from the overall spirit and scope of the invention.

THE CLAIMS:

1. An assembly for boost fuel substitution in turbo charged diesel engines; the assembly including;

a diesel engine including an inlet manifold and an exhaust manifold;

a turbocharger in communication with said inlet manifold;

first and second reservoirs of diesel and gas respectively selectively in communication with said engine;

a fuel injection pump including an aneroid intermediate the first reservoir of diesel and said inlet manifold;

a control valve intermediate the second reservoir of gas and said inlet manifold;

characterised in that the assembly includes at least two solenoids each capable of moving between first and second operational states; wherein a first of said solenoids is located between the inlet manifold and said fuel injection pump and the second solenoid is located between said inlet manifold and said control valve;

wherein, said first solenoid responsive to a predetermined engine operating parameter moves between a first state in which pressurised air from said inlet manifold communicates with said aneroid and atmospheric air is isolated from the aneroid and a second state in which manifold air to the fuel injection pump is interrupted and atmospheric air is in communication with the aneroid and pressurised air from said inlet manifold terminates at said first solenoid;

and wherein the second solenoid responsive to said predetermined engine operating parameter and/or signal is located between said inlet manifold and said control valve and a moves between a first state in which atmospheric air is in communication with said gas metering valve and second state in which pressurised air from said inlet manifold is in communication with said control valve;

wherein when the first solenoid isolates said first fuel type, the second solenoid operates responsive to a signal to allow boost fuel provided by said second fuel type to communicate between the second fuel source and the engine.

2. An assembly for boost fuel substitution in turbo charged diesel engines; the assembly including;

a diesel engine including an inlet manifold and an exhaust manifold;

a turbocharger in communication with said inlet manifold;

first and second reservoirs of diesel and LP gas respectively in communication with said engine;

a fuel injection pump including an aneroid intermediate a first reservoir of one of said two fuel types and said inlet manifold;

a control valve intermediate a second reservoir of said fuel types and said inlet manifold;

characterised in that the assembly includes at least two solenoids each capable of moving between first and second operational states; wherein a first of said solenoids is located between the inlet manifold and said fuel injection pump and the second solenoid is located between said inlet manifold and said control valve;

wherein, said first solenoid responsive to a predetermined engine operating parameter moves between a first state in which pressurised air from said inlet manifold communicates with said aneroid and atmospheric air is isolated from the aneroid and a second state in which manifold air to the fuel injection pump is interrupted and atmospheric air is in communication with the aneroid and pressurised air from said inlet manifold terminates at said first solenoid;

and wherein the second solenoid responsive to said predetermined engine operating parameter is located between said inlet manifold and said control valve and moves between a first state in which atmospheric air is in communication with said gas metering valve and a second state in which pressurised air from said inlet manifold is in communication with said control valve;

wherein when the first solenoid is in its second state, the second solenoid is in its second state such that when first fuel is isolated from the engine by operation of the first solenoid, the operation of the second solenoid allows delivery of boost fuel from the second fuel reservoir to the engine.

3. A system for boost fuel substitution in a turbo charged diesel engine of the high speed type;

the system including a diesel engine including an inlet manifold and an exhaust manifold, a turbocharger in communication with said inlet manifold;

a first fuel reservoir of diesel fuel and a second reservoir of gas fuel each available for delivery to said engine;

a diesel fuel injection pump including an aneroid intermediate the first reservoir and the inlet manifold;

a gas control valve intermediate the second reservoir and the inlet manifold for regulating the pressure of gas supplied from the second reservoir;

wherein the system further includes first and second solenoids each capable of movement between two states of operation; wherein the first of said solenoids is located between the inlet manifold and said diesel fuel pump and the second is located between the inlet manifold and said gas control valve;

wherein the operation of each said solenoid is responsive to a predetermined engine operating parameter;

said first solenoid moves between a first operating condition in which the inlet manifold pressure is in communication with the aneroid and fuel pump and a second operating condition in which the inlet manifold pressure is isolated from said fuel pump limiting flow of diesel to the engine to a predetermined maximum and ambient air is accessible to the aneroid;

said second solenoid moves between a first operating condition in which gas fuel is isolated from the engine and ambient air is in communication with the gas control valve and a second operating condition in which gas fuel is in communication with said diesel engine wherein when the first solenoid is in its first operating state the second solenoid is in its first operating state and when the first solenoid is in its second operating state the second solenoid is in its second operating state;

wherein the solenoids are influenced by an electrical signal or signals initiated by a sensor or sensor which detects a predetermined engine operating parameter or parameters.

4. An assembly according to claim 1, 2 or 3 wherein the engine operating parameters include; engine revolutions per minute, inlet manifold pressure, throttle position and diesel fuel flow rate.

5. An assembly according to claim 4 wherein the gas control valve is located intermediate the second solenoid and said LP gas fuel source; said control valve operating in response to an electrical signal dictated by said operating parameters.

6. An assembly according to claim 5 wherein inlet manifold pressure may be determined from an outlet of said turbocharger.

7. An assembly according to claim 6 wherein inlet manifold pressure is measured by a sensor electrically connected to a circuit which includes said first and second solenoids.

8. An assembly according to claim 7 wherein the air pressure of the inlet manifold is sensed electrically by means of an electronic sensor which transmits a signal to one or both said solenoids.

9. An assembly according to claim 8 wherein the air pressure of the inlet manifold is mechanically sensed at said fuel pump.

10. An assembly according to claim 9 wherein the flow of said second fuel is regulated so as to ensure a lean mix.

11. A system for boost fuel substitution in a turbo charged diesel engine; the system including;

a diesel engine including an inlet manifold and an exhaust manifold;

a turbocharger in communication with said inlet manifold;

first and second reservoirs of diesel and gas respectively selectively in communication with said engine;

a fuel injection pump including an aneroid intermediate the first reservoir of diesel and said inlet manifold;

a control valve intermediate the second reservoir of gas and said inlet manifold;

characterised in that the system includes a single solenoid capable of moving between two operational states;

wherein said single solenoid is located intermediate the inlet manifold and the fuel pump and control valve such that the solenoid is capable of allowing communication between the first or second fuel and the engine responsive to a single dictated by a predetermined engine operating parameter;

wherein said single solenoid moves between a first operational state which allows communication between pressurised air from the inlet manifold and said aneroid and isolates pressurised air access to said gas control valve and a second operational state in which communication between the inlet manifold and the aneroid of the fuel pump is isolated and communication between the inlet manifold pressurised air and the control valve is allowed;

wherein when the solenoid is in its first operational state the first fuel is delivered to the engine and when the solenoid is in its second operational state boost fuel

comprising the second fuel is substituted for the first fuel wherein the solenoid operates responsive to predetermined engine operating parameters.

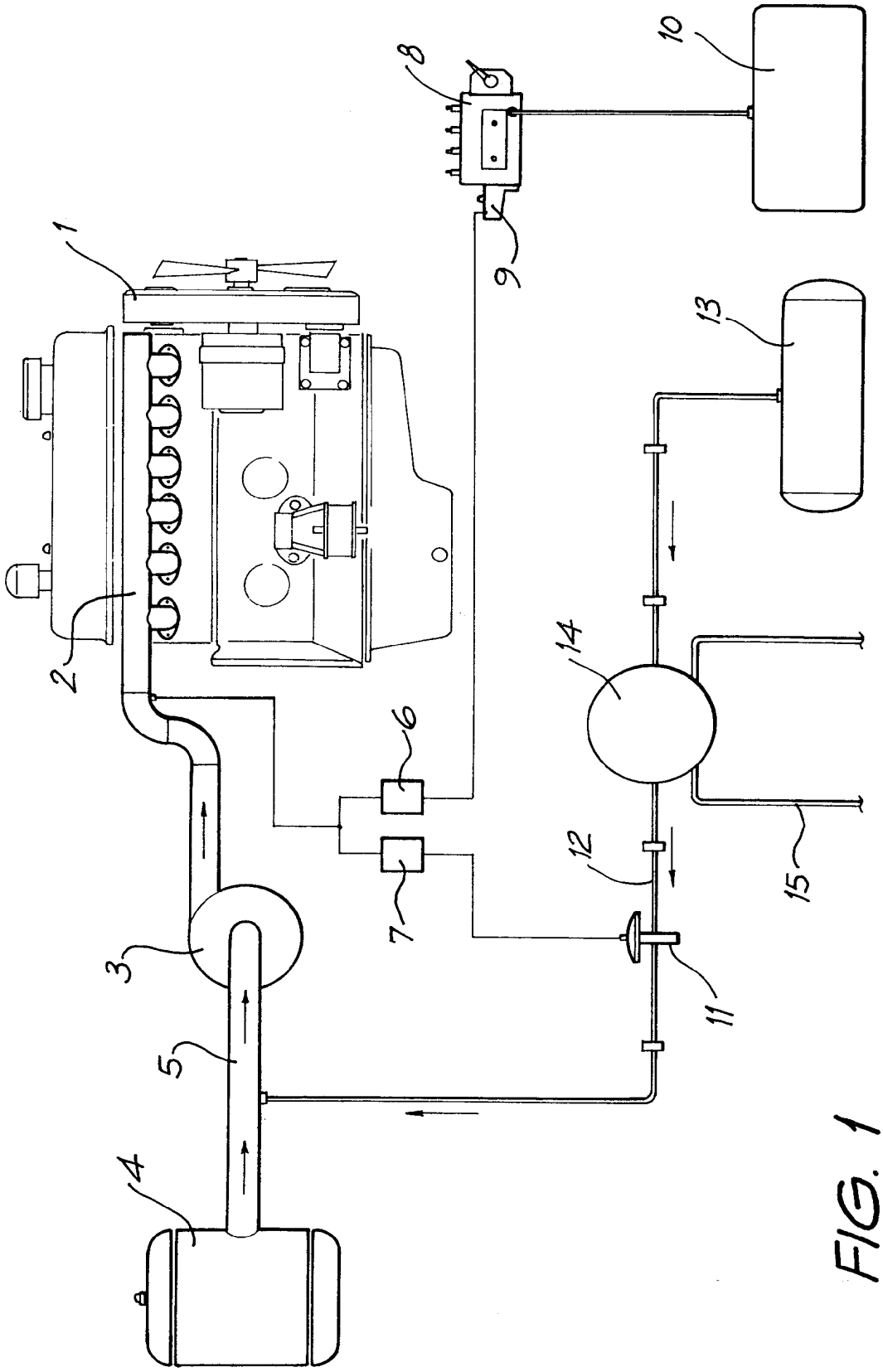


FIG. 1

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 164

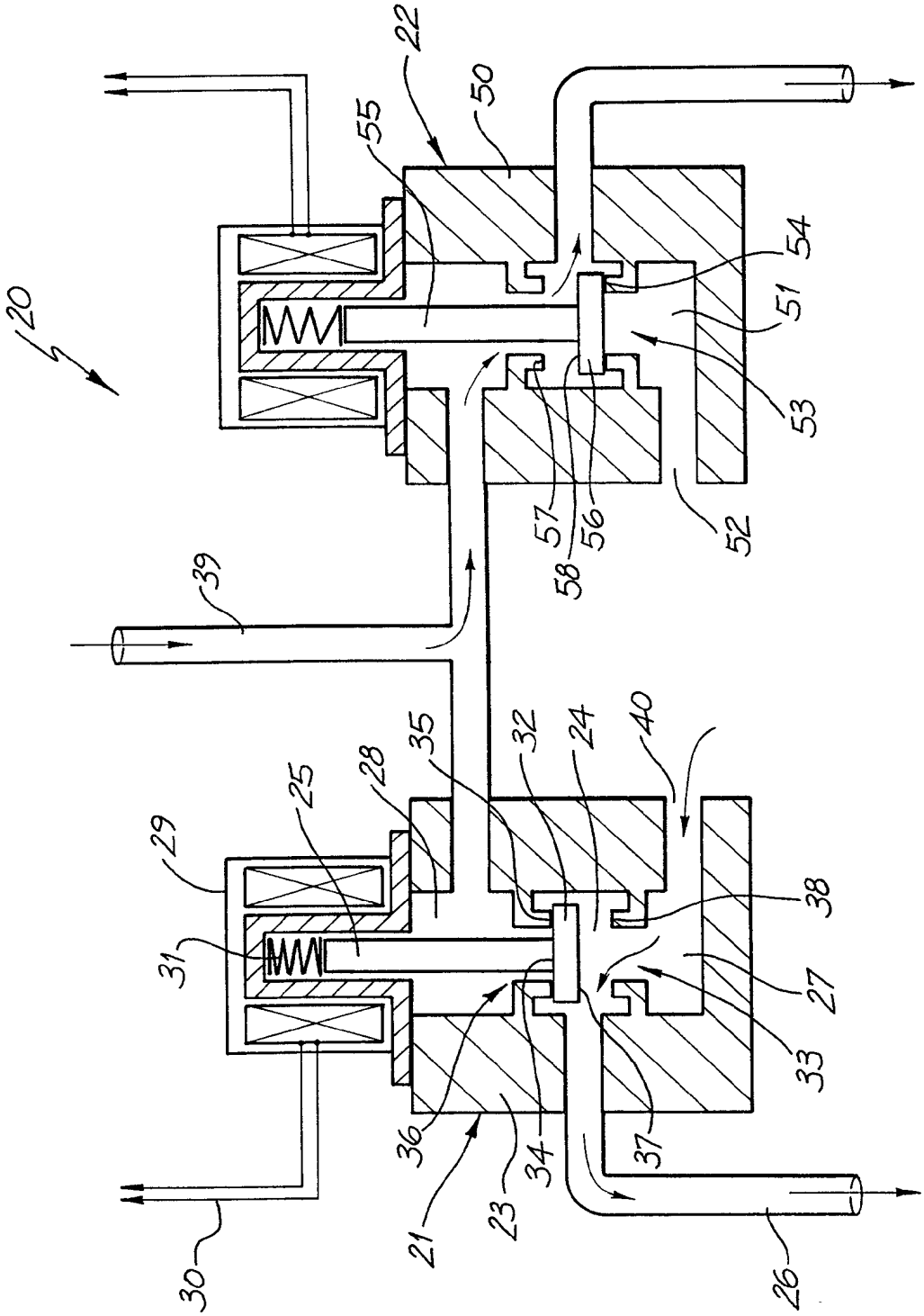


FIG. 2

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 165

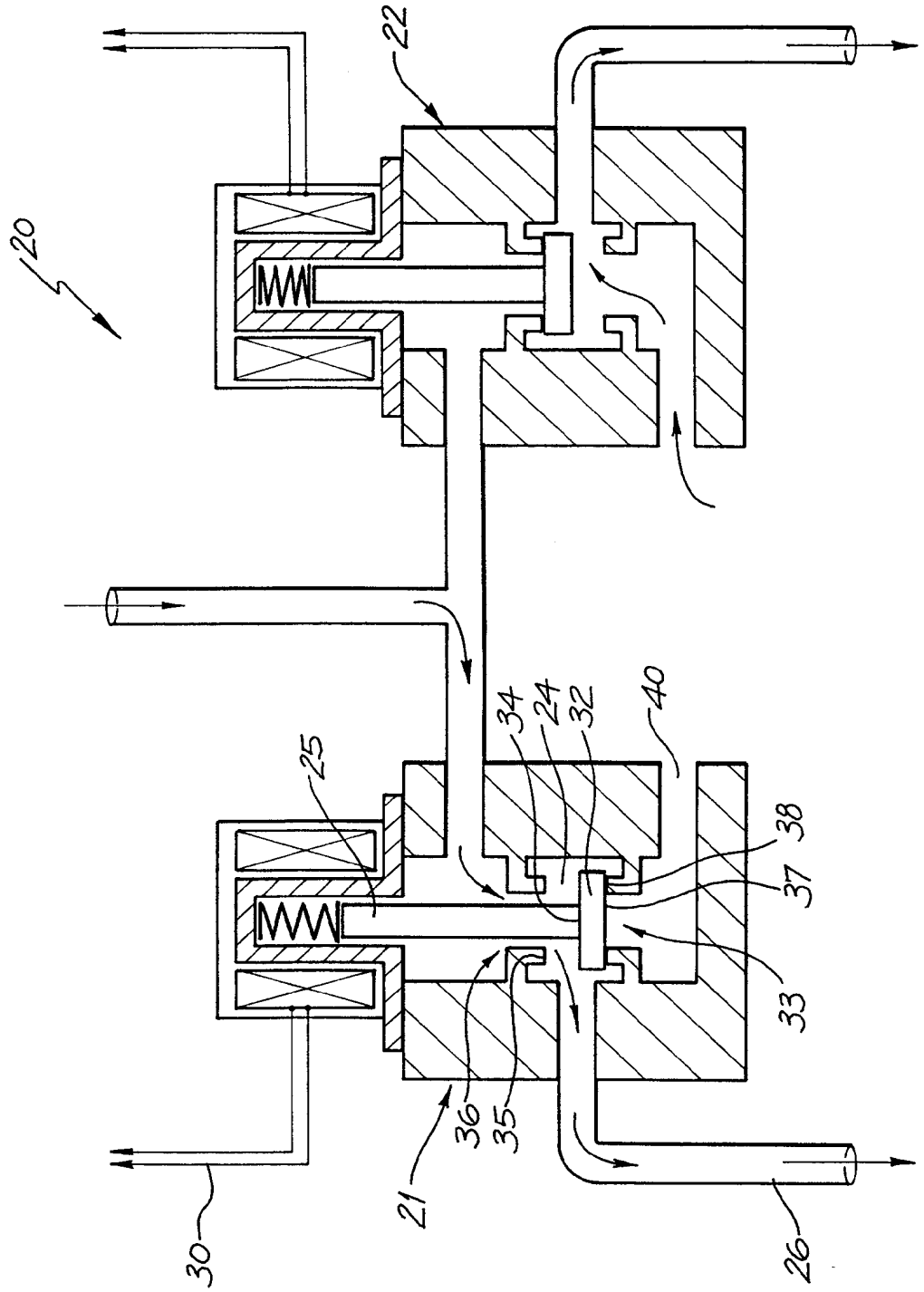


FIG. 3

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 166

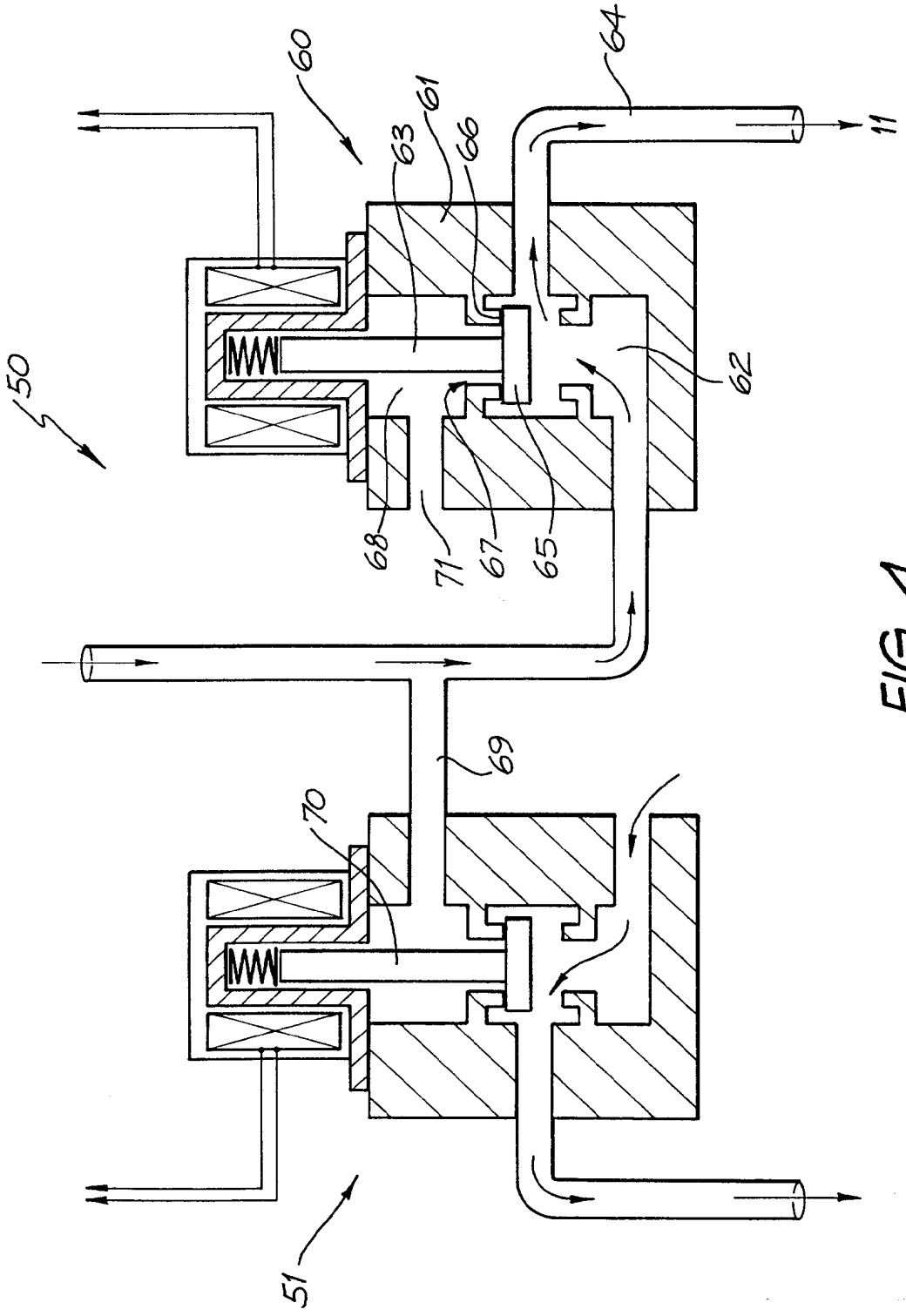


FIG. 4

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 167

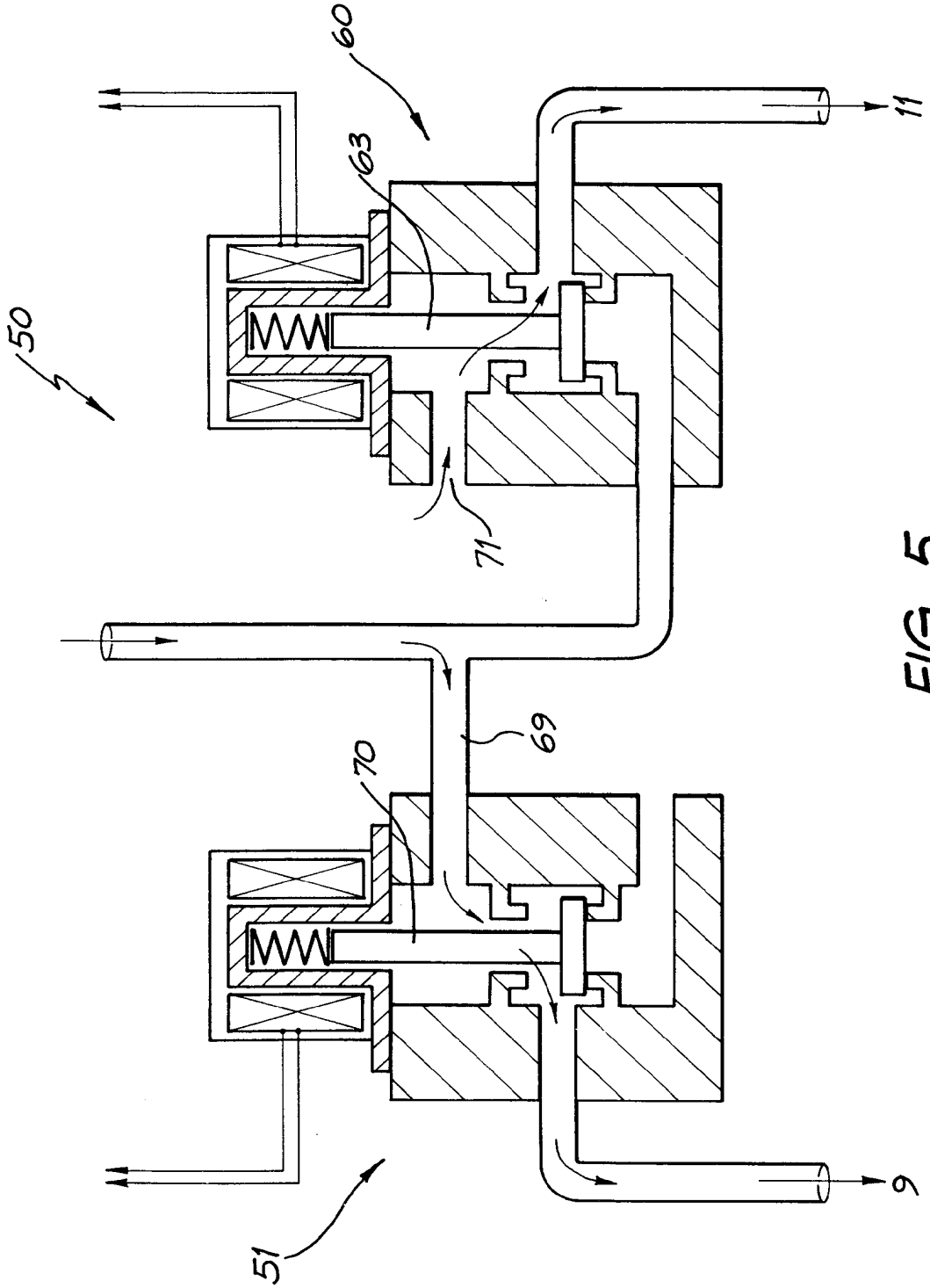


FIG. 5

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 168

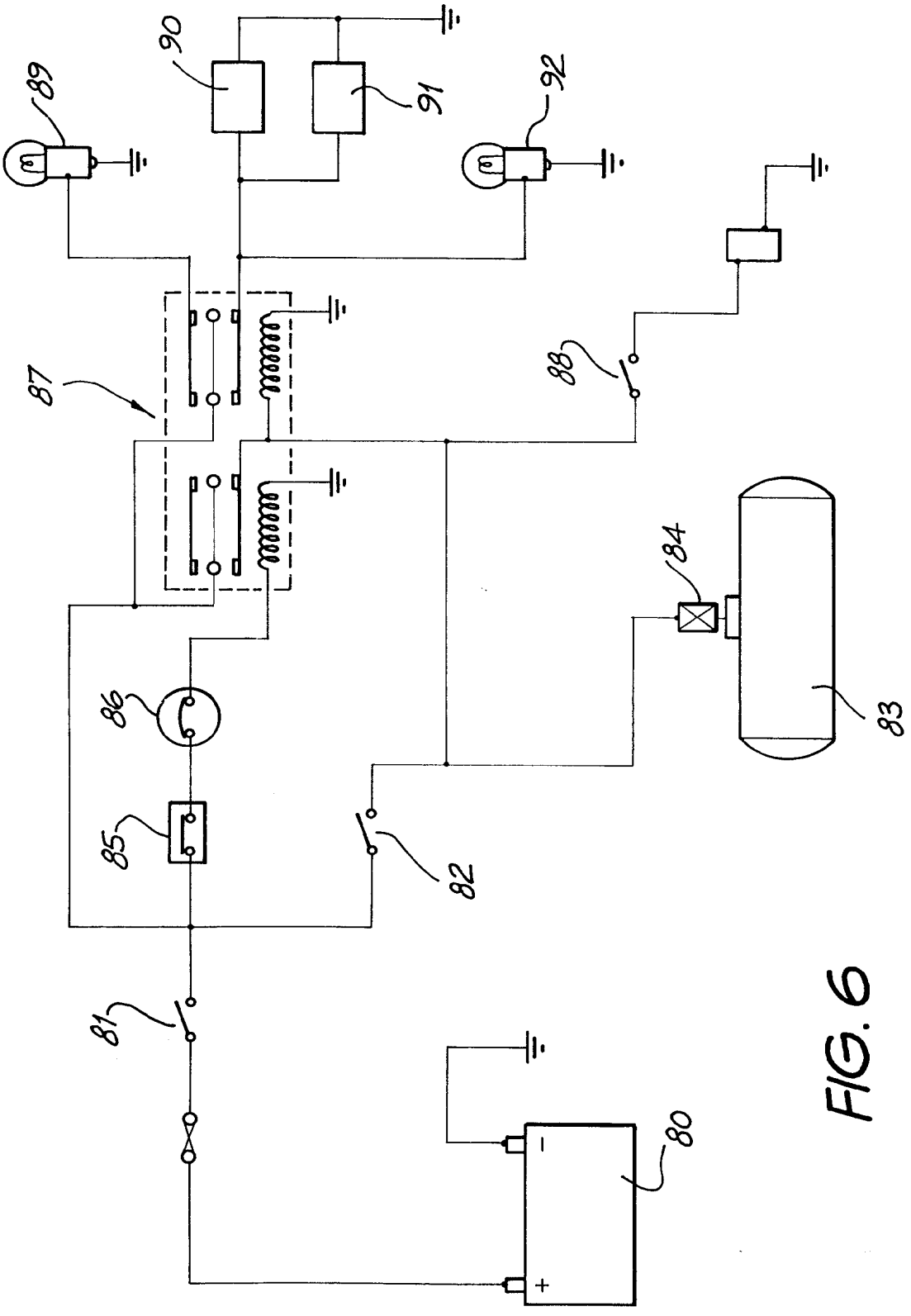


FIG. 6

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 169

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 98/00500

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: F02M 43/00; F02D 19/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F02M 21/02, 43/00, 02; F02D 19/08, 23/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPAT + keywords

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4619240 A (BEDFORD et al) 28 October 1986 whole document	
A	US 4517928 A (WOLTERS) 21 May 1985 whole document	

☐ Further documents are listed in the continuation of Box C

☒ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 August 1998	28 AUG 1998
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929	Authorized officer **KURT TOBLER** Telephone No.: (02) 6283 2469

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No.
PCT/AU 98/00500

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	4619240	CA	1226183	EP	108582		
US	4517928	AU	17878/83	BR	8304334	CA	1213484
		IN	161555	NL	8203169	ZA	8305922
						EP	102119

END OF ANNEX

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(54) Fuel change-over system and change-over method for motorcycle or motor-assisted bicycle

(57) The invention discloses a fuel change-over system for a motorcycle or motor assisted bicycle. The system comprises a solenoid-actuated gasoline valve (70) for controlling opening/closing of a gasoline supply passage, a solenoid-actuated LPG valve (40) for controlling opening/closing of a LPG supply passage, a gasoline pump (80), a change-over switch (140), a control device (100), and a indication device (150). During a change-over from gasoline to LPG, the control device (100) makes the pump (80) starting and operating so that any rest gasoline in a carburetor (60) of the vehicle can be drawn by the pump (80) back to a tank (90) of the vehicle. Moreover, the invention provides a fuel change-over method for conducting a smooth fuel change-over between gasoline and LPG in a dual-fuel motorcycle or motor assisted bicycle during its running or stop time. This will be contributive to popularize motorcycles and motor assisted bicycles.

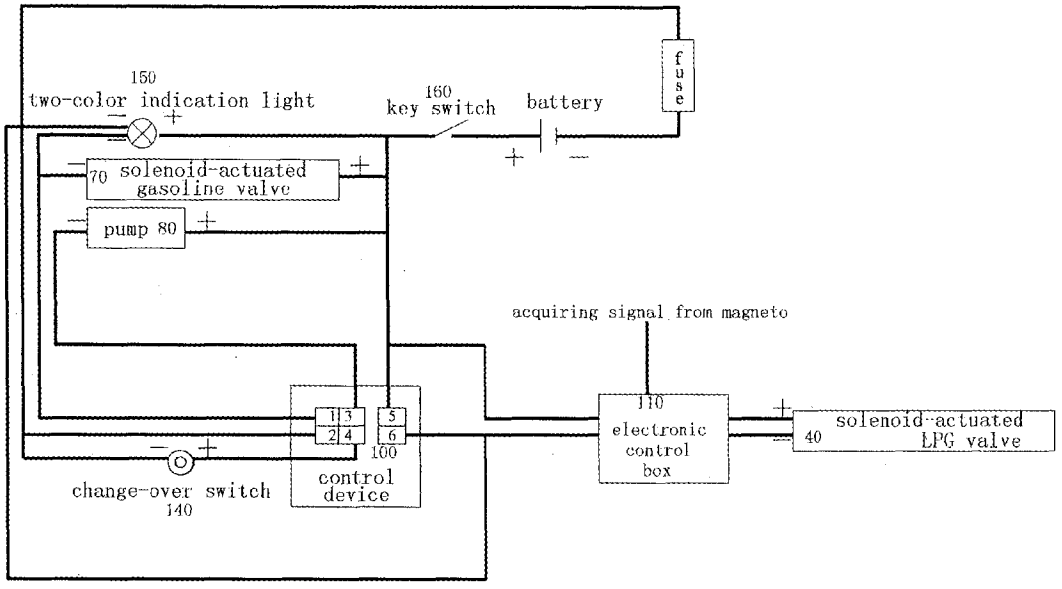


FIG. 2

EP 1 826 377 A2

Description

Technical field

[0001] The present invention relates generally to a fuel change-over system and a corresponding change-over method thereto for a motorcycle or motor-assisted bicycle (called jointly by motorcycle(s) hereafter).

Background of the invention

[0002] Nowadays, a motorcycle which uses clean energy sources such as LPG is becoming a new popular traffic vehicle, for the emissions of the gasoline-burning motorcycles have polluted the atmosphere heavily. Therefore, a LPG-burning motorcycle is and will be in a great demand in the world market. The gas refilling of LPG motorcycles, however, is a big problem in some countries, which needs the public administrations concerned to invest finance to build sufficient LPG refilling stations and service facilities associated with them. This is a big obstacle for popularizing LPG motorcycles in some countries. If a dual-fuel motorcycle can be developed that uses LPG as a primary fuel and gasoline as a secondary one, the dual-fuel motorcycle of this type will be adopted in large amounts in the cities where there are less LPG refilling stations, it will make its users unnecessary to worry about the trouble in gas refilling, harmful emissions will be reduced, and the environmental atmosphere will be less polluted accordingly. At present, there have existed sophisticated single-fuel motorcycles, that is, gasoline burning ones and LPG burning ones, in wide use. A gasoline-burning motorcycle uses a carburetor to mix fuel with air and to form a combustible mixture, while a LPG-burning motorcycle uses a mixer to mix LPG with air. It is a difficult problem to combine a carburetor and a mixer together in a volume-limited motorcycle body, and it is another difficult problem to make a smooth change-over between the two fuels under a precondition not to influence user's riding. So far, in this field, there has not been a technology capable of solving the problems. Though some technologies for change-over between two fuels have been successfully used in the fields of cars and buses, the difference between a four-wheel vehicle and a two-wheel one is rather great, and most cars and buses are electronically fuel-injected, therefore, there is also a great difference in fuel change-over between a car and a motorcycle.

Summary of the invention

[0003] The object of the invention is to provide a fuel change-over system for conducting smooth and save changing-over between gasoline and LPG in a motorcycle.

[0004] The another object of the invention is to provide a fuel change-over system for conducting smooth and safe changing-over between gasoline and LPG during user's riding or in stop time.

[0005] The still another object of the invention is to provide a fuel change-over method for conducting smooth and safe changing-over between gasoline and LPG in a motorcycle.

[0006] In one aspect of the invention, the invention provides a fuel change-over system for conducting fuel change-over of a dual-fuel motorcycle. The system is used to conduct changing-over between gasoline supply and LPG supply and comprises: a solenoid-actuated gasoline valve for controlling opening/closing of a gasoline supply passage, it is connected at its one end to a gasoline tank and at its the other end to a carburetor; a solenoid-actuated LPG valve for controlling opening/closing of a LPG supply passage, it is connected at its one end to a LPG source and at its the other end to a mixer, and a outlet of the mixer is connected to a inlet of the carburetor; a change-over switch for conducting changing-over operation. The change-over system further comprises: a pump whose inlet is connected to the carburetor for drawing any rest gasoline in the carburetor back to the gasoline tank; a control device which is electrically connected to the pump, the change-over switch, the solenoid-actuated gasoline valve, and the solenoid-actuated LPG valve, respectively. In changing-over from gasoline to LPG, the control device makes the pump starting so as to draw any rest gasoline in the carburetor back to the gasoline tank.

[0007] In another aspect of the invention, the solenoid-actuated LPG valve is attached on a pressure reducing valve which is connected at its one end to the LPG source and at its the other end to the mixer.

[0008] In still another aspect of the invention, the mixer is connected at its outlet to an inlet of the carburetor and is provided with an air cleaner at its inlet.

[0009] In yet another aspect of the invention, the fuel change-over system is provided with an electronic control box for acquiring a signal from the magneto of a motorcycle. The electronic control box is connected with the solenoid-actuated LPG valve. When the magneto is stopped, the electronic control box transmits a control signal to make the solenoid-actuated LPG valve closed and thereby to shut off LPG supply passage.

[0010] In a further aspect of the invention, the control device further includes a condition memory device which is able to remember if gasoline or LPG is used before electrical power supply is turned off until the motorcycle and its magneto is power on and started again. The change-over switch is a two-position button switch and can be triggered by a voltage signal. The change-over switch is not triggered when the power supply of a motorcycle is turned off.

[0011] In a further aspect of the invention, the fuel change-over system further includes a fuel attribute indicator for indicating if gasoline or LPG is used at that right time. The fuel attribute indicator is electrically connected with the control device.

[0012] In a further aspect of the invention, the control

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 173

device can control the gasoline pump so that the operation time length of the pump is proportional to the gasoline chamber volume of the carburetor.

[0013] In a further aspect of the invention, during a changing-over from LPG to gasoline, the control device controls the solenoid-actuated LPG valve so as to make it closed at a time delay; and during a changing-over from gasoline to LPG, the control device controls the solenoid-actuated gasoline valve so as to make it open at a time delay.

[0014] In a further aspect of the invention, the control device is provided with a change-over disabling device which is used to disable any following changing-over operation in a predetermined period after the last changing-over is triggered.

[0015] Furthermore, the invention provides a fuel change-over method for conducting fuel change-over in a dual-fuel motorcycle. The method comprises: during a changing-over from LPG to gasoline, as soon as the change-over switch of the change-over system is operated, the control device of the change-over system makes the solenoid-actuated gasoline valve open immediately so as to make gasoline passage through, and at the same time, the solenoid-actuated LPG valve is closed at a time delay; during a changing-over from gasoline to LPG, as soon as the change-over switch of the change-over system is operated, the control device of the change-over system makes the solenoid-actuated gasoline valve closed immediately so as to shut off gasoline passage, and at the same time, the gasoline pump in the fuel change-over system is started, and the solenoid-actuated LPG valve is opened at a time delay.

[0016] With the fuel change-over system and the fuel change-over method according to the invention, a rider can conduct a smooth fuel changing-over between gasoline and LPG during whose running or in stop time. This will be contributive to popularize motorcycles.

Brief description of drawings

[0017]

Fig. 1 is a schematic diagram of a general layout of the fuel change-over system according to the invention; and

Fig. 2 is a wiring principle diagram of the control device of the fuel change-over system according to the invention.

Detailed description of the invention

[0018] The invention is described below in detail in reference to the accompanying drawings.

[0019] Fig.1 is a schematic diagram of a general layout of the fuel change-over system for a motorcycle according to the invention, which is used for conducting changing-over between gasoline and LPG. The fuel change-over system comprises a solenoid-actuated gasoline valve 70 for opening/closing a gasoline supply passage and a solenoid-actuated LPG valve 40 for opening/closing a LPG supply passage. The solenoid-actuated gasoline valve 70 is connected at its one end to a gasoline tank 90 and at its the other end to a carburetor 60. The solenoid-actuated LPG valve 40 is attached on a pressure-reducing valve 120 which is used for adjusting LPG pressure into a mixer 50. The pressure-reducing valve 120 is connected at its one end to a LPG container 20 and at its other end to the mixer 50 which is used for mixing LPG and air. An outlet of the mixer 50 is connected to an inlet of the carburetor 60, and thereby it is possible to use a common fuel throttle wire, and an air cleaner (not shown) is provided at an inlet of the mixer 50. As shown in Fig. 1, a combination valve 30 is provided in the LPG container 20 and is connected to a LPG refilling valve 10 which is used for filling LPG into LPG container 20.

[0020] The fuel change-over system comprises a change-over switch for triggering a changing-over operation. Preferably, the change-over switch is a two-position button switch and can be triggered by a voltage signal. Thus, the change-over switch will not be triggered by a mal-operation in the case that the main power supply is turned off.

[0021] The fuel change-over system of the invention further comprises a gasoline pump 80 which is connected at its inlet to a discharge port at the bottom of the carburetor 60 and at its outlet to a gasoline tank 90 so that it can draw any rest gasoline in the carburetor 60 back to the gasoline tank 90.

[0022] Furthermore, the fuel change-over system includes a control device 100. As shown in Fig. 2, the control device 100 has six control legs, wherein leg 1 is connected to the solenoid-actuated gasoline valve 70 and can be connected in parallel with a double-color indication light 150 for indicating the condition of the solenoid-actuated gasoline valve 70, e.g. red light's lighting up indicates that the solenoid-actuated gasoline valve 70 is open and gasoline is used; leg 6 is connected to solenoid-actuated LPG valve 40 and also connected with the double-color indication light 150 for indicating the condition of the solenoid-actuated LPG valve 40, e.g. green light's lighting up indicates that the solenoid-actuated LPG valve 40 is open and LPG is used; leg 2 is connected to the negative of the battery; leg 3 to gasoline pump 80; leg 4 to the change-over switch 140; and leg 5 to the key switch 160 of a motorcycle.

[0023] The control device 100 carries out its control functions as follows: in a changing over from LPG to gasoline, as soon as the change-over switch 140 is pressed down, the control device 100 makes solenoid-actuated gasoline valve 70 open immediately so that the gasoline supply passage becomes through; meanwhile the solenoid-actuated LPG valve 40 on the pressure-reducing valve 120 is closed at a time delay and the LPG supply passage is closed at a time delay accordingly. The double-color indication light 150 gives out a red light

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 174

in the time a motorcycle runs on gasoline. In a changing over from gasoline to LPG, as soon as the change-over switch 140 is pressed again, the control device 100 makes solenoid-actuated gasoline valve 70 closed immediately so that the gasoline supply passage shut off, and the pump 80 is put into operation for a suitable predetermined period to draw any rest gasoline in the carburetor 60 back to the gasoline tank 90 and then is stopped; meanwhile the solenoid-actuated LPG valve 40 on the pressure-reducing valve 120 is opened at a time delay and the LPG supply passage becomes through accordingly. The double-color indication light 150 gives out a green light in the time a motorcycle runs on gasoline.

[0024] In the control process described above, the length of the time delay at which the solenoid-actuated LPG valve 40 is closed or opened is dependent on the displacement volume of a specific motorcycle and on the internal configuration of the carburetor 60; the length of the period for which the gasoline pump 80 works is dependent on the size of the carburetor gasoline chamber. Generally, the larger the gasoline chamber is the longer the period for which the gasoline pump 80 shall work after the solenoid-actuated gasoline valve 70 is closed.

[0025] Preferably, the control device 100 further includes a condition memory device which is able to remember the condition in which if gasoline or LPG is used before electrical power supply is turned off until power supply is turned on again, thereby, when the motorcycle is restarted, the control device 100 can hold the motorcycle to use the fuel that was used before its electrical power supply is turned off. In the case that the change-over switch 140 is a voltage triggered button-type switch, in combination with the condition memory device, a program malfunction or mal-operation which may cause the two fuel burned simultaneously can be avoided.

[0026] Furthermore, the control system 100 includes a change-over disabling device which is used to disable any following changing-over operation in a predetermined period (e.g. 10 seconds) after the change-over switch 140 is pressed down last-time, this is to ensure that two successive fuel change-overs can not be conducted in a stipulated time length so as to avoid the program out of order and the two fuels burned simultaneously.

[0027] Moreover, in order to ensure motorcycle's stability and safety, the control device 100 of the fuel change-over system of the invention is provided with an electronic control box 110 for acquiring a signal from a magneto of the motorcycle. The electronic control box 110 is connected with the solenoid-actuated LPG valve 40. As soon as the motorcycle stops traveling and its magneto stops as well, the electronic control box 110 transmits a control signal to make the solenoid-actuated LPG valve 40 closed so as to shut off LPG passage.

[0028] In addition, as shown in Fig. 1, an additional solenoid-actuated LPG valve 130 is provided in the container which is LPG source. The valve, together and at the same time with the solenoid-actuated LPG valve 40 attached on the pressure-reducing valve 120, is controlled by the control device 100. This is advantageous to raise the safety of the whole system.

[0029] While the preferred embodiment of the invention has been described and illustrated, it is obvious that those who are skillful in this technical field can make many changes and modifications without departing from the spirit and principle of the invention. For example, the fuel change-over system according to the invention can be modified to suit motorcycles of different displacements and carburetors of different sizes by adjusting the time delay of the solenoid-actuated LPG valve 40 in the system. Therefore, the scope of the invention is only defined by the claims.

Claims

1. A fuel change-over system which is used on a dual-fuel motorcycle or motor assisted bicycle for conducting its fuel change-over, more particularly for conducting change-over between gasoline supply and LPG supply, is **characterized in that** the fuel change-over system comprises:

   a solenoid-actuated gasoline valve for controlling opening/closing of a gasoline supply passage, the solenoid-actuated gasoline valve being connected at its one end to a gasoline tank and at its the other end to a carburetor;
   a solenoid-actuated LPG valve for controlling opening/closing of a LPG supply passage, the solenoid-actuated LPG valve being connected at its one end to a LPG source and at its the other end to a mixer;
   a change-over switch for conducting changing-over operation;
   a gasoline pump which is connected at its inlet to the carburetor and at its outlet to the gasoline tank so that the pump can draw the gasoline in the carburetor back to the tank;
   a control device which is electrically connected to the pump, the change-over switch, the solenoid-actuated gasoline valve, and the solenoid-actuated LPG valve, respectively, the control device is configured to start the pump to draw the gasoline in the carburetor back to the tank as soon as the change-over switch is triggered when a changing-over from gasoline to LPG is conducted.

2. The fuel change-over system according to claim 1, wherein the solenoid-actuated LPG valve is attached on a pressure-reducing valve, and the pressure-reducing valve is connected at its one end to the LPG source and at its the other end to the mixer.

3. The fuel change-over system according to claim 1,

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 175

wherein the mixer is connected at its outlet to an inlet of the carburetor and is provided with an air cleaner at its inlet.

4. The fuel change-over system according to claim 1, wherein the fuel change-over system is provided with an electronic control box for acquiring a signal from a magneto of a motorcycle and motor assisted bicycle, the electronic control box is connected with the solenoid-actuated LPG valve, the electronic control box transmits a control signal to make the solenoid-actuated LPG valve closed and thereby to shut off LPG passage as soon as the magneto stops.

5. The fuel change-over system according to claim 1, wherein further comprising a condition memory device which is able to remember the condition in which if gasoline or LPG is used before the electrical power supply of the control device is turned off until the power supply is turned on again, thereby, when the motorcycle or motor assisted bicycle is restarted, the control device can hold it to use the fuel that was used before its electrical power supply is turned off, the change-over switch is a voltage triggered button-type switch, which is not triggered when the electrical power supply of the motorcycle or motor assisted bicycle is turned off.

6. The fuel change-over system according to claim 1, wherein the fuel change-over system comprises a fuel attribute indicator for indicating if gasoline or LPG is used by the vehicle at that right time, the indicator is connected with the control device.

7. The fuel change-over system according to claim 1, wherein the control device can control the gasoline pump so that the length of its operation time is proportional to the gasoline chamber volume of the carburetor.

8. The fuel change-over system according to claim 1, wherein during a changing-over from LPG to gasoline, the control device controls the solenoid-actuated LPG valve so as to make it closed at a time delay; and during a changing-over from gasoline to LPG, the control device controls the solenoid-actuated gasoline valve so as to make it open at a time delay.

9. The fuel change-over system according to claim 1, wherein the fuel change-over system includes a change-over disabling device which is used to disable any following changing-over operation in a predetermined period after the last-time change-over is carried out.

10. A fuel change-over method for conducting fuel change-over of a dual-fuel motorcycle or motor assisted bicycle via a fuel change-over system, comprising:

during a changing-over from LPG to gasoline, as soon as a change-over switch of the change-over system is operated, a control device of the change-over system makes a solenoid-actuated gasoline valve thereof open immediately so as to make gasoline supply passage through, and at the same time, a solenoid-actuated LPG valve thereof is closed at a time delay; during a changing-over from gasoline to LPG, as soon as the change-over switch of the change-over system is operated, the control device of the change-over system makes the solenoid-actuated gasoline valve closed immediately so as to shut off the gasoline supply passage, and at the same time, the gasoline pump in the fuel change-over system is started to work and the solenoid-actuated LPG valve is opened at a time delay.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 176

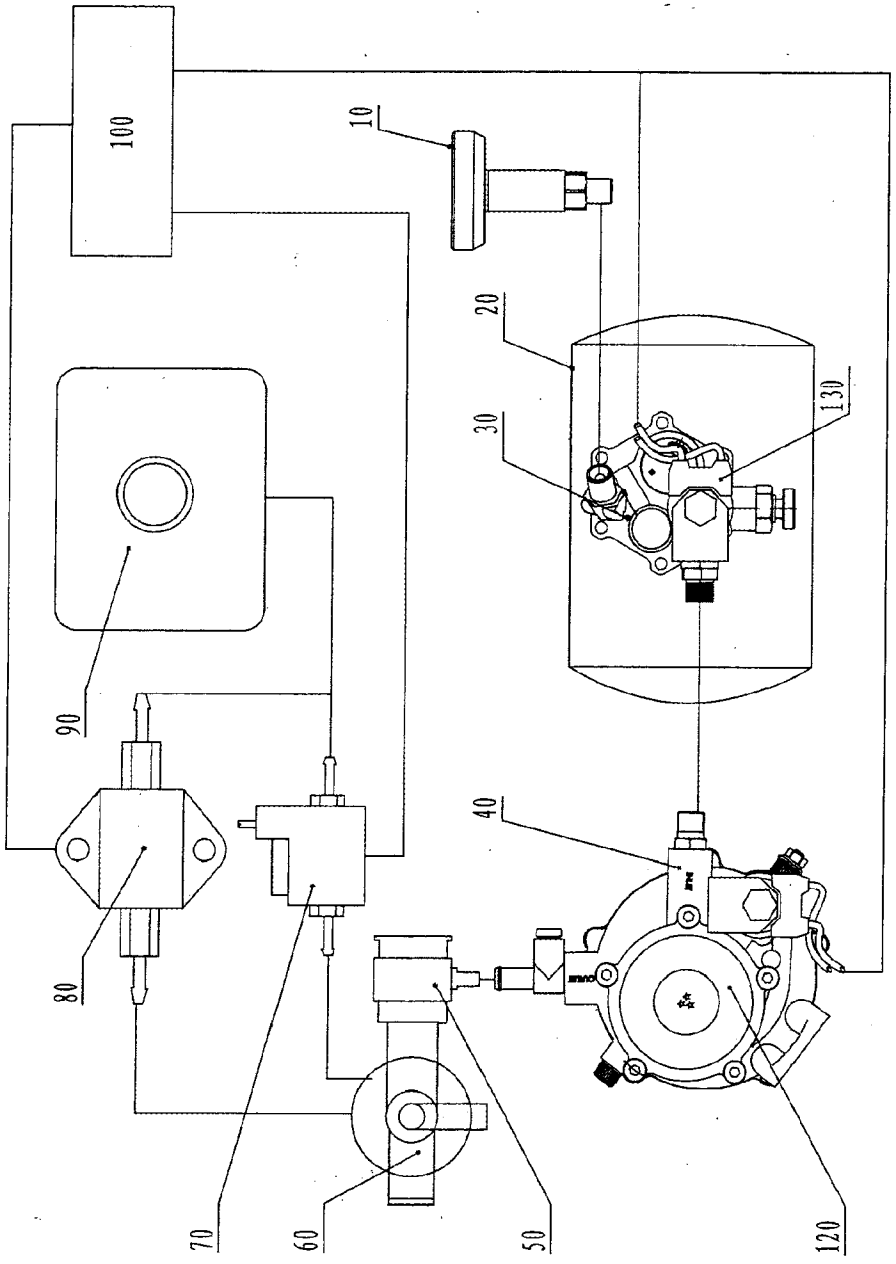


FIG. 1

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 177

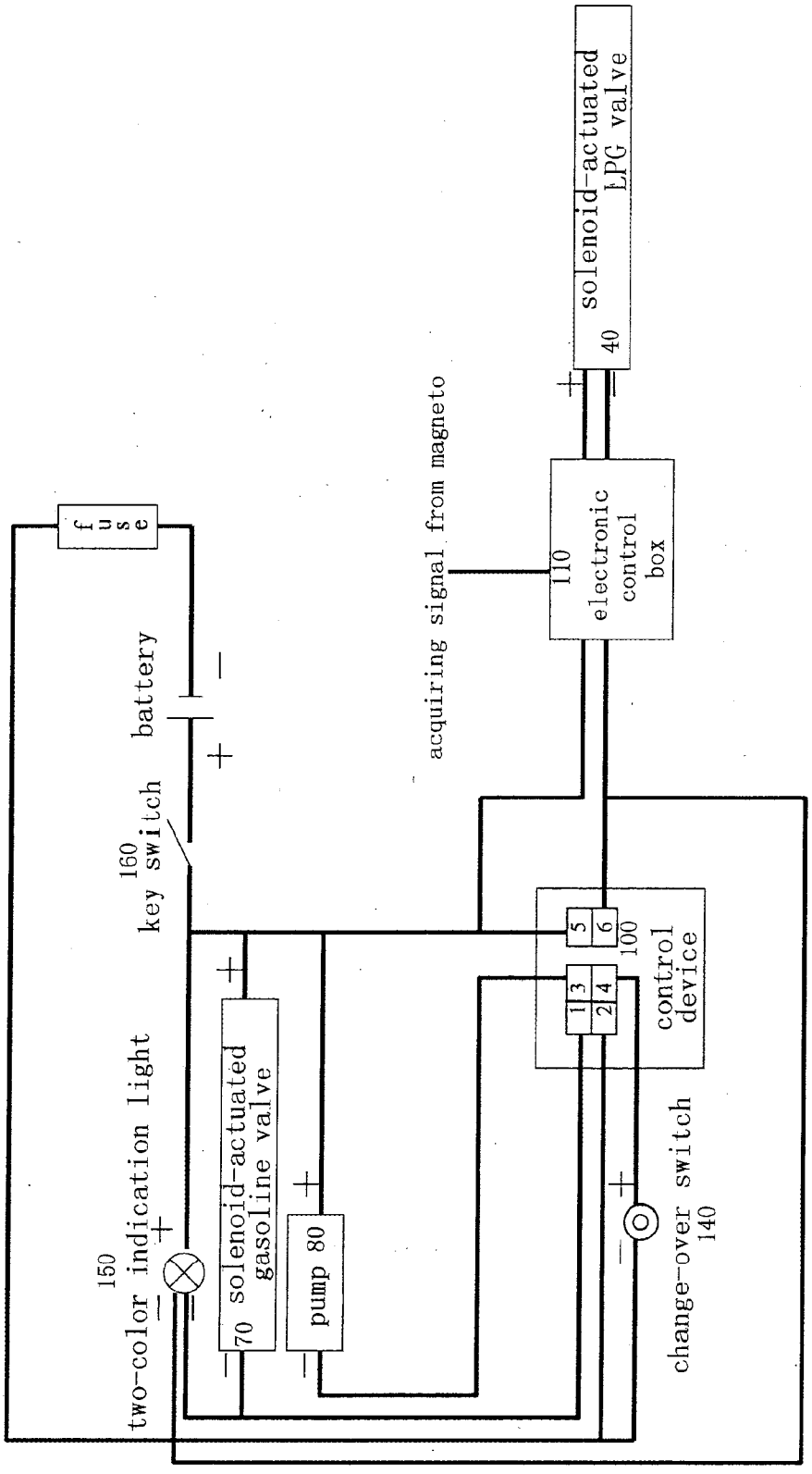


FIG. 2

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 178

Espacenet

Bibliographic data: FR2220679 (A1) — 1974-10-04

Fuel control system for I.C. engine - supplies light or heavy fuel, according to use of engine, to injection pump

Inventor(s):

Applicant(s): SERVEQUIP [FR] ± (SERVEQUIP,FR, ; SERVEQUIP)

Classification:
- **international:** ***F02D19/06;*** (IPC1-7): F02D19/06
- **cooperative:** **F02D19/0618 (EP)**; **F02D19/0676 (EP)**; Y02T10/30 (EP)

Application number: FR19730008061 19730307

Priority number(s): FR19730008061 19730307

Also published as: FR2220679 (B1)

Abstract of FR2220679 (A1)

The engine fuel pump is supplied from either of two fuel tanks through an electromagnetic three-way valve. Excess fuel from the pump is returned to either tank through another three way valve. The valve motors are energised by a circuit containing a switch controlled by a manual lever. The flow valve is operated immediately by the controls but the return valve is operated through an adjustable delay timer. This ensures that fuel already in the pipes is returned to the correct tank.

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(74) Mandataire : Cabinet Faber.

(54) **Installation de contrôle de l'alimentation d'un moteur sélectivement en gas-oil et en fuel-oil.**

(72) Invention de :

(33) (32) (31) Priorité conventionnelle :

Vente des fascicules à l'IMPRIMERIE NATIONALE, 27, rue de la Convention - 75732 PARIS CEDEX 15

L'invention concerne le contrôle de l'alimentation d'un moteur à combustion interne sélectivement en gas-oil et en fuel-oil, notamment les moteurs de pompes à béton montées sur véhicules automobiles.

Lorsqu'une pompe à béton est installée d'une manière immobile sur un chantier, il est autorisé de l'actionner au moyen d'un moteur alimenté en fuel-oil, c'est-à-dire, un carburant détaxé et par conséquent bon marché. Mais lorsque cette même pompe est montée sur un véhicule automobile, il n'est pas permis que le moteur d'entrainement de ce véhicule soit alimenté également en fuel-oil, on l'alimente donc en général en gas-oil, c'est-à-dire en carburant non détaxé, et par conséquent onéreux.

En moyenne, on a constaté que les temps d'utilisation d'une pompe à béton se partagent approximativement en 3/5 pour le travail de pompage du béton à poste fixe et 2/5 pour les déplacements de la pompe.

Au lieu d'avoir un moteur alimenté à partir d'un réservoir de fuel-oil pour l'actionnement de la pompe et un autre moteur alimenté à partir d'un réservoir de gas-oil pour l'entrainement du véhicule, il serait intéressant d'avoir un moteur unique que l'on puisse accoupler sélectivement à la pompe ou à la transmission d'entrainement des roues du véhicule pourvu que l'on soit assuré que l'alimentation du moteur se fasse dans chacune des deux utilisations, à partir du réservoir de carburant correspondant et qu'au début du fonctionnement au gas-oil le reliquat de fuel-oil demeuré dans les diverses tuyauteries et accessoires, tels que filtres et injecteurs, retourne bien dans le réservoir de fuel-oil.

A cet effet, on va donc utiliser une installation de contrôle de l'alimentation d'une pompe à injection d'un moteur unique sélectivement à partir d'un réservoir de gas-oil ou d'un réservoir de fuel-oil, selon que le moteur est accouplé à un premier ou à un second appareil d'utilisation, notamment d'un moteur de pompe à béton montée sur un véhicule automobile mû par le même moteur, accouplé sélectivement à la pompe ou à une transmission d'entrainement des roues motrices du véhicule par un embrayage sélectif à commande manuelle et, suivant l'invention, l'entrée de la pompe d'alimentation du moteur est reliée

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 181

aux deux réservoirs de carburant par l'intermédiaire d'une première électro-valve d'amenée à trois voies et la sortie de ladite pompe est reliée semblablement aux deux réservoirs de carburant par l'intermédiaire d'une seconde électro-valve de retour à trois voies, les deux électro-valves étant placées sous le contrôle de l'organe de commande manuelle de l'embrayage sélectif du moteur, la première directement et la seconde par l'intermédiaire d'un relais temporisé, de façon telle que le retour de fuel-oil se fasse vers le réservoir de fuel-oil, non seulement lorsque l'alimentation de la pompe du moteur est assurée en fuel-oil, mais aussi pendant la durée de la temporisation dudit relais au début de l'alimentation de la pompe du moteur en gas-oil.

Grâce à une telle installation, le fait même d'accoupler le moteur à la pompe à béton ou bien à la transmission d'entraînement des roues du véhicule assure automatiquement l'alimentation de la pompe à injection du moteur à partir du réservoir de carburant approprié et, de plus, le reliquat de fuel-oil demeuré dans les conduites et accessoires ne risque pas de retourner dans le réservoir de gas-oil pendant le début du fonctionnement du moteur au gas-oil.

L'invention sera mieux comprise à la lecture de la description qui va suivre et à l'examen du dessin annexé dont la figure unique est un schéma d'une installation de contrôle de l'alimentation d'un moteur de pompe à béton suivant l'invention.

Sur le schéma, on a indiqué en 1 un moteur qui peut être accouplé, sélectivement, à une pompe à béton et aux roues d'un véhicule sur lequel est montée ladite pompe, au moyen d'un embrayage sélectif placé sous le contrôle d'un levier à commande manuelle 2 que l'on peut placer, sélectivement, dans l'une ou l'autre de deux positions correspondantes désignées respectivement par 2C et 2R sur le schéma, à savoir une position "chantier" pour l'entrainement de la pompe et une position "route" pour les déplacements.

Lorsque le moteur 1 est accouplé à la pompe à béton, sa pompe à injection 4 est alimentée à partir d'un réservoir 5 de fuel-oil par l'intermédiaire d'une électro-valve d'amenée à trois voies 6, dans sa position de repos, le levier 2 de sélection étant dans la position 2C. Lorsque le moteur 1 est accou-

plé aux roues du véhicule par la mise enposition du levier de sélection 2 dans la position 2R, la pompe à injection 4 du moteur est alimentée à partir d'un autre réservoir 7 de gas-oil, par l'intermédiaire de la même électro-valve 6 en position de travail.

L'électro-valve est donc reliée d'une part, à l'entrée de la pompe à injection 4 par une conduite 11 et, d'autre part, aux deux réservoirs de carburant 5 et 7 par deux conduites 13 et 14, respectivement.

La sortie de la pompe à injection 4 est reliée par une conduite 16 à une électro-valve de retour 17 qui est reliée, à son tour, aussi aux deux réservoirs de carburant 5 et 7 par deux conduites 18 et 19 respectivement.

Dans sa position de repos l'électro-valve de retour 17 met la sortie de la pompe à injection 4 en communication avec le réservoir de fuel-oil 5, tandis que lorsqu'elle est excitée elle la met en communication avec le réservoir de gas-oil 7.

Les deux électro-valves 6 et 17 sont alimentées à partir d'une source de courant appropriée, telle qu'une batterie d'accumulateuns 21, par l'intermédiaire d'un interrupteur 22 fermé lorsque le levier de sélection 2 est dans la position 2R de déplacement du véhicule, de préférence sous le contrôle du contact 24 de marche du moteur 1, muni d'un témoin lumineux 25. Toutefois, l'alimentation de l'électro-valve d'amenée 6 se fait directement à partir de l'interrupteur 22, tandis que celle de l'électro-valve de retour 17 se fait par l'intermédiaire d'un relais 26 temporisé par exemple pour une durée de deux minutes. On peut avantageusement utiliser à cet effet, un relais à temporisation réglable par exemple de 0 à 180 secondes.

Le fonctionnement de l'installation est le suivant :

pour faire fonctionner la pompe à béton, on place le levier sélecteur 2 dans la position "chantier" 2C. Le contact 24 étant fermé, le moteur 1 en fonctionnement entraine par conséquent la pompe à béton et sa pompe à injection 4 est alimentée en fuel-oil bon marché à partir du réservoir 5 par la conduite 13, l'électro-valve d'amenée 6 au repos et la conduite 11. Le retour de carburant de la pompe à injection 4 se fait par la conduite 16, l'électro-valve de retour 17en position de repos et la conduite 18.

Si l'on a besoin de déplacer la pompe à béton, on doit

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 183

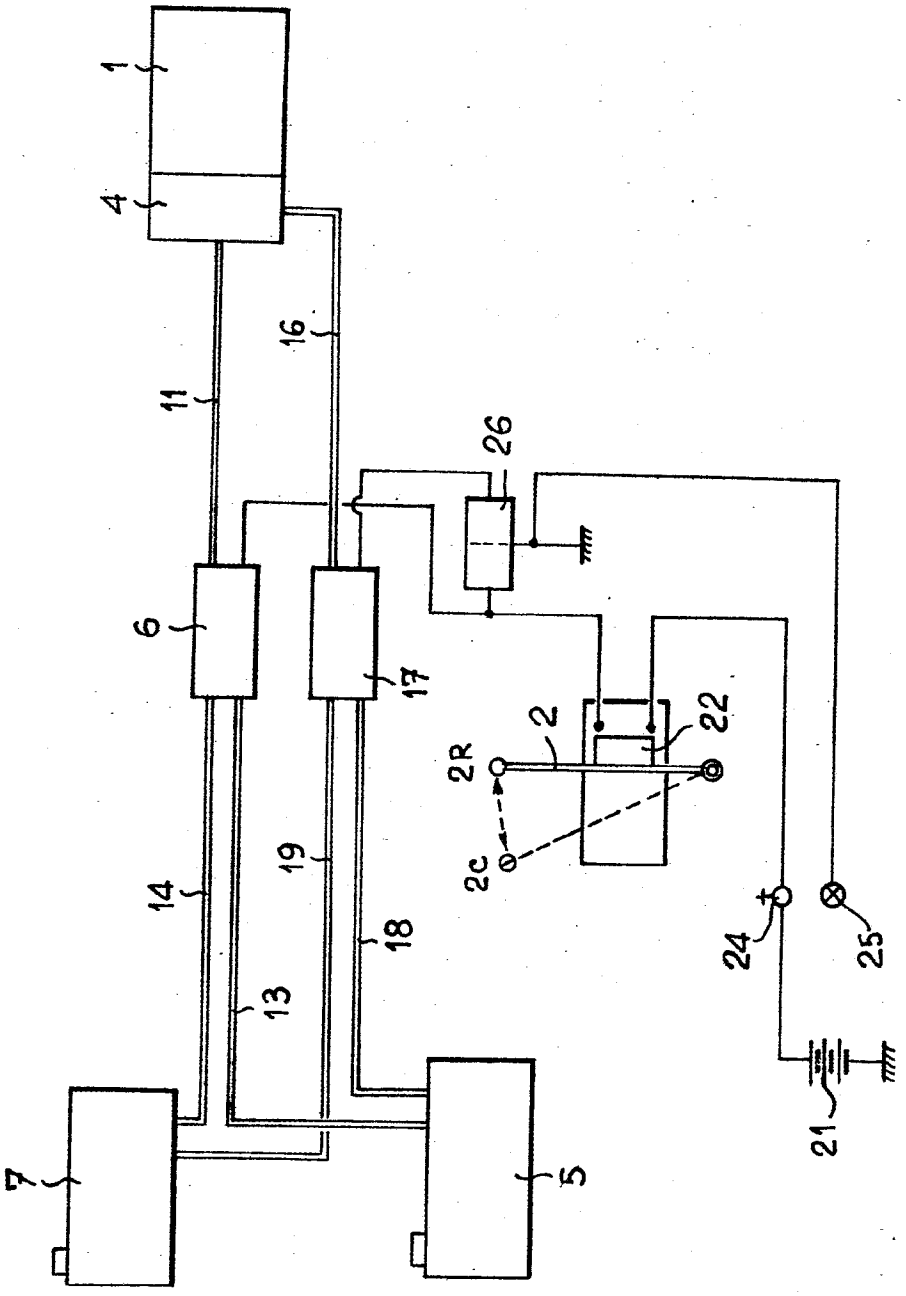
amener le levier sélecteur 2 dans la position "route" 2R de manière à assurer l'accouplement du moteur 1 aux roues du véhicule. Dans cette position, l'électro-valve d'amenée 6 est immédiatement mise en position de travail et la pompe à injection 4 du moteur est alimentée en gas-oil cher par la conduite 14, l'électro-valve d'amenée 6 en position de travail, et la conduite 11. Dès le début du fonctionnement du moteur dans cette condition, le relais temporisé 26, bien qu'alimenté aussi, laisse encore, pendant une durée d'environ deux minutes l'électro-valve de retour 17 en position de repos, de sorte que le reliquat du carburant précédemment utilisé, c'est-à-dire du fuel-oil bon marché qui se trouvait encore dans les conduites et accessoires retourne par la conduite 16, l'électro-valve 17 de retour au repos et la conduite 18, au réservoir 5 de fuel-oil. A l'expiration du temps de temporisation, on est certain que tout le circuit de retour est purgé de fuel-oil bon marché et, à ce moment, le relais 26 assure la mise de l'électro-valve de retour 17 en position de travail pour permettre le retour de gas-oil de la pompe à injection, par la conduite 19, au réservoir 7 de gas-oil cher.

Bien entendu, l'invention n'est pas limitée au mode de réalisation décrit et représenté ; on peut y apporter des modifications, suivant les applications envisagées, sans sortir, pour cela, du cadre de l'invention.

REVENDICATION

Installation de contrôle de l'alimentation d'une pompe à injection de moteur sélectivement à partir d'un réservoir de gas-oil ou d'un réservoir de fuel-oil, selon que le moteur est accouplé à un premier ou à un second appareil d'utilisation, notamment d'un moteur de pompe à béton monté sur un véhicule automobile mû par le même moteur, accouplé sélectivement à la pompe ou à une transmission d'entrainement des roues motrices du véhicule par un embrayage sélectif à commande manuelle, ladite installation étant caractérisée en ce que l'entrée de la pompe d'alimentation du moteur est reliée aux deux réservoirs de carburant par l'intermédiaire d'une électro-valve d'amenée à trois voies et la sortie de ladite pompe est reliée semblablement aux deux réservoirs de carburant par l'intermédiaire d'une électro-valve de retour à trois voies également, les deux électro-valves étant placées sous le contrôle de l'organe de commande manuelle de l'embrayage sélectif du moteur, la première directement et la seconde par l'intermédiaire d'un relais temporisé, de façon telle que le retour de fuel-oil se fasse vers le réservoir de fuel-oil, non suelement lorsque l'alimentation de la pompe du moteur est assurée en fuel-oil, mais aussi pendant la durée de la temporisation dudit relais au début de l'alimentation de la pompe du moteur en gas-oil.

Pl. unique 2220679



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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	**08/11/2022 11:00:14 AM ET**	**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 #	60863142	FILING DATE	11/15/2018
CUSTOMER #	26629	FIRST NAMED INVENTOR	Mark J. Sarder
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Andrew Stark

Documents

TOTAL DOCUMENTS: 12

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
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2022.08.11 Response to Decision on Appeal-BD.A.pdf	(1-1)	1	Amendment/Argument after Patent Board Decision	111 KB
2022.08.11 Response to Decision on Appeal-CLM.pdf	(2-5)	4	Claims	86 KB
2022.08.11 Response to Decision on Appeal-REM.pdf	(6-7)	2	Applicant Arguments/Remarks Made in an Amendment	82 KB

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FPD6-FR2220679A1.pdf	8	Foreign Reference	931 KB
NPL1-Yamaha EF2000iS Tri Fuel Conversion Overview and Installation Tips.pdf	9	Non Patent Literature	669 KB

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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

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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

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 $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ 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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	08/11/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $240 =	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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		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".	/LASHAWN A HINTON/
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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: 07/11/2022

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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 07/11/2022

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EXAMINER
LATHERS, KEVIN ANTHONY

ART UNIT	PAPER NUMBER
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARK J. SARDER, ALEKO D. SOTIRIADES, JAMES J. DEHN, and LEIGH JENISON

Appeal 2022-001059
Application 16/191,503
Technology Center 3700

Before DANIEL S. SONG, STEFAN STAICOVICI, and BRETT C. MARTIN, *Administrative Patent Judges.*

SONG, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), the Appellant[1] appeals from the Examiner's decision to reject claims 1–17, 21, 22, and 24.[2] Final Act. 5–8. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

---

[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42(a). The Appellant identifies the real party in interest as Champion Power Equipment, Inc. Appeal Br. 1.

[2] We note that the Examiner's rejection of claim 24 under 35 U.S.C. § 112(a) has been withdrawn. Ans. 9; *see also* Final Act. 3–4.

CLAIMED SUBJECT MATTER

The claims are directed to a dual fuel generator and fuel delivery system. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. 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.

Appeal Br. 15 (Claims App.). Claims 11 and 21 are also independent, and include limitations that are similar to those of claim 1.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 195

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
NoOutage	web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm	Aug. 27, 2006
Sugimoto	US 2007/0137591 A1	June 21, 2007
Pursifull	US 2011/0168133 A1	July 14, 2011
GasHose	https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/	May 17, 2014

REJECTIONS[3]

1. Claims 1–17, 21, and 22 are rejected on the grounds of nonstatutory double patenting as being unpatentable over claims 1–15 of U.S. Patent 10,221,780 B2 (issued Mar. 5, 2019). Final Act. 2–3.
2. Claims 1, 6, 10–13, 16, and 21 are rejected under 35 U.S.C. § 103 as being unpatentable over Pursifull in view of Sugimoto and GasHose. Final Act. 5.
3. Claims 7–9, 14, 15, 17, and 22 are rejected under 35 U.S.C. § 103 as being unpatentable over Pursifull in view of Sugimoto, GasHose, and NoOutage. Final Act. 7.

OPINION

I. *Double Patenting:*

The Examiner rejects claims 1–17, 21, and 22 on the ground of nonstatutory double patenting as being unpatentable over claims 1–15 of U.S. Patent 10,221,780 B2. The Appellant does not argue this rejection, but

[3] As noted, the Examiner's rejection of claim 24 under 35 U.S.C. § 112(a) has been withdrawn. Ans. 9; *see also* Final Act. 3–4.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 196

requests that this rejection be held in abeyance until a determination of allowable subject matter is made. Appeal Br. 13–14. Thus, we summarily affirm this nonstatutory double patenting rejection.

II. *Claims 1, 6, 10–13, 16, and 21:*

The Examiner rejects claims 1, 6, 10–13, 16, and 21 as being unpatentable over Pursifull in view of Sugimoto and GasHose. Final Act. 5. The Appellant only submits arguments directed to independent claims 1, 11, and 21, and argues these independent claims together as a group. Appeal Br. 3, 7, *et seq*. Indeed, although independent claim 1 recites primary and secondary pressure regulators, whereas independent claims 11 and 21 recite first and second stages, there does not appear to be any substantive difference between these terms. Appeal Br. 15, 17, 19 (Claims App.). Therefore, we select claim 1 as representative, and claims 6, 10–13, 16, and 21 stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv).

A. Off-Board Fuel Regulator System

The Examiner rejects claim 1 finding that Pursifull discloses a dual fuel generator substantially as claimed, including being "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." Final Act. 5 (citing Pursifull ¶ 40). The Examiner concedes that Pursifull "fails to disclose a fuel regulator system located off board the dual fuel generator," or the recited primary and secondary pressure regulators as claimed. Final Act. 5–6.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 197

The Examiner finds 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 reducing device. Final Act. 6. The Examiner concludes that it would have been obvious to modify the device of Pursifull in view 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." Final Act. 6 (citing Sugimoto ¶¶ 2, 10). The Examiner also finds that "Sugimoto does not disclose the exact details of its off-board fuel system, such as the type of tank and regulator it contains." *Id.* The Examiner further finds that GasHose discloses "twin stage regulators (i.e. two regulators in series)," and concludes that it would have been obvious to one of ordinary skill in the art in light of GasHose to use such a twin stage system with the off-board fuel system of Pursifull, as modified by Sugimoto. *Id.*

The Appellant argues that the art cited by the Examiner lacks a "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 . . . (claim 1) and/or both a first stage and second stage being located off board the dual fuel generator (claims 11 and 21)." Appeal Br. 8. The Appellant further argues that the fuel regulator system in Sugimoto comprises pressure reducing device 72 and fuel pressure regulator 62, and as such, the "'fuel regulator system' in Sugimoto . . . is different from what is called for in claims 1, 11, and 21 where an entirety of a fuel regulator system . . . is located *off board* the generator." *Id.* The Appellant

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 198

further notes that the "fuel pressure regulator 62 could not simply be removed from the [Sugimoto] generator 1 and combined with pressure reducing device 72 . . . as there would then be no pressure regulator on/in generator 1 that would regulate gas from fuel bottles 61." Appeal Br. 9.

The Examiner responds that "that the claim does not specify there being no on-board pressure regulation, simply that there exists an off-board pressure regulation." Ans. 14–15. The Examiner explains that "the proposed modification of Pursifull is not wholesale importation of the entirety of Sugimoto." Ans. 15. The Examiner further explains that the "modification of Pursifull with Sugimoto is that of the inclusion of Sugimoto's off-board propane tank systems not *literally all of Sugimoto*," such that the presence of pressure regulator 62 is not dispositive as to the rejection at hand. Ans. 15.

We agree with the Examiner for the reasons explained by the Examiner. Claim 1 recites a "dual fuel generator and fuel delivery system comprising . . . a fuel regulator system located off board," which includes a primary and secondary pressure regulator. However, the Appellant incorrectly argues that the claim precludes the provision of another fuel regulator system that is located on board the dual fuel generator. We agree with the Examiner that the recitation of the off-board two stage regulator system for the gaseous fuel supply in the claim does not preclude another regulator system that is on-board, such as regulator 62 in Sugimoto.

The Examiner is also correct that although Sugimoto teaches an off-board pressure reducing device, it is silent as to the details thereof. Thus, the Examiner properly relies on GasHose for teaching a two-stage regulator, for use as the generically taught off-board regulator disclosed in Sugimoto. The Appellant's further argument, that regulator 62 cannot be moved off-board,

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 199

fails because the rejections of claims 1, 11, and 21 do not move or make any changes to regulator 62.

Accordingly, the Appellant's arguments are unpersuasive.

B. Adding a Two Stage Off-Board Regulator:

The Appellant also argues that "one skilled in the art would not . . . modify pressure reducing device 72 [in Sugimoto] from a single-stage regulator to a dual-stage regulator — as such a modification would be unnecessary and duplicative." Appeal Br. 9. The Appellant further argues that "a dual-stage regulator . . . would only add additional cost and complexity to the generator 1, without providing any additional benefit." *Id.* The Appellant explains that "two stage pressure regulation is already provided [in Sugimoto] by fuel pressure regulator 62 and a single stage pressure reducing device 72," so that such a change "may actually cause undesirable pressure reduction of fuel from external fuel bottle 71." *Id.*; Reply Br. 7. The Appellant "believes the combination to be nothing more than the use of improper hindsight." Appeal Br. 10.

The Examiner responds that "the device 72 within Sugimoto is never s[t]ated 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.'" Ans. 15. The Examiner explains that as such, one would need to use some type of regulator for the pressure reducing device 72 in providing an off board gaseous fuel system (Fb), and that one of ordinary skill in the art would have chosen a regulator "that is not only common and cheap, but well-known and effective." Ans. 16. The Examiner finds that the regulator of GasHose provides these qualities and that

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 200

GasHose would provide these "benefits regardless of whatever on-board conditions exist in the generator in question." *Id*. The Examiner also finds that "the device 72 being a dual stage regulator would not harm Sugimoto or alter its system in any way" and that it would not "do anything other than benefit it." *Id*.

We agree with the Examiner's findings and conclusion. We agree with the Examiner's finding that using a two-stage regulator such as that disclosed in GasHose for an off board regulator would have been advantageous because it provides "a more even output control and a reduction in freeze-ups from an off-board fuel system (such as a propane tank)." Final Act. 6–7. Indeed, GasHose specifically teaches that twin state regulators "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 "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." GasHose 8. In light of these explicitly disclosed advantages, we do not find the combination to employ "the use of improper hindsight." *See In re Cree, Inc.*, 818 F.3d 694, 702 n.3 (Fed. Cir. 2016) (hindsight argument is of no moment where the Examiner provides a sufficient, non-hindsight reason to combine the references). Thus, the Appellant's arguments are unpersuasive.

In the Reply Brief, the Appellant also submits various additional new arguments directed to the teachings of Pursifull. Reply Br. 3–4. However, the Appellant's arguments are not timely and improperly submitted under the Rules. 37 C.F.R. § 41.41(b)(2) ("Any argument raised in the reply brief which was not raised in the appeal brief, or is not responsive to an argument

raised in the examiner's answer, including any designated new ground of rejection, will not be considered by the Board for purposes of the present appeal, unless good cause is shown."). The Appellant has not made any showing of good cause. Thus, we decline to consider the Appellant's untimely arguments newly raised in the Reply Brief. *See also Ex parte Borden*, 93 USPQ2d 1473, 1473–74 (BPAI 2010) ("informative").

Moreover, in the Reply Brief, the Appellant argues that the Examiner's "reliance on Champion How-To, Chuck Webb, Bassguitaristl985, and Bigredd110 to show the 'state of the art' in the Examiner's Answer is improper . . . [and] their disclosures do not remedy the deficiencies in the combination of Pursifull, Sugimoto, and GasHose." Reply Br. 9. In the "Response to Argument" section of the Examiner's Answer, the Examiner stated that "it would be important to note the *state of the art*," and noted various YouTube© videos. Ans. 10–11. The Appellant argues that the Examiner's reliance on new art may be new grounds of rejection, and further submits arguments alleging deficiencies of the noted videos in establishing obviousness. Reply Br. 8–9. However, notwithstanding the fact that this appears to be a petitionable issue, the Examiner did not actually rely on any of the cited videos in the pending rejections as the Appellant asserts. Indeed, the rejection as set forth in the Final Office Action was not altered in the Answer. Ans. 5–8 (reproducing the rejection applied in the Final Office Action). Thus, the Appellant's argument is unpersuasive.

In view of the above considerations, the rejection of claim 1 is affirmed, and claims 6, 10–13, 16, and 21 fall with claim 1.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 202

III. *Claims 7–9, 14, 15, 17, and 22*

The Examiner rejects dependent claims 7–9, 14, 15, 17, and 22 as being unpatentable over Pursifull in view of Sugimoto, GasHose, and NoOutage. Final Act. 7. The Appellant does not submit any substantive arguments directed to these claims except for claims 9 and 15. Appeal Br. 12. Thus, dependent claims 7, 8, 14, 17, and 22, fall with their respective independent claims. We address the Appellant's arguments directed to claims 9 and 15 below.

Claims 9 and 15 recite that the regulator mounting device secures to a collar such that the regulators are "positioned adjacent each other along an outer periphery of the collar." Appeal Br. 17–18 (Claims App.). The Examiner finds that the combination of Pursifull in view of Sugimoto and GasHose discloses containers having collars, wherein GasHose specifically discloses a mounting bracket for mounting regulators. Final Act. 8. The Examiner finds that the combination fails to specifically teach the claimed mounting arrangement. Final Act. 8. However, the Examiner finds that "the system of NoOutage is shown with a mounting bracket on the collar of the propane tanks supporting the regulator." Final Act. 8. The Examiner concludes that utilizing the mounting bracket of NoOutage "is nothing more than a simple substitution of one known element for another." *Id*. The Examiner explains that "both components perform functions well-known in the art (attaching and maintaining tank regulators) and the substation [sic] would have been a predictable solution with expected results, then the modification would have been obvious to one of ordinary skill in the art." Final Act. 8 (citing *Ruiz v. AB Chance Co*., 357 F.3d 1270 (Fed. Cir. 2004)).

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 203

The Appellant argues that GasHose and NoOutage "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 Br. 13. The Appellant explains that "neither GasHose nor Nooutage.com has been shown to disclose a regulator mounting device . . . as called for in claims 9 and 15." *Id.* Appellant further explains that "the connecting rod of Nooutage.com is not secured to a collar of a pressurized fuel container . . . since the connecting rod would clearly fall off the collar of the single pressurized fuel container in Nooutage.com." Reply Br. 12.

We do not find Appellant's arguments persuasive because the Appellant appears to argue the prior art references separately and fails to consider what the art teaches to one of ordinary skill. "Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references." *In re Merck*, 800 F.2d 1091, 1097 (Fed. Cir. 1986); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). As discussed above relative to claim 1, GasHose discloses a two-stage regulator, the benefits thereof, and a mounting bracket for the regulators. Final Act. 6–7; GasHose 8, 9 (GR-905 mounting bracket for twin state regulator), 12 ("Universal Mounting Bracket"). However, GasHose is silent as to securement of the mounting bracket to a collar and the positioning of the regulators adjacent each other along an outer periphery of the collar. As the Examiner finds, NoOutage teaches a regulator having a mounting bracket that is secured to collars. Accordingly, as the Examiner correctly concludes, it would have been a simple substitution to incorporate the mounting bracket of NoOutage to provide mounting of the regulators on

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 204

the collar. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) ("[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result."). Contrary to the Appellant's assertion, we agree with the Examiner's finding that because the claims do not specify the manner in which securement is attained, the bracket disclosed in NoOutage can reasonably be considered as being secured to the collar because its attachment thereto is maintained. Ans. 17.

Furthermore, as to the recited positioning of the regulator, merely altering a position of a component in a device, without more, does not render the device patentable. *See In re Japikse*, 181 F.2d 1019, 1023 (CCPA 1950) (specific positioning of a starting switch of a hydraulic power press held unpatentable because shifting the position of the starting switch would not have modified the operation of the device); *In re Kuhle*, 526 F.2d 553, 555 (CCPA 1975) (particular placement of a contact in a conductivity measuring device is an obvious matter of design choice). It would have been obvious to one of ordinary skill and creativity to further position the regulators in the manner recited by claims 9 and 15 as a mere predictable variation and obvious design choice. *KSR*, 550 U.S. at 417 ("When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability.").

Therefore, because the Appellant's arguments do not persuade us of error, we affirm the rejection of claims 9 and 15 as well.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 205

CONCLUSION

The Examiner's rejections are affirmed.

DECISION SUMMARY

In summary:

Claim(s) Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1–17, 21, 22		Nonstatutory Double Patenting U.S. Patent 10,221,780	1–17, 21, 22	
1, 6, 10–13, 16, 21	103	Pursifull, Sugimoto, GasHose	1, 6, 10–13, 16, 21	
7–9, 14, 15, 17, 22	103	Pursifull, Sugimoto, GasHose, NoOutage	7–9, 14, 15, 17, 22	
Overall Outcome			1–17, 21, 22	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 206

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16/191,503	11/15/2018	Mark J. Sarder	CET1090.070	6187

26629 7590 12/13/2021

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LATHERS, KEVIN ANTHONY

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARK J. SARDER et al.

Appeal 2022-001059
Application 16/191,503
Technology Center 3700

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Customer No. 26629 Patent
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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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REPLY BRIEF RESPONSIVE TO EXAMINER'S ANSWER MAILED SEPTEMBER 7, 2021

Dear Sir:

This Reply Brief is being filed in Response to the Examiner's Answer mailed on September 7, 2021.

REPLY BRIEF

In the Examiner's Answer mailed September 7, 2021[1] (hereinafter - "Examiner's Answer"), the Examiner maintained the rejection of 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 rejection of claims 1, 6, 10-13, 16, and 21 under 35 U.S.C. §103 as being unpatentable over Pursifull et al. (US Pub. 2011/0168133 - hereinafter "Pursifull") in view of Sugimoto et al. (US Pub. 2007/0137591 – hereinafter "Sugimoto") and further in view of GasHoseandRegulators (May 17th, 2014, https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/ - hereinafter "GasHose"); the rejection of claims 7-9, 14, 15, 17, and 22 under 35 U.S.C. §103 as being unpatentable over Pursifull in view of Sugimoto and GasHose, and further in view of Nooutage.com (Aug. 27th, 2006, http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm), as set forth in the Final Office Action mailed October 28, 2020 (hereinafter "Final Office Action"). *Examiner's Answer*, pp. 4-5, 7.

Appellant believes claims 1-17, 21-22, and 24 are patentable over the art of record and stands by the positions set forth in its Appeal Brief filed March 29, 2021. Herein, Appellant limits its remarks to the assertions presented by the Examiner in the Examiner's Answer of September 7, 2021, with it being understood that the following remarks are meant to supplement the remarks previously set forth it its Appeal Brief, and that the Appeal Brief includes the fullest and most complete arguments as to why the rejections of the pending claims are improper and cannot be sustained.

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

Claims 1, 11, and 21

The Examiner rejected claims 1, 11, and 21 under 35 U.S.C. §103 as being unpatentable over Pursifull in view of Sugimoto and GasHose.

In the Appeal Brief, Appellant argued that the combination of Pursifull, Sugimoto, and GasHose does not teach or suggest a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising a primary pressure

[1] Appellant notes here that, as explained on page 2 of the Examiner's Answer mailed September 7, 2021, the Examiner vacated the Examiner's Answer mailed June 29, 2021 due to an error.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 210

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). *Appeal Brief*, 03/29/2021, pp. 3-12. More specifically, Appellant argued that, 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. *Id.* at p. 8. Additionally, Appellant argued that 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. *Id.* at p. 9.

In maintaining the rejection of claims 1, 11, and 21, the Examiner stated that "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 [*sic*] pressure regulator being located off board.'" *Examiner's Answer*, p. 14 (quoting Appeal Brief, p. 8). The Examiner argued 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." *Id.* at p. 15.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 211

(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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 212

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 213

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 214

"[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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 215

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 216

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 217

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 218

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 219

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 it's 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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 220

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 <u>along an outer periphery of a collar</u>, 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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 221

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.

Respectfully submitted,

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Dated: November 2, 2021
Attorney Docket No.: CET1090.070

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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 222

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	11/02/2021 11:26:53 AM ET	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
CUSTOMER #	26629	FILING DATE	11/15/2018
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Mark J. Sarder

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 4529	E2021A2B27480638	Robyn Templin

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2413	FORWARDING AN APPEAL IN AN APPLICATION OR EX PARTE REEXAMINATION PROCEEDING TO THE BOARD	1180.00	1	1180.00
			TOTAL AMOUNT:	$1,180.00

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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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	**11/02/2021 11:26:53 AM ET**	**CET1090.070**

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CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Andrew Stark

Documents

TOTAL DOCUMENTS: 1

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

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2021.11.02 Reply Brief.pdf	666CDBF1CA5A1615CA528D25AB39752AAFE6C94CA98C0F14 229708AD2B653DF7756195E53AFDC6344B3C71DF143CE4A35 BCC58531A68736C7A152DC7820A1A7F

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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: 09/07/2021

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 09/07/2021
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EXAMINER	
LATHERS, KEVIN ANTHONY	

ART UNIT	PAPER NUMBER
3747	

NOTIFICATION DATE	DELIVERY MODE
09/07/2021	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):

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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(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 § 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 substation 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

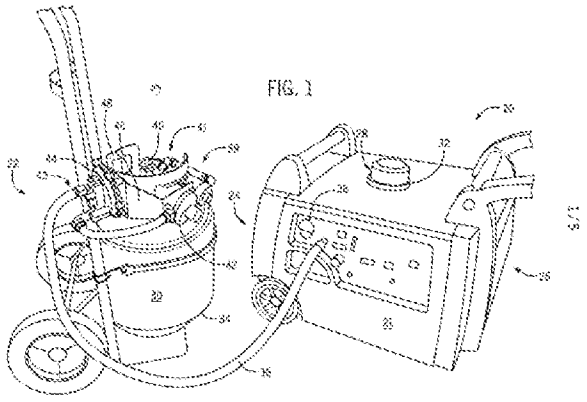
21. Claims 2-5 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims if the Non-Statutory Double Patenting rejection presented above is also overcome.

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=L6TB9nqbqtg, 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 EF2000iS Tri-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.

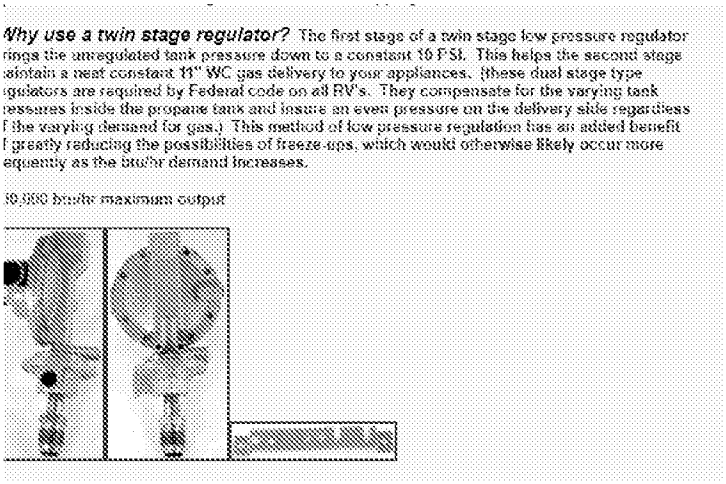
26. **A quick summation of the art used in the rejections will be noted following the above state of the art discussion.** The details of this art and their rejections is above. Below is just a quick reiteration of what exactly is in the rejections in light of the shown state of the art.

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).

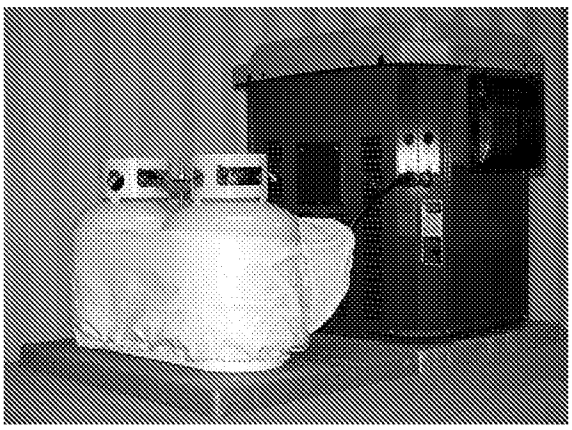
28. Sugimoto et al (US 2007/070137591) shows a more typical representation of a dual fuel engine (¶ [0073], the on board storage differing) in Fig. 2 (note its similarities to the above devices in the art). Sugimoto more specifically pertains to a dual fuel engine generator (Abstract) and includes an 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/lowpressureregulators.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.

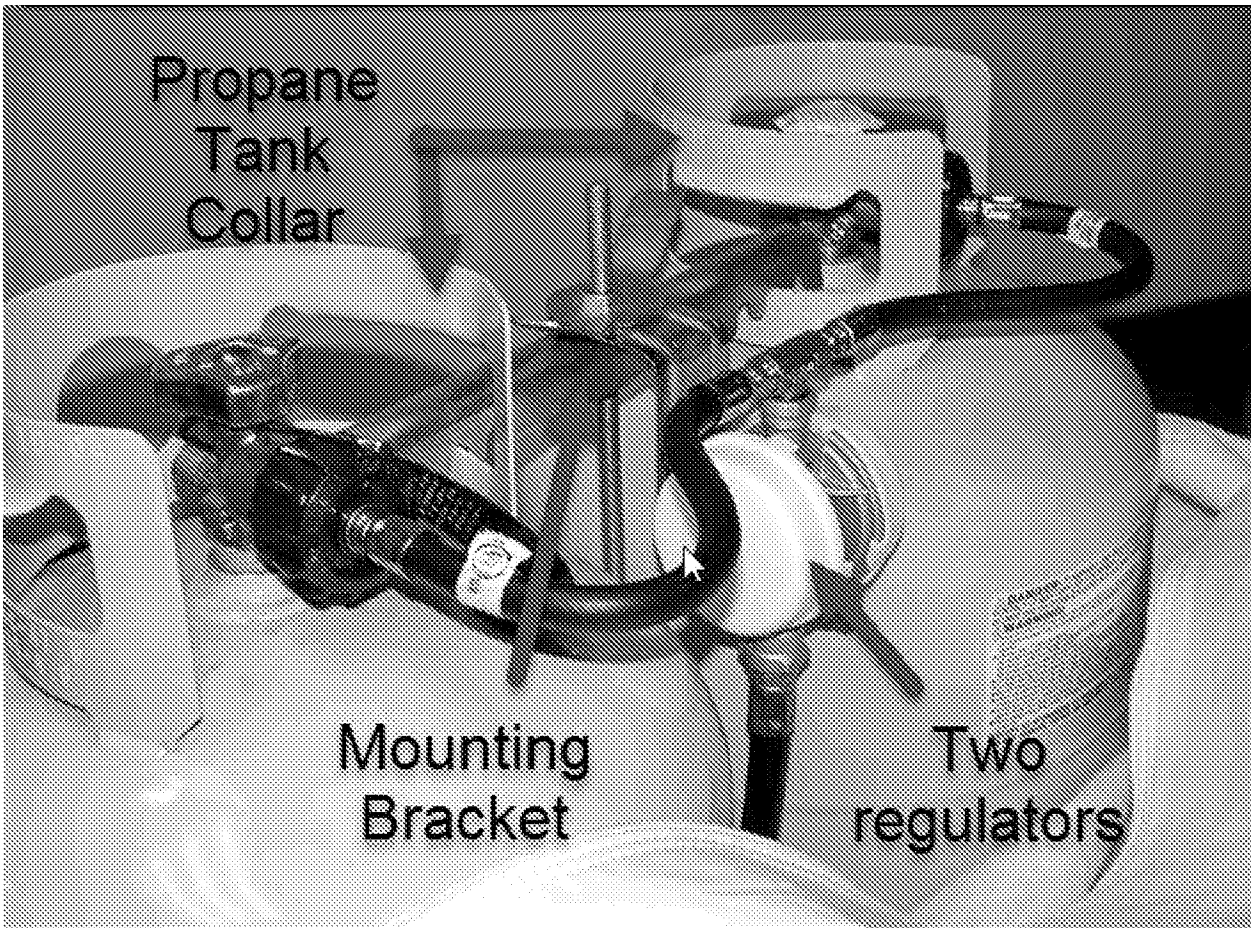
37. **With regards to b. and c.:** As noted above, Sugimoto is not being modified by Gashose. Rather, *the modified Pursifull* is being modified by Gashose. The modified Pursifull does not disclose a fuel regulator and as far as is concerned with its modification of Sugimoto, it simply includes a "pressure 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.

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

/NATHANIEL E 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.

Notice of References Cited	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					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
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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:DualFuelGeneratorStart-Up,"https://(www.youtube.com/watch?v=CMW2nxPnWpeE,Jun 1st,2014(Year:2014) (Year: 2014)
	V	ChuckWebb,"Yamahaef2000isrunningonthepropanequickconnectpullingtheColemanairconditioner."https:// www.youtube.com/watch?v=L6TB9ngqbqig,Sep.24th,2017(Year:2017) (Year: 2017)
	W	Bassguitarist1985(Bassguitarist1985,"YamahaEF2000iSTri-FuelKit:FinalAssembly&GasolineBreak-In,"https://youtu.be/ dTawH4Cok2o,Jan.4th,2014(Year:2014) (Year: 2014)
	X	Bigredd110,"Sportsman7500WattDualFuelGeneratorwithElectricStart,"httos:/Avww.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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	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	✓	O	✓	✓					
	3	✓	O	✓	✓					
	4	✓	O	✓	✓					
	5	✓	O	✓	✓					
	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

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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):

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jmf@zpspatents.com

Applicant-Initiated Interview Summary	**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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16/191,503	11/15/2018	Mark J. Sarder	CET1090.070	6187

26629 7590 06/29/2021

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ART UNIT	PAPER NUMBER
3747	

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06/29/2021	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.

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 substation would have been a

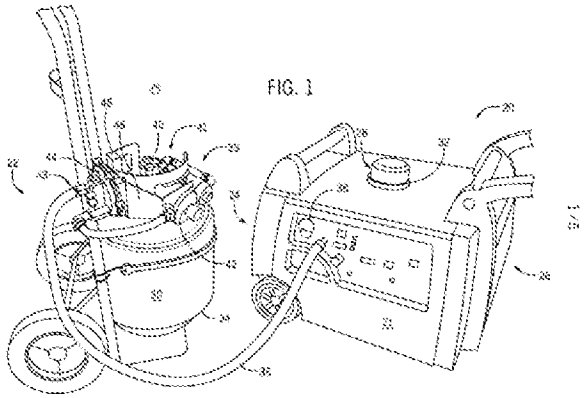
predictable solution with expected results, then the modification would have been obvious to one of ordinary skill in the art. *Ruiz v. AB Chance Co.*, 357 F.3d 1270, 69 USPQ2d 1686 (Fed. Cir. 2004), MPEP 2143(B).

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=L6TB9nqbqtg, 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 EF2000iS Tri-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.

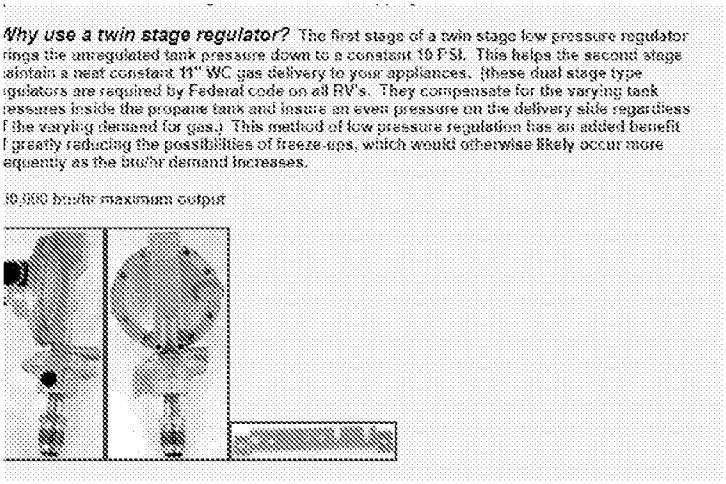
26. **A quick summation of the art used in the rejections will be noted following the above state of the art discussion.** The details of this art and their rejections is above. Below is just a quick reiteration of what exactly is in the rejections in light of the shown state of the art.

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).

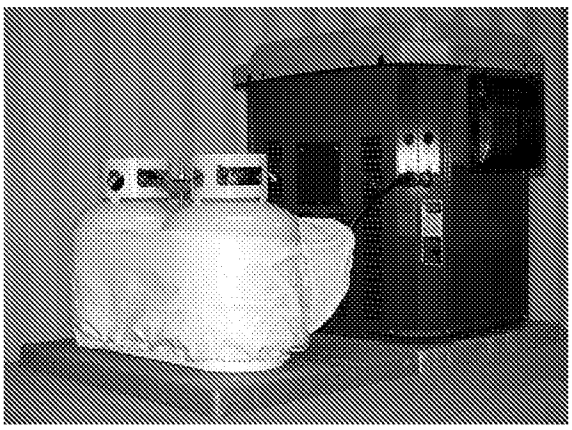
28. Sugimoto et al (US 2007/070137591) shows a more typical representation of a dual fuel engine (¶ [0073], the on board storage differing) in Fig. 2 (note its similarities to the above devices in the art). Sugimoto more specifically pertains to a dual fuel engine generator (Abstract) and includes an 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/lowpressureregulators.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 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.

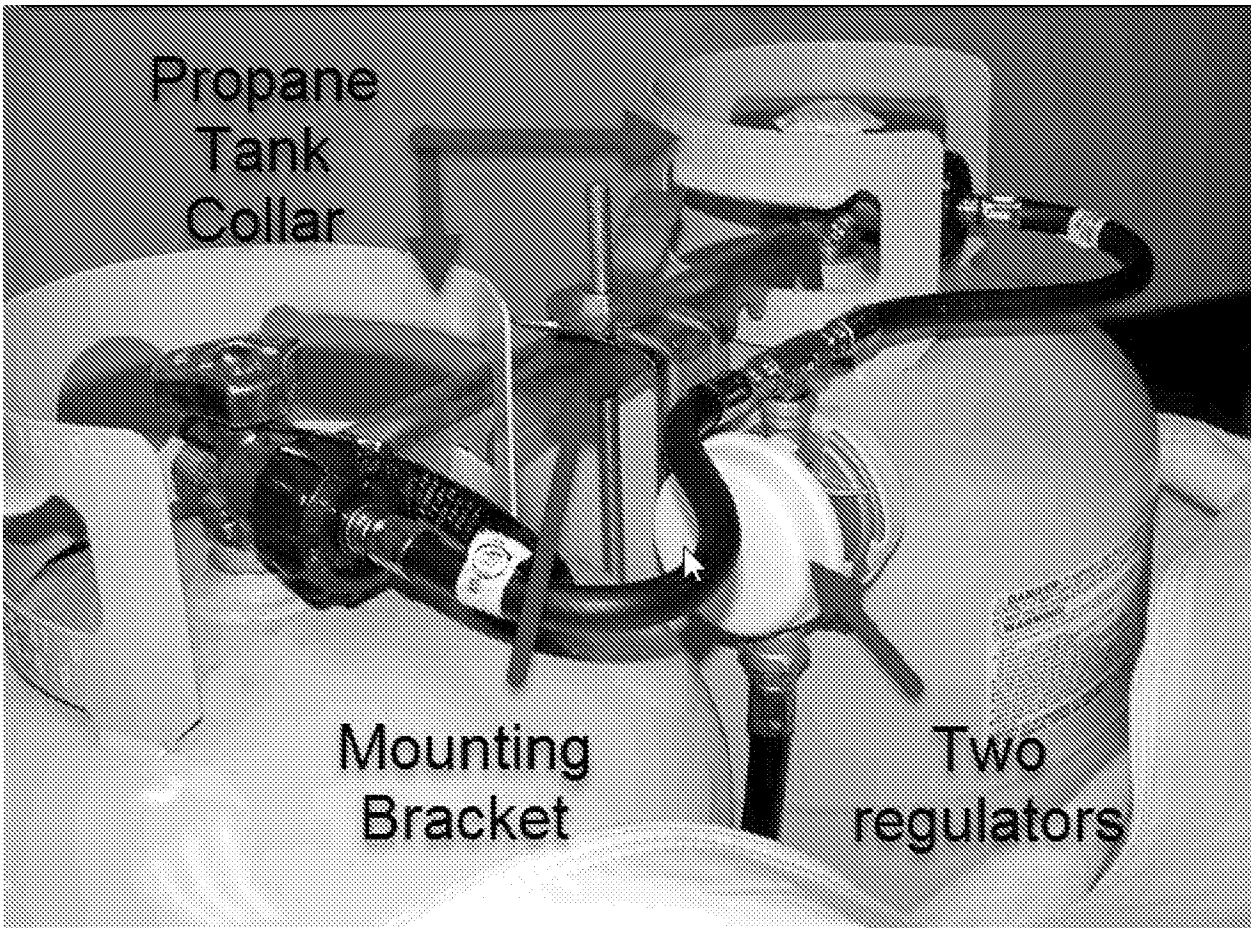
37. **With regards to b. and c.:** As noted above, Sugimoto is not being modified by Gashose. Rather, *the modified Pursifull* is being modified by Gashose. The modified Pursifull does not disclose a fuel regulator and as far as is concerned with its modification of Sugimoto, it simply includes a "pressure 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.

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

/NATHANIEL E 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.

Notice of References Cited	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					
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	T					

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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	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	✓	O	✓	✓					
	3	✓	O	✓	✓					
	4	✓	O	✓	✓					
	5	✓	O	✓	✓					
	6	✓	✓	✓	✓					
	7	✓	✓	✓	✓					
	8	✓	✓	✓	✓					
	9	✓	✓	✓	✓					
	10	✓	✓	✓	✓					
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	22	✓	✓	✓	✓					
	23	✓	✓	-	-					
	24			✓	✓					

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Doc description: Information Disclosure Statement (IDS) Filed

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(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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	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	
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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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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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	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	
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	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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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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Customer No. 26629 Patent
Confirmation No. 6187 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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Signature

Commissioner for Patents
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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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 278

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,

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 279

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 280

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 281

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].

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 282

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 283

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 284

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 285

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 286

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 287

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 <u>whole</u>, 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.

<u>Conclusion</u>

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 288

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.*

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 289

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 290

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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Dated: March 29, 2021
Attorney Docket No.: CET1090.070

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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 291

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:

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 292

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 293

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 294

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 295

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 296

EVIDENCE APPENDIX:

-- None --

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 297

RELATED PROCEEDINGS APPENDIX:

-- None --

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Exhibit 1002-Part 1, Page 298

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	**03/29/2021 03:19:18 PM ET**	**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	3AB5BD9EB7A22DCC4D2AE6F8840B443F2FB3804D3B2E57D6FB86E2033D42F37D90515135DDA5B12DC4A7C83A05B141CAB82FDB86C0D90A585FBD9779C7B30E17

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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

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.

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

Docket Number (Optional)
CET1090.070

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On January 27, 2021

Signature /Robyn L. Templin/

Typed or printed name Robyn L. Templin

In re Application of
Sarder et al.

Application Number	Filed
16/191,503	11/15/2018

For OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

Art Unit	Examiner
3747	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

[X] 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.

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[ ] 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.

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I am the

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[X] 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*.

[X] * 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 `450, Alexandria, VA 22313-1450.**

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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	**01/27/2021 12:42:37 PM ET**	**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 #	60136650	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)
2021.01.27 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	5529771B56B7E1038DF6B6BD39548D5F2F74A4CF3CF879610503D15BB182559AFA946DDE8CAD791D61465E29087FFF0AE879B43F786E9E1D1F9DB02DEE12730A

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(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	

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

	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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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

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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NON-PATENT LITERATURE DOCUMENTS Remove

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	

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

	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 Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*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.

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

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

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	**12/15/2020 11:40:04 AM ET**	**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	FILING DATE	11/15/2018
CUSTOMER #	26629	FIRST NAMED INVENTOR	Mark J. Sarder
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

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
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NPL5-Dyna Portable Generators.pdf	AE368FA7D80F9CD099493863F4DDB2F03FF5D15884D65947E5A483CC9665F8416314728C87380F2D9C13AD4910E6325EFE624E21E34391F8529F8C42563318E4
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NPL7-Winco HPS6000HEI Manual.pdf	5FE786387E1DFBE53CE6CEE007DA0728AF9C967A3CF6B4C8728C4EB7CD935482CC1B3E1C1BACE9C6D775FBED15031F68B81041D1585BE50270C3160688436EA0

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.

Espacenet

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

Improvements in or relating to internal combustion engines

Inventor(s):

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

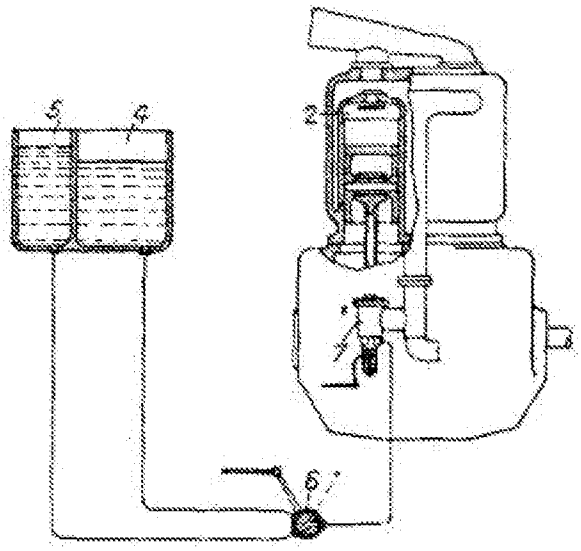
Classification: **- international:** ***F02M1/00***
- cooperative: **F02M1/00 (EP)**; F02M2700/4316 (EP)

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.



REFERENCE COPY

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 Conferation, 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 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-

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Exhibit 1002-Part 1, Page 315

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 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 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 simplicity, being coupled together or even combined as a unit. The latter construction has the advantage that it is impossible to effect an incorrect adjustment. In the linkwork for the cock and for the 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 invention 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 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 liquid fuels.

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

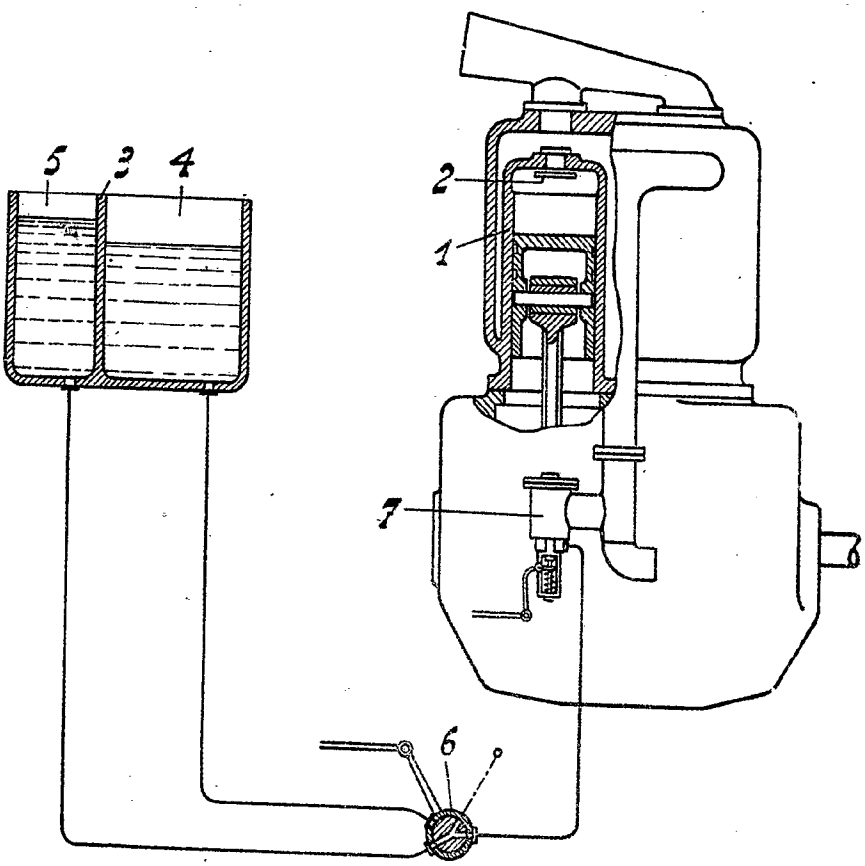
Dated this 1st day of December, 1922.

HY. FAIRBROTHER,
Chartered Patent Agent,
30 and 32, Ludgate Hill, London, E.C. 4.

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

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Exhibit 1002-Part 1, Page 316

[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

Inventor(s): HAGEN HARALD [DE]; HASBERG MARKUS [DE]; SUHR ANDREAS [DE] ± (HAGEN, HARALD, ; HASBERG, MARKUS, ; SUHR, ANDREAS, ; Hagen, Harald, ; Hasberg, Markus, ; Suhr, Andreas)

Applicant(s): VOSS AUTOMOTIVE GMBH [DE] ± (VOSS AUTOMOTIVE GMBH, ; VOSS Automotive GmbH)

Classification: **- international:** ***F16K11/22***
- cooperative: **F16K11/07 (EP); F16K11/22 (EP)**

Application number: DE20061008524 20060222

Priority number(s): DE20052002909U 20050222 ; DE20061008524 20060222

Also published as: DE102006008524 (B4)

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.

(19) Bundesrepublik Deutschland
Deutsches Patent- und Markenamt

(10) **DE 10 2006 008 524 A1** 2006.08.31

(12) # Offenlegungsschrift

(21) Aktenzeichen: **10 2006 008 524.8**
(22) Anmeldetag: **22.02.2006**
(43) Offenlegungstag: **31.08.2006**

(51) Int Cl.[8]: ***F16K 11/22*** (2006.01)

(66) Innere Priorität:
20 2005 002 909.2 22.02.2005

(71) Anmelder:
VOSS Automotive GmbH, 51688 Wipperfürth, DE

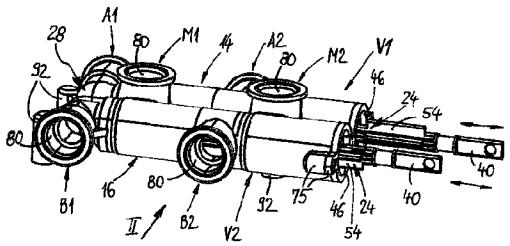
(74) Vertreter:
Patentanwälte Dr. Solf & Zapf, 42103 Wuppertal

(72) Erfinder:
Hagen, Harald, 51688 Wipperfürth, DE; Hasberg, Markus, 51688 Wipperfürth, DE; Suhr, Andreas, 50823 Köln, DE

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 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. 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 % teuerer 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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 320

[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 Deckelelemente),

[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 Deckelelementes 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 Deckelelementes 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-

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 321

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 Schaftstellung (siehe Fig. 10) kann beispielsweise – durch eine geeignete Steuerung betätigt – den Kraftstoff zwangsweise absperren, um als Wegfahrsperre 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 Schieberraum **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** anschneidet. 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 Hinterschneidungen **44** aufweisen. Bei einer bevorzugten Herstellung der Schieber **24** als einstückige Kunststoff-Formteile werden durch die Hinterschneidungen **44** vorteilhafterweise Materialanhäufungen und damit ein Verzug vermieden. Diese Hinterschneidungen **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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 322

wird. Durch diese vorteilhafte Maßnahme wird vermieden, dass eine der Umfangsdichtungen **32** bei ihrer Bewegung über eine seitlich in den Schieberraum **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 Schieberraum **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 ≤ 1°, 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 Schieberraums **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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 323

[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 Montageansätzen **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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 324

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 offenbartes 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**) zuammengefasst 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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 325

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 vorzugsweise 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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 326

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 verzugbedingte 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, lagerichtige 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 Schieberraum (**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 Schieberraums (**20**) zusammenwirken, um in den Schieberraum (**20**) mündende Steueröffnungen (**26**) und damit verbundene Anschlüsse (A1, A2, B1, B2, M1, M2) entweder zumindest paarweise zu verbinden oder gegeneinander abzusperren, 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 bewegende 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, zuammengefasst 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.

Es folgen 6 Blatt Zeichnungen

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 327

Anhängende Zeichnungen

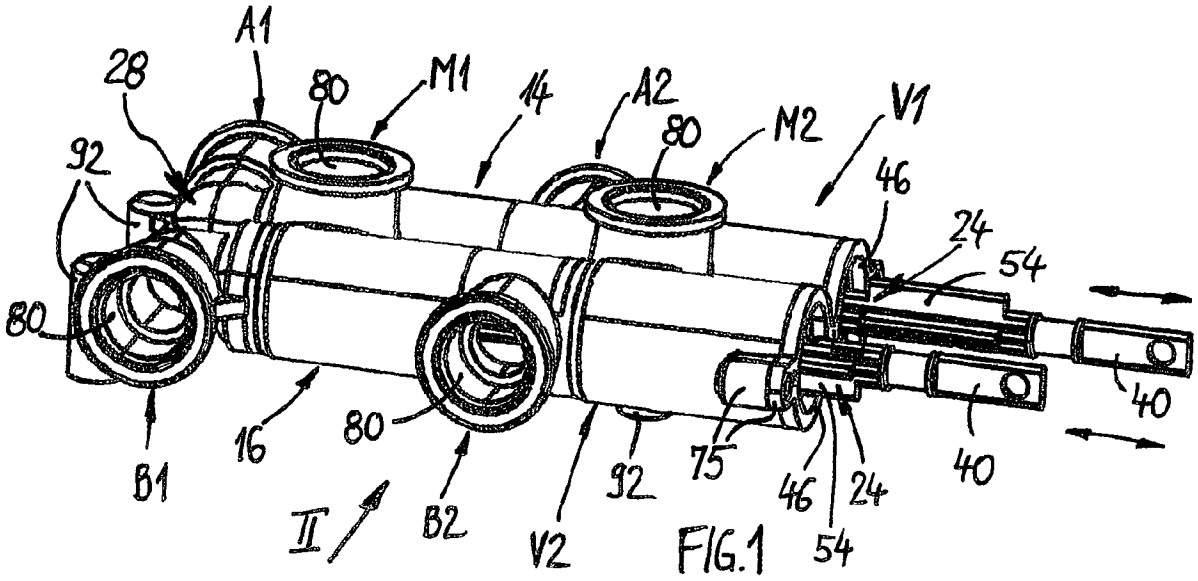


FIG.1

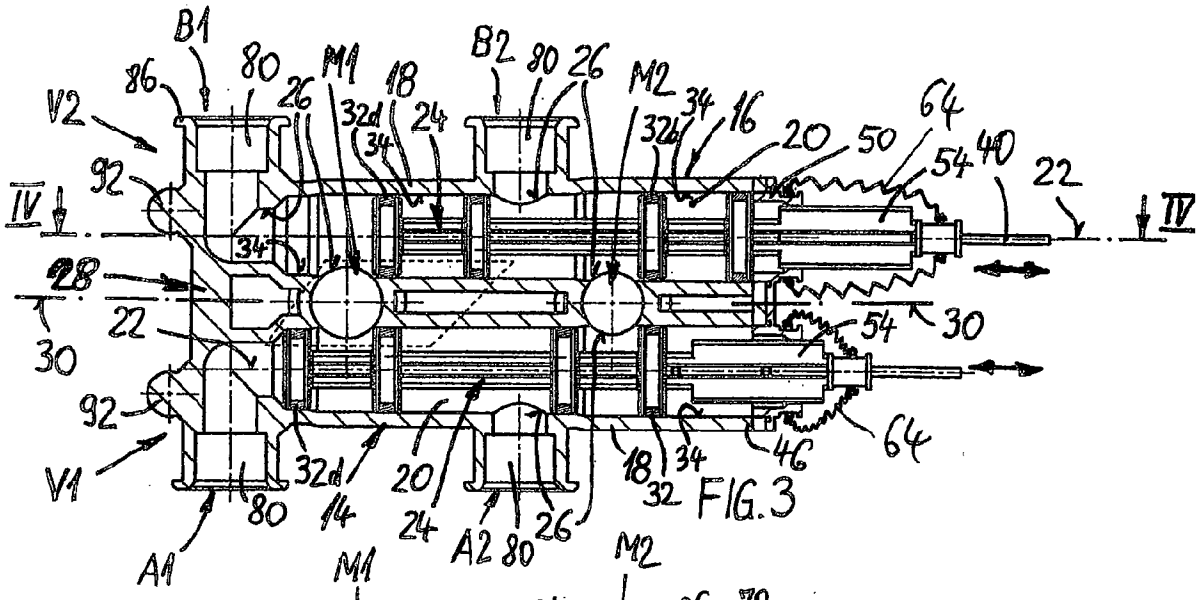


FIG.3

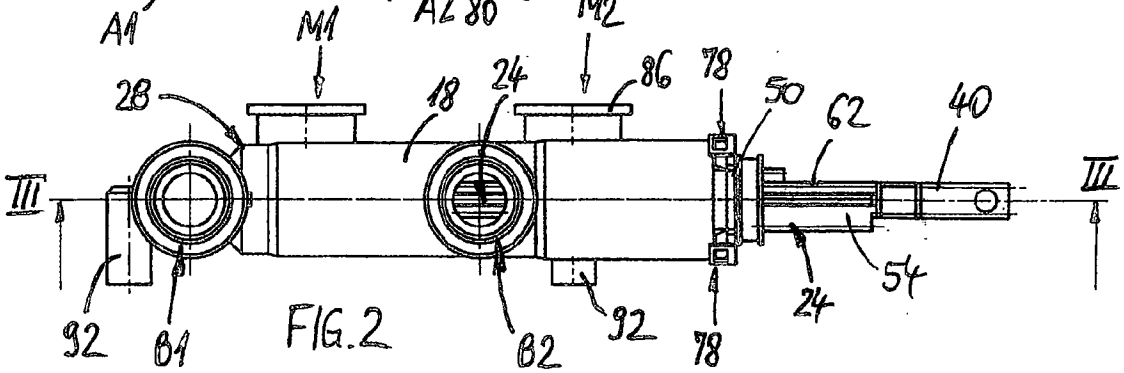


FIG.2

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 328

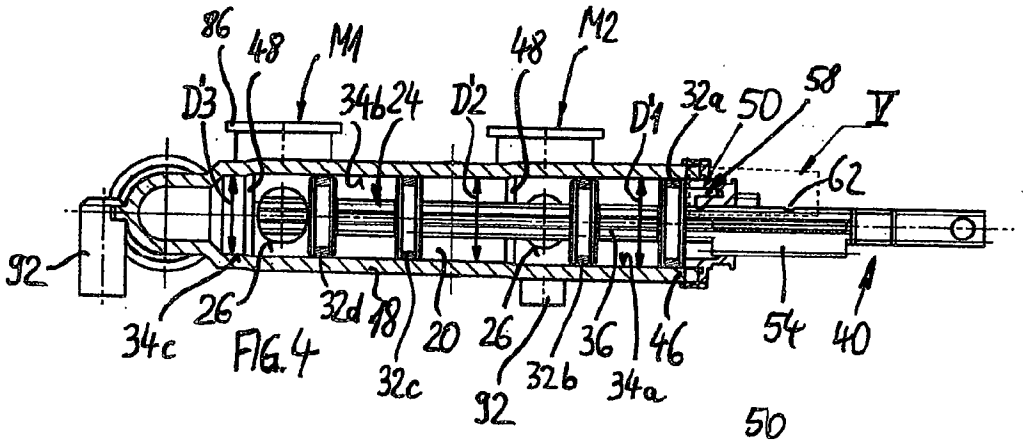


FIG.4

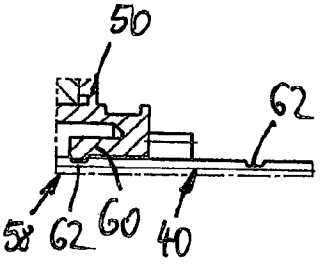


FIG.5

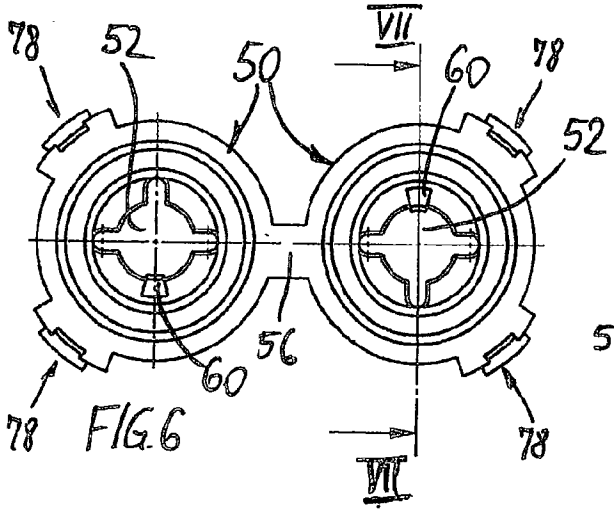


FIG.6

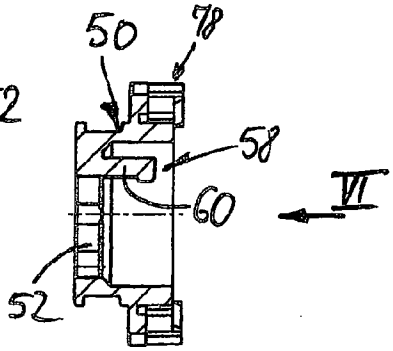


FIG.7

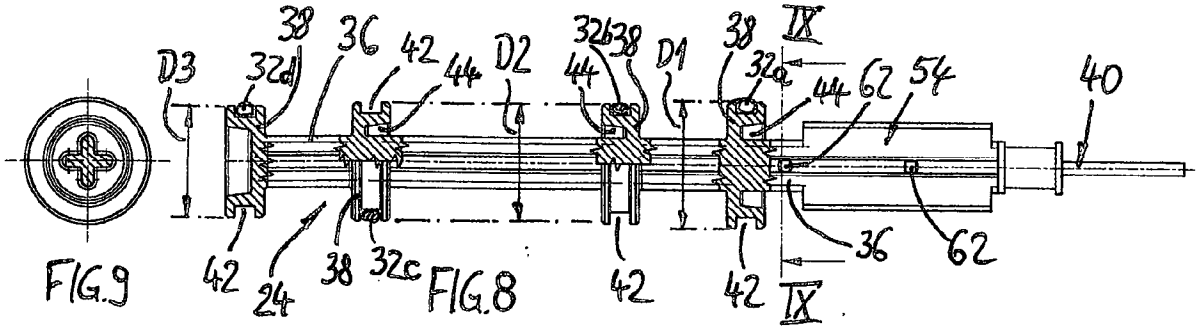


FIG.9

FIG.8

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 329

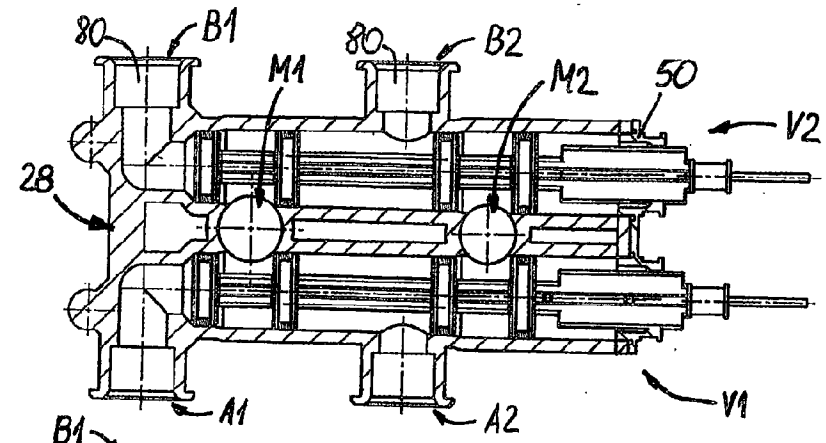


FIG. 10

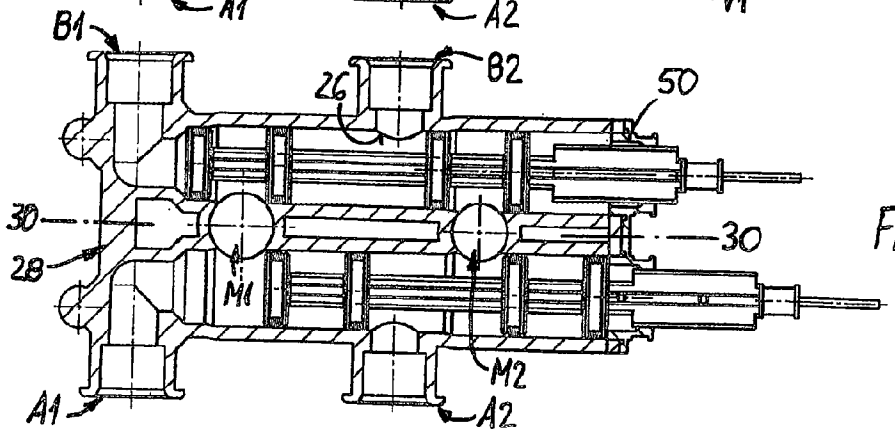


FIG. 11

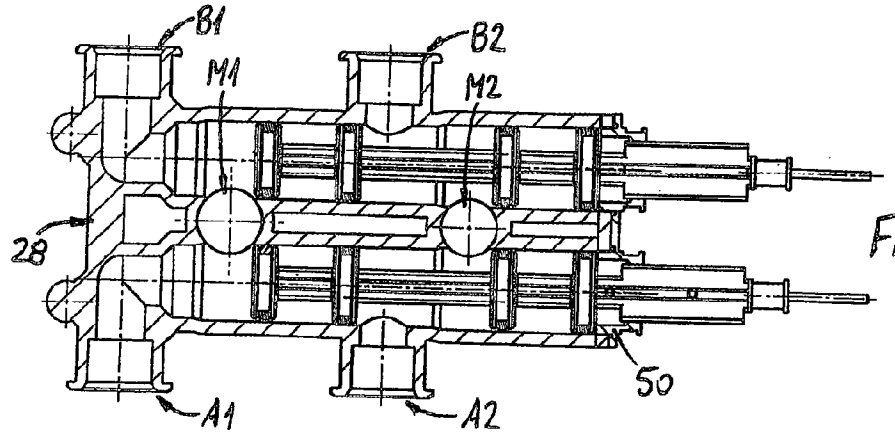


FIG. 12

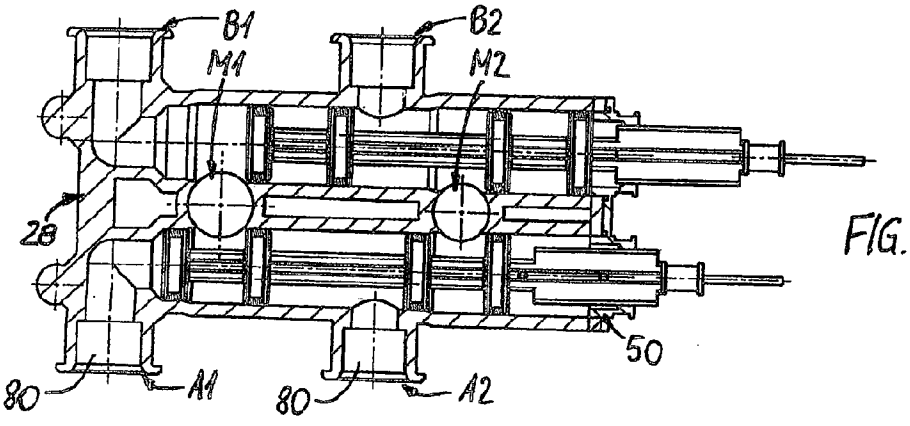


FIG. 13

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 330

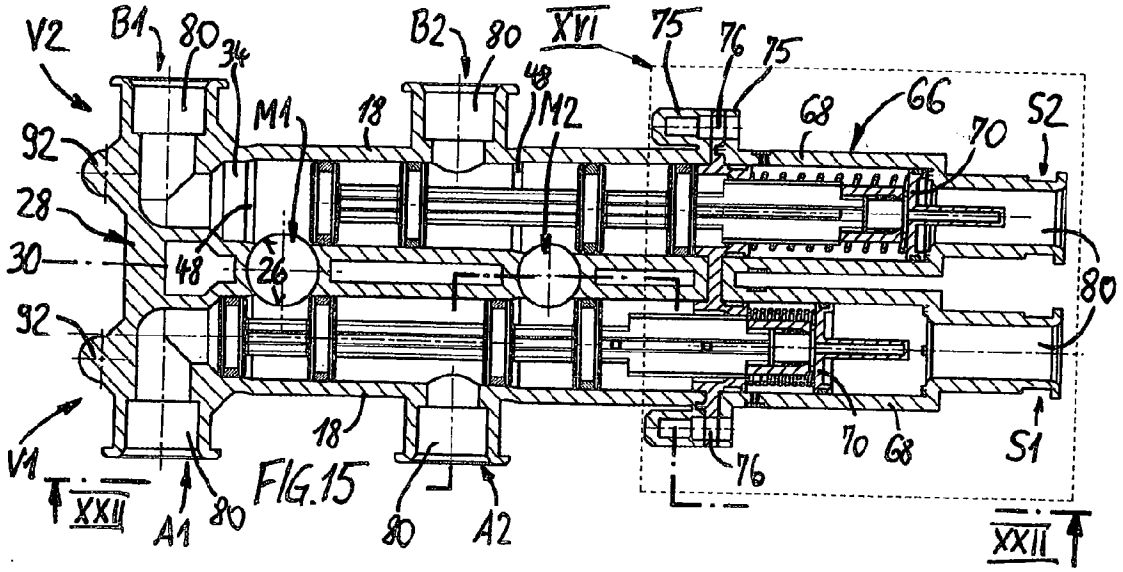


FIG.15

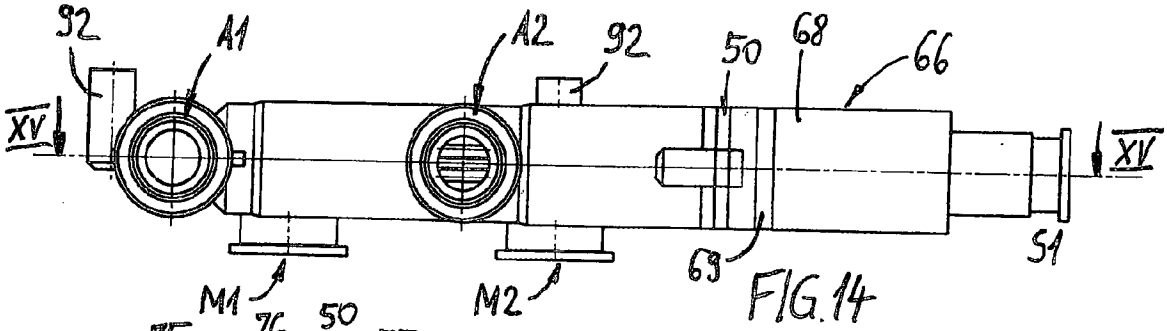


FIG.14

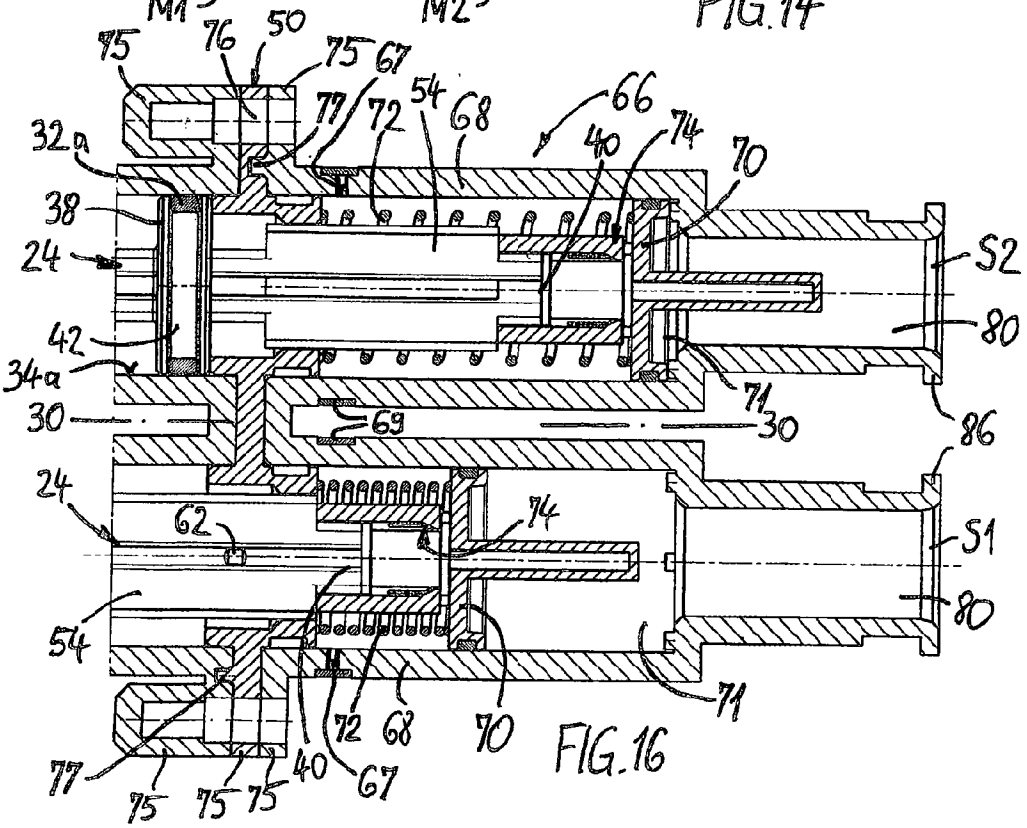


FIG.16

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 331

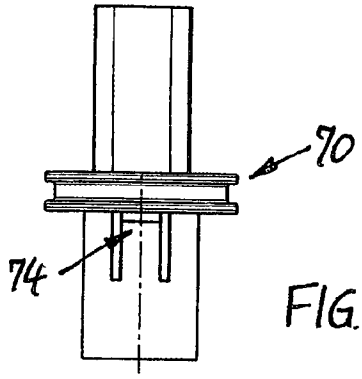


FIG. 19

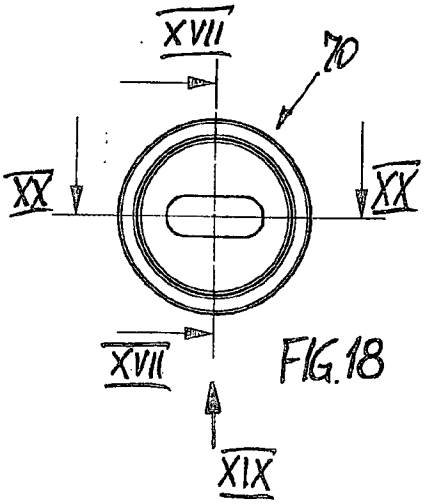


FIG. 18

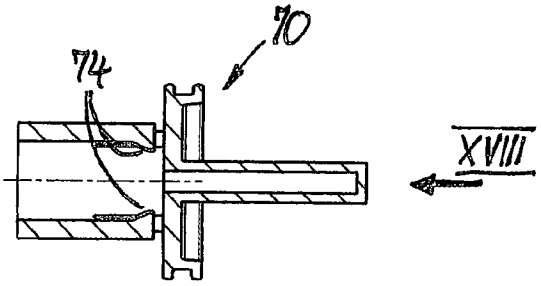


FIG. 17

FIG. 20

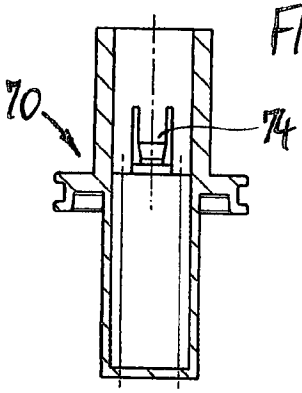
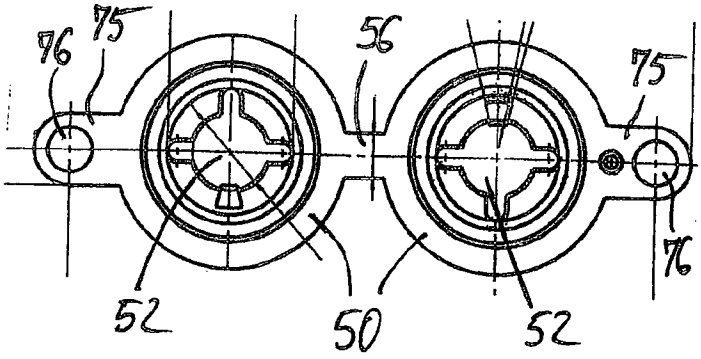


FIG. 21



Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 332

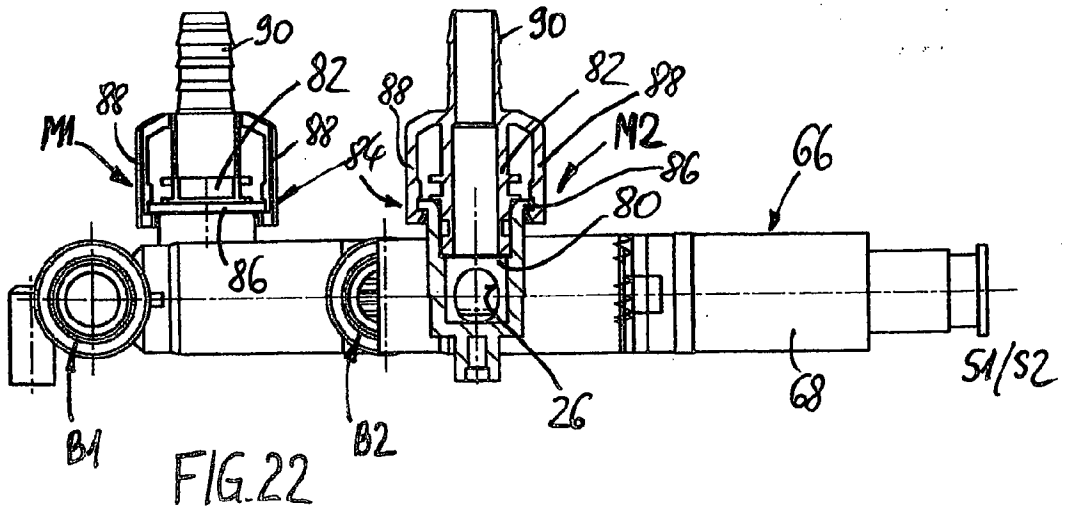


FIG.22

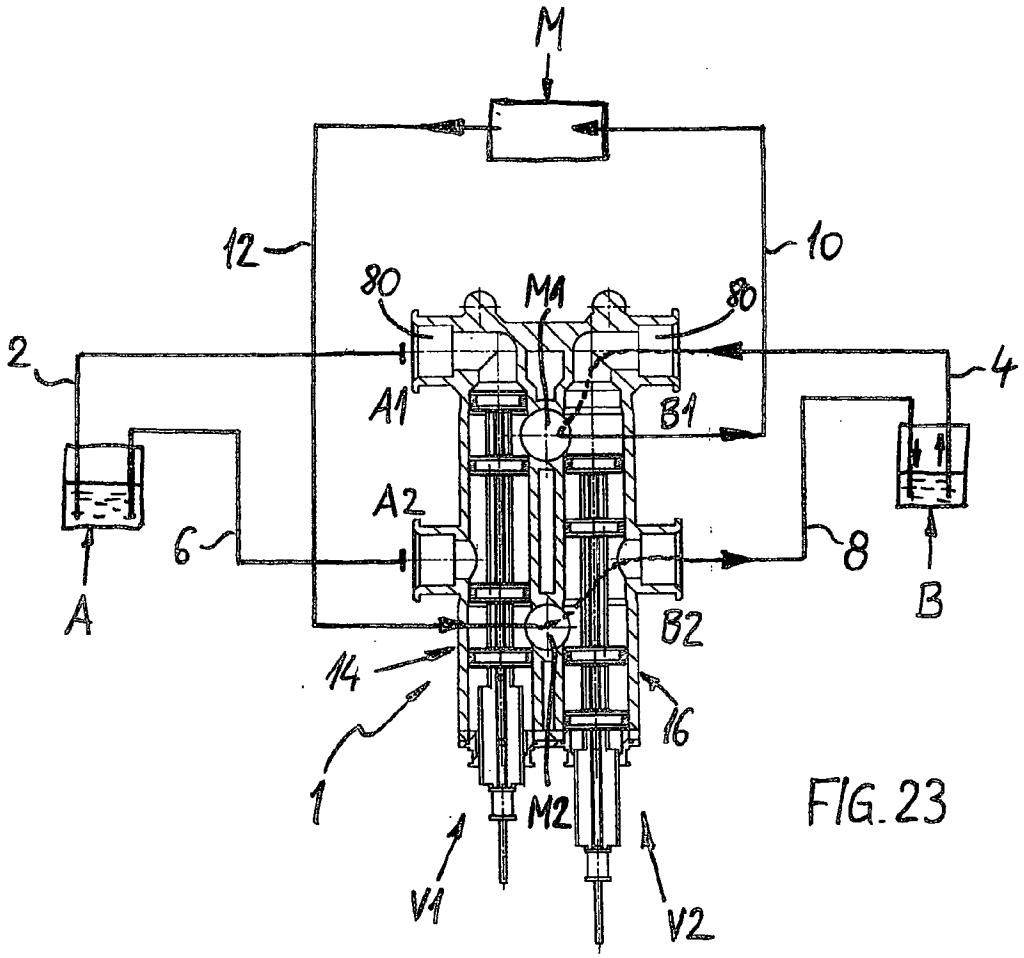


FIG.23

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 333

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] ± (LAIQING XIA, ; SHUSHENG XIONG, ; JUNPEI WANG)

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. Cl[7]
F02M 43/00

[12]实用新型专利说明书

[21] ZL 专利号 99250994.7

[45]授权公告日 2000 年 10 月 18 日

[11]授权公告号 CN 2401704Y

[22]申请日 1999.11.23 [24]颁证日 2000.8.12

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[21]申请号 99250994.7

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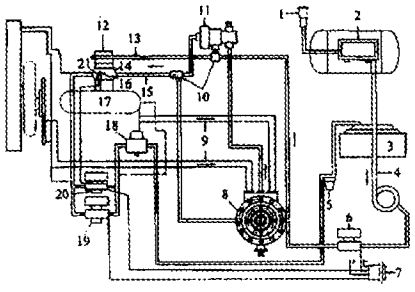
代理人 张法高

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。



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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 335

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。

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 336

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。共主要原因是：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、栓塞型行程开关 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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 337

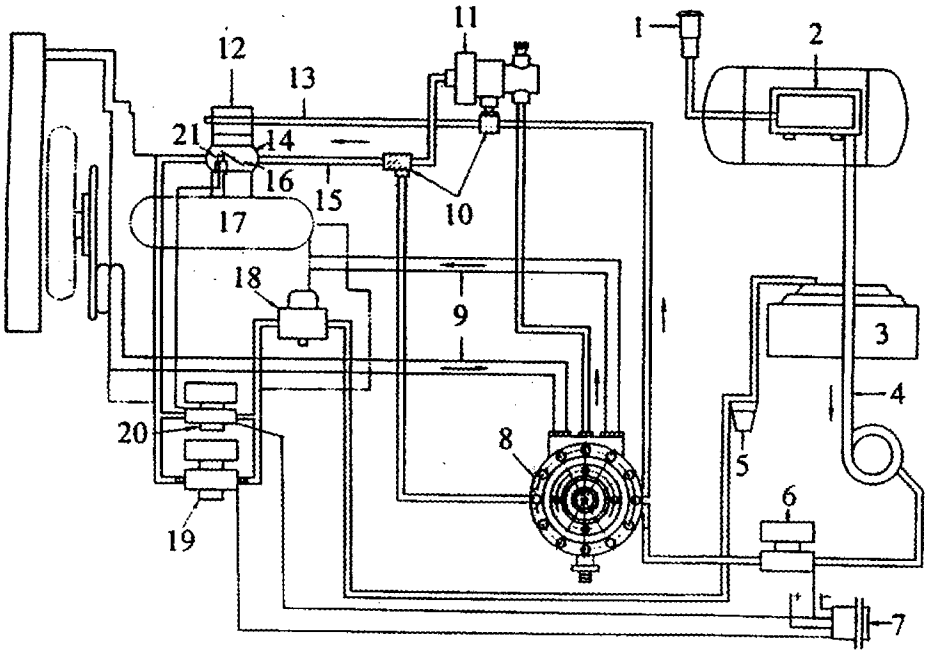
阀启闭的行程开关 21。控制汽油流量的电磁阀 20，其负极接到行程开关的活动端上，正极与电磁阀 6 的正极相连。行程开关 21 为柱塞型行程开关，该开关的活动端与控制汽油流量的电磁阀 20 的负极相连，固定端搭铁。

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。

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 338

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):

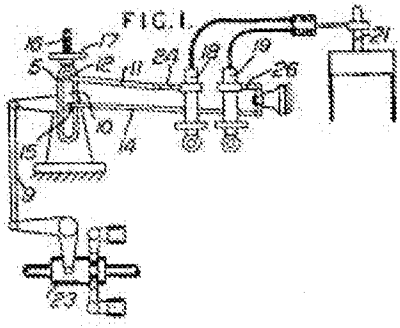
Applicant(s): ALEXANDER HENDERSON; FREDERICK ERNEST REBECK ± (ALEXANDER HENDERSON, ; FREDERICK ERNEST REBECK)

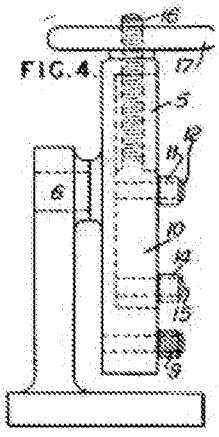
Classification: **- international:** ***F02D19/08; F02D19/10***
- cooperative: F02D19/0607 (EP); F02D19/0684 (EP); F02D19/08 (EP); F02D19/10 (EP); Y02T10/30 (EP)

Application number: GB19390026528 19390923

Priority number(s): GB19390026528 19390923

Abstract of GB532903 (A)





532,903. Regulating. HENDERSON, A., and REBBECK, 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.

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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 REEBECK, 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. 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

[Pric

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 341

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 5*a* 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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 342

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 5*a* 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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 343

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

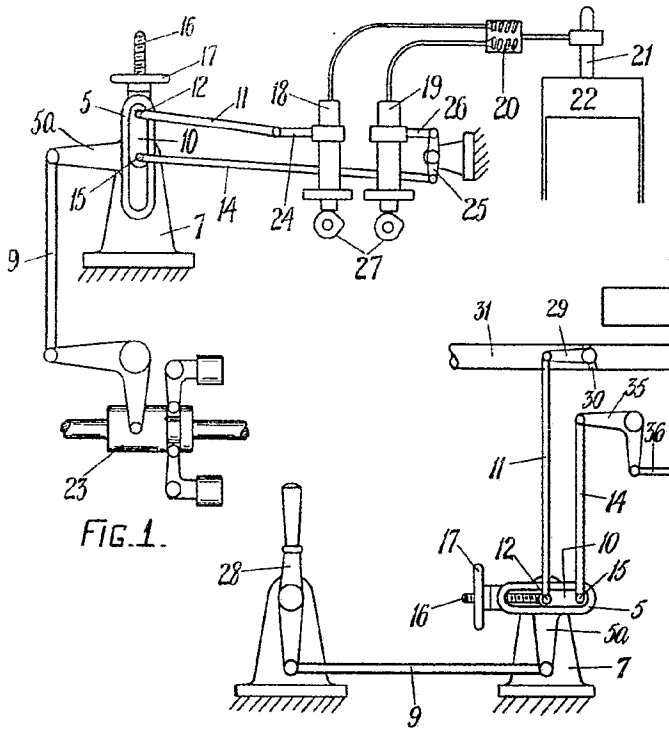


FIG. 1.

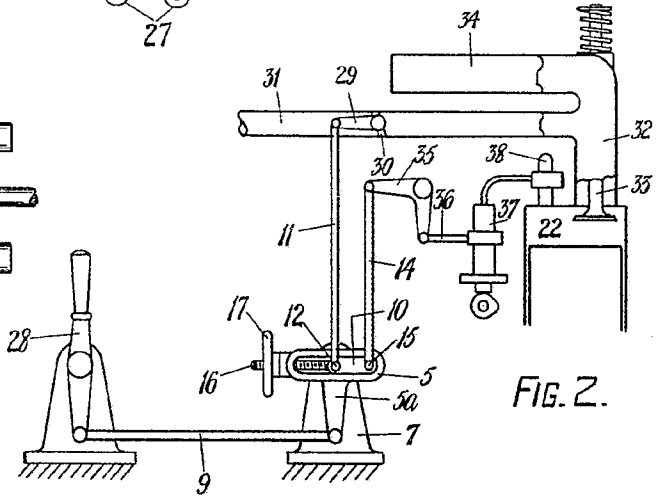


FIG. 2.

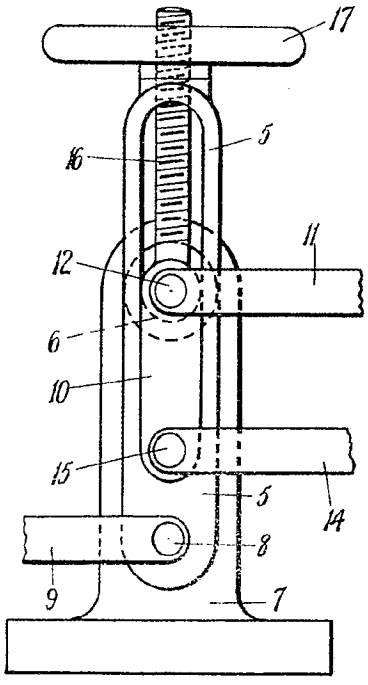


FIG. 3.

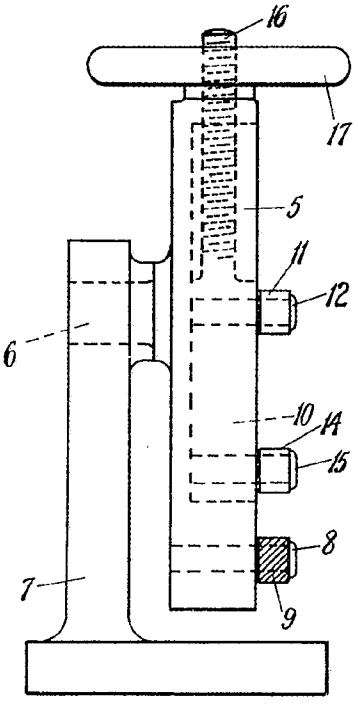


FIG. 4.

Malby & Sons, Photo-Lith.

UNITED STATES
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Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	12/15/2020 11:40:04 AM ET	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	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 4529	E2020BEB41256751	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.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

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)
136 S WISCONSIN ST
PORT WASHINGTON, WI 53074

EXAMINER	
LATHERS, KEVIN ANTHONY	

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

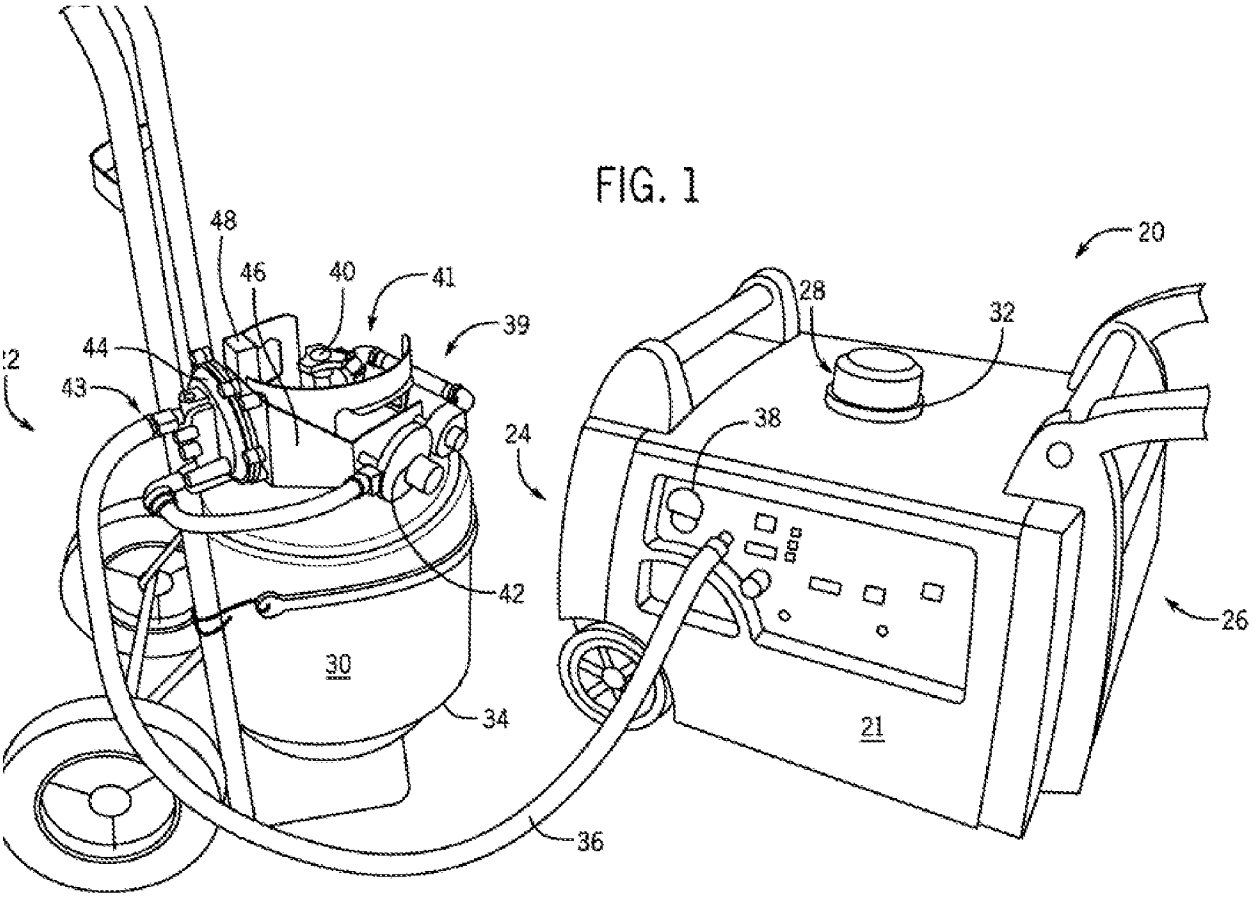
DETAILED ACTION

Response to Arguments

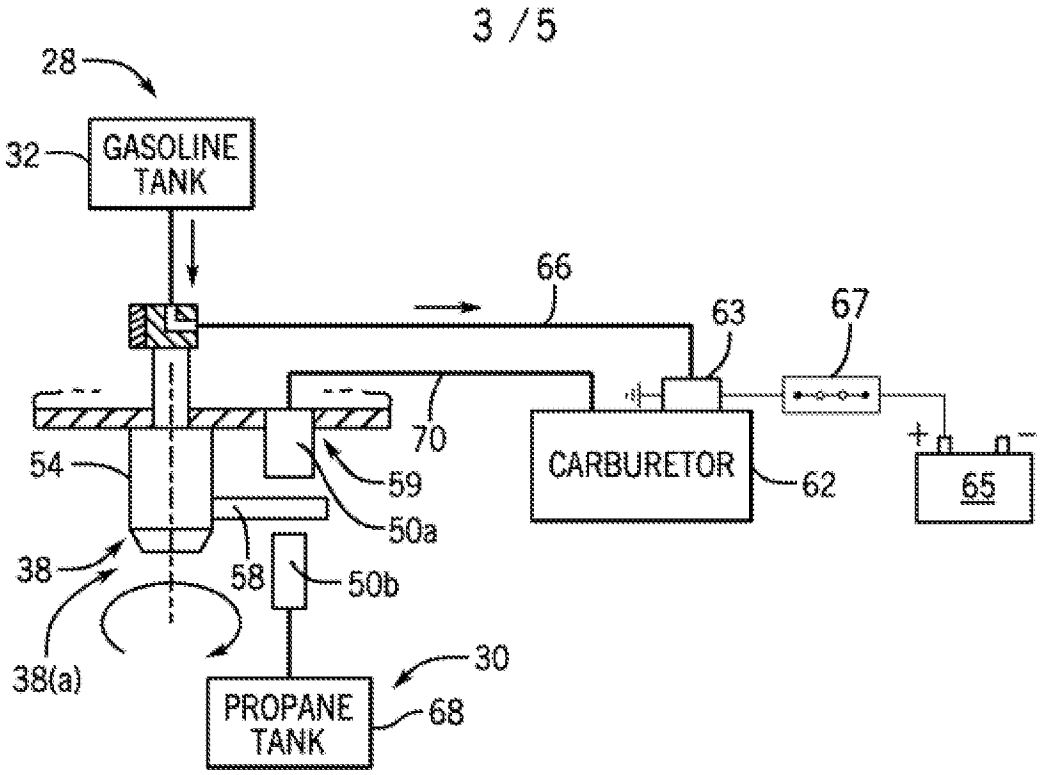
1. Applicant's arguments filed 11/25/2020 have been fully considered but they are not persuasive.

2. Firstly a visual of the claimed invention is shown and a discussion on what is being claimed.

FIG. 1

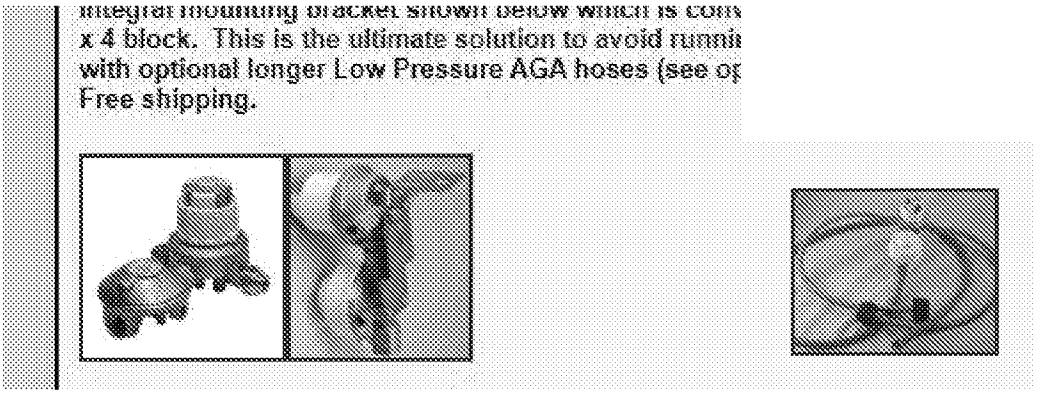


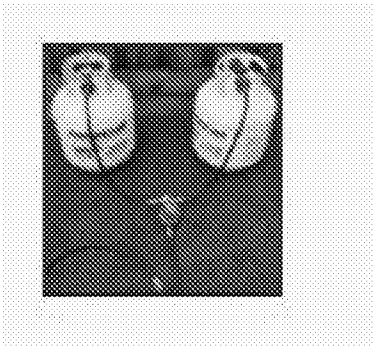
3.



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).

5.



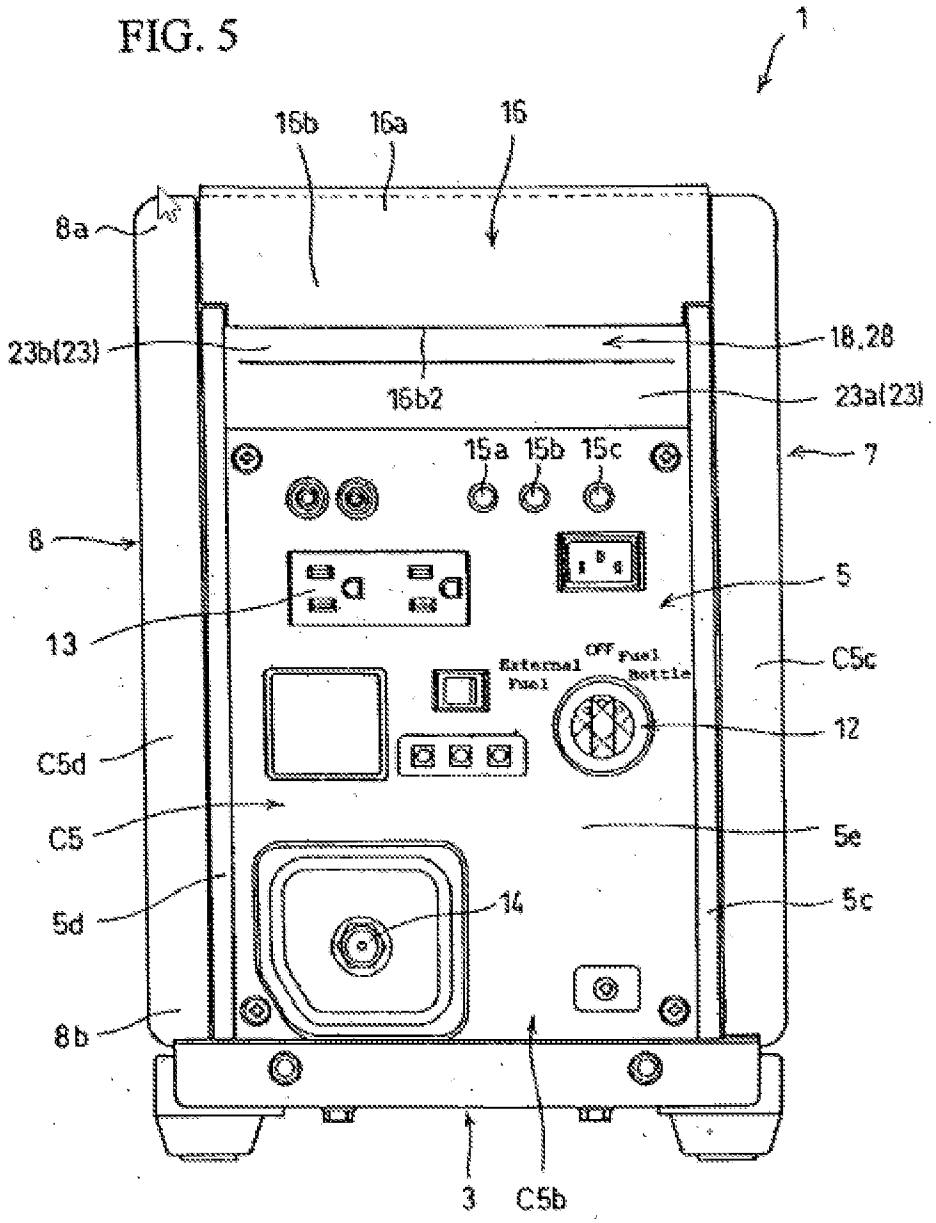
6. 

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. Purisfull 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.

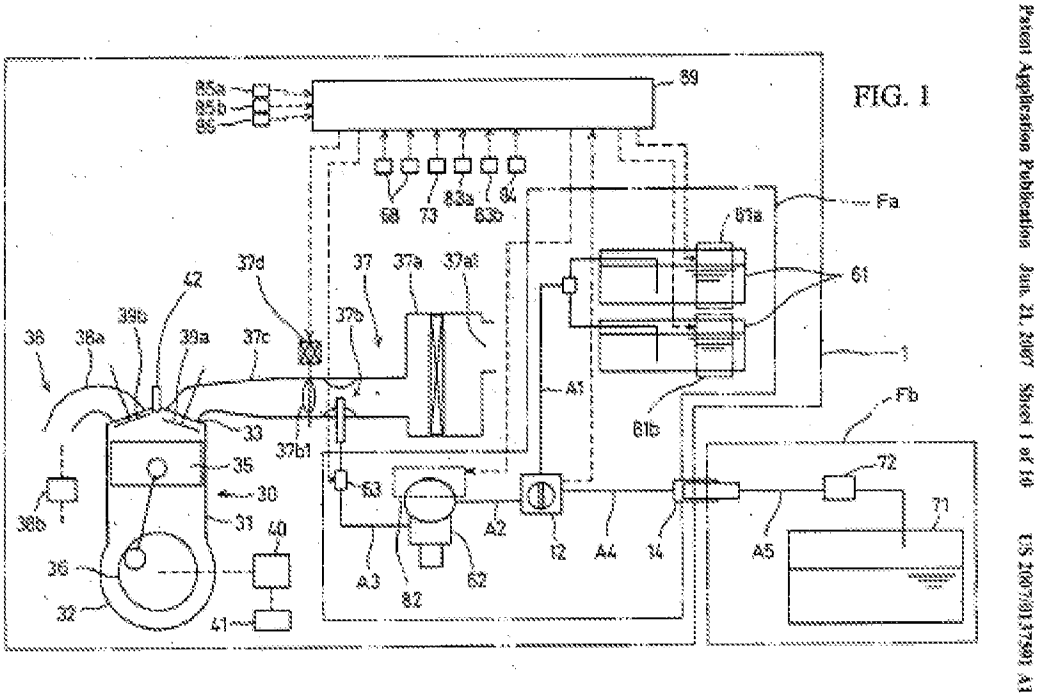
FIG. 5



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.



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

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

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	

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 Patent
Confirmation No. 6187 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:

Mailing

□ deposited with the US Postal Service in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

37 CFR 1.8(a) **37 CFR 1.10**

□ with sufficient postage as first class mail □ As "Express Mail Post Office to Addressee" Mailing Label No.

Transmission

□ transmitted by facsimile to Fax No.: 571-273-8300 addressed to **Examiner Kevin A. Lathers** at the Patent and Trademark Office.

■ transmitted by EFS-WEB addressed to **Examiner Kevin A. Lathers** at the Patent and Trademark Office.

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/

Customer No. 26629 Patent
Confirmation No. 6187 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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□ deposited with the US Postal Service in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

37 CFR 1.8(a) **37 CFR 1.10**

□ with sufficient postage as first class mail □ As "Express Mail Post Office to Addressee" Mailing Label No.

Transmission

□ transmitted by facsimile to Fax No.: 571-273-8300 addressed to **Examiner Kevin A. Lathers** at the Patent and Trademark Office.

■ transmitted by EFS-WEB addressed to **Examiner Kevin A. Lathers** at the Patent and Trademark Office.

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:

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 360

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 361

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 362

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 363

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 364

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 365

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 366

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 367

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 368

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 369

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 370

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 371

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 372

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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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 373

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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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 374

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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
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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	21154D5CF96EE2087260B163C9D733B60BD83EBBE08DDF9773A65007ECC12257AB288582B2656F73F5AFEEB1BE7FFC36BE8B6CEF3509F81B71F882437113516D
2020.11.25 Response-A.NE.pdf	39C2069E3CE873EE97C828EBF539964AB013D69EF1FEB23342C5098A9D82EC4EC422E50087086A019EA85D8F7FEB86D47F081F4635C295FBCAD77C87647B04DC
2020.11.25 Response-CLM.pdf	176517EE4C2C973ADE69EFB061633F100D9E549CF401A1F189C5F5CB945B7D0746D7C44F12CA8163A8799A725C0C01817D0B50AA2F3BF71C321C3FFD6FAA7E96
2020.11.25 Response-REM.pdf	8B78533F96E639D0E961BD103B024EB9166DEF39404D4A2899FACE552E3FD314C29145C1EBBD21D034D9E420CF032CB5CE6D0DC44B939442183DCE558F49147B

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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.

PTO/SB/06 (09-11)
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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

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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	11/25/2020	CLAIMS REMAINING AFTER AMENDMENT		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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		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.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

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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

ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
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EXAMINER	
LATHERS, KEVIN ANTHONY	

ART UNIT	PAPER NUMBER
3747	

NOTIFICATION DATE	DELIVERY MODE
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):

info@zpspatents.com
jmf@zpspatents.com

Office Action Summary	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 --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

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

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-17,21-22 and 24 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-17,21-22 and 24 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

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(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." 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 substation 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 looks to GasHose to modify Pursiffull and Sugimoto with a duel-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 duel-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

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

Petitioner MWE Investments, LLC et al.
Exhibit 1002-Part 1, Page 392

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	**Art Unit**
	KEVIN A LATHERS	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	✓	O	✓						
	3	✓	O	✓						
	4	✓	O	✓						
	5	✓	O	✓						
	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 Patent
Confirmation No. 6187 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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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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 405

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 406

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 407

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 408

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 409

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 is 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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 410

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 411

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 412

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 413

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.

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," *Office Action*, supra at 5, Applicant believes that one skilled in the

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 414

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).

While the Examiner asserts 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)," *Office Action*, supra at 6, such statements are merely conclusory and fall far short of supporting a *prima facie* case of obviousness, as the Examiner has not set forth any articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. ("[R]ejections on obviousness cannot be sustained

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 415

with mere conclusory statements; instead, there must be articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *MPEP §2143*).

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.

Canceled & Newly Presented Claims

In addition to the above amendments and remarks, Applicant has canceled claim 23 and newly added claim 24 in the present response. Support for claim 24 can be found at least in Paragraphs [0024] and [0053] of the Specification and in FIGS. 1, 4A, and 4B.

No fees are deemed necessary for new claim 24, as claim 23 has been canceled.

Claim 24 is believed to be patentably distinct from that which is disclosed in the cited prior art, as there is no teaching therein of a generator free of any pressure regulator, in combination with the additional elements of claim 21 from which claim 24 depends.

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 and 21, 22, and 24.

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

Respectfully submitted,

/Kevin R. Rosin/

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Dated: July 16, 2020
Attorney Docket No.: CET1090.070

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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 416

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.

/Kevin R. Rosin/

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Dated: July 16, 2020
Attorney Docket No.: CET1090.070

P.O. ADDRESS:
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136 South Wisconsin Street
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262-268-8100

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 417

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/191,503	07/16/2020 02:18:29 PM ET	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 #	60054895	FILING DATE	11/15/2018
CUSTOMER #	26629	FIRST NAMED INVENTOR	Mark Sarder
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Kevin Rosin

Documents

TOTAL DOCUMENTS: 3

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
2020.07.16 Response.pdf		14	-	550 KB
2020.07.16 Response-A....pdf	(1-1)	1	Amendment/Req. Reconsideration-After Non-Final Reject	115 KB
2020.07.16 Response-CLM.pdf	(2-6)	5	Claims	92 KB
2020.07.16 Response-REM.pdf	(7-14)	8	Applicant Arguments/Remarks Made in an Amendment	132 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2020.07.16 Response.pdf	8F0719821B095D1ED69B55566D103B6F03385A1A119DE0EA6F BD4B074D653E624D8F0A94B916DD1E5CA5AC07552B23B0045 5A9C38D25B7EA3BEFE393ED7CDCFA
2020.07.16 Response-A....pdf	01DEFEAE02DD10FDAFE2CC5638F7E392E27067AE2B07DE1F 2D6480FC1328F18D8BBBBAB652E77CC9889C4C1F7441368B9 3F47E46D6ACAA217F4C6D4A8BE2EB81
2020.07.16 Response-CLM.pdf	BC0D4BCA336C1AC29F0F8BE5AF4111D6EC8359D3A755B142 E1FE4C38103B9424D896636F716168D38192856D494F2DF659 F6A003587A9A5D5D166E2C53CC693E
2020.07.16 Response-REM.pdf	C82991ECE8EEDAEFF44D5C0BC261225B32EDBAAC25552DC B8D81ED7E4A0E71C4A1DBED7432079EFA9105873A83A0D6F CAB6B7835CD9D0C1202D4411010F7B4A4

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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ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
136 S WISCONSIN ST
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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: 04/30/2020

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.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

info@zpspatents.com
sml@zpspatents.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://ppair-my.uspto.gov/pair/PrivatePair.**
If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

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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 04/30/2020

ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
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PORT WASHINGTON, WI 53074

EXAMINER
LATHERS, KEVIN ANTHONY

ART UNIT	PAPER NUMBER
3747	

NOTIFICATION DATE	DELIVERY MODE
04/30/2020	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
sml@zpspatents.com

Office Action Summary	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 --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 02/28/2020.

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

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-17 and 21-22 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1,6-17 and 21-22 is/are rejected.

8) ☑ Claim(s) 2-5 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☑ Other: NPL.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

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

Response to Appeal Brief

2. In view of the appeal brief filed on 02/28/2020, PROSECUTION IS HEREBY REOPENED. A new ground of rejection set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/LINDSAY M LOW/
Supervisory Patent Examiner, Art Unit 3747

Double Patenting

3. 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.

4. Claims 1-17 and 21-23 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 21-23 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?").

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 disclose 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).

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.

17. Claims 7-9, 14, 15, and 17 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).

18. **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.

19. Purisfull and Sugimoto fail to disclose how their regulators are mounted while 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.

20. 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").

21. 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 substation 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

22. 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 with respect to claims 1-23 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

24. For the sake of argument, with regards to Pursifull and Sugimoto, the two have now had a modification in light of Gashose, as disclosed and discussed above, which renders the arguments pertaining to their combination moot. It is noted that Sugimoto discloses a typical propane, or other gaseous fuel, tank attachment (Fig. 14, attachment point 14), but simply does not show the exact nature of its offboard tank. Whether or not a regulator is inside the main generator system of either Pursifull or

Sugimoto would not alter the functionality and inclusion of the regulators and their functionalities of Gashose. There is good reason to make use of the routine systems of Gashose and they would not discount, disable, or remove any functionality from the other devices, nor would any possible duplicative usage cause any issue other than providing more fail safes as well as the benefits as discussed above.

25. While Sugimoto shows a typical connection point for a gaseous quick-connect hose, it does fail to discuss it directly, and so the modification in view of Gashose remedies this by discussing the benefits of such a modification and inclusion. Similarly, Gashose makes use of a mounting device but does not exactly show its location with regards to its fuel sources, however Nooutage clarifies such an attachment point to being on a source collar.

Conclusion

26. 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

/LINDSAY M LOW/
Supervisory Patent Examiner, Art Unit 3747

Notice of References Cited	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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	G					
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	J					
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	L					
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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	GasHoseandRegulators (May 17th, 2014, https://web.archive.org/web/20140517093401/http://gashosesandregulators.com/) (Year: 2014)
	V	Nooutage.com (Aug. 27th, 2006, http://web.archive.org/web/20061113112733/http://www.nooutage.com/40248.htm) (Year: 2006)
	W	
	X	

*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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/191,503	Sarder et al.
	Examiner	Art Unit
	KEVIN A LATHERS	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							
	1	✓	✓							
	2	✓	O							
	3	✓	O							
	4	✓	O							
	5	✓	O							
	6	✓	✓							
	7	✓	✓							
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	15	✓	✓							
	16	✓	✓							
	17	✓	✓							
	18	-	-							
	19	-	-							
	20	-	-							
	21	✓	✓							
	22	✓	✓							
	23	✓	✓							

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

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

/KEVIN A LATHERS/ Primary Examiner, Art Unit 3747	

Petitioner MWE Investments, LLC et al.
Exhibit 1002-Part 1, Page 434

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	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
L2	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
S1	445	F02D19/0613.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:25
S2	1204	F02D19/0605.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:25
S3	3408	F02D19/0647.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/07/27 14:25
S4	15258	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;	OR	OFF	2017/07/27 14:46

			DERWENT; IBM_TDB			
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" | "5524582" | "5623907" | "5720266" | "5816224" | "6035837").PN. OR ("6591817").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/07/27 15:20
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;	OR	OFF	2017/07/28 10:32

			DERWENT; IBM_TDB			
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-$ 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-$).did.	US-PGPUB; USPAT; USOCR; JPO; DERWENT	OR	OFF	2018/02/12 17:19
S48	35	(US-20020014077-$ 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" | "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.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/03/05 15:38
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-	US-PGPUB; USPAT; USOCR; JPO; DERWENT	OR	OFF	2019/03/05 16:01

		20130047964-$ or US-4463735-$ or CN-203796423-$).did.				
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; DERWENT; IBM_TDB	OR	OFF	2019/03/05 16:02
S61	1423	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

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	3711	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

4/22/2020 4:49:08 PM
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propane tank regulator mount

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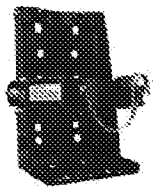
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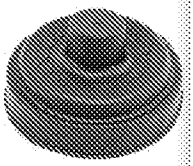
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Global Industrial



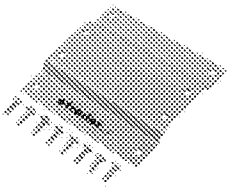
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etrailer.com



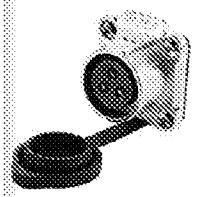
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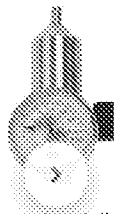
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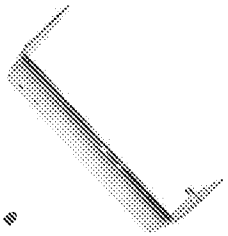
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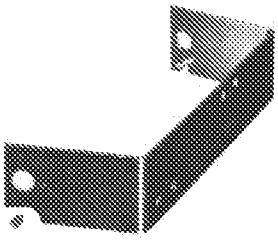
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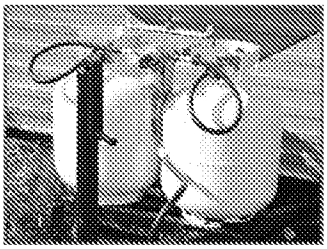
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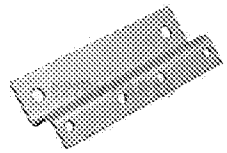
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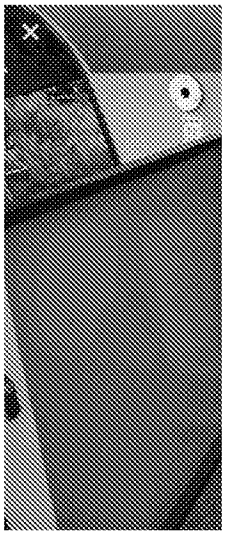
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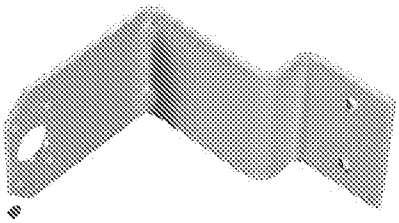


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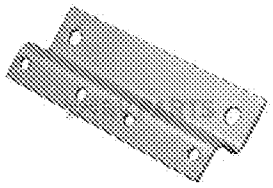


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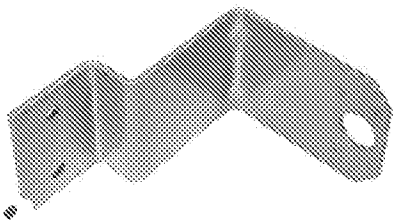




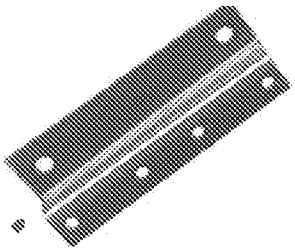
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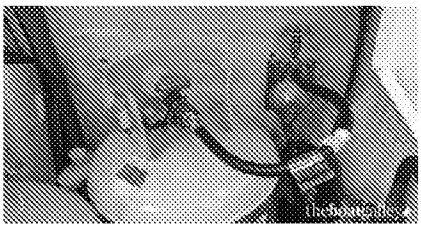
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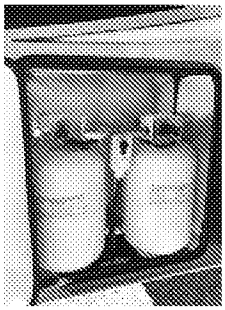
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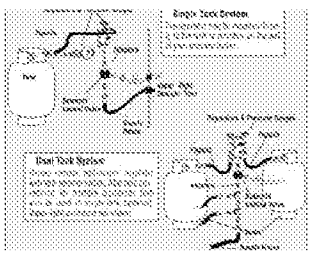
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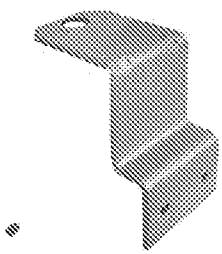
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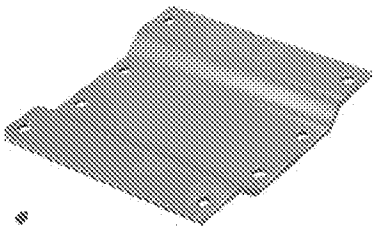
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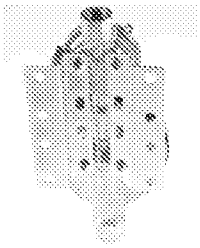
Propane Tank Regulator Mount B...

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Exhibit 1002, Part 1, Page 446

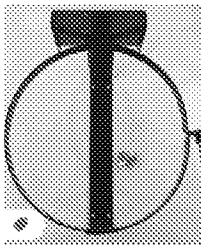
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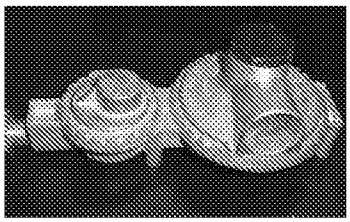
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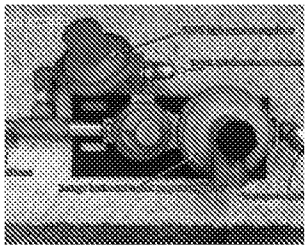
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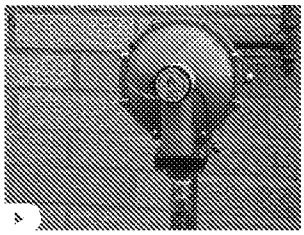
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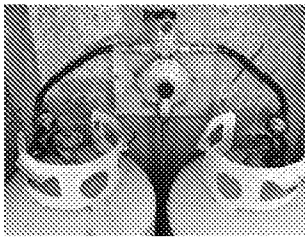
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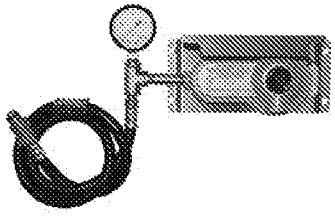
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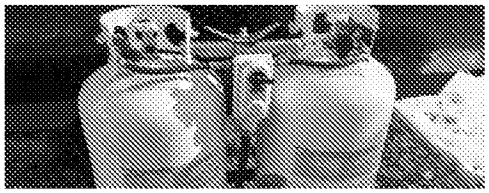
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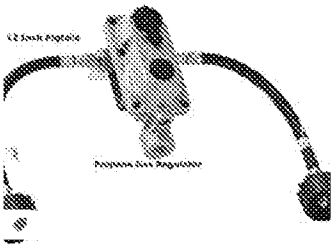
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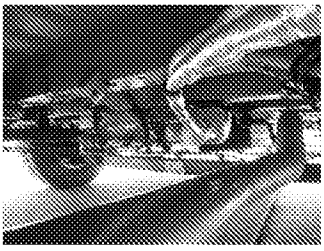
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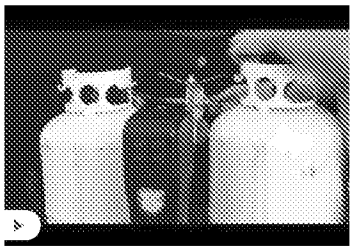
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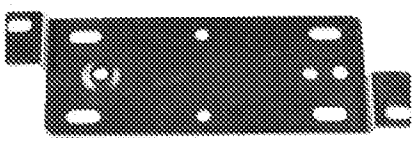
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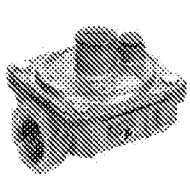


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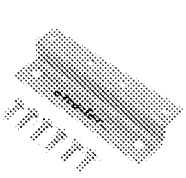


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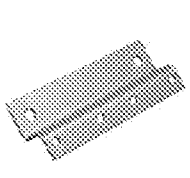
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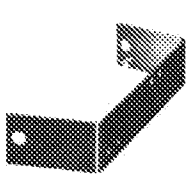
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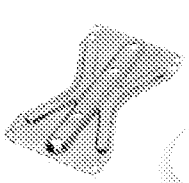
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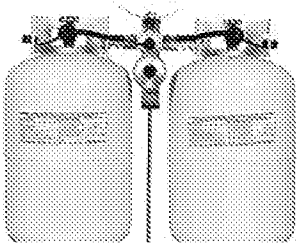


Propane Tank

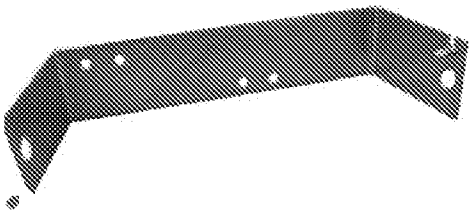


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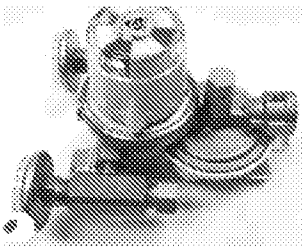
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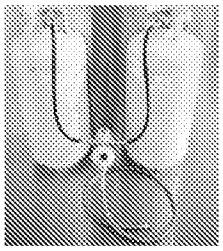
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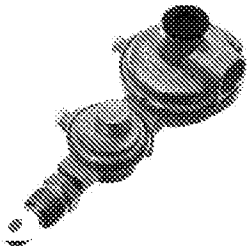
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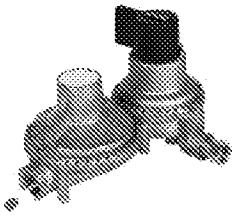
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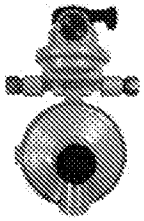
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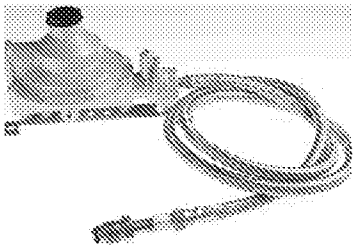
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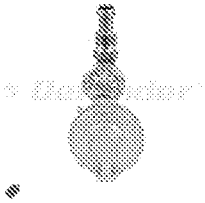
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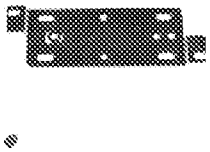
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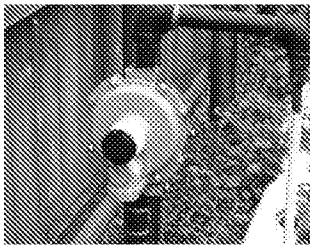
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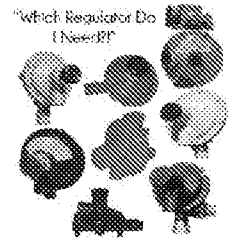
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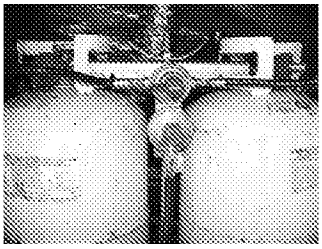
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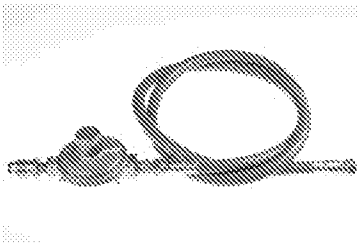
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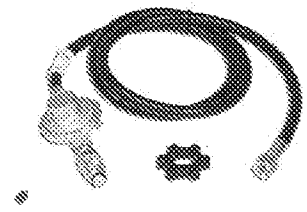
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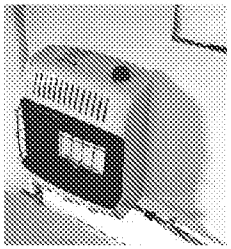
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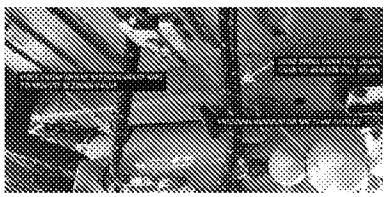
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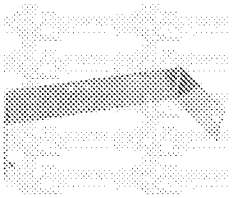
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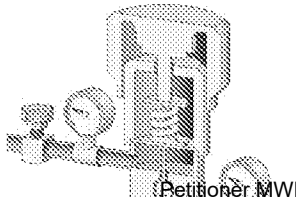


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Exhibit 1002, Part 1, Page 448



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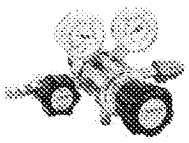
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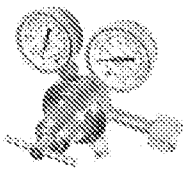

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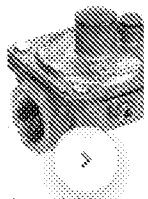

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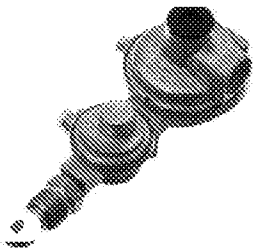

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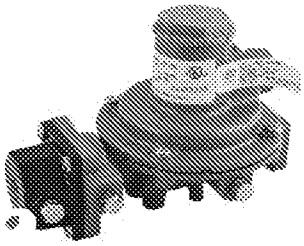

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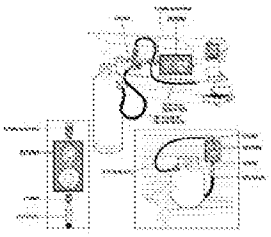

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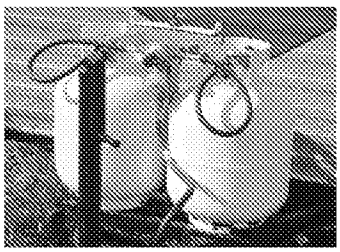

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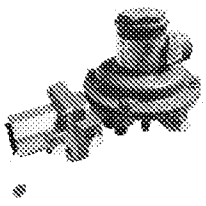

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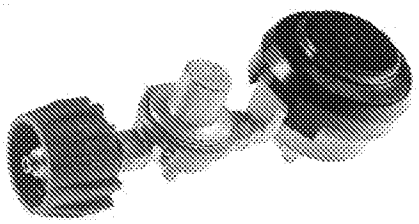

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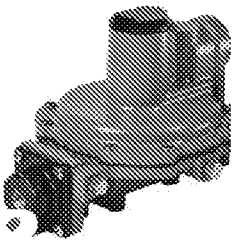

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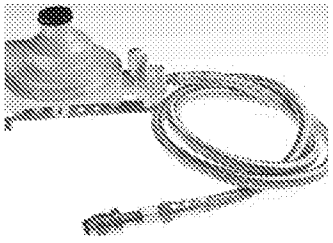

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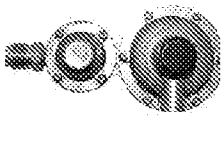

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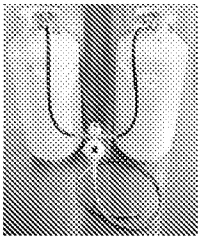

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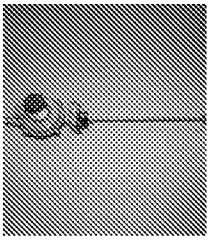

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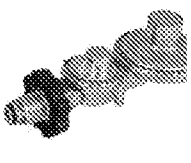

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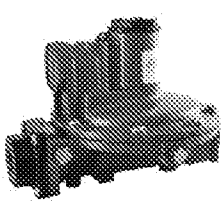

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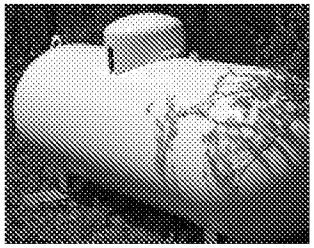

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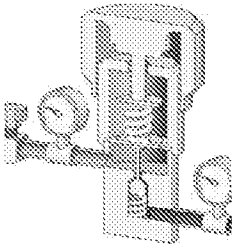

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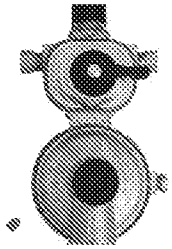

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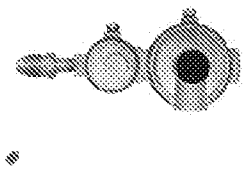
- 100 lb propane tank regulator
- propane regulator
- rv propane regulator

Petitioner MWE Investments, LLC, et al.
Exhibit 1002 Part 1 Page 452

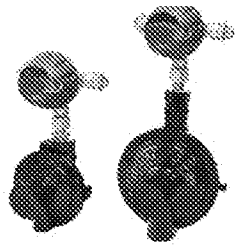
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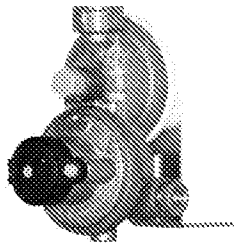
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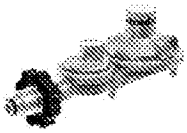


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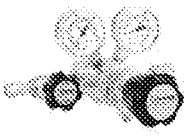
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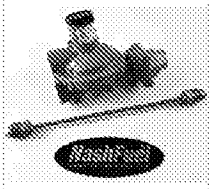
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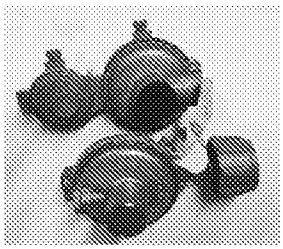
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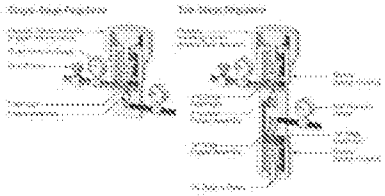
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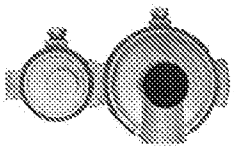
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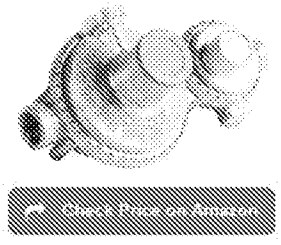
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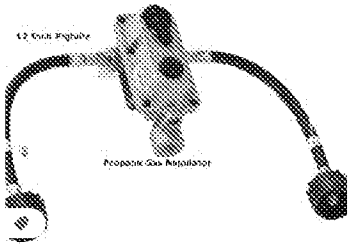
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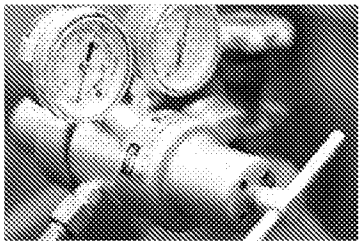
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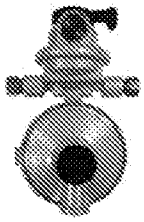
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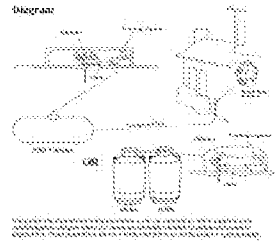
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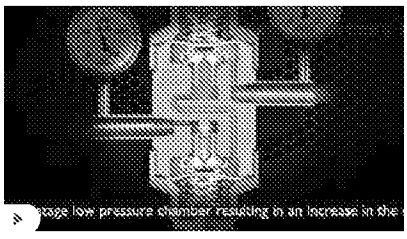
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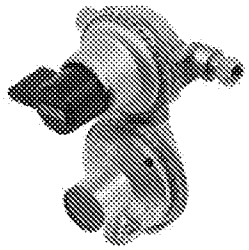
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Petitioner MWE Investments, LLC, et al.
Exhibit 1002 Part 1 Page 455

Customer No. 26629 Patent
Confirmation No. 6187 Attorney Docket No. CET0190.070

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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Commissioner for Patents
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Alexandria, VA 22313-1450

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 6, 2020.

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

Appellant is unaware of any other appeals or interferences related to this Appeal. 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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 457

(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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 458

4. **ARGUMENTS**

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).

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*, August 30, 2019, p. 3-4. 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 4. 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.*

Appellant respectfully disagrees with the rejection and believes claims 1, 11, and 21 to be patentably distinct from that which is disclosed in Pursifull and Sugimoto. 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 and Sugimoto 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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 459

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 460

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].

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 461

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].

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 462

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

With regard to the claimed limitations, there is no disclosure provided in Pursifull and/or Sugimoto 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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 463

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 light of the above, the combination of Sugimoto with Pursifull would therefore result in a dual fuel generator and fuel delivery system that includes a primary pressure regulator located off board the dual fuel generator (as disclosed in Sugimoto) and a secondary pressure regulator located on-board the dual fuel generator (as disclosed in Sugimoto). The resulting system thus would not teach or suggest that which is specifically called for in claims 1, 11, and 21 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) being located *off board* the generator.

As evidence of the validity of the above arguments, Appellant notes that the Examiner has admitted in the Final Office Action that "the inclusion of multiple pressure regulators in the off-board fuel system [is] not disclosed in Pursifull as modified by Sugimoto." *Final Office Action*, supra at 4. Thus, by the Examiner's own admission, the combination of Pursifull and Sugimoto – which is the basis for the rejection under 35 U.S.C. §103 – does not teach the claimed fuel regulator system of claim 1. Therefore, the rejection of claims 1, 11, and 21 under 35 U.S.C. §103 as being unpatentable over Pursifull in view of Sugimoto is deficient on its face and cannot be sustained.

Obviousness of Claims 1, 11, and 21 further in view of Propane 101 and/or Harris

As indicated above, in setting forth the rejection of claims 1, 11, and 21, the Examiner admitted that "the inclusion of multiple pressure regulators in the off-board fuel system [is] not disclosed in Pursifull as modified by Sugimoto." *Final Office Action*, supra at 4. The Examiner thus further stated that "the inclusion of multiple pressure regulators in the off-board fuel system, while not disclosed in Pursifull as modified by Sugimoto, would have been an obvious modification of the system of Sugimoto which includes an off-board fuel regulation system including a single regulator 72," *id.* at 4, asserting that such a modification would be a mere "duplication of parts." *Id.* at 5. The Examiner additionally stated that "dual tank regulators are extremely old and well-known in the art" and that "it would have been obvious to one of ordinary skill in the art… to

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 464

modify the modified Pursifull to include such a dual-stage off-board regulator," with the Examiner referencing "Propane 101" and "Harris" as examples of such dual-stage regulators. *See id.*

With regard to the Examiner's reference to "Propane 101" and "Harris," Appellant notes that these references have **not** been cited to as forming part of the rejection of claims 1, 11, and 21 under 35 U.S.C. §103. Thus, on its face, the rejection of claims 1, 11, and 21 as set forth by the Examiner is improper and cannot be sustained, as MPEP 706.02(j) sets forth that "[w]here a reference is relied on to support a rejection, whether or not in a minor capacity, ***that reference should be positively included in the statement of the rejection***" (citing *In re Hoch,* 428 F.2d 1341, 1342 n.3 166 USPQ 406, 407 n. 3 (CCPA 1970)).

Additionally, Appellant notes that "Harris" is not available as prior art as part of any rejection under 35 U.S.C. §103 proposed by the Examiner, as the Examiner has indicated a publication date of 2017 for Harris, while the present application claims priority to U.S. Patent Application Serial No. 14/738,060, filed on *June 12, 2015*. Accordingly, the reliance on Harris is improper and any theoretical rejection that cites to Harris as part of the rejection cannot be sustained.

Regardless of all the above, Appellant believes that one skilled in the art would not look to Propane 101 (and/or Harris) to modify Pursifull and Sugimoto in order to include "multiple pressure regulators 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 4, 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];

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 465

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 Propane 101 (and/or Harris) 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 not simply replace the fuel pressure regulator 62 with another offboard regulator (for reasons discussed in detail above due to the internal fuel system Fa onboard the generator), and (2) adding a dual-stage regulator offboard the generator 1 (for gaseous fuel bottle 71) in addition to the onboard 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. Accordingly, one skilled in the art would not look to Propane 101 (and/or Harris) to modify the modified system of Pursifull and Sugimoto.

In sustaining the rejection, the Examiner further asserted that "duplicative, especially as a fail safe or for ease of use, systems are common and despite cost one of ordinary skill in the art would have found it obvious to duplicate systems for these purposes" and that "rearranging [and/or duplication of] parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70." *Advisory Action*, December 5, 2019. Appellant disagrees.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 466

With regard to the Examiner's reliance on a "duplication" or "rearrangement" of parts as a basis for the rejection, MPEP 2144.04 specifies that "[t]he mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims… is not by itself sufficient to support a finding of obviousness" and that "[t]he prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device." (citing *Ex parte Chicago Rawhide Mfg. Co.,* 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984)). In the present case, the Examiner's suggestion to modify the system of Pursifull and Sugimoto to have an entirety of a fuel regulator system (primary and second regulators or first and second stages) off-board the generator is not a mere rearrangement of parts that would have been obvious to one skilled in the art based on a motivation or reason provided by Propane 101, but instead the Examiner has improperly relied on the teaching of the present Specification as the basis for such rearrangement.

As set forth above, 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, with an onboard fuel pressure regulator 62 corresponding to the internal fuel system Fa and a pressure reducing device 72 corresponding to the external fuel system Fb. *Sugimoto*, ¶[0070]; FIGS. 1 and 2. In light of the teachings of Sugimoto, it would *not* be an obvious "rearrangement of parts" or "duplication of parts" to have both primary and second regulators or first and second stages of a fuel regulator system being located off-board the generator. The fuel pressure regulator 62 could not simply be "rearranged" by removing the regulator from the generator 1 and combining it with pressure reducing device 72 as part of a dual-stage off-board regulator for gaseous fuel bottle 71, 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 be motivated to simply add an additional or "duplicative" pressure regulator offboard the generator 1 (in addition to fuel pressure regulator 62 and pressure reducing device 72), as such a duplication of pressure regulators would serve no purpose in the generator 1. "[O]bviousness concerns whether a skilled artisan not only *could have made but would have been motivated to make* the

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 467

combinations or modifications of prior art to arrive at the claimed invention." *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (citing *InTouch Technologies, Inc. v. VGO Communications, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (emphasis in original)). The Examiner's addition of a duplicative regulator offboard the system of Sugimoto (and Pursifull) is merely the result of improper hindsight using Applicant's specification as a roadmap and, in fact, would only add increased cost and complexity to the system(s) of Pursifull and Sugimoto.

In light of all the above, one skilled in the art would recognize that it would not be a mere "duplication or rearrangement of parts" to modify the system of Sugimoto to include an additional pressure regulator offboard the generator, as alleged by the Examiner. Rather, such a proposed "duplication or rearrangement of parts" would be an entirely unnecessary modification to Sugimoto (and Pursifull) for which there would be no "motivation or reason for the worker in the art, without the hindsight benefit of appellant's specification, to make the necessary changes in the reference device," as required under MPEP 2144.04.

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(a) with respect to claims 6 and 13. The combination of Pursifull and Sugimoto - alone or in further combination with Propane 101 (and/or Harris) - 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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 468

Claims 6 and 13

The Examiner rejected claims 6 and 13 under 35 U.S.C. §103 as being unpatentable over Pursifull in view of Sugimoto.

Each of claims 6 and 13 calls for 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.

In rejecting claims 6 and 13, the Examiner asserted that "the modified [teachings of] Pursifull discloses… 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)." *Final Office Action*, supra at 5. Appellant disagrees with the rejection.

As set forth above, Sugimoto discloses an engine operated generator 1 that includes a fuel system F for supplying the fuel gas to the engine 30, with the fuel system F having 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 pipe connector 14, and a fuel cutoff valve 63. *Sugimoto*, ¶[0071]. The external fuel system Fb includes the external fuel bottle 71, namely, a second fuel source or an external fuel source, a pipe A5 and a pressure reducing device 72. *Sugimoto*, ¶[0073]. The pipe A5 connects the external fuel bottle 71 to the connector 14, with a pipe A4 connecting pipe connector 14 to the fuel cutoff valve 12. *Sugimoto*, ¶¶[0073], [0079].

However, there is no teaching in Sugimoto (alone or in combination with Pursifull) of 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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 469

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, as called for in claims 6 and 13. That is, there is no disclosure in Sugimoto that connector 14, which was referenced by the Examiner in the rejection, is structured as a "*quick-connect hose coupling*" with a first end coupled to an outlet of the secondary pressure regulator and a second end coupled to an inlet of the gaseous fuel line. Instead, the connector 14 of Sugimoto is only generally/generically described as "a pipe connector 14 to which a fuel pipe connected to an external fuel bottle 71 shown in FIG. 1 is connected." *Sugimoto*, ¶[0048]. This general reference to pipe connector 14 thus provides no teaching or suggestion of the specifically claimed quick-connect hose coupling having first and second ends that is called for in claims 6 and 13.

The Examiner's characterization of the connector 14 of Sugimoto as teaching the claimed quick-connect hose coupling having first and second ends as called for in claims 6 and 13 ignores the standard of a broadest reasonable interpretation of the claim language, ignores the clear teaching of the present claims/Specification, and distorts that which is disclosed in Sugimoto. That is, 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. Circ. 1999)). "The plain meaning of a term means the ordinary and customary meaning given to the term by those of ordinary skill in the art at the time of the invention… [and] may be evidenced by a variety of sources, including the words of the claims themselves, the specification, drawings, and prior art." "However, the best source for determining the meaning of a claim term is the specification - the greatest clarity is obtained when the specification serves as a glossary for the claim terms." *MPEP § 2111.01* (citing *In re Zletz,* 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)).

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 470

In the present case, a skilled artisan would readily recognize that a "quick-connect hose coupling" is "a coupling used to provide a fast, make-or-break connection of fluid transfer lines that is operated by hand and can, upon disconnection, automatically contain any fluid in the line."[1] This plain meaning is consistent with the use of the term "quick-connect hose coupling" as disclosed in the Specification, with the specification disclosing that "a quick-connect hose coupling, connects LPG supply hose 36 to generator 20 so that LPG supply hose 36 may be quickly attached and detached from generator 20," that "[h]ose coupling 50 has a first end 50a mounted on the external surface of generator 20 and… a second end 50b coupled to the outlet of LPG supply hose 36," and that "quick-disconnect hose coupling 50 automatically opens when connected to enable fuel flow from LPG supply hose 36 to the engine… [and] automatically disconnects fluid communication when disconnected." *Specification*, ¶[0035]. When the claimed "quick-connect hose coupling" is given its proper broadest reasonable interpretation consistent with the requirements of MPEP § 2111 and MPEP § 2111.01, it is clear that Sugimoto (alone or in combination with Pursifull) fails to teach or suggest that which is called for in claims 6 and 13. That is, as set forth above, the pipe connector 14 in Sugimoto provides **no** teaching or suggestion of a quick-connect hose coupling having first and second ends, as called for in claims 6 and 13.

In light of at least the above, the Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. §103(a) with respect to claims 6 and 13. Sugimoto and Pursifull, and any resulting combination thereof, does not teach or suggest that which is called for in claims 6 and 13. Appellant therefore respectfully requests reversal of the rejection of claims 6 and 13 under 35 U.S.C. §103.

Claims 7, 8, and 14

The Examiner rejected claims 7, 8, and 14 under 35 U.S.C. §103 as being unpatentable over Pursifull in view of Sugimoto.

[1] *See* https://en.wikipedia.org/wiki/Quick_connect_fitting

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 471

Claims 7, 8, and 14 call for a regulator mounting device secured to the pressurized fuel source with the secondary pressure regulator (claim 7) and/or the primary pressure regulator (claims 8 and 14) mounted on the regulator mounting device.

In rejecting claims 7, 8, and 14, the Examiner admitted that Pursifull and Sugimoto fail to disclose a regulator mounting device secured to the pressurized fuel source with at least the secondary pressure regulator mounted on the regulator mounting device. *See Final Office Action*, supra at 5. However, the Examiner asserted that "it would have been obvious to one having ordinary skill in the art… to mount both regulators in a similar location on the same bracket since it has been held that rearranging parts of an invention involves only routine skill in the art" and that "[i]n this case locating the two regulators mounted with a mounting device on the pressure source is not only common but obvious due to its efficiency, ease of use, and ease of movement for any potential operator." *Id.* Appellant disagrees with the rejection.

With regard to the Examiner's reliance on a "rearrangement of parts" as a basis for the rejection, MPEP 2144.04 specifies that "[t]he mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims [ ] is not by itself sufficient to support a finding of obviousness" and that "[t]he prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device." (citing *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984)). In the present case, the Examiner's suggestion to modify the system of Pursifull and Sugimoto to include a mounting device secured to the pressurized fuel source and on which the secondary pressure regulator (claim 7) and/or the primary pressure regulator (claims 8 and 14) are mounted is not a mere rearrangement of parts that would have been obvious to one skilled in the art, but instead adds an entirely new element/component not disclosed in Pursifull or Sugimoto – i.e., a mounting device. There is no disclosure in Sugimoto of any "mounting device" that would be used to mount pressure reducing device 72 to pressurized fuel source 71, but instead the only disclosure regarding the device 72 is that "external fuel system Fb includes the external fuel bottle 71, namely, a second fuel source or an external fuel source, a pipe A5 and a pressure reducing device

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 472

72." *Sugimoto*, ¶[0073]. Furthermore, FIG. 1 in Sugimoto shows that pressure reducing device 72 is *not* secured to the pressurized fuel source 71, as called for in claims 7, 8, and 14, but is instead positioned along pipe A5 that connects pressurized fuel source 71 to the generator 1. The "rearranging of parts" alleged by the Examiner is thus, in fact, an addition of an entirely new component (the claimed mounting device) not included in either of Pursifull or Sugimoto, such that the Examiner's alleged basis for the rejection is improper and cannot be sustained.

In light of at least the above, the Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. §103(a) with respect to claims 7, 8, and 14. Sugimoto and Pursifull, and any resulting combination thereof, does not teach or suggest that which is called for in claims 7, 8, and 14. Appellant therefore respectfully requests reversal of the rejection of claims 7, 8, and 14 under 35 U.S.C. §103.

Claims 9 and 15

The Examiner rejected claims 9 and 15 under 35 U.S.C. §103 as being unpatentable over Pursifull in view of Sugimoto.

Claims 9 and 15 call for 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.

In rejecting claims 9 and 15, the Examiner admitted that Pursifull and Sugimoto fail to disclose such an arrangement but asserted that pressurized fuel containers "are well-known in the art to have a 'collar' piece which often has regulators attached to it." *See Final Office Action*, supra at 6. The Examiner therefore took Official Notice that "it is old and well-known to make use of standard-in-the-art propane tanks with regulators attached to their collars," with the Examiner citing to "RVDoctor" and "Nooutage.com" as evidence of such an arrangement. *See id.*

Appellant disagrees with the rejection. As set forth in 2144.03, "[w]hile 'official notice' may be relied on, these circumstances should be rare" and "the notice of facts beyond the record which may be taken by the examiner must be "capable of such instant

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 473

and unquestionable demonstration as to defy dispute." *Id.* (citing In re Knapp Monarch Co., 296 F.2d 230, 132 USPQ 6 (CCPA 1961)). In the present case, Appellant believes that the Examiner's use of Official Notice still fails to address all the elements called for in claims 9 and 15. That is, assuming *arguendo* that the Examiner is correct in that pressurized fuel containers are well-known in the art to have a "collar" piece thereon, 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 6. Additionally, neither RVDoctor or Nooutage.com referenced in the Official Notice taken by the Examiner 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 RVDoctor and Nooutage.com*. Accordingly, none of the prior art references cited by the Examiner teaches or suggests the arrangement 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.

In light of at least the above, the Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. §103(a) with respect to claims 9 and 15. Sugimoto and Pursifull, 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 1-20

The Examiner rejected claims 1-20 on the ground of non-statutory double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 10,221,780.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 474

Appellant notes that the double patenting rejection is not the only remaining rejection in the present application. The Examiner 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 and 21-23 is not taught or suggested in the art of record or a combination thereof. As such, Appellant believes that claims 1-17 and 21-23 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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Dated: February 28, 2020
Attorney Docket No.: CET1090.070

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Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 475

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 476

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 477

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

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 478

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 479

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.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 480

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.

23. (Previously Presented) The generator and fuel delivery system of claim 22 wherein the dual stage regulator is mounted directly onto the pressurized fuel source, off-board from the generator.

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 481

EVIDENCE APPENDIX:

-- None --

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 482

RELATED PROCEEDINGS APPENDIX:

-- None --

Petitioner MWE Investments, LLC, et al.
Exhibit 1002-Part 1, Page 483

Electronic Acknowledgement Receipt

EFS ID:	38727249
Application Number:	16191503
International Application Number:	
Confirmation Number:	6187
Title of Invention:	DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE
First Named Inventor/Applicant Name:	Mark J. Sarder
Customer Number:	26629
Filer:	Kevin Roger Rosin./Robyn Templin
Filer Authorized By:	Kevin Roger Rosin.
Attorney Docket Number:	CET1090.070
Receipt Date:	28-FEB-2020
Filing Date:	15-NOV-2018
Time Stamp:	15:38:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Appeal Brief Filed	AppealBrief.pdf	618683 115aac07eb75da31f1e2b54afa04f44b9e766a9a	no	28

Warnings:

Information:	
Total Files Size (in bytes):	618683

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If a new application is being filed and the application includes the necessary components for a 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.

PTO/AIA/31 (03-14)
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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 6, 2020

Signature /Robyn L. Templin/

Typed or printed name Robyn L. Templin

In re Application of
Sarder et al.

Application Number	Filed
16/191,503	11/15/2018

For OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

Art Unit	Examiner
3747	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)) $ 800.00

[X] Applicant asserts small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by 50%, and the resulting fee is: $ 400.00

[ ] Applicant certifies micro entity status. See 37 CFR 1.29. Therefore, the fee shown above is reduced by 75%, and the resulting fee is: $
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

[ ] 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. _____.

[X] 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

[X] attorney or agent of record
Registration number 55584

[ ] attorney or agent acting under 37 CFR 1.34
Registration number _____.

Signature /Kevin R. Rosin/

Typed or printed name Kevin R. Rosin

Telephone number (262) 268-8100

Date January 6, 2020

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*.

[X] * 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 `450, Alexandria, VA 22313-1450**.

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PTO/AIA/22 (03-13)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) CET1090.070
Application Number **16/191,503**	Filed **11/15/2018**
For **OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE**	
Art Unit **3747**	Examiner **Kevin A. Lathers**

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	Micro Entity Fee	
[X] One month (37 CFR 1.17(a)(1))	$ 200	$ 100	$ 50	$ 100
[ ] Two months (37 CFR 1.17(a)(2))	$ 600	$ 300	$ 150	$
[ ] Three months (37 CFR 1.17(a)(3))	$ 1400	$ 700	$ 350	$
[ ] Four months (37 CFR 1.17(a)(4))	$ 2200	$ 1100	$ 550	$
[ ] Five months (37 CFR 1.17(a)(5))	$ 3000	$ 1500	$ 750	$

[X] Applicant asserts small entity status. See 37 CFR 1.27.

[ ] Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

[ ] A check in the amount of the fee is enclosed.

[ ] Payment by credit card. Form PTO-2038 is attached.

[ ] The Director has already been authorized to charge fees in this application to a Deposit Account.

[ ] The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number ___.

[X] Payment made via EFS-Web.

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.

[X] attorney or agent of record. Registration Number 55584.

[ ] attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Kevin R. Rosin/ — January 6, 2020
Signature — Date

Kevin R. Rosin — (262) 268-8100
Typed or printed name — Telephone Number

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.*

[X] *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). 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 and 1.14. This collection is estimated to take 6 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**.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Patent Application Fee Transmittal

Application Number:	16191503
Filing Date:	15-Nov-2018
Title of Invention:	DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE
First Named Inventor/Applicant Name:	Mark J. Sarder
Filer:	Kevin Roger Rosin./Robyn Templin
Attorney Docket Number:	CET1090.070

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
NOTICE OF APPEAL	2401	1	400	400
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 1 month with $0 paid	2251	1	100	100
Miscellaneous:				
		Total in USD ($)		**500**

Electronic Acknowledgement Receipt

EFS ID:	38208085
Application Number:	16191503
International Application Number:	
Confirmation Number:	6187
Title of Invention:	DUAL FUEL LOCKOUT SWITCH FOR GENERATOR ENGINE
First Named Inventor/Applicant Name:	Mark J. Sarder
Customer Number:	26629
Filer:	Kevin Roger Rosin./Robyn Templin
Filer Authorized By:	Kevin Roger Rosin.
Attorney Docket Number:	CET1090.070
Receipt Date:	06-JAN-2020
Filing Date:	15-NOV-2018
Time Stamp:	12:13:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$500
RAM confirmation Number	E202016C14187773
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Notice of Appeal Filed	NoticeOfAppeal.pdf	100582 2d15d8f0bc2772568b7bdaf987ac002aaf364cf8	no	1
Warnings:					
Information:					
2	Extension of Time	PetForExt.pdf	101191 e2836aa321ab7d2a32dec223ff2570e671175325	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32502 564595b232c529cc3b567e0fa2d082b5b00be009	no	2
Warnings:					
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a 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.