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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/397,488	01/03/2017	David LYMBEROPOULOS	SAFO/0012USPC02

CONFIRMATION NO. 1341

PUBLICATION NOTICE



OC000000091633295

26290
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

Title:SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

Publication No.US-2017-0147012-A1

Publication Date:05/25/2017

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/397,488	06/06/2017	9671794	SAFO/0012USPC02	1341

2629 759 5/17/2017

PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

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 0 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 Data Management (ODM) at (571)-272-4200.

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

David LYMBEROPOULOS, Houston, TX;
SAFOCO, INC., Houston, TX;
Benjamin R. MATTHEWS, Missouri City, TX;

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.

Document Description: Issue Fee Payment (PTO-85B)

Issue Fee Transmittal Form

Application Number	Filing Date	First Named Inventor	Atty. Docket No.	Confirmation No.
15397488	03-Jan-2017	David LYMBEROPOULOS	SAFO/0012USPC02	1341

TITLE OF INVENTION :

SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

Entity Status	Application Type	Art Unit	Class - Subclass	EXAMINER
Small	Utility under 35 USC 111(a)	3753	488000	WILLIAM MCCALISTER
Issue Fee Due	Publication Due	Total Fee(s) Due	Date Due	Prev. Paid Fee
\$480	\$0	\$480	26-Jul-2017	\$0

1.Change of Correspondence Address and/or Indication Of Fee Address (37 CFR 1.33 & 1.363)

Current Correspondence Address:	Current Indicated Fee Address :
26290 PATTERSON & SHERIDAN, L.L.P. 24 Greenway Plaza, Suite 1600 Houston TX 77046 UNITED STATES 713-623-4844 ~~PSDocketing@pattersonsheridan.com~~	
☐ Change of correspondence address requested, system generated AIA/122-EFS form attached	☐ Fee Address indication requested, system generated SB/47-EFS form attached

2.Entity Status**Change in Entity Status**

Applicant certifying micro entity status; system generated Micro Entity certification form attached. See 37 CFR 1.29.

Note: Absent a valid certification of micro entity status, issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. If this box is checked, you will be prompted to choose a micro entity status on the gross income basis (37 CFR 1.29(a)) or the institution of higher education basis (37 CFR 1.29(d)), and make the applicable certification online.



Applicant asserting small entity status. See 37 CFR 1.27.

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.



Applicant changing to regular undiscounted fee status.

Note: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.



Document Description: Issue Fee Payment (PTO-85B)

3.The Following Fee(s) Are Submitted:

☒ Issue Fee

☐ I authorize USPTO to apply my previously paid issue fee to the current fees due

☐ Publication Fee

☐ The Director is hereby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number _____

☐ Advance Order - # of copies _____

☒ If in **addition** to the payment of the issue fee amount submitted with this form, there are any discrepancies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number 200782/SAFO/00120.
The **issue fee must be submitted** with this form. **If payment of the issue fee does not accompany this form, checking this box and providing a deposit account number will NOT be effective to satisfy full payment of the fee(s) due.**

4.Firm and/or Attorney Names To Be Printed

NOTE: If no name is listed, no name will be printed
For printing on the patent front page, list to be displayed as entered

1. Patterson & Sheridan, L.L.P.
2.
3.

5.Assignee Name(s) and Residence Data To Be Printed

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

Name	City	State	Country	Category
SAFOCO, INC.	Houston	TEXAS	united states	corporation

6.Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via EFS-WEB on the date indicated below.

Signature	/Jessie D. Herrera/	Date	04-28-2017
Name	Jessie D. Herrera	Registration Number	63799

Electronic Patent Application Fee Transmittal

Application Number:	15397488			
Filing Date:	03-Jan-2017			
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE			
First Named Inventor/Applicant Name:	David LYMBEROPOULOS			
Filer:	Jessie D. Herrera/Stephanie Dominguez			
Attorney Docket Number:	SAFO/0012USPC02			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPL ISSUE FEE	2501	1	480	480
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				480

Electronic Acknowledgement Receipt

EFS ID:	29060683
Application Number:	15397488
International Application Number:	
Confirmation Number:	1341
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE
First Named Inventor/Applicant Name:	David LYMBEROPOULOS
Customer Number:	26290
Filer:	Jessie D. Herrera/Stephanie Dominguez
Filer Authorized By:	Jessie D. Herrera
Attorney Docket Number:	SAFO/0012USPC02
Receipt Date:	28-APR-2017
Filing Date:	03-JAN-2017
Time Stamp:	14:32:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$480
RAM confirmation Number	050117INTEFSW14320900
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	Issue Fee Payment (PTO-85B)	Web85b.pdf	46293	no	2
			84fc67824b105d70629cf8334503268c69ed86a2		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32179	no	2
			7908a1cbdfc9b550d6998fbd1b6c4431de92a07f		
Warnings:					
Information:					
Total Files Size (in bytes):			78472		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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 ALLOWANCE AND FEE(S) DUE

26290 7590 04/26/2017
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

EXAMINER

MCCALISTER, WILLIAM M

ART UNIT

PAPER NUMBER

3753

DATE MAILED: 04/26/2017

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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15/397,488

01/03/2017

David LYMBERPOULOS

SAFO/0012USPC02

1341

TITLE OF INVENTION: SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	07/26/2017

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 and an extra copy of the form should be submitted. 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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or **Fax** (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)

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.

26290 7590 04/26/2017
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/397,488	01/03/2017	David LYMBEROPOULOS	SAFO/0012USPC02	1341

TITLE OF INVENTION: SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	07/26/2017

EXAMINER	ART UNIT	CLASS-SUBCLASS
MCCALISTER, WILLIAM M	3753	137-488000

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/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form 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 has been filed for recordation as set forth in 37 CFR 3.11. 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. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/397,488	01/03/2017	David LYMBEROPOULOS	SAFO/0012USPC02	1341

26290 7590 04/26/2017
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

EXAMINER

MCCALISTER, WILLIAM M

ART UNIT	PAPER NUMBER
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3753

DATE MAILED: 04/26/2017

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 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, 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. 15/397,488	Applicant(s) LYMBEROPOULOS ET AL.	
	Examiner WILLIAM MCCALISTER	Art Unit 3753	AIA (First Inventor to File) Status No

-- 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 the terminal disclaimer filed 4/13/17.
☐ 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 1-21. 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) | 5. ☐ Examiner's Amendment/Comment |
| 2. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 6. ☒ Examiner's Statement of Reasons for Allowance |
| 3. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 7. ☐ Other _____. |
| 4. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____. | |

/WILLIAM MCCALISTER/
Primary Examiner, Art Unit 3753

The present application is being examined under the pre-AIA first to invent provisions.

Allowable Subject Matter

Claims 1-21 are allowed.

The following is an examiner's statement of reasons for allowance: the prior art fails to teach a control system including the claimed arrangement of a fluid supply, a first line, a pump, and a second line, along with the claimed arrangement of the safety valve, valve actuator, controller, valve assembly and fluid drive assembly.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **William McCalister**, whose telephone number **571-270-1869**. The examiner can normally be reached on Monday-Friday (7:00AM-5:30PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisors can be reached by phone. Craig Schneider can be reached at 571-272-3607, John Fristoe can be reached at 571-272-4926 and Mary McManmon can be

Art Unit: 3753

reached at 571-272-6007. 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 <http://pair-direct.uspto.gov>. 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.

/WILLIAM MCCALISTER/
Primary Examiner, Art Unit 3753

4/20/17

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	13/480704	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/02 12:52
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S3	170	S2 and (pump or compressor)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/02 13:17
S5	138	S2 and pump	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/02 13:18
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S11	21	("1223326" "3225785" "4037619" "4414882" "4431159" "4585205" "4613111" "4774980" "4778351" "5094267" "5158108" "5158230" "5197328" "5318272" "5431182" "5460196").PN. OR ("6202681").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2014/07/02 17:01
S12	3	("2010/0154894").URPN.	USPAT	OR	OFF	2014/07/03 13:51
S13	19	("2132132" "2203243" "3227171" "3367355" "3467129").PN. OR ("3788341").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2014/07/03 13:53
S14	11	("3788341" "4186766" "4240463" "4319603" "5293910" "5396923").PN. OR ("7044156").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2014/07/03 13:54
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S16	6	S15 and control\$4 near4 pump	US-PGPUB; USPAT	OR	OFF	2014/07/03 14:01
S17	18	(US-20100154894-\$ or US-20110240126-\$ or US-20120031494-\$ or US-20120227983-\$).did. or (US-3788341-\$ or US-4186766-\$ or US- 4213480-\$ or US-4240463-\$ or US-4774980-\$ or US-6116268-\$ or US-6202681-\$ or US-6289737- \$ or US-6450477-\$ or US-6854704-\$ or US- 7004445-\$ or US-7044156-\$ or US-7934562-\$ or US-8763983-\$).did.	US-PGPUB; USPAT	OR	OFF	2014/07/07 07:40
S18	7	S17 and pump	USPAT	OR	OFF	2014/07/07 07:40
S19	10	S17 and pump	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/07 07:40
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S23	61	137/492,492.5.ccls. and well and controller	US-PGPUB; USPAT; USOCR	OR	OFF	2014/07/07 09:06
S24	5	11/426109	US-PGPUB; USPAT; USOCR	OR	OFF	2014/07/07 09:10
S25	10	("2006/0219299").URPN.	USPAT	OR	OFF	2014/07/07 09:12
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S28	9	S27 and pump with control\$4	US-PGPUB; USPAT	OR	OFF	2014/07/07 12:21
S29	12	S27 and housing	US-PGPUB; USPAT	OR	OFF	2014/07/07 12:25
S30	20	(US-20060219299-\$ or US-20100154894-\$ or US-20110240126-\$ or US-20120031494-\$ or US-20120227983-\$).did. or (US-3788341-\$ or US-4186766-\$ or US-4213480-\$ or US-4240463-\$ or US-4774980-\$ or US-6056008-\$ or US-6116268-\$ or US-6202681-\$ or US-6289737-\$ or US-6450477-\$ or US-6854704-\$ or US-7004445-\$ or US-7044156-\$ or US-7934562-\$ or US-8763983-\$).did.	US-PGPUB; USPAT	OR	OFF	2014/07/07 14:46
S31	16	S30 and hydraulic	US-PGPUB; USPAT	OR	OFF	2014/07/07 14:46
S32	9	S30 and hydraulic and pump	US-PGPUB; USPAT	OR	OFF	2014/07/07 15:12
S33	592	g05d16/2086.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/07 15:44
S34	2283	f16k17/00.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/07 15:55
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S41	5	S40 and gate	US-PGPUB; USPAT; USOCR	OR	OFF	2015/03/19 08:12
S42	432	137/487.5,488.ccls. and safety and (oil or gas or pipeline or well or wellhead)	US-PGPUB; USPAT; USOCR	OR	OFF	2015/03/19 08:16
S43	80	137/487.5,488.ccls. and safety and (oil or gas or pipeline or well or wellhead) and gate	US-PGPUB; USPAT; USOCR	OR	OFF	2015/03/19 08:17
S44	38	("3198207" "3252476" "3338302" "3389718" "3452592" "3712129" "3898877" "3920040" "3963050" "4046006" "Re29638").PN. OR ("4230187").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/03/19 08:26
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S47	1	"5335730".pn.	USPAT	OR	OFF	2015/03/19 08:58
S48	0	"20030051881"	USPAT	OR	OFF	2015/03/19 08:59
S49	11	"20030051881"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/03/19 08:59
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S66	0	Hoogerhyde.in. near2 Eric.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/06/29 08:45
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S68	4	"5271428".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/06/29 10:10
S69	1	13/480704	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/12/29 10:46
S70	81	(G05D16/2086.CPC. OR F16K17/00.CPC.) AND @PD>"20150601"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/12/29 14:01
S71	1	13/345660	USPAT	OR	OFF	2016/06/06 13:10

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S77	279	S76 not 137/488,492,492.5.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/08 13:36
S78	13041	E21B34/06,02,10,16.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/06/09 10:52
S79	2505	y10t137/7761.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/09 10:57
S80	4130	e21b34/02,10,16,06.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/09 10:57
S81	272	f15b20/00,31576,6303,665,7052,0091,1262.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/09 10:58
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S83	1	13/480704	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/09 11:03
S85	1	14/208509	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/10 15:27
S86	1	"5983398".pn.	USPAT	OR	OFF	2017/03/01 11:28
S87	1	"9441453".pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 08:46
S88	127	137/115.23.ccls.	US-PGPUB; USPAT;	OR	OFF	2017/03/02 10:31

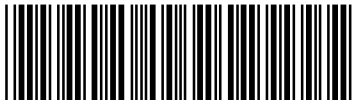
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S93	1645	g05d16/2086.cpc. or f16k17/00.cpc. or 137/488,492,492.5.ccls. and @pd>"20140707"	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S94	2406	y10t137/7762,7769,777.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S95	2406	y10t137/7762,7769,777.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S96	304	S95 not 137/488,492,492.5.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S97	15012	E21B34/06,02,10,16.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/03/02 10:53
S98	2572	y10t137/7761.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S99	4544	e21b34/02,10,16,06.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S100	296	f15b20/00,31576,6303,665,7052,0091,1262.cpc.	US-PGPUB; USPAT;	OR	OFF	2017/03/02 10:53

			USOCR			
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S102	78	(lymberopoulos.in. near2 david.in.) or (matthews.in. near2 benjamin.in.)	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:54

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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L2	190	(g05d16/2086.cpc. or f16k17/00.cpc. or f16k37/0091.cpc. or f16k31/1262.cpc. or e21b34/02,06,10,16.cpc. or y10t137/7761,7762,7769,777,0318,2635.cpc. or f15b20/00.cpc. or f15b2211/31576,6303,665,7052.cpc.) and @pd>"20170215"	US-PGPUB; USPAT	OR	OFF	2017/04/20 14:32
S84	0	(fluid and supply and first and line and pump and second and downstream and return and safety and valve and controller and actuator and drive and gate).clm.	US-PGPUB; USPAT	OR	OFF	2016/06/09 11:43

4/ 20/ 2017 3:23:01 PM
C:\ Users\ wmccalister\ Documents\ EAST\ Workspaces\ 15397488.wsp

Issue Classification 	Application/Control No. 15397488	Applicant(s)/Patent Under Reexamination LYMBEROPOULOS ET AL.	
	Examiner WILLIAM MCCALISTER	Art Unit 3753	

CPC					
Symbol				Type	Version
G05D	7	0635		F	2013-01-01
E21B	41	0021		I	2013-01-01
E21B	34	02		I	2013-01-01
Y10T	137	2635		A	2015-04-01
F15B	2211	31576		A	2013-01-01
F16K	17	00		A	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
		21	
(Assistant Examiner)	(Date)		
/WILLIAM MCCALISTER/ Primary Examiner.Art Unit 3753	04/20/2017	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	15

Search Notes 	Application/Control No. 15397488	Applicant(s)/Patent Under Reexamination LYMBEROPOULOS ET AL.
	Examiner WILLIAM MCCALISTER	Art Unit 3753

CPC- SEARCHED		
Symbol	Date	Examiner
G05D 16/2086	3/2/2017	WM
F16K 17/00;37/0091; 31/1262	3/2/2017	WM
E21B 34/02,06,10,16	3/2/2017	WM
Y10T 137/7761,7762,7769,777,0318,2635	3/2/2017	WM
F15B 20/00; 2211/31576,6303,665,7052	3/2/2017	WM

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
137	115.23, 488, 492, 492.5	3/2/2017	WM

SEARCH NOTES		
Search Notes	Date	Examiner
EAST cpc and uspc in parent application, updated search, inventor name, key words	3/2/2017	wm
updated search	4/20/2017	wm

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	see interference search history	4/20/2017	wm

	/WILLIAM MCCALISTER/ Primary Examiner.Art Unit 3753
--	--



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UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/397,488	01/03/2017	David LYMBEROPOULOS	SAFO/0012USPC02

26290
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

CONFIRMATION NO. 1341
POA ACCEPTANCE LETTER



OC00000090674111

Date Mailed: 04/18/2017

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/13/2017.

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.

/atesfai/

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/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	15/397,488
Filing Date	January 3, 2017
First Named Inventor	David LYMBEROPOULOS
Title	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE
Art Unit	3753
Examiner Name	William M. MCCALISTER
Attorney Docket Number	SAFO/0012USPC02

SIGNATURE of Applicant or Patent Practitioner

Signature	/Jessie D. Herrera/	Date (Optional)	April 13, 2017
Name	Jessie D. Herrera	Registration Number	63,799
Title (if Applicant is a juristic entity)	Attorney for Applicant		
Applicant Name (if Applicant is a juristic entity)	SAFOCO, 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.

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
15/262,642	September 12, 2016

(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: 26290
- 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):

SAFOCO, INC.

- ☐ 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	<u>[Signature]</u>	Date (Optional)	
Name	David Lymberopoulos		
Title	President of SAFOCO, INC.		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.23. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of _____ forms are submitted.

**TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)

SAFO/0012USPC02

In re Application of: David Lymberopoulos

Application No.: 15/397,488

Filed: January 3, 2017

For: SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

The applicant, SAFOCO, 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 of **prior patent** No. 9,441,453 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 acknowledge 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. 63,799

/Jessie D. Herrera/

Signature

March 20, 2017

Date

Jessie D. Herrera

Typed or printed name

Attorney for Applicant

Title

713-623-4844

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.

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.

Electronic Acknowledgement Receipt

EFS ID:	28924435
Application Number:	15397488
International Application Number:	
Confirmation Number:	1341
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE
First Named Inventor/Applicant Name:	David LYMBEROPOULOS
Customer Number:	26290
Filer:	Jessie D. Herrera/Stephanie Dominguez
Filer Authorized By:	Jessie D. Herrera
Attorney Docket Number:	SAFO/0012USPC02
Receipt Date:	13-APR-2017
Filing Date:	03-JAN-2017
Time Stamp:	18:00:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	SAFO0012USPC02_POA_.pdf	322117	no	2
			3f1b848bcbfd0195f95a09e83b65977c91e115da7		

Warnings:

KLX Energy Services LLC v. Safoco, Inc.

KLX - Exhibit No. 1011

Page 34

Information:					
2	Terminal Disclaimer Filed	SAFO_0012USPC02_TD.PDF	130183	no	2
			5cb91add292841d2f8a8fdb57162ab3210e5579d		
Warnings:					
Information:					
Total Files Size (in bytes):				452300	
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.					

Application Number 	Application/Control No. 15/397,488	Applicant(s)/Patent under Reexamination LYMBEROPOULOS ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 13 April, 2017	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
<u>/CRYSTAL QUEEN/</u> Technology Center: <u>PLRC</u> Telephone: _____

U.S. Patent and Trademark Office

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
David Lymberopoulos	§	
Serial No.: 15/397,488	§	Group Art Unit: 3753
Filed: January 3, 2017	§	
Confirmation No.: 1341	§	Examiner: McCalister, William M.
For: SAFETY VALVE CONTROL	§	
SYSTEM AND METHOD OF USE	§	

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

Dear Sir:

RESPONSE TO OFFICE ACTION DATED MARCH 10, 2017

In response to the Office Action dated March 10, 2017, please enter this response and reconsider the claims pending in the application for reasons discussed below. Although Applicant believes that no additional fees are due in connection with this response, the Commissioner is hereby authorized to charge counsel's Deposit Account No. 20-0782/SAFO/0012USPC02/JDH for any fees required to make this response timely and acceptable to the Office.

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 7 of this paper.

AMENDMENTS TO THE CLAIMS

Please cancel claim 22.

1. (Original) A control system for controlling fluid flow through a flow line at a wellsite, the control system comprising:

a fluid supply;

a first fluid line in fluid communication with the fluid supply;

a pump in fluid communication with the first fluid line and configured to pump fluid from the fluid supply to one or more wellheads through the first fluid line;

a second fluid line in fluid communication with the first fluid line at a location downstream of the pump and configured to return fluid from the first fluid line to the fluid supply or another reservoir;

a safety valve in-line with the second fluid line and having a gate normally maintained in a closed position to close fluid flow through the second fluid line;

a valve actuator configured to move the gate into the closed position by fluid supplied into the valve actuator and configured to move the gate into an open position by a biasing member disposed in the valve actuator;

an electronic controller assembly programmed with a predetermined condition and configured to receive a signal from a transducer connected to the first fluid line, wherein the signal corresponds to a measured physical property;

a valve assembly in communication with the controller assembly; and
a fluid drive assembly in communication with the controller assembly, wherein the controller assembly is operable to actuate the fluid drive assembly to supply fluid into the valve actuator to move the gate into the closed position, and wherein the controller assembly is operable to actuate the valve assembly in response to a comparison of the measured physical property to the predetermined condition to release the fluid from the valve actuator so that the biasing member moves the gate into the open position, forces the fluid out of the valve actuator, and thereby opens fluid flow through the second fluid line to return fluid in the first fluid line back to the fluid supply or another reservoir.

2. (Original) A control system for controlling fluid flow through a flow line at a wellsite, the control system comprising:

a fluid supply;

a first fluid line in fluid communication with the fluid supply;

a pump in fluid communication with the first fluid line and configured to pump fluid from the fluid supply to one or more wellheads through the first fluid line;

a second fluid line in fluid communication with the first fluid line at a location downstream of the pump and configured to relieve fluid from the first fluid line;

a safety valve in-line with the second fluid line and normally maintained in a closed position to close fluid flow through the second fluid line;

a valve actuator configured to move the safety valve into the closed position by fluid supplied to the valve actuator and configured to move the safety valve into an open position by a biasing member disposed in the valve actuator;

an electronic controller assembly programmed with a predetermined condition and configured to receive a signal from a transducer connected to the first fluid line, wherein the signal corresponds to a measured physical property;

a valve assembly in communication with the controller assembly; and

a fluid drive assembly in communication with the controller assembly, wherein the controller assembly is operable to actuate the fluid drive assembly to supply fluid to the valve actuator to move the safety valve into the closed position, and wherein the controller assembly is operable to actuate the valve assembly in response to a comparison of the measured physical property to the predetermined condition to release fluid from the valve actuator so that the biasing member moves the safety valve into the open position, forces fluid out of the valve actuator, and thereby opens fluid flow through the second fluid line to relieve fluid from the first fluid line.

3. (Original) The system of claim 2, further comprising a housing for supporting the controller assembly, the valve assembly, and the fluid drive assembly.

4. (Original) The system of claim 3, wherein the fluid supplied into the valve actuator by the fluid drive assembly is supplied from a reservoir disposed outside of the housing.
5. (Original) The system of claim 2, wherein the fluid drive assembly is a compressor and the fluid is a pneumatic fluid.
6. (Original) The system of claim 2, wherein the fluid drive assembly is a pump and the fluid supplied into the valve actuator by the fluid drive assembly is a hydraulic fluid.
7. (Original) The system of claim 2, further comprising a power source for supplying power to the controller assembly, the valve assembly, and the fluid drive assembly.
8. (Original) The system of claim 2, further comprising a housing for supporting the fluid drive assembly, and a filter attached to the housing for filtering fluid entering the housing by the fluid drive assembly.
9. (Original) The system of claim 2, wherein the fluid supplied into the valve actuator by the fluid drive assembly is ambient air.
10. (Original) The system of claim 2, wherein the controller assembly is operable to communicate a signal corresponding to the measured physical property to a remote computer system.
11. (Original) The system of claim 2, wherein the controller assembly is a programmable logic controller.
12. (Original) The system of claim 2, wherein the measured physical property is pressure in the first fluid line.

13. (Original) A method for controlling fluid flow through a flow line at a wellsite, the method comprising:

providing a control system comprising:

a fluid supply;

a first fluid line in fluid communication with the fluid supply;

a pump in fluid communication with the first fluid line and configured to pump fluid from the fluid supply to one or more wellheads through the first fluid line;

a second fluid line in fluid communication with the first fluid line at a location downstream of the pump and configured to relieve fluid from the first fluid line;

a safety valve in-line with the second fluid line,

a valve actuator configured to actuate the safety valve,

an electronic controller assembly,

a fluid drive assembly, and

a valve assembly;

supplying fluid to the valve actuator using the fluid drive assembly to actuate the valve actuator to move the safety valve into a closed position;

maintaining the safety valve in the closed position to close fluid flow through the second fluid line;

monitoring a physical property in the first fluid line using the controller assembly; and

actuating the valve assembly using the controller assembly to release fluid from the valve actuator so that a biasing member disposed in the valve actuator moves the safety valve into an open position, forces fluid out of the valve actuator, and thereby opens fluid flow through the second fluid line based upon a comparison of the monitored physical property to a predetermined condition to relieve fluid from the first fluid line.

14. (Original) The method of claim 13, wherein the fluid supplied to the valve actuator by the fluid drive assembly is a pneumatic fluid disposed external to the housing, and

further comprising filtering the pneumatic fluid as it enters the housing by the fluid drive assembly.

15. (Original) The method of claim 13, wherein the fluid supplied to the valve actuator by the fluid drive assembly is a hydraulic fluid disposed in a reservoir within the housing that is in fluid communication with the fluid drive assembly.

16. (Original) The method of claim 13, further comprising measuring the physical property using a transducer configured to communicate a signal corresponding to the measured physical property to the controller assembly.

17. (Original) The method of claim 13, wherein the fluid supplied to the valve actuator by the fluid drive assembly is a pneumatic fluid, and wherein the fluid drive assembly is a compressor.

18. (Original) The method of claim 13, wherein the fluid supplied to the valve actuator by the fluid drive assembly is a hydraulic fluid, and wherein the fluid drive assembly is a pump.

19. (Original) The method of claim 13, further comprising communicating a signal from the controller assembly to a remote computer system, wherein the signal corresponds to an operational characteristic of the safety valve.

20. (Original) The method of claim 13, further comprising actuating the safety valve by communicating a signal from a remote computer system to the controller assembly.

21. (Original) The method of claim 13, wherein the measured physical property is pressure in the first fluid line.

22. (Canceled)

REMARKS

This is intended as a full and complete response to the Office Action dated March 10, 2017. Claims 1-22 remain pending in the application and are shown above. Claims 1-22 stand rejected by the Examiner. Claim 22 has been canceled without prejudice. No new subject matter has been added. Reconsideration of the rejected claims is requested for the reasons presented below.

Double Patenting

Claims 1-22 stand rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-18 of U.S. Patent 9,441,453.

Applicant submits herewith a terminal disclaimer of the pending claims over claims 1-18 of U.S. Patent No. 9,441,453. Applicant respectfully requests withdrawal of the rejection.

Claim Rejections Under 35 USC § 102

Claim 22 stands rejected under pre-AIA 35 § U.S.C. 102(b) as being anticipated by *Wailes* (US 3,776,249).

Claim 22 has been canceled without prejudice to place this application in condition for allowance. Applicant respectfully requests withdrawal of the rejection.

Claim Rejections Under 35 USC § 103

Claim 22 stands rejected under pre-AIA 35 § U.S.C. 103(a) as being unpatentable over *Vinegar* (US 2003/0051881) in view of *Cotham* (US 5,335,730).

Claim 22 has been canceled without prejudice to place this application in condition for allowance. Applicants respectfully request withdrawal of the rejection.

Conclusion

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully requests that the claims be allowed.

Respectfully submitted,

/Jessie D. Herrera/

Jessie D. Herrera
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Houston, TX 77046
Telephone: (713) 623-4844
Facsimile: (713) 623-4846
Attorney for Applicant

**TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)

SAFO/0012USPC02

In re Application of: David Lymberopoulos

Application No.: 15/397,488

Filed: January 3, 2017

For: SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

The applicant, SAFOCO, 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 of **prior patent** No. 9,441,453 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 acknowledge 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. 63,799

/Jessie D. Herrera/

Signature

March 20, 2017

Date

Jessie D. Herrera

Typed or printed name

Attorney for Applicant

Title

713-623-4844

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.

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.

Electronic Patent Application Fee Transmittal

Application Number:	15397488			
Filing Date:	03-Jan-2017			
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE			
First Named Inventor/Applicant Name:	David LYMBEROPOULOS			
Filer:	Jessie D. Herrera/Stephanie Dominguez			
Attorney Docket Number:	SAFO/0012USPC02			
Filed as Large 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:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	160	160
Total in USD (\$)				160

Electronic Acknowledgement Receipt

EFS ID:	28682176
Application Number:	15397488
International Application Number:	
Confirmation Number:	1341
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE
First Named Inventor/Applicant Name:	David LYMBEROPOULOS
Customer Number:	26290
Filer:	Jessie D. Herrera/Stephanie Dominguez
Filer Authorized By:	Jessie D. Herrera
Attorney Docket Number:	SAFO/0012USPC02
Receipt Date:	20-MAR-2017
Filing Date:	03-JAN-2017
Time Stamp:	17:07:36
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response.pdf	83614	yes	8
			3c9a52a74e16f77e7ef9e742a24358ca783396e3		

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Amendment/Req. Reconsideration-After Non-Final Reject			1	1	
Claims			2	6	
Applicant Arguments/Remarks Made in an Amendment			7	8	
Warnings:					
Information:					
2	Terminal Disclaimer Filed	Terminal_Disclaimer.PDF	159963	no	2
			8fe97fb39745ba1b305efc826f47054e697434b8		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30677	no	2
			5b1d614609b82ec4702bb59d81b137d98064afea		
Warnings:					
Information:					
Total Files Size (in bytes):			274254		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.					

Electronic Patent Application Fee Transmittal

Application Number:	15397488			
Filing Date:	03-Jan-2017			
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE			
First Named Inventor/Applicant Name:	David LYMBEROPOULOS			
Filer:	Jessie D. Herrera/Stephanie Dominguez			
Attorney Docket Number:	SAFO/0012USPC02			
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:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	2814	1	160	160
Total in USD (\$)				160

Electronic Acknowledgement Receipt

EFS ID:	28682275
Application Number:	15397488
International Application Number:	
Confirmation Number:	1341
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE
First Named Inventor/Applicant Name:	David LYMBEROPOULOS
Customer Number:	26290
Filer:	Jessie D. Herrera/Stephanie Dominguez
Filer Authorized By:	Jessie D. Herrera
Attorney Docket Number:	SAFO/0012USPC02
Receipt Date:	20-MAR-2017
Filing Date:	03-JAN-2017
Time Stamp:	17:11:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 160
RAM confirmation Number	032117INTEFSW17114700
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	Fee Worksheet (SB06)	fee-info.pdf	30677	no	2
			eb0a0e72df279183a42ccf0e987ef3ec5e187bdd		
Warnings:					
Information:					
Total Files Size (in bytes):			30677		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.					

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/397,488	Filing Date 01/03/2017	☐ To be Mailed
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ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

(Column 1)

(Column 2)

FOR	NUMBER FILED	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 \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
☐ 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	03/20/2017	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 21	Minus	** 22	= 0	X \$40 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 4	= 0	X \$210 =	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	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =
	☐ 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.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** 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.

LIE
YUVANNA CHAPHIV

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.**

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

Application Number 	Application/Control No. 15/397,488	Applicant(s)/Patent under Reexamination LYMBEROPOULOS ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	☐ APPROVED	☒ DISAPPROVED
Date Filed : 20 March, 2017	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
<u>/CRYSTAL QUEEN/</u> Technology Center: <u>PLRC</u> Telephone: _____ <u>The person who signed the terminal disclaimer is not the applicant, patentee or an attorney or agent of record. 37 CFR 1.321(a) and (b). (See FP 14.26.08)</u> <u>(Note: PoA can be given to a customer number, wherein all practitioners listed under the customer number have PoA. 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 PoA. If the applicant is a juristic entity (e.g., corporation), a representative of the applicant cannot sign the TD unless it is established that the representative is a party authorized to act on behalf of the applicant.)</u> <u>Also resubmit Td with this paper, NO FEE is required.</u>



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/397,488	01/03/2017	David LYMBEROPOULOS	SAFO/0012USPC02	1341

26290 7590 03/10/2017
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

EXAMINER

MCCALISTER, WILLIAM M

ART UNIT	PAPER NUMBER
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3753

NOTIFICATION DATE	DELIVERY MODE
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03/10/2017

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):

PSDocketing@pattersonsheridan.com
pair_eofficeaction@pattersonsheridan.com
jcardenas@pattersonsheridan.com

Office Action Summary	Application No. 15/397,488	Applicant(s) LYMBEROPOULOS ET AL.	
	Examiner WILLIAM MCCALISTER	Art Unit 3753	AIA (First Inventor to File) Status No

-- 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 1/3/17.
☐ 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) 1-22 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) 1-22 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 1/3/17 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: ____.

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Double Patenting

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.

Claims 1-22 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 9,441,453. Although the claims at issue are not identical, they are not patentably distinct from each other because, aside from stylistic differences, the patented claims recite more than the pending claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 3753

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim(s) 22 is/are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Wailes (US 3,776,249).

Wailes discloses:

22. A control system for controlling fluid flow through a flow line that extends from a pump to a wellhead, the control system comprising:

a safety valve (11) configured to relieve pressurized fluid from the flow line (the side of 12 that is upstream of 11);

a valve actuator (16) configured to actuate the safety valve between an open position and a closed position;

a transducer (41) configured to measure pressure in the flow line;

an electronic controller assembly (122) programmed with a predetermined condition (the "predetermined minimum level" at low pressure detector 68) and configured to receive a signal from the transducer corresponding to the measured pressure in the flow line;

a fluid drive assembly (121; alternatively 119) in communication with the electronic controller assembly, wherein the electronic controller assembly is configured to actuate the fluid drive assembly to supply fluid to the valve actuator (16) to actuate the safety valve to the closed position; and

a valve assembly (119; alternatively 121) in communication with the electronic controller assembly, wherein the electronic controller assembly is configured to actuate the valve assembly in response to a comparison of the measured pressure to the predetermined condition to release fluid from the valve actuator (16) to actuate the safety valve to the open position to relieve fluid from the flow line.

Claim Rejections - 35 USC § 103

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.

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

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

Art Unit: 3753

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

Claim 22 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Vinegar (US 2003/0051881) in view of Cotham (US 5,335,730).

Vinegar discloses a control system for controlling fluid flow through a flow line that extends from a pump to a wellhead, the control system comprising:

- a safety valve (74) configured to relieve pressurized fluid from the flow line (the side of 26 that is upstream of 74);

- a valve actuator (84) configured to actuate the safety valve between an open position and a closed position;

- an electronic controller assembly (90);

- a fluid drive assembly (76, 78) in communication with the electronic controller assembly, wherein the electronic controller assembly is configured to actuate the fluid drive assembly to supply fluid to the valve actuator to actuate the safety valve to the closed position; and

- a valve assembly (82) in communication with the electronic controller assembly, wherein the electronic controller assembly is configured to actuate the valve assembly to release fluid from the valve actuator (16) to actuate the safety valve to the open position to relieve fluid from the flow line.

Vinegar does not disclose the electronic controller assembly to actuate the valve assembly in response to a comparison between a predetermined condition and a pressure along the flow line. Cotham teaches that it was known in the art at the time of invention to use a similar electronic controller assembly (114) compare a predetermined

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condition to a pressure signal from a pressure transducer (135) along a similar flow line (see col. 8 lines 6-25), in order to actuate a similar safety valve. To protect against over- or under-pressures in Vinegar's system, it would have been obvious to configure Vinegar's controller to receive a signal from a transducer connected to the flow line, and to compare the signal to a predetermined condition, in order to actuate the safety valve via the valve assembly.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **William McCalister**, whose telephone number **571-270-1869**. The examiner can normally be reached on Monday-Friday (7:00AM-5:30PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisors can be reached by phone. Craig Schneider can be reached at 571-272-3607, John Fristoe can be reached at 571-272-4926 and Mary McManmon can be reached at 571-272-6007. 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 <http://pair-direct.uspto.gov>. 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

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automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WILLIAM MCCALISTER/
Primary Examiner, Art Unit 3753

3/2/17

Notice of References Cited	Application/Control No. 15/397,488		Applicant(s)/Patent Under Reexamination LYMBEROPOULOS ET AL.	
	Examiner WILLIAM MCCALISTER		Art Unit 3753	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2,278,952 A	04-1942	SODERBERG STEN E B	G05D16/163	137/102
*	B	US-3,776,249 A	12-1973	Wailles; Rodney A.	F17D5/06	137/14
*	C	US-3,788,341 A	01-1974	Athy, Jr.; Lawrence P.	F16K31/124	137/209
*	D	US-4,186,766 A	02-1980	Snyder; David E.	F16K17/105	137/458
*	E	US-4,213,480 A	07-1980	Orum; Paul R.	F16K31/143	137/556
*	F	US-4,230,187 A	10-1980	Seto; Rodney K. M.	E21B33/0355	137/458
*	G	US-4,240,463 A	12-1980	Moore; Allen D.	F16K17/00	137/458
*	H	US-4,328,672 A	05-1982	Zumstein; Bruno	F02B37/16	137/489
*	I	US-4,662,603 A	05-1987	Etheridge; Reggie H.	E21B34/02	137/488
*	J	US-4,774,980 A	10-1988	Etheridge; Reggie H.	E21B34/02	137/488
*	K	US-4,968,221 A	11-1990	Noll; Lawrence G.	F04B49/225	137/492.5
*	L	US-5,251,148 A	10-1993	Haines; Lawrence A.	G05D7/0635	137/487.5
*	M	US-5,335,730 A	08-1994	Cotham, III; Heman C.	E21B43/12	166/374

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 15/397,488		Applicant(s)/Patent Under Reexamination LYMBEROPOULOS ET AL.	
	Examiner WILLIAM MCCALISTER		Art Unit 3753	Page 2 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-5,758,686 A	06-1998	Ohtsuka; Akira	G05D7/005	137/488
*	B	US-6,056,008 A	05-2000	Adams; Paul R.	G05D16/2093	137/487.5
*	C	US-6,116,268 A	09-2000	Johnson; Clarence William	E21B34/16	137/458
*	D	US-6,202,681 B1	03-2001	Kouketsu; Masayuki	F16K31/1221	137/488
*	E	US-6,289,737 B1	09-2001	Kouketsu; Masayuki	G05D16/2093	73/714
*	F	US-2002/0011269 A1	01-2002	Adler, Bernhard	F15B11/028	137/488
*	G	US-6,450,477 B1	09-2002	Young; Terry G.	F16K31/1262	251/285
*	H	US-2003/0051881 A1	03-2003	Vinegar, Harold J.	E21B17/003	166/374
*	I	US-6,938,637 B2	09-2005	McGill; James C.	F16K17/36	137/38
*	J	US-7,004,445 B2	02-2006	Lymberopoulos; David	F16K3/0254	137/77
*	K	US-7,044,156 B2	05-2006	Webster; David	F16K17/02	137/488
*	L	US-2006/0219299 A1	10-2006	Snowbarger; Jimmie L.	F16K37/0091	137/487.5
*	M	US-2009/0120508 A1	05-2009	Yeater; Tommy William	F04D9/006	137/197

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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Notice of References Cited	Application/Control No. 15/397,488		Applicant(s)/Patent Under Reexamination LYMBEROPOULOS ET AL.	
	Examiner WILLIAM MCCALISTER		Art Unit 3753	Page 3 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2010/0154894 A1	06-2010	Kotapish; Edward C.	F16K17/10	137/14
*	B	US-7,934,562 B2	05-2011	Grimseth; Tom	E21B33/0355	166/105
*	C	US-2011/0240126 A1	10-2011	Lymberopoulos; David	F16K31/1262	137/1
*	D	US-2012/0031494 A1	02-2012	Lymberopoulos; David	E21B47/12	137/1
*	E	US-2012/0227983 A1	09-2012	Lymberopoulos; David	E21B34/02	166/373
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

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Search Notes 	Application/Control No. 15397488	Applicant(s)/Patent Under Reexamination LYMBEROPOULOS ET AL.
	Examiner WILLIAM MCCALISTER	Art Unit 3753

CPC- SEARCHED		
Symbol	Date	Examiner
G05D 16/2086	3/2/2017	WM
F16K 17/00;37/0091; 31/1262	3/2/2017	WM
E21B 34/02,06,10,16	3/2/2017	WM
Y10T 137/7761,7762,7769,777,0318,2635	3/2/2017	WM
F15B 20/00; 2211/31576,6303,665,7052	3/2/2017	WM

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
137	115.23, 488, 492, 492.5	3/2/2017	WM

SEARCH NOTES		
Search Notes	Date	Examiner
EAST cpc and uspc in parent application, updated search, inventor name, key words	3/2/2017	wm

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/WILLIAM MCCALISTER/ Primary Examiner.Art Unit 3753
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CONFIRMATION NO. 1341

SERIAL NUMBER 15/397,488	FILING or 371(c) DATE 01/03/2017 RULE	CLASS 137	GROUP ART UNIT 3753	ATTORNEY DOCKET NO. SAFO/0012USPC02	
APPLICANTS SAFOCO, INC., Houston, TX; INVENTORS David LYMBEROPOULOS, Houston, TX; Benjamin R. MATTHEWS, Missouri City, TX; ** CONTINUING DATA ***** This application is a CON of 15/262,642 09/12/2016 which is a CON of 13/480,704 05/25/2012 PAT 9441453 which claims benefit of 61/551,319 10/25/2011 and is a CIP of 13/195,662 08/01/2011 ABN which claims benefit of 61/415,238 11/18/2010 and claims benefit of 61/370,721 08/04/2010 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 01/12/2017					
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and <u>/WILLIAM M</u> <u>MCCALISTER/</u> Acknowledged <u>Examiner's Signature</u>	☐ Met after Allowance <u>Initials</u>	STATE OR COUNTRY TX	SHEETS DRAWINGS 15	TOTAL CLAIMS 22	INDEPENDENT CLAIMS 4
ADDRESS PATTERSON & SHERIDAN, L.L.P. 24 Greenway Plaza, Suite 1600 Houston, TX 77046 UNITED STATES					
TITLE SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE					
FILING FEE RECEIVED 1090	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	13/480704	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/02 12:52
S2	626	137/492.5.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/02 13:17
S3	170	S2 and (pump or compressor)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/02 13:17
S5	138	S2 and pump	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/07/02 13:18
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S23	61	137/492,492.5.ccls. and well and controller	US-PGPUB; USPAT; USOCR	OR	OFF	2014/07/07 09:06
S24	5	11/426109	US-PGPUB; USPAT; USOCR	OR	OFF	2014/07/07 09:10
S25	10	("2006/0219299").URPN.	USPAT	OR	OFF	2014/07/07 09:12
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S41	5	S40 and gate	US-PGPUB; USPAT; USOCR	OR	OFF	2015/03/19 08:12
S42	432	137/487.5,488.ccls. and safety and (oil or gas or pipeline or well or wellhead)	US-PGPUB; USPAT; USOCR	OR	OFF	2015/03/19 08:16
S43	80	137/487.5,488.ccls. and safety and (oil or gas or pipeline or well or wellhead) and gate	US-PGPUB; USPAT; USOCR	OR	OFF	2015/03/19 08:17
S44	38	("3198207" "3252476" "3338302" "3389718" "3452592" "3712129" "3898877" "3920040" "3963050" "4046006" "Re29638").PN. OR ("4230187").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/03/19 08:26
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S48	0	"20030051881"	USPAT	OR	OFF	2015/03/19 08:59
S49	11	"20030051881"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/03/19 08:59
S50	1	"5335730".pn.	USPAT	OR	OFF	2015/03/19 09:46

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S57	14	("4240463" "4285362" "4319603" "4328672" "4617958" "4671319" "5029609" "5425396" "5590685" "5687759").PN. OR ("5758686").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/06/25 13:39
S58	30	("1893462" "1918891" "2203243" "2278952" "2637946" "2707483" "3227171" "3788341" "3991784").PN. OR ("4240463").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/06/25 13:42
S59	9	("3613070" "4087073" "4240463" "4649704" "4687014" "6332315").PN. OR ("6729130").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/06/25 13:42
S60	12	("3788341" "4186766" "4240463" "4319603" "5293910" "5396923").PN. OR ("7044156").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/06/25 13:43
S61	11	("4091832" "4240463").PN. OR ("4319603").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/06/25 13:44
S62	77	S54 and (normal\$3 near4 open\$3)	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2015/06/25 13:49

			EPO; JPO; DERWENT; IBM_TDB			
S63	41	137/488,492,492.5.ccls. and @pd>"20150301"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/06/26 14:10
S64	0	g05d16/2086.ccls. and @pd>"20150301"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/06/26 14:11
S65	0	g05d17/00.ccls. and @pd>"20150301"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/06/26 14:11
S66	0	Hoogerhyde.in. near2 Eric.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/06/29 08:45
S67	0	14/277478	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/06/29 08:51
S68	4	"5271428".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/06/29 10:10
S69	1	13/480704	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/12/29 10:46
S70	81	(G05D16/2086.CPC. OR F16K17/00.CPC.) AND @PD>"20150601"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/12/29 14:01
S71	1	13/345660	USPAT	OR	OFF	2016/06/06 13:10

S72	2	13/345660	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/06/06 13:10
S73	1	13/645660	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/06/06 13:11
S74	1627	g05d16/2086.cpc. or f16k17/00.cpc. or 137/488,492,492.5.ccls. and @pd>"20140707"	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/08 12:32
S75	2377	y10t137/7762,7769,777.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/08 12:33
S76	2377	y10t137/7762,7769,777.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/08 13:36
S77	279	S76 not 137/488,492,492.5.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/08 13:36
S78	13041	E21B34/06,02,10,16.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/06/09 10:52
S79	2505	y10t137/7761.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/09 10:57
S80	4130	e21b34/02,10,16,06.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/09 10:57
S81	272	f15b20/00,31576,6303,665,7052,0091,1262.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/09 10:58
S82	6886	S78 or S79 or S80 or S81	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/09 10:58
S83	1	13/480704	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/09 11:03
S85	1	14/208509	US-PGPUB; USPAT; USOCR	OR	OFF	2016/06/10 15:27
S86	1	"5983398".pn.	USPAT	OR	OFF	2017/03/01 11:28
S87	1	"9441453".pn.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 08:46
S88	127	137/115.23.ccls.	US-PGPUB; USPAT;	OR	OFF	2017/03/02 10:31

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S89	36	137/115.23.ccls. and well	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/03/02 10:33
S90	284	y10t137/2635.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/03/02 10:36
S91	40	S90 and well	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/03/02 10:36
S92	4	S91 not S89	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/03/02 10:36
S93	1645	g05d16/2086.cpc. or f16k17/00.cpc. or 137/488,492,492.5.ccls. and @pd>"20140707"	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S94	2406	y10t137/7762,7769,777.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S95	2406	y10t137/7762,7769,777.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S96	304	S95 not 137/488,492,492.5.ccls.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S97	15012	E21B34/06,02,10,16.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/03/02 10:53
S98	2572	y10t137/7761.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S99	4544	e21b34/02,10,16,06.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S100	296	f15b20/00,31576,6303,665,7052,0091,1262.cpc.	US-PGPUB; USPAT;	OR	OFF	2017/03/02 10:53

			USOCR			
S101	510	(S93 or S94 or S95 or S96 or S97 or S98 or S99 or S100) and @pd>"20160515"	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:53
S102	78	(lymberopoulos.in. near2 david.in.) or (matthews.in. near2 benjamin.in.)	US-PGPUB; USPAT; USOCR	OR	OFF	2017/03/02 10:54

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S84	0	(fluid and supply and first and line and pump and second and downstream and return and safety and valve and controller and actuator and drive and gate).clm.	US-PGPUB; USPAT	OR	OFF	2016/06/09 11:43

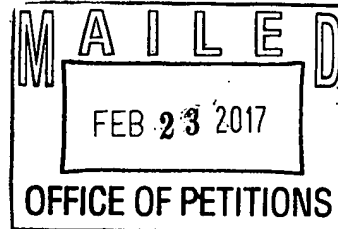
3/ 2/ 2017 12:02:44 PM
C:\ Users\ wmccalister\ Documents\ EAST\ Workspaces\ 15397488.wsp



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PATTERSON & SHERIDAN, L.L.P.
24 GREENWAY PLAZA, SUITE 1600
HOUSTON TX 77046



Doc Code: TRACK1.GRANT

Decision Granting Request for Prioritized Examination (Track I or After RCE)	Application No.: 15/397,488
1. THE REQUEST FILED <u>1/3/17</u> IS GRANTED. The above-identified application has met the requirements for prioritized examination A. ☒ for an original nonprovisional application (Track I). B. ☐ for an application undergoing continued examination (RCE). 2. The above-identified application will undergo prioritized examination. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs: A. filing a <u>petition for extension of time</u> to extend the time period for filing a reply; B. filing an <u>amendment to amend the application to contain more than four independent claims, more than thirty total claims</u>, or a multiple dependent claim; C. filing a <u>request for continued examination</u>; D. filing a notice of appeal; E. filing a request for suspension of action; F. mailing of a notice of allowance; G. mailing of a final Office action; H. completion of examination as defined in 37 CFR 41.102; or I. abandonment of the application. Telephone inquiries with regard to this decision should be directed to Cheryl Gibson-Baylor at (571)272-3213, Office of Petitions. In his/her absence, calls may be directed to Brian W. Brown, (571)272-5338. Cheryl Gibson-Baylor <u>/Cheryl Gibson-Baylor/</u> [Signature] <u>Petitions Paralegal Specialist</u> (Title)	



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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
15/397,488	01/03/2017	3753	1090	SAFO/0012USPC02	22	4

26290
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

CONFIRMATION NO. 1341
UPDATED FILING RECEIPT



Date Mailed: 02/17/2017

Receipt is acknowledged of this non-provisional 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 APPLICANT, 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 Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections 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**

Inventor(s)

David LYMBEROPOULOS, Houston, TX;
Benjamin R. MATTHEWS, Missouri City, TX;

Applicant(s)

SAFOCO, INC., Houston, TX;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 15/262,642 09/12/2016
which is a CON of 13/480,704 05/25/2012 PAT 9441453
which claims benefit of 61/551,319 10/25/2011
and is a CIP of 13/195,662 08/01/2011 ABN
which claims benefit of 61/415,238 11/18/2010
and claims benefit of 61/370,721 08/04/2010

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: 01/12/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/397,488**

Projected Publication Date: 05/25/2017

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

Preliminary Class

137

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 Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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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

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/397,488				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A				
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	300		N/A				
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	22 minus 20 =	*	x 40 =	80	OR					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	*	x 210 =	210						
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).			0.00						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00						
			TOTAL	1020		TOTAL				
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** 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 found in the appropriate box in column 1.										

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
David Lymberopoulos et al.	§	
Serial No.: 15/397,488	§	Group Art Unit: 3753
Confirmation No.: 1341	§	
Filed: January 3, 2017	§	Examiner: Unknown
For: SAFETY VALVE CONTROL	§	
SYSTEM AND METHOD OF	§	
USE	§	

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

RESPONSE TO NOTICE TO FILE MISSING PARTS OF APPLICATION

Applicant files this Response to a Notice to File Missing Parts dated January 17, 2017, within the two-month period set to expire on March 17, 2017. The Notice indicates that the application was not filed with the required fees and inventor oath or declaration.

In response, Applicant submits herewith a payment of the required fees, including the surcharge, via credit card. Applicant also submits herewith the properly executed inventor's declaration. The Commissioner is hereby authorized to charge, or credit to, Deposit Account No. 20-0782/SAFO/0012USPC02/JDH for any additional fees required to make this response timely and acceptable to the Office.

Respectfully submitted,

/Jessie D. Herrera/
Jessie D. Herrera
Registration No. 63,799
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046
Telephone: (713) 623-4844
Facsimile: (713) 623-4846
Attorney for Applicant

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of
Invention

SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

As the below named inventor, I hereby declare that:

This declaration ☐ The attached application, or
is directed to:

☒ United States application or PCT international application number 15/262,642
filed on 09/12/2016

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

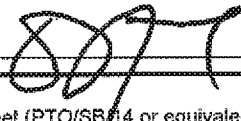
WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: David LYMBEROPOULOS

Date (Optional): 9-28-16

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)****Title of
Invention**

SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

As the below named inventor, I hereby declare that:

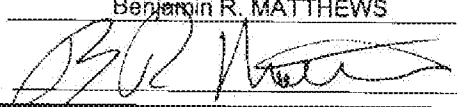
This declaration ☐ The attached application, or
is directed to:☒ United States application or PCT international application number 15/262,642
filed on 09/12/2016

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001
by fine or imprisonment of not more than five (5) years, or both.**WARNING:**

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTORInventor: Benjamin R. MATTHEWSDate (Optional): 2/13/17Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

Electronic Patent Application Fee Transmittal

Application Number:	15397488			
Filing Date:	03-Jan-2017			
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE			
First Named Inventor/Applicant Name:	David LYMBEROPOULOS			
Filer:	Jessie D. Herrera/Stephanie Dominguez			
Attorney Docket Number:	SAFO/0012USPC02			
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:				
LATE FILING FEE FOR OATH OR DECLARATION	2051	1	70	70
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				70

Electronic Acknowledgement Receipt

EFS ID:	28355940
Application Number:	15397488
International Application Number:	
Confirmation Number:	1341
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE
First Named Inventor/Applicant Name:	David LYMBEROPOULOS
Customer Number:	26290
Filer:	Jessie D. Herrera/Stephanie Dominguez
Filer Authorized By:	Jessie D. Herrera
Attorney Docket Number:	SAFO/0012USPC02
Receipt Date:	14-FEB-2017
Filing Date:	03-JAN-2017
Time Stamp:	17:44:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 70
RAM confirmation Number	021517INTEFSW17454200
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	Applicant Response to Pre-Exam Formalities Notice	Response_to_Missing_Parts.pdf	56232	no	1
			81c19df1b1e626ad5830a2582ec2f208db3350fa		
Warnings:					
Information:					
2	Oath or Declaration filed	Declaration.pdf	438792	no	2
			be7dac12b71c17a9e5afbb116ad12994f47c547b		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30587	no	2
			d4bd2de9d375d300464e9423eccbaedaa1b2c71d		
Warnings:					
Information:					
Total Files Size (in bytes):			525611		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/397,488	01/03/2017	3753	1020	SAFO/0012USPC02	22	4

CONFIRMATION NO. 1341

FILING RECEIPT



0000000088489697

26290
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

Date Mailed: 01/17/2017

Receipt is acknowledged of this non-provisional 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 APPLICANT, 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 Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections 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**

Inventor(s)

David LYMBEROPOULOS, Houston, TX;
Benjamin R. MATTHEWS, Missouri City, TX;

Applicant(s)

SAFOCO, INC., Houston, TX;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 15/262,642 09/12/2016
which is a CON of 13/480,704 05/25/2012 PAT 9441453
which claims benefit of 61/551,319 10/25/2011
and is a CIP of 13/195,662 08/01/2011 ABN
which claims benefit of 61/415,238 11/18/2010
and claims benefit of 61/370,721 08/04/2010

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: 01/12/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/397,488**

Projected Publication Date: 04/27/2017

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

Preliminary Class

137

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 Assets Control, 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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
15/397,488

APPLICATION AS FILED - PART I

(Column 1)		(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(j))	22	minus 20 = *	x 40 =	80	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4	minus 3 = *	x 210 =	210			
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).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
			TOTAL	1020		TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** 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 found in the appropriate box in column 1.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/397,488	01/03/2017	David LYMBEROPOULOS	SAFO/0012USPC02

CONFIRMATION NO. 1341

FORMALITIES LETTER



OC000000088469698

26290
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

Date Mailed: 01/17/2017

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing.

Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.

The surcharge is due for any one of:

- late submission of the basic filing fee, search fee, or examination fee,
- late submission of inventor's oath or declaration,
- filing an application that does not contain at least one claim on filing, or
- submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- \$ 70 surcharge.
- \$(0) previous unapplied payment amount.
- \$ 70 TOTAL FEE BALANCE DUE.

Items Required To Avoid Processing Delays:

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):

page 1 of 2

David LYMBEROPOULOS
Benjamin R. MATTHEWS

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice".
<https://portal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

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.

/sgorems/

**CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION
UNDER 37 CFR 1.102(e) (Page 1 of 1)**

First Named Inventor:	David LYMBEROPOULOS	Nonprovisional Application Number (if known):	Filed Herewith
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently \$0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.
2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.
3. The applicable box is checked below:

I. ☒ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

- i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.
---OR---
(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.
- ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, or the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

- i. A request for continued examination has been filed with, or prior to, this form.
- ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
- iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
- iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
- v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature <u>/Jessie D. Herrera/</u>	Date <u>January 3, 2017</u>
Name (Print/Typed) <u>Jessie D. Herrera</u>	Practitioner Registration Number <u>63,799</u>

Note: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.*

☒ *Total of 1 forms are submitted.

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.

UNITED STATES PATENT APPLICATION FOR:
SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

INVENTORS:

DAVID LYMBEROPOULOS

BENJAMIN ROBERT MATTHEWS

ATTORNEY DOCKET NUMBER: SAFO/0012USPC02

Customer Number: 26290
PATTERSON & SHERIDAN, L.L.P.
24 Greenway Plaza, Suite 1600
Houston, TX 77046

SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Patent Application Serial No. 15/262,642, filed September 12, 2016, which claims benefit of U.S. Patent Application Serial No. 13/480,704, filed May 25, 2012, now U.S. Patent No. 9,441,453, which claims benefit of U.S. Provisional Patent Application Serial No. 61/551,319, filed October 25, 2011 and is a continuation-in-part of U.S. Patent Application Serial No. 13/195,662, filed August 1, 2011, which claims benefit of U.S. Provisional Patent Application Serial No. 61/415,238, filed November 18, 2010, and U.S. Provisional Patent Application Serial No. 61/370,721, filed August 4, 2010, the disclosures of which are herein incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] Embodiments of the invention relate to a wellhead control system for oil and gas wells. In particular, embodiments of the invention relate to systems and methods of an emergency shut down control system for surface and subsurface safety valves. Embodiments of the invention further relate to systems and methods of a relief valve control system.

Description of the Related Art

[0003] A wellhead system may be used to control the flow of fluids recovered from an oil and gas well in a safe and efficient manner. The wellhead system may include a variety of flow control devices, such as valves, which are operable direct fluid flow through a tubing system connected to the wellhead system. Fluids can be directed downstream of the wellhead system via the tubing system for further processing and/or storage.

[0004] The wellhead system may include surface and subsurface safety valves that are connected to the tubing system and are operable to shut off fluid flow through the tubing system in the event of an emergency in the well or at a location downstream of the wellhead system. Prior art safety valves are generally in fluid communication with the tubing system, and utilize the fluids therein for operation. For example, the pressure in the tubing system may be directly tied into the safety valves to actuate the valves into an open position, thereby allowing fluid flow through the system. In the event of an emergency, such as a rupture in the tubing system downstream of the safety valve or a drop in pressure in the well, as the pressure in the tubing system drops, so does the pressure in the safety valves. The safety valves are configured to move into a closed position after the pressure therein falls below a minimum pressure, thereby closing fluid flow through the tubing system and shutting in the wellhead system. Some safety valves may also be equipped with relief valves that are operable to block pressure from entering the valve and exhaust the pressure in the valve, thereby allowing the valve to move into a closed position.

[0005] There are numerous drawbacks to the prior art safety valve systems. One drawback includes the reliance of the safety valves on fluid pressure in the tubing system. These safety valves cannot be unilaterally operated as desired. Another drawback includes regular, manual maintenance of the safety valves to ensure that they are fully operational. Another drawback includes the potential pollution to the environment when fluid in the safety valves are exhausted into the atmosphere.

[0006] In some wellbore operations, such as when conducting a fracking operation, a high volume pressurized fluid is pumped to a manifold, which directs the fluid to one or more wells for fracturing the formation below. In the event that flow through the flow or fluid lines to the manifold and/or in the wells experience an interruption or become plugged, the highly pressurized fluid volume can cause catastrophic failure of the fluid lines, the wells, and any other equipment surrounding the wellsite, which can even potentially harm workers at the wellsite. Conventional relief valve systems are inefficient at detecting a failure, have slow response times,

and/or are only one-time use, which require complete replacement in the event of operation.

[0007] Therefore, there is a need for a new and improved safety control valve system that is self reliant, can be remotely operated and monitored real-time, and can automatically shut in and/or relieve a wellhead system in the event of an emergency or when desired.

SUMMARY OF THE INVENTION

[0008] In one embodiment, a control system for controlling a safety valve attached to a flow line at a wellsite is provided. The control system includes a housing. The control system further includes a controller assembly disposed within the housing. The controller assembly is configured to receive a signal from a transducer connected to the flow line, wherein the signal corresponds to a measured physical property. Further, the control system includes a valve assembly disposed within the housing and in communication with the controller assembly. The control system further includes a compressor assembly disposed within the housing and in communication with the controller assembly. Additionally, the control system includes a power source disposed within the housing. The power source is configured to supply power to the controller assembly, the valve assembly, and the compressor assembly. The controller assembly is operable to cause the compressor assembly to supply pneumatic fluid to the safety valve to actuate the safety valve to an open position, wherein the controller assembly is operable to cause the valve assembly to actuate the safety valve to a closed position.

[0009] In one embodiment, a method for controlling a safety valve attached to a flow line at a wellsite is provided. The method includes the step of positioning a control system adjacent the safety valve. The control system has a controller assembly, a compressor assembly, and a power source disposed within a housing of the control system. The method further includes the step of supplying pneumatic fluid from the compressor assembly to the safety valve to open the safety valve. The

method also includes the step of receiving a signal in the controller assembly corresponding to a sensed physical property in the flow line. Additionally, the method includes the step of closing the safety valve in response to a comparison of the sensed physical property to a pre-set condition.

[0010] In one embodiment, a control system for controlling a safety valve attached to a flow line at a wellsite may comprise a controller assembly configured to receive a signal from a transducer connected to the flow line, wherein the signal corresponds to a measured physical property; a valve assembly in communication with the controller assembly; and a fluid drive assembly in communication with the controller assembly, wherein the controller assembly is operable to actuate the fluid drive assembly to supply fluid to the safety valve to actuate the safety valve to a first position, and wherein the controller assembly is operable to actuate the valve assembly to actuate the safety valve to a second position.

[0011] In one embodiment, a method for controlling a safety valve attached to a flow line at a wellsite may comprise providing a control system for positioning adjacent to the safety valve, wherein the control system includes a housing, a controller assembly, a fluid drive assembly, and a valve assembly; supplying fluid to the safety valve using the fluid drive assembly to actuate the safety valve into a first position; monitoring a physical property in the flow line using the controller assembly; and actuating the valve assembly using the controller assembly to actuate the safety valve into a second position based upon a comparison of the monitored physical property to a predetermined condition.

[0012] In one embodiment, a method for controlling a safety valve attached to a flow line at a wellsite may comprise providing a remotely operable control system for positioning adjacent to the safety valve; actuating the safety valve into a closed position using the control system; monitoring fluid pressure in the flow line using a transducer in communication with the control system while maintaining the safety valve in the closed position; and actuating the safety valve into an open position

using the control system when the monitored fluid pressure reaches or exceeds a predetermined fluid pressure to relieve fluid pressure in the flow line.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] So that the manner in which the above recited features of the invention can be understood in detail, a more particular description of the invention, briefly summarized above, may be had by reference to embodiments, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only typical embodiments of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments.

[0014] Figure 1 illustrates a wellhead control system according to one embodiment.

[0015] Figure 2 illustrates a safety valve control system according to one embodiment.

[0016] Figure 3 illustrates a surface safety valve according to one embodiment.

[0017] Figure 4 is a sectional view of a gate valve, an actuator, a mechanical override, and a safe mode indicator.

[0018] Figure 5 is a sectional view of the gate valve in an open position after a manual operation of the mechanical override.

[0019] Figure 6 is a sectional view of the gate valve in the open position after an automatic operation of the actuator and with the safe mode indicator indicating that the gate valve is operating in a safe mode.

[0020] Figure 7 is a sectional view of the gate valve in the open position after the automatic operation of the actuator, the mechanical override having been partially

actuated, and the safe mode indicator indicating that the gate valve is not operating in the safe mode.

[0021] Figure 8 is a cross-sectional view of the mechanical override along section line 8-8 in Figure 4.

[0022] Figure 9 is a sectional view of the gate valve in an open position after an automatic operation of the actuator.

[0023] Figures 10A-10H and 11-11D illustrate a valve assembly according to one embodiment.

[0024] Figure 12 is a sectional view of a valve in a fail-safe opened position.

[0025] Figure 13 illustrates a safety valve control system according to one embodiment.

[0026] Figure 14 illustrates a well control system according to one embodiment.

[0027] Figure 15 illustrates the well control system according to one embodiment.

DETAILED DESCRIPTION

[0028] Figure 1 illustrates a wellhead control system 100 of an oil/gas well according to one embodiment. The wellhead control system 100 is configured to control the recovery of fluids, such as hydrocarbons, from a reservoir through a primary wellbore 105. The wellhead control system 100 includes a tree 110 having a series of valve and flow control devices, a surface safety valve 120 in communication with the tree 100 via tubing 115, and a subsurface safety valve 130 in communication with the tree 100 via tubing 125. The subsurface safety valve 130 may also be in communication with a well production flow line 145 used to recover oil and/or gas from the oil/gas well. The surface safety valve 120 may also be in communication with a surface production flow line 135 used to direct any recovered fluids to one or more locations downstream of the wellhead control system 100 for further processing

and/or storage. In one embodiment, the safety valves 120, 130 may include pneumatically or hydraulically actuated valves. In one embodiment, the safety valves 120, 130 may include pneumatic valves that are operated using hydraulic fluid. Each of the safety valves 120, 130 may include a self contained emergency shut down (“ESD”) control system, identified as items 200, 300, and 700, respectively, that (1) may be operable to automatically close the safety valves 120, 130; (2) may be operable to be continuously monitored and/or operated (opened and closed) in real-time from a remote location; and (3) may be operable to verify at all times the operating condition/characteristics of the safety valves 120, 130, and various other components of the control system.

[0029] The ESD control systems 200, 300 may be “self-contained,” which means that they do not depend on any external pneumatic, hydraulic, mechanical, or electrical sources for their operation to shut down the oil/gas well. For example, if there is a rupture of a production flow line downstream from the surface safety valve 120, and/or if there is a loss of well pressure at the subsurface safety valve 130, the ESD control systems 200, 300 are operable to effectively close the safety valves 120, 130, thereby shutting in the oil/gas well, and alert the appropriate personnel that a shut-in has occurred without the assistance of any additional external pneumatic, hydraulic, mechanical, or electrical power sources. All of the operating fluids and mechanisms necessary to operate the safety valves 120, 130 are maintained within the ESD control systems 200, 300 so that there is no pollution of the environment, and so that any fluids and/or gases from the oil/gas well may be effectively contained therein without any additional external dependencies.

[0030] Figure 2 illustrates the ESD control system 200 according to one embodiment. Embodiments of the ESD control system 200 described herein are equally applicable to the ESD control system 300 (and vice versa). The ESD control system 200 may include a housing 210 for supporting a controller assembly 220, a power source 230, a pump assembly 240, a fluid reservoir 250, a valve assembly 260, and a solar panel assembly 270. The ESD control system 200 may also include

one or more transducers/devices 280, 282, 284, 286, and 288 for monitoring and/or measuring one or more physical properties (further described below). In embodiment, the ESD control system 200 may be configured to control one or more valves, such as flow control valves or choke valves, that are in communication with the flow lines of the valves 120, 130 to control fluid flow through the wellhead control system 100

[0031] The housing 210 may include any structural support member, such as an explosion-proof container, for protecting the components stored therein from damage and environmental elements. Appropriate ventilation of the housing 210 may be provided by ventilation holes and/or an independent solar powered fan mounted in or through the housing 210. The housing 210 may further include an access panel or door for ease of access to the housing's interior, and may be configured for attachment to the tree 110 or the respective surface and subsurface safety valve 120, 130. One or more manifold assemblies 212, 214, 216 may be provided on the housing 210 for fluid and/or electrical connections between the housing 210 (and the components within the housing 210) and the safety valves 120, 130, the solar panel assembly 270, and the transducer 280. In one embodiment, the manifold assembly 216 includes a solar converting charger device. In one embodiment, the structural components of the ESD control systems 200, 300, to the extent possible, may be made from stainless steel.

[0032] The controller assembly 220 may be disposed in the housing 210 and may include a microprocessor unit 222, a display screen 224, and a keypad 226. In one embodiment, the controller assembly 220 may be weather-proof, and may be intrinsically safe to provide power as necessary to one or more components of the ESD control systems 200, 300. In one embodiment, the controller assembly 220 may be positioned external to and/or adjacent to the housing 210. The microprocessor unit 222 may include a programmable logic controller, including a supervisory control and data acquisition system (SCADA) that is in communication with the one or more transducers/devices 280, 282, 284, 286, and 288, as well as the pump and valve

assemblies 240, 260. The microprocessor unit 222 may include a current regulator to provide low current transmission between the controller assembly 220 and the various components of the control system. A watchdog sensor 228 may be used to monitor the operation of the microprocessor unit 222 and provide an alarm in the event of a failure. The controller assembly 220 may be operable to send and receive signals with a computer system 150 (such as a desktop computer, laptop computer, or personal digital assistant (PDA)) at a remote location from the wellhead control system 100. In one embodiment, the signals may be sent and/or received between the controller assembly 220 and the computer system 150 via wired and/or wireless telemetry means, including but not limited to electrical wires, fiber optical cables, radio frequency, infrared, microwave, satellite, and/or laser light communication. In this manner, the ESD control systems 200, 300, 700 can be monitored and operated remotely from one or more locations on-site or off-site relative to the wellhead control system 100. In one embodiment, the ESD control systems 200, 300, 700 may be configured for manual and/or remote operation on-site at the wellhead control system 100. In one embodiment, the controller assembly 220 may be programmed with one or more trigger points, such as upstream and/or downstream high and/or lower pressure points, that will automatically trigger operation of the ESD control system 200, 700 upon sensing a pressure outside of the trigger point ranges. In one embodiment, the controller assembly 220 may be configured with a “master/slave” polling protocol or a “master/master” polling protocol as known in the art to retrieve and communicate information regarding the ESD control system 200, 700 as desired.

[0033] In one embodiment, the controller assembly 220 may be in communication with a pressure transducer 280 that is connected to the surface production flow line 135 as illustrated in Figure 1. The pressure transducer 280 can measure the pressure in the flow line 135 and communicate a signal corresponding to the measured pressure to the controller assembly 220. The pressure transducer 280 can be connected at various other locations within the wellhead control system 100, such as at the tree 110 or the tubing 115, 125. In one embodiment, the transducer 280 can be used to measure fluid flow rate or detect hydrogen sulfide. In one

embodiment, one or more transducers 280 may be used to measure and/or detect additional well characteristics at the wellhead control system 100 and communicate the measured/detected well characteristics to the controller assembly 220 via a signal corresponding to the measurement or detection for comparison to one or more predetermined conditions.

[0034] Regarding the pressure transducer 280, the signal may be recorded and/or communicated to the computer system 150 via the controller assembly 220 to provide real-time monitoring of the pressure in the flow line 135. The measured pressure may be displayed on the display screen 224 and/or on a display screen of the computer system 150. In response to the measured pressure, the controller assembly 220 may be configured to operate the respective safety valve 120, 130 to which it is connected. For example, the controller assembly 220 may be used to direct the pump assembly 240 and the valve assembly 260 to supply fluid from the fluid reservoir 250 to the surface safety valve 120 to open the valve. Upon receiving the signal from the controller assembly 220, the valve assembly 260 may be configured to open a circuit defined by lines 211, 213, 215 between the surface safety valve 120 and the fluid reservoir 250 to allow the pump assembly 240 to direct pressurized fluid from the fluid reservoir 250 to the surface safety valve 120, thereby opening the surface safety valve 120. The surface safety valve 120 may be maintained in the open position while the pressure transducer 280 continuously monitors the pressure in the flow line 135. The controller assembly 220 may be programmed to close the surface safety valve 120 upon receiving a signal from the pressure transducer 280 that corresponds to a pressure measurement that is greater than or less than a predetermined condition, such as a pre-set pressure range. The pre-set pressure range may be input into the controller assembly 220 by manual entry using the keypad 226 and the display screen 224. The pre-set pressure range may also be input into the controller assembly 220 remotely from the computer system 150. When the signal is received from the pressure transducer 280 that the pressure in the flow line 135 falls outside of the pre-set pressure range stored in the microprocessor unit 222, the controller assembly 220 may automatically direct the

valve assembly 260 and/or the pump assembly 240 to return the fluid from the surface safety valve 120 to the fluid reservoir 250. Upon receiving the signal from the controller assembly 220, the valve assembly 260 may be configured to open a circuit defined by lines 211, 217 between the surface safety valve 120 and the fluid reservoir 250 to allow the pressurized fluid to dump into the fluid reservoir 250, thereby closing the surface safety valve 120. In one embodiment, a closing pressure generated by the surface safety valve 120 may be used to force the fluid into the fluid reservoir 250. Continuous real-time monitoring of the pressure in the flow line 135 may be used to verify that the surface safety valve 120 has been closed.

[0035] The ESD control systems 200, 300, 700 may be adjusted at anytime and can be configured to shut in the wellhead control system 100 at anytime manually and/or remotely. In particular, the microprocessor unit 222 can be programmed with one or more pre-set conditions, manually using the display screen 224 and keypad 226 and/or remotely via the computer system 150. The pre-set conditions may be changed at anytime. And when a signal is received from one or more of the various transducers/devices and/or the computer system 150 that conflicts with the pre-set conditions when compared, the controller assembly 220 may be operable to automatically close the safety valve 120, 130 to which it is connected. The controller assembly 220 may be operable when the signal is above the pre-set condition or when the signal is below the pre-set condition. Continuous real-time monitoring of the ESD control systems 200, 300, 700 may be used to verify the operating condition/characteristics of the wellhead control system 100 components at all times.

[0036] In one embodiment, the ESD control systems 200, 300, 700 may communicate an auditory, visual, or other similar type of sensory signal that the wellhead control system 100 has been shut in. In one embodiment, the controller assembly 220 may send a signal to the computer system 150 that can be converted into an alarm to alert an operator of the shut-in. In one embodiment, the controller assembly 220 may send a signal to trigger an indication device 282, such as an

auditory and/or visual alarm disposed interior or exterior of the housing 120, to alert an operator within close proximity of the wellhead control system 100 of the shut-in.

[0037] In one embodiment, the ESD control systems 200, 300, 700 may include an emergency shutdown device 284 manually and/or remotely operable to automatically give an alarm and send a signal to the controller assembly 220 to shut in the wellhead control system 100. In one embodiment, the ESD control systems 200, 300, 700 may include a fire device 286 that senses heat, and automatically gives an alarm and shuts in the wellhead control system 100 via the controller assembly 220 when the measured heat exceeds a certain temperature. In one embodiment, the ESD control systems 200, 300, 700 may include an anti-intrusion device 288 that when activated automatically gives an alarm and shuts in the wellhead control system 100 via the controller assembly 220, for example when a theft is attempted or the control system sustains some type of structural damage. In one embodiment, one or more of the transducers 282, 284, 286, 288 may be used to detect hydrogen sulfide (H₂S), other gases and vapors, and/or the level of fluid in one or more storage tanks that are in fluid communication with the valves 120, 130. Each of the devices 284, 286, 288 may be continuously monitored real-time using the controller assembly 220 via the computer system 150 to verify operating conditions/characteristics of the wellhead control system 100.

[0038] Power may be provided to the controller assembly 220 and the pump assembly 240 from the power source 230. The power source 230 may be operable to provide a low current (amp) stream to the controller assembly 220 and/or the pump assembly 240. In one embodiment, the power source 230 may include an intrinsically-safe battery, such as a 12 or 24 volt, direct current, explosion-proof power supply. In one embodiment, the power source 230 may include a watchdog sensor 232 to communicate to the computer system 150 via the controller assembly 220 a failure of the power source. The watchdog sensor 232 may also give an auditory or visual alarm to alert an operator onsite that the power source 230 is low and/or dead. The controller assembly 220 may be configured to automatically shut in

the wellhead control system 100 upon receiving a signal from the sensor 232. In one embodiment, the power source 230 may be a (re-chargeable) power supply that is supported by the solar panel assembly 270. The solar panel assembly 270 may include one or more solar panels 272 connected to the exterior of the housing 210 to consume light energy from the sun to generate electricity. The solar panels 272 may be connected to the exterior of a housing 730 in the ESD control system 700. An intrinsically safe voltage controller 274 may deliver electrical current at an appropriate voltage, 12 or 24 volts for example, to the power source 230, which in turn supplies power to the controller assembly 220 and/or pump assembly 240. In one embodiment, the solar panel assembly 270 may be configured to provide enough power to the ESD control systems 200, 300, 700 to open and close the safety valves 120, 130 ten or more times from about two hours of sunlight per day.

[0039] In one embodiment, the pump (or fluid drive) assembly 240 may include an intrinsically safe motor 242 and a pump 244, which may each be located in the explosion-proof housing 210. The pump 244 may include a rotary piston pump with about a 100 to 10,000 psi range. The pump assembly 240 may pump pneumatic and/or hydraulic fluid from the fluid reservoir 250 to actuate the safety valve 120, 130 to which it is connected.

[0040] In one embodiment, the fluid reservoir 250 may be configured to store an amount of operating fluid sufficient to actuate the safety valve 120, 130 to which it is connected. The operating fluid may include air, water, propylene glycol, and other valve operating fluids known in the art. In one embodiment, the fluid reservoir 250 may include a level gauge 252, such as a sight glass, to indicate the level of fluid in the fluid reservoir 250. The fluid reservoir may also include a level sensor 252 that is in communication with the controller assembly 220 and is operable to monitor in real-time the level of fluid in the fluid reservoir 250. In the event that the level of fluid falls below a pre-set limit, due to evaporation of the fluid for example, the level sensor 252 may provide an alarm to alert an operator on-site at the wellhead control system 100 and/or at the remote location via the controller assembly 220 and the computer

system 150. The controller assembly 220 may automatically shut in the wellhead control system 100 upon receiving a signal from the level sensor 252.

[0041] In one embodiment, the valve assembly 260 may include one or more (intrinsically safe) valves 262 to control and direct communication between the pump assembly 240, the fluid reservoir 250, and the safety valve 120, 130 to which it is connected. The one or more valves 262 may include solenoid valves, shuttle valves, and/or any other type of valves operable to open and close the fluid circuits between the pump assembly 240, the fluid reservoir 250, and the safety valve 120, 130 to which it is connected. The valve assembly 260 may include an internal relief valve and/or circuit to rapidly expel the fluid from the safety valves 120, 130 to the fluid reservoir 250 to ensure quick closure of the safety valves 120, 130. The valve assembly 260 may include one or more gauges, such as pressure gauge 264, which can be visually inspected to monitor the pressure in the valve assembly 260 flow lines. In one embodiment, the pressure gauge 264 may be configured to shut off the pump assembly 240 when the pressure in the actuator of the safety valves 120, 130 reaches a pre-determined pressure setting. The one or more valves 262 may be controlled by the controller assembly 220 as described above.

[0042] In one embodiment, the display screen 224 and/or one or more gauges may be mounted through a front panel of the housing 210, 730 to indicate pressure within the various valves and lines in fluid communication with the ESD control systems 200, 300, 700 and the wellhead control system 100.

[0043] Figure 3 illustrates a surface safety valve 120 according to one embodiment. The surface safety valve 120 may include a valve actuator 122 for moving a gate valve 124 between an open and closed position. Pressurized fluid from the fluid reservoir 250 of the ESD control system 200 or pressurized fluid from the ESD control system 700 may be supplied to a chamber 123 of the valve actuator 122 via tubing 201 to open the gate valve 124. A biasing member 127, such as a spring disposed within the valve actuator 122 may be used to close the gate valve 124 when the force of the biasing member exceeds the fluid pressure in the valve

actuator chamber 123. The valve actuator 122 may also include a top shaft 126 that can be used to manually actuate the valve actuator 122 by rotation of a hand wheel 128 to open and close the gate valve 124. The top shaft 126 may also be used as a visual indication to determine whether the gate valve 120 is in an open or closed position. For example, when the top shaft 126 is fully extended outward from the upper end of the valve actuator 122, the gate valve 124 may be in a closed position, and when the top shaft 126 is retracted into the upper end of the valve actuator 122, the gate valve 124 may be in an open position.

[0044] In one embodiment, the ESD control systems 200, 300, 700 may include a position indication assembly 290 that is operable to indicate whether the surface safety valve 120 is in an open or closed position, including any partial open/closed position therebetween, based on the location of the top shaft 126. As illustrated in Figure 3, when the top shaft 126 is in a fully extended position, the surface safety valve 120 is in the closed position. As the surface safety valve 120 begins to open and is moved either manually or automatically to the open position, the top shaft 126 will retract into the upper end of the valve actuator 122. The position indication assembly 290 may include one or more sensors 292 operable to sense the extension and retraction of the top shaft 126. The sensors 292 may communicate a signal to the controller assembly 220 corresponding to the measured position, which may then send a signal to the computer system 150 and display the measured position on a display screen. In this manner, an operator can continuously monitor and verify the position of the surface safety valve 120 at all times. The position indication assembly 290 can also be used to verify that the surface safety valve 120 is closed in the event that one of the other ESD control system 200, 700 components initiated a shut-in of the wellhead control system 100. In one embodiment, the sensors 292 may include magnetic sensors operable to sense a magnetic material of the top shaft 126. For example, one or more sensors 292 may be positioned at various locations along the longitudinal stroke of the top shaft 160 during opening and closing of the gate valve 124. When the top shaft 160 is fully extended, all of the sensors 292 may sense the magnetic material of the shaft, thereby indicating that the gate valve 124 is closed.

However, when the top shaft 160 is fully retracted, only the sensors 292 closest to the upper end of the valve actuator 122 may sense the magnetic material of the shaft, thereby indicating that the gate valve 124 is open. In one embodiment, the sensors 292 may include other types of position sensors known in the art to monitor and measure the position of the top shaft 126.

[0045] In one embodiment, the ESD control system 200, 300, 700 can be used to partially stroke the safety valves 120, 130. In one embodiment, the controller assembly 220 may be configured to direct the pump assembly 240 and valve assembly 260 to supply an amount of operating fluid to the safety valves 120, 130 to partially open the safety valves. In one embodiment, the controller assembly 220 may be configured to direct the pump assembly 240 and valve assembly 260 to return an amount of operating fluid from the safety valves 120, 130 to partially close the safety valves. The controller assembly 220 may be programmed to automatically conduct a partial stroke of the safety valves 120, 130 after a pre-set amount of time or other condition. The controller assembly 220 may be manually and/or remotely operable to conduct a partial stroking of the safety valve to which it is connected when desired. The sensors 292 of the position indication assembly 290 can be used to monitor and verify the partial stroke of the safety valves 120, 130, based on the position of the top shaft 126. The partial stroking of the safety valves 120, 130 can assist in preventing/removing build-up of debris within the valves from the fluids flowing therethrough, which can potentially prevent complete opening and/or closing of the valves when necessary.

[0046] In one embodiment, the ESD control systems 200, 300, 700 may be configured to perform a specific sequential opening and closing of the safety valves 120, 130 when starting up or shutting in the wellhead control system 100. In one embodiment, either ESD control system 200, 300, 700 may initiate closure or opening of the surface safety valve first 120, and then closure or opening of the subsurface safety valve 130. In one embodiment, either ESD control system 200, 300, 700 may initiate closure or opening of the subsurface safety valve first 130, and

then closure or opening of the surface safety valve 120. In one embodiment, if one of the ESD control system 200, 700 components initiates a shut-in, the controller assembly 220 may automatically send a signal to the computer system 150, which may then automatically send a signal to the controller assembly of the ESD system 300 to initiate closing of the subsurface safety valve 130. After closure of the subsurface safety valve 130 is verified by the ESD control system 300 via the computer system 150, another signal may be sent to the ESD control system 200, 700 to then initiate closing of the surface safety valve 120. The reverse process may be performed beginning with the ESD control system 300 if closure of the surface safety valve 120 is required prior to closure of the subsurface safety valve 130.

[0047] In one embodiment, a method for controlling a wellhead control system having a plurality of valves, including a surface safety valve and a subsurface safety valve, may include producing power with solar panel assembly and delivering the produced power to a controller assembly and to a pump assembly that supplies operating fluid to the valves, the control assembly operable to monitor a variety of conditions in an oil/gas well and at the wellhead control system. The controller assembly may be used to control the operation of the pump assembly and the valves manually, remotely, automatically, and/or in response to one or more pre-set conditions programmed in the controller assembly. The solar panel assembly may provide to a power source or directly to a pump assembly to operate a motor of the pump assembly, which in turn operates a pump of the pump assembly. The motor may be controlled by the controller assembly. The controller assembly may include a microprocessor and its related apparatuses, circuits, devices, switches, etc. The power produced by the solar panel assembly may be stored in a power source, such as in one or more battery apparatuses for use on demand. The use and flow of the stored power may be controlled and/or monitored by the controller assembly. The pump assembly may supply operating fluid (hydraulic and/or pneumatic) at a low or high pressure to operate either of both of the safety valves as directed by the controller assembly. The pre-set condition may include a fluid flow parameter, a flow line condition, an alarm, an emergency condition, and/or an intrusion of the

components of the wellhead control system, including the valves and the controller assembly.

[0048] The voltages of power from the solar panel assembly may be controlled with a voltage controller having a sensor provide an alert signal, an alarm signal, and/or a shut-off signal if a pre-set voltage is exceeded or is not provided. One or more sensors may be provided to sense an amount and/or pressure of available operating fluid in any or all of the flow lines used and/or in a fluid reservoir, the sensor(s) providing a signal to indicate fluid volume and/or fluid pressure to the controller assembly. In response to the signal, the controller assembly may operate one or more of the valves and/or shut in the wellhead control system. The controller assembly may signal other devices, such as the pump assembly or a valve assembly to increase fluid pressure and/or fluid amount in some or all of the flow lines. A sensor may signal the controller assembly when a fire is detected and provide a fire alarm. The controller assembly may provide a fire alarm signal to a remote location and/or operate the valves to shut in the wellhead control system. The signals of alarm, intrusion, etc. may be provided at the immediate area of the wellhead control system and to a remote location via known transmission methods.

[0049] The controller assembly may be operable to monitor the various components of the wellhead control system and employing intrinsically safe components. A single controller assembly may be operable to control a surface safety valve, a subsurface safety valve, as well as one or more additional valves in communication with the wellhead control system. The controller assembly may be operable to control the subsurface safety valve with an electric submersible pump. The controller assembly may be operable to remotely shut in the wellhead control system using switches interconnected therewith, telephone, radio, SCADA, DCS and/or satellite signals. One or more sensors may be use to detect dangerous gases in the oil/gas well and/or at the wellhead control system and producing an alarm signal in response. A thermoelectric generator may be used instead of or in addition to a solar panel assembly. The pre-set condition(s) may include one or more of the

following: the presence of fire or dangerous gases, intrusion by unwanted humans or animals, vandalism, damage, or destruction of equipment used in the wellhead control system, or too low to too high fluid pressures, fluid volumes, power amperages, or power voltages. In one embodiment, that various components of the control system may be weather proof and “intrinsically safe,” i.e. that they require vastly reduced power levels and therefore minimize the risk of sparks and explosions, e.g. less than 100 milliamps.

[0050] Figure 4 is a sectional view of a mechanical override 400, an actuator 401, a gate valve 402, and a safe mode indicator 403. The actuator 401 couples to a valve body 404 of the gate valve 402. A bonnet assembly can provide an interface between the gate valve 402 and the actuator 401. During an automatic operation of the gate valve 402, hydraulic or pneumatic pressure enters a chamber 406 of the actuator 401 defined by a cover 408 of the actuator 401 and a diaphragm 410 positioned over an operator member 412. The operator member 412 moves in response to the hydraulic or pneumatic pressure within the chamber 406 and against a biasing force supplied by a spring 418. A valve stem 414 coupled to a sliding gate 416 of the gate valve 402 moves in response to the movement of the operator member 412. In this manner, the automatic operation of the actuator 401 moves the sliding gate 416 of the gate valve 402 between a closed position shown in Figure 4 and an open position as shown in Figure 6.

[0051] In one embodiment, the actuator 401 may be selected from the pneumatic and hydraulic actuators described in detail in U.S. Patent No. 6,450,477 which is herein incorporated by reference in its entirety. The actuator 401 may be selected from any other actuator known in the industry for moving the sliding gate 416 of the gate valve 402 between the open and closed positions by automatic operation.

[0052] When using the automatic operation of the actuator 401, the biasing force of the spring 418 is configured to act as a fail-safe mechanism. When the pressure in the actuator 401 is removed, inadvertently or otherwise, the spring 418 will move the gate valve 402 into a fail-safe closed position illustrated in Figure 4 or a fail-safe

opened position illustrated in Figure 12. Although the mechanical override 400 may provide an additional means to actuate the gate valve 402 in the event of a failure, such as a loss of pressure, it may also override the fail-safe mechanism. The mechanical override 400 may prevent the spring 418 from moving the gate valve 402 into the fail-safe closed position or the fail-safe opened position. The gate valve 402 is operating in a safe mode when the fail-safe mechanism has not been overridden by the mechanical override and is not prevented or inhibited from moving into the fail-safe closed position or the fail-safe opened position. Therefore, the safe mode indicator 403 is configured to provide a signal, such as a visual indication, communicating to a valve operator that the valve is or is not operating in the safe mode. The signal from the safe mode indicator 403 may also communicate that (1) the valve will move to the fail-safe closed position or the fail-safe opened position in the event of a pressure loss in the actuator, (2) the valve has been automatically actuated into the open position, and/or (3) the mechanical override will not disable or interfere with the fail-safe mechanism.

[0053] As illustrated in Figure 4, the mechanical override 400 is connected to the actuator 401 to provide a manual operation for moving the sliding gate 416 between open and closed positions. The mechanical override 400 includes a top shaft 460, a lever for manual rotation of the top shaft 460, such as a handwheel 500, a housing 450 having a longitudinal bore therethrough, a drive sleeve 504 rotationally locked to the housing 450, and a top seal cartridge 550. The housing 450 passes through an aperture 452 in the cover 408 of the actuator 401. A shoulder 454 formed by a portion of the housing 450 with an increased outer diameter provides a stop for positioning the housing 450 in the aperture 452 of the cover 408. The housing 450 may be secured to the cover 408 by any known means such as a thread or by welding.

[0054] The housing 450 includes an upper bore 509, an inner shoulder 511, a top bore 510, and a bottom bore 512. The inner shoulder 511 is disposed below the upper bore 509, the top bore 510 is disposed below the inner shoulder 511, and the

bottom bore 512 is disposed below the top bore 510. The bottom bore 512 has an inner diameter greater than the top bore 510. A tapered shoulder 515 is located at the interface between the top bore 510 and the bottom bore 512.

[0055] The top seal cartridge 550 is disposed in the upper bore 509 and can be removed for replacement as a single unit without disassembling the actuator 401 or the mechanical override 400. The top seal cartridge 550 is preferably formed of a plastic-like material such as Delrin and is held in place by at least one retainer ring 552 which is preferably stainless steel. Accessibility to the retainer ring 552 without disassembly of the actuator 401 permits removal of the retainer ring 552 from the top of the housing 450, thereby allowing removal and replacement of the top seal cartridge 550. The top seal cartridge 550 contains dual reciprocating top shaft seals 556 and dual static seals 558 to ensure seal integrity and long life. The top seal cartridge 550 incorporates rod wiper 554 to keep a shaft sealing region therebelow clean of dirt, grease, and other contaminants for longer life of the top shaft seals 556. The rod wiper 554 is preferably made from Molythane 90. These and other seals may be T-seals or other substantially elastomeric seals, such as O-ring seals.

[0056] The top shaft 460 extends through the longitudinal bore of the housing 450, the top seal cartridge 550, and the drive sleeve 504. The inner diameter of the inner shoulder 511 is greater than the outer diameter of the top shaft 460, but smaller than the outer diameter of the drive sleeve 504. The inner shoulder 511 permits axial movement of the top shaft 460 therethrough while providing a backstop for the drive sleeve 504. The top shaft 460 may also include a shoulder configured to engage an upper shoulder of the drive sleeve 504 to prevent removal of the top shaft 460 from the upper end of the drive sleeve 504.

[0057] The drive sleeve 504 is disposed in the housing 450 and is movable within the top bore 510 and the bottom bore 512. The drive sleeve 504 includes a threaded bore 516 that corresponds with a drive thread 514 on an outside surface of the top shaft 460. In one embodiment, the drive thread 514 is an Acme thread capable of functioning under loads and includes a small number of threads per inch, such as

five, in order to decrease the work required to manually operate the actuator 401. The drive thread 514 permits unassisted rotation of the top shaft 460 with the handwheel 500. The threaded engagement permits relative axial movement between the top shaft 460 and the drive sleeve 504 within the housing 450. The outer diameter of the upper portion of the drive sleeve 504 is substantially the same as the inner diameter of the top bore 510 of the housing 450. One or more seals 518, such as o-rings, are provided on the outer diameter of the upper portion of the drive sleeve 504 to form a sealed engagement with the top bore 510 of the housing 450. One or more seals 519, such as o-rings, are provided on the inner diameter of the upper portion of the drive sleeve 504 to form a sealed engagement with the top shaft 460.

[0058] In one embodiment, the lower end of the drive sleeve 504 is configured to move axially relative to the bottom bore 512 of the housing 450 while being rotationally locked relative to the housing 450. Any known rotational locking assembly that prevents rotation of the drive sleeve 504 while permitting the drive sleeve 504 (and the top shaft 460) to move axially within the housing 450 during the automatic operation of the actuator 401 may be used. Figure 8 illustrates a new rotational locking assembly by showing one embodiment of a cross-section at sectional line 8-8 in Figure 4. Figure 8 illustrates the outer diameter of the lower end of the drive sleeve 504 having an oval shape that corresponds to an oval shape of the inner diameter of the housing 450. The oval shaped diameters provide a physical interference that rotationally locks the drive sleeve 504 to the housing 450 without inhibiting axial movement of the drive sleeve 504 relative to the housing 450. The outer diameter of the drive sleeve 504 and the bore of the housing 450 may be formed in a number of ways known by one of ordinary skill in the art to prevent relative rotational movement while permitting relative axial movement. In one embodiment, the lower portion of the drive sleeve 504 may have one or more splines that extend into one or more corresponding longitudinal grooves formed in the bottom bore 512 of the housing 450 to permit relative axial movement but prevent relative rotational movement. In one embodiment, the lower portion of the drive sleeve 504

may be keyed to the bottom bore 512 with a pin that extends through corresponding longitudinal grooves in the drive sleeve 504 and the bottom bore 512.

[0059] A coupling assembly 458 prevents longitudinal separation between a retaining nut 462 secured to the operator member 412 and the top shaft 460 while isolating rotational movement of the top shaft 460 from the actuator 401 and the gate valve 402. The coupling assembly 458 includes a female coupler 464 and ball bearings 468. The lower end of the top shaft 460 rotates around the upper end of the retaining nut 462 and against the ball bearings 468. A bottom shoulder 472 on the top shaft 460 is secured against the ball bearings 468, which are positioned on the upper end of the retaining nut 462, by the female coupler 464. The female coupler 464 is connected to the upper end of the retaining nut 462 and includes an upper shoulder that engages the bottom shoulder 472 of the top shaft 460 to prevent separation of the shaft from the retaining nut 462 and thus the actuator 401 and the gate valve 402. The top shaft 460 freely rotates relative to the retaining nut 462 and eliminates the transmission of torque to the valve stem 414, the sliding gate 416, and/or components of the actuator 401 when using the mechanical override 400.

[0060] Embodiments of the invention do not require the coupling assembly connecting the top shaft 460 with the operator member 412. The top shaft 460 of the mechanical override 400 may contact and apply force directly to a portion of the actuator 401, such as the retaining nut 462 or the operator member 412 depending on the type of actuator used. For example, the end of the top shaft 460 may directly contact the upper end of the retaining nut 462. The solid retaining nut 462 may include a separate locking device to prevent the retaining nut 462 from unthreading from the operator member 412 since the top shaft 460 rotates during the manual operation of the mechanical override 400. Alternatively, other known rotation isolation means may be provided to prevent transference of the rotation of the top shaft 460 to other components within the actuator 401 and the gate valve 402.

[0061] Referring to Figure 6, a chamber 610 is formed within the housing 450 between the top seal cartridge 550 and the drive sleeve 504. The chamber 610 is

sealed at an upper end by the engagement between the top seal cartridge 550, the upper bore 509, and the top shaft 460, and at a lower end by the engagement between the drive sleeve 504, the top bore 510, and the top shaft 460. Fluid communication may be established between the chamber 610 and the actuator 401 when the drive sleeve 504 is moved into the bottom bore 512, as shown in Figure 6. In particular, the seals 518 of the drive sleeve 504 are moved across the tapered shoulder 515 into the bottom bore 512, thereby releasing the sealed engagement with the top bore 510. When the drive sleeve 504 is located in the bottom bore 512 and fluid communication is established between the chamber 610 and the actuator 401, the gate valve 402 is operating in the safe mode. When the gate valve 402 is operating in the safe mode, the valve may be moved to the fail-safe closed position (shown in Figure 4) or the fail-safe opened position (shown in Figure 12) by the fail-safe mechanism without interference from the mechanical override 400.

[0062] The safe mode indicator 403 communicates to a valve operator when the valve is operating in the safe mode. The safe mode indicator 403 includes an indication device 600, such as a sensor, that is connected to the housing 450. The indication device 600 is in fluid communication with the chamber 610 via an orifice 615 located through the housing 450. The pressure in the chamber 610 may be used to actuate the indication device 600 to communicate a signal to the valve operator.

[0063] In one embodiment, when the chamber 610 is at a first pressure, the indication device 600 may communicate a first signal to the valve operator to indicate that the valve is not operating in the safe mode. When the chamber 610 is at a second pressure that is different than the first pressure, the indication device 600 may communicate a second signal that is different than the first signal to the valve operator to indicate that the valve is operating in the safe mode. The pressure in the chamber 610 may be the pressure directed into the actuator 401 when fluid communication is established between the chamber 610 and the actuator 401, as shown in Figure 6. The pressure in the chamber 610 is communicated to the

indication device 600 through the orifice 615 to actuate the indication device 600. In one embodiment, the first and/or second pressures may be in a range from about 0 PSI to about 80 PSI, 150 PSI, or greater. In one embodiment, the first and/or second signals may be a visual indication, such as a colored light or marker, an auditory indication, and any other type of signal known to one of ordinary skill.

[0064] In one embodiment, the indication device 600 may be any commercial sensor, such as a pressure sensor, that can be used to indicate a pressure change in the chamber 610. In one embodiment, the indication device 600 may be a Rotowink Indicator, commercially available through Norgen Ltd. The Rotowink Indicator is a spring-loaded device actuated by air pressure for use in visual monitoring of pneumatic or fluidic circuits. The device uses two contrasting colors (e.g. black, red, yellow, green) on a rotating ball that can be viewed from any angle to indicate the presence or absence of pressure.

[0065] The operation of the invention illustrated in Figures 4, 5, 6, 7, 12 will now be described. Figure 4 illustrates the gate valve 402 in the fail-safe closed position. The spring 418 provides a force configured to bias the valve stem 414, the operator member 412, the top shaft 460, and the drive sleeve 504 in an upward direction, thereby positioning the sliding gate 416 in the closed position. Seating of the sliding gate 416 in the closed position limits the upward axial movement of the top shaft 460 and the drive sleeve 504. The mechanical override 400 is in an un-actuated position and does not interfere with the closing of the gate valve 402. The bias of the spring 418 raises the top shaft 460 to an extended position providing a visual indication that the gate valve 402 is in the closed position. The safe mode indicator 403 may provide a first visual indication that the gate valve 402 is not automatically actuated into the operating safe mode and/or the chamber 610 is not pressurized or has experienced a pressure change.

[0066] Figure 12 illustrates the gate valve 402 in the fail-safe opened position. The spring 418 provides a force configured to bias the valve stem 414, the operator member 412, the top shaft 460, and the drive sleeve 504 in an upward direction,

thereby positioning the sliding gate 416 in the opened position. Seating of the sliding gate 416 in the opened position limits the upward axial movement of the top shaft 460 and the drive sleeve 504. The mechanical override 400 is in an un-actuated position and does not interfere with the opening of the gate valve 402. The bias of the spring 418 raises the top shaft 460 to an extended position providing a visual indication that the gate valve 402 is in the opened position. The safe mode indicator 403 may provide a first visual indication that the gate valve 402 is not automatically actuated into the operating safe mode and/or the chamber 610 is not pressurized or has experienced a pressure change.

[0067] Figure 5 illustrates the gate valve 402 in an open position after a manual operation of the actuator 401 using the mechanical override 400. To move the sliding gate 416 to the open position using the mechanical override 400, the valve operator manually turns the handwheel 500 to provide rotation to the top shaft 460. Rotation of the handwheel 500 rotates the top shaft 460 to advance the top shaft 460 through the drive sleeve 504 across the length of the drive thread 514. As the top shaft 460 rotates, the top shaft 460 advances through the drive sleeve 504 until the upper portion of the drive thread 514 is located at the lower portion of the threaded bore 516 of the drive sleeve 504. During the manual operation, the inner shoulder 511 provides the backstop that prevents the drive sleeve 504 from moving relative to the housing 450. The manual rotation of the handwheel 500 mechanically advances the top shaft 460 through the housing 450 to either directly or indirectly axially move the valve stem 414 to place the gate valve 402 in the open position. The top shaft 460 is mechanically driven against the bias of the spring 418, thereby compressing the spring 418. The top shaft 460 lowers during the manual operation to a retracted position and provides a visual indication that the gate valve 402 is in the open position. The valve operator may also check the safe mode indicator 403 to determine whether the gate valve 402 is operating in the safe mode. The pressure in the chamber 610 should not have significantly changed between the operation of the gate valve 402 from the fail-safe closed position, shown in Figure 4, to the open position by manual operation, shown in Figure 5. Thus, the safe mode indicator 403

communicates the same first visual indication to the valve operator, which has not changed by the mechanical operation of the gate valve 402. The safe mode indicator 403 may therefore indicate that the gate valve 402 is not operating in the safe mode, has not been automatically actuated, has been actuated (at least partially) using the mechanical override 400, and/or may be prevented from moving into the fail-safe closed position or the fail-safe opened position.

[0068] Figure 6 illustrates the gate valve 402 in the open position after an automatic operation of the actuator 401. Pressure is directed into the chamber 406 of the actuator 401 to overcome the bias of spring 418 and advance the top shaft 460, the drive sleeve 504, the operator member 412, and the valve stem 414 in a downward direction to position the sliding gate 416 into the open position. The top shaft 460 and the drive sleeve 504 are moved together axially within the bore of the housing 450 until the seals 518 on the drive sleeve 504 are moved across the tapered shoulder 515 and into the bottom bore 512. Fluid communication is established between the chamber 610 and the chamber 406. The pressure in the chamber 406 is communicated to the indication device 600 via the orifice 615, thereby actuating the indication device 600. The pressure change in the chamber 610 actuates the safe mode indicator 403 to communicate a second visual indication that is different than the first visual indication. Since the top shaft 460 also lowers during the automatic operation to the retracted position and provides a visual indication that the gate valve 402 is in the open position, the valve operator may use the safe mode indicator 403 to determine whether the gate valve 402 is operating in the safe mode. The second visual indication may therefore indicate that the gate valve 402 is operating in the safe mode, has not been mechanically actuated, has been automatically actuated, and/or will move into the fail-safe closed position or the fail-safe opened position upon release of pressure in the actuator 401. When operating in the safe mode, the upper end of the drive sleeve 504 is located at least a distance X from the inner shoulder 511 of the housing 450. In this position, the mechanical override 400 will not disable or interfere with the fail safe mechanism. When the pressure in the actuator 401 is released, the drive sleeve 504 is located a

sufficient distance from the inner shoulder 511 so as not to limit upward axial movement of the top shaft 460 and thus the valve stem 414 and the sliding gate 416. In this manner, the sliding gate 416 may move into the fail-safe closed position or the fail-safe opened position.

[0069] Figure 7 illustrates the gate valve 402 in an open position after an automatic operation of the actuator 401 and a partial operation of the mechanical override 400. Before and/or after automatic actuation of the gate valve 402, the mechanical override 400 may be actuated at least partially, inadvertently or otherwise. If the handwheel 500 has been rotated one or more times, the top shaft 460 and the drive sleeve 504 will move relative to each other in an offset position illustrated in Figure 7. When in the offset position and if the valve is automatically actuated, then the upper end of the drive sleeve 504 may be positioned a distance Y from the inner shoulder 511, which would prevent the gate valve 402 from moving to the fail-safe closed position or the fail-safe opened position. In one embodiment, the distance Y may be any distance that is less than the distance X identified in Figure 6. When the pressure in the actuator 401 is released, the upper end of the drive sleeve 504 would backstop on the inner shoulder 511 before the sliding gate 416 closes, and limit the upward axial movement necessary to move the sliding gate 416 into the fail-safe closed position or the fail-safe opened position. Depending on the amount of offset between the drive sleeve 504 and the top shaft 460, the sliding gate 416 may be located in a partially open/closed position. Also, when in the gate valve 402 is automatically actuated and the drive sleeve 504 is located the distance Y from the inner shoulder 511, the chamber 610 remains isolated from fluid communication with the chamber 406 by the seals 518 and 519. Any slight actuation of the mechanical override 400 may offset the top shaft 460 and the drive sleeve 504 enough to prevent the seals 518 from moving across the tapered shoulder 515 during automatic actuation.

[0070] Since the top shaft 460 may still visually indicate that the valve 402 is in the open position in Figure 7, the valve operator may also check the safe mode indicator

403 to determine whether the gate valve 402 is operating in the safe mode. The pressure in the chamber 610 should not have significantly changed since it is isolated from the chamber 406 by the seals 518 and 519. Thus, the safe mode indicator 403 communicates the same first visual indication to the valve operator, which has not changed by the automatic actuation of the gate valve 402. The safe mode indicator 403 may therefore indicate that the gate valve 402 is not operating in the safe mode, has been actuated (at least partially) using the mechanical override 400, and/or may be prevented from moving into the fail-safe closed position or the fail-safe opened position. While the actuator 401 is pressurized, the valve operator may rotate the handwheel 500 to advance the drive sleeve 504 into the bottom bore 512 until the gate valve 402 is operating in the safe mode. The valve operator may rotate the handwheel 500 until the safe mode indicator 403 changes from the first visual indication to the second visual indication, e.g. when fluid communication is established between the chamber 406 and the chamber 610, to ensure that the gate valve 402 is operating in the safe mode. Alternatively, the valve operator may release the pressure in the actuator 401 to permit the drive sleeve 504 to backstop against the inner shoulder 511, and then rotate the handwheel 500 to move the mechanical override 400 into the un-actuated position so that the top shaft 460 and the drive sleeve 504 are not in an offset position as described above. The actuator 401 may be re-actuated automatically so that the safe mode indicator 403 indicates that the valve is operating in the safe mode.

[0071] Figure 9 illustrates the gate valve 402 in an open position after an automatic operation of the actuator 401 according to one embodiment. The gate valve 402, the actuator 401, and the mechanical override 400 illustrated in Figure 9 may each include the embodiments described above with respect to Figures 4-8. Figure 9 further illustrates a bore 462 disposed through the top shaft 460, a check valve 464 disposed in a lower end of the top shaft 460 and in communication with the bore 462, and a retaining member 466 coupled to the top shaft 460 to support the check valve 464 in the lower end of the top shaft 460. In one embodiment, the bore 462 may be disposed through the top shaft 460 in any manner known by one of

ordinary skill in the art to allow fluid communication between the chamber 610 and the chamber 406. In one embodiment, the check valve 464 may be any type of valve known by one of ordinary skill in the art, such as a one-way valve, that is operable to control the flow of fluid through the bore 462 in either direction. In one embodiment, the retaining member 466 may be any type of member known by one of ordinary skill in the art, such as a retainer ring, that is operable to maintain the check valve 462 in engagement with the top shaft 460 and/or the bore 462. The top shaft 460 illustrated in Figure 9 may be used in any of the embodiments described with respect to Figure 4-8.

[0072] In operation, the bore 462 may be configured to relieve any fluid pressure that is located in the chamber 610, which may cause a pressure lock and prevent the fail-safe mechanism from closing the gate valve 402. For example, when the gate valve 402 is operating in the safe mode as illustrated in Figure 9, the chamber 610 is in fluid communication with the chamber 406 of the actuator 401 and is filled with pressurized fluid. As the pressure in the chamber 406 is reduced, the spring 418 begins to move the gate valve 402 into the closed position, as illustrated in Figure 4, and the chamber 610 is sealed upon engagement of the seals 518 with the inner surface of the top bore 510. Any fluid that may be retained in the chamber 610 is relieved through the bore 462 into the chamber 460. In one embodiment, the fluid may be forced through the bore 462 and the check valve 464 under its own pressure and/or as it is pressurized as the volume of the chamber 610 is reduced by movement of the drive sleeve 504 toward the shoulder 511 via the spring 418. The check valve 464 may allow fluid to flow from the upper end of the top shaft 460, through the bore 462 and into the chamber 406, and prevent fluid from flowing into the bore 462 and thus into the chamber 610 from the lower end of the top shaft 460. In one embodiment, the top shaft 460 may include one or more ports 468 located adjacent to the outlet of the check valve 464 to assist with venting fluid pressure into the chamber 406. In one embodiment, one or more seals 519 may be situated between the top shaft 460 and the drive member 504 to prevent any unintended leak

paths from communicating fluid to the bore 462 during operation of the gate valve 402.

[0073] In one embodiment, the ESD Control Systems 200, 300, 700 described herein with respect to Figures 1-3 and 13 may be used in combination with the mechanical override 400, the actuator 401, the gate valve 402, and/or the safe mode indicator 403 as described herein with respect to Figures 4-9. In one embodiment, the pressure transducer 280 illustrated in Figure 2 can be connected to the housing 450, similar to the indication device 600 illustrated in Figures 6, 7, and 9. The pressure transducer 280 may be operable to measure the pressure in the chamber 610 via the orifice 615 and send a signal to the controller assembly 220 corresponding to the measured pressure. The controller assembly 220 may then send a signal to the computer system 150 via wired or wireless telemetry for monitoring and display of the measured pressure in real time. In this manner, the ESD control systems 200, 300, 700 can be used to remotely monitor and verify whether the gate valve 402 is operating in the safe mode as described above.

[0074] Figures 10A-10H and 11-11D illustrate a valve assembly 1000 according to one embodiment. Figures 10A-10H illustrate a top perspective view, a left side view, a bottom perspective view, a front view, a top view, a right side view, a bottom view, and a rear view, respectively, of the valve assembly 1000. Figure 11 illustrates a top view of the valve assembly 1000, and Figures 11A-11D illustrate cross sectional views A-A, B-B, C-C, and D-D, respectively, of the valve assembly 1000. The valve assembly 1000 may be used as the valve assembly 260 described above. The valve assembly 1000 includes a first body portion 1010, a second body portion 1015, a first seat 1020, and a second seat 1030. The first and second body portions 1010, 1015 may be formed from a single piece of material, or may include two separate pieces of material that are connected together. The first and/or second seats 1020, 1030 may be removably secured to the first body portion 1010 for accessing a gate 1055 that is movably disposed in the first body portion 1010 to control fluid communication therethrough. The first and second body portions 1010, 1015 may be provided with

one or more mounting holes 1011, 1012, 1013 for securing the valve assembly 1000 within the housing 210 and/or to one or more components of the ESD control systems 200, 300. The first body portion 1010 may include a first fluid inlet 1040 for receiving fluid from the pump assembly 240. The first fluid inlet 1040 may include a fluid path 1041 disposed through the first body portion 1010 from a first end to a second end, adjacent to the first seat 1020. Second and third fluid inlets 1042, 1045 (the third fluid inlet 1045 being disposed through the first seat 1020) may optionally be provided to receive fluid from the pump assembly 240. As illustrated, the optional second and third fluid inlets 1042, 1045 are plugged with one or more sealing members, but include fluid paths that are in communication with the fluid path 1041 of the first fluid inlet 1040. The first body portion 1010 may also include a first fluid outlet 1050 for directing fluid to the actuator of the surface and/or subsurface safety valves 120, 130 to actuate the valves. The first fluid outlet 1050 may also include a fluid path 1051 disposed through the first body portion 1010 from a first end to a second end, adjacent to the second seat 1030. The first body portion 1010 may further include a fluid path 1052 that extends from the first seat 1020 to the second seat 1030 to provide fluid communication between the first fluid inlet 1040 and the first fluid outlet 1050. The gate 1055 may be disposed in the fluid path 1052 between the first and second seats 1020, 1030 to control fluid communication between the first fluid inlet 1040, the first fluid outlet 1050, and a first relief outlet 1060 of the second seat 1030 as described below. One or more machining holes 1051, 1052 (illustrated as being plugged) may be formed in the first body portion 1010 to form the fluid paths disposed through the body as described herein.

[0075] During operation, fluid may flow through at least one of the fluid inlets 1040, 1042, 1045 past the gate 1055 that is disposed within the fluid path 1052 of the first body portion 1010 between the first and second seats 1020, 1030, and then through the fluid outlet 1050. While fluid is flowing through the valve assembly 1000 to the actuators of the valves 120 and/or 130, the pressure in the first body portion 1010 forces the gate 1055 to seal off communication with the first relief outlet 1060. The first relief outlet 1060 provides fluid communication to the fluid reservoir 250, to

dump the fluid in the first body portion 1010 and the valve actuators when desired during operation. A second relief outlet 1070 may also be provided to quickly release fluid from the first body portion 1010 and the valve actuators. The second relief outlet 1070 may include a fluid path 1071 that intersects the fluid path 1041 of the first fluid inlet 1040, but which includes an in-line relief valve to release fluid from the fluid paths to the fluid reservoir 250 in the event that the pressure in the first body portion 1010 exceeds a pre-determined pressure. A pressure switch port 1019 may be disposed through the first body portion 1010 that intersects the fluid path 1051 of the first fluid outlet 1050. The pressure switch port 1019 may be used as a means to communicate the pressure in the first body portion 1010 to one or more sensors/transducers that are in communication with the ESD control systems 200, 300 and/or the controller assemblies 220, 320. Using the pressure measured by the sensors/transducers via the pressure switch port 1019, the controller assemblies 220, 320 may selectively control, e.g. turn on and off, the pump assemblies 240, 340 to actuate the valves 120, 130 as described herein.

[0076] The second body portion 1015 may include a fluid control outlet 1090 that directs flow from the fluid path 1041 of the first fluid inlet 1040 via a fluid path 1091 to a control valve assembly, such as a solenoid valve assembly. The solenoid valve assembly may also be in communication with the controller assemblies 220, 320 to control operation (e.g. open and close) of the valve assembly 1000 to thereby control actuation of the valves 120, 130 as desired. The second body portion 1015 may further include a second fluid control outlet 1080 to release fluid from the fluid paths in the second body portion 1015 via a fluid path 1081 and the control valve assembly to the fluid reservoir 250. When the control valve assembly is actuated to dump fluid pressure to the fluid reservoir 250, the pressure release in the fluid path 1041 of the first fluid inlet 1040 and the back pressure in the fluid path 1051 of the first fluid outlet 1050 may move the gate 1055 to a position within the first body portion 1010 where the fluid in the first body portion 1010 and the valve actuators is quickly released to the fluid reservoir 250 via the first relief outlet 1060, the second relief outlet 1070, and/or the second fluid control outlet 1080. In this manner, the valve assembly 1000

may be selectively used to supply and maintain fluid in one or more valve actuators of the valves 120, 130, and to selectively release and dump fluid from the valve actuators to the fluid reservoir 250.

[0077] Figure 13 illustrates the ESD control system 700 according to one embodiment. Embodiments of the ESD control system 700 described herein may be applicable to the ESD control system 300. For convenience, the components in the ESD control system 700 that are similar to the components in the ESD control system 200 will be labeled with the same number indicator. The ESD control system 200 may include the housing 730 for supporting the controller assembly 220, the power source 230, a compressor (or fluid drive) assembly 740, a check valve 715, a pressure switch 710, a filter/dryer assembly 705, and the solar panel assembly 270. In one embodiment, the controller assembly 220 and/or any of the other components may be disposed external to and/or adjacent to the housing 730.

[0078] The ESD control system 700 may be “self-contained” or “stand-alone unit,” which means that the ESD control system 700 does not depend on any external pneumatic, hydraulic, mechanical, or electrical sources for its operation to shut down the oil/gas well. In other words, the power source 230, the compressor assembly 740 and other components are within the housing 730 and thus the ESD control unit 700 is an integral portable unit. For example, if there is a rupture of a production flow line downstream from the surface safety valve 120, and/or if there is a loss of well pressure at the subsurface safety valve 130, the ESD control system 700 is operable to effectively close the safety valves 120, 130, thereby shutting in the oil/gas well, and alert the appropriate personnel that a shut-in has occurred without the assistance of any additional external power sources, such as external compressors or motors.

[0079] The ESD control system 700 may also include one or more transducers/devices 280, 282, 284, 286, and 288 for monitoring and/or measuring one or more physical properties as described herein. The ESD control system 700 may be configured to control one or more valves, such as flow control valves or

choke valves that are in communication with the flow lines of the valves 120, 130 to control fluid flow through the wellhead control system 100. The ESD control system 700 may also include a quick dump valve 725 in line 211. The quick dump valve 725 is a manual valve that is configured to exhaust pneumatic fluid to an area outside of the housing 730. Additionally, the check valve 715 may be located in the line 211. The check valve 715 is a valve that allows fluid flow in one direction, from the compressor assembly 744 to the valve 120, and restricts fluid flow in the opposite direction.

[0080] The housing 730 may include any structural support member, such as an explosion-proof container, for protecting the components stored therein from damage and environmental elements. Appropriate ventilation of the housing 730 may be provided by ventilation holes and/or an independent solar powered fan mounted in or through the housing 730. The housing 730 may further include an access panel or door for ease of access to the housing's interior, and may be configured for attachment to the tree 110 or the respective surface and subsurface safety valve 120, 130. In one embodiment, the structural components of the ESD control system 700, to the extent possible, may be made from stainless steel. The controller assembly 220 may be disposed in the housing 730 and may include a microprocessor unit 222, a display screen 224, and a keypad 226. In one embodiment, the controller assembly 220 may be weather-proof, and may be intrinsically safe to provide power as necessary to one or more components of the ESD control system 700. The microprocessor unit 222 may include a programmable logic controller, including a supervisory control and data acquisition system (SCADA) that is in communication with the one or more transducers/devices 280, 282, 284, 286, and 288, as well as the compressor assembly 740 and valve assemblies 710, 720.

[0081] In one embodiment, the compressor assembly 740 may include an intrinsically safe motor 742 and a compressor 744, which may each be located in the explosion-proof housing 730. As set forth herein, the compressor assembly 740 may supply pneumatic fluid from a location outside the housing 730 to actuate the safety

valve 120, 130 to which it is connected. The pneumatic fluid may be ambient fluid, such as air, outside the housing 730. In one embodiment, the compressor assembly 740 may have multiple compressors and/or motors in parallel.

[0082] In one embodiment, the pneumatic fluid may be supplied from an optional reservoir 735 located outside of the housing 730. The reservoir 735 may be connected to the filter/dryer assembly 705 for supplying fluid to the compressor assembly 740. The reservoir may also be connected to the valve assembly 720 and/or valve 725 for receiving fluid exhausted from the system. The reservoir 735 may include a level gauge, such as a sight glass, to indicate the level of fluid in the reservoir 735. The reservoir 735 may also include a level sensor that is in communication with the controller assembly 220 and is operable to monitor in real-time the level of fluid in the reservoir 735. In the event that the level of fluid falls below a predetermined limit (e.g. pre-set limit), due to evaporation of the fluid for example, the level sensor may provide an alarm to alert an operator on-site at the wellhead control system 100 and/or at the remote location via the controller assembly 220 and the computer system 150. The controller assembly 220 may automatically shut in the wellhead control system 100 upon receiving a signal from the level sensor.

[0083] As set forth herein, the signal from the pressure transducer 280 may be recorded and/or communicated to the computer system 150 via the controller assembly 220 to provide real-time monitoring of the pressure in the flow line 135. The measured pressure may be displayed on the display screen 224 and/or on a display screen of the computer system 150. In response to the comparison of the measured pressure to one or more predetermined conditions, the controller assembly 220 may be configured to operate the respective safety valve 120, 130 to which it is connected. For example, the controller assembly 220 may be used to direct the compressor assembly 740 to supply pneumatic fluid, such as ambient air, to the surface safety valve 120 to open the valve. Upon receiving the signal from the controller assembly 220, the valve assembly 720 may be configured to open a circuit

defined by lines 211, 215 between the surface safety valve 120 and the filter/dryer assembly 705 to allow the compressor assembly 740 to direct fluid from the fluid entering the filter/dryer assembly 705 to the surface safety valve 120, thereby opening the surface safety valve 120. The surface safety valve 120 may be maintained in the open position while the pressure transducer 280 continuously monitors the pressure in the flow line 135. The controller assembly 220 may be programmed to close the surface safety valve 120 upon receiving a signal from the pressure transducer 280 that corresponds to a pressure measurement that is greater than or less than a pre-set pressure range. The pre-set pressure range may be input into the controller assembly 220 by manual entry using the keypad 226 and the display screen 224. The pre-set pressure range may also be input into the controller assembly 220 remotely from the computer system 150. When the signal is received from the pressure transducer 280 that the pressure in the flow line 135 falls outside of the pre-set pressure range stored in the microprocessor unit 222, the controller assembly 220 may automatically direct the compressor assembly 740 to stop supplying pressurized fluid to the surface safety valve 120 and/or allowing the valve assembly 720 to exhaust the pneumatic fluid, thereby closing the surface safety valve 120. Continuous real-time monitoring of the pressure in the flow line 135 may be used to verify that the surface safety valve 120 has been closed.

[0084] Power may be provided to the controller assembly 220 and the compressor assembly 740 from the power source 230. The power source 230 may be operable to provide a low current (amp) stream to the controller assembly 220 and/or the compressor assembly 740. The controller assembly 220 is configured to control the pressure switch 710, which can be visually inspected to monitor the pressure in the line 211. In one embodiment, the pressure switch 710 may be configured to shut off the compressor assembly 740 when the pressure in the actuator of the safety valves 120, 130 reaches a predetermined pressure setting.

[0085] Figure 14 illustrates a well control system 800 at a wellsite for conducting a wellbore operation, such as a fracturing operation. The well control system 800 may

be configured with one or more of the control systems 200, 300, 700 as described herein. The well control system 800 includes a fluid supply 810, such as a reservoir or tank, or a vehicle comprising a storage tank for storing fluid. A pump 820, or other fluid drive assembly, is provided for pumping fluid from the fluid supply 810 to a well. In particular, fluid from the fluid supply 810 is pumped through flow or fluid line 811 to a manifold 830, which directs the pressurized fluid to one or more wellheads 840, 841, 842, 843 via fluid lines 831, 832, 833, 834, respectively. As illustrated, the wellhead 840 may control the pressurized fluid flow into a well 850 that intersects a formation 860 for conducting a fracturing operation as conventionally known in the art.

[0086] A fluid line 812 is in fluid communication with the fluid line 811 at a location downstream of the pump 820. The fluid line 812 may also be in fluid communication with the fluid supply 810 or with any other fluid reservoir type assembly. The safety valve 120 is in-line with the fluid line 812 for controlling fluid flow from the fluid line 811 to the fluid supply 810. The safety valve 120 may be configured as a fail-safe open relief valve or a fail-safe close safety valve, and is operable using one or more of the control systems 200, 300, 700. The safety valve 120 is operable using a pneumatic/hydraulic working fluid, which may be supplied from a fluid reservoir internal or external of the control systems 200, 300, 700 (as described herein) and/or from the fluid supply 812 directly or via one of the fluid lines. The transducer 280, such as a pressure transducer, measures the pressure in the fluid line 812 and communicates the measured characteristic to the controller assemblies of the control systems 200, 300, 700, which compare the measured characteristic to one or more predetermined conditions. The computer system 150 enables remote monitoring, control and operation of the safety valve 120 using the control systems 200, 300, 700 as described herein.

[0087] In one embodiment, one or more fluid lines 812 may be provided for fluid communication between fluid lines 811, 831, 832, 833, 834 (including the manifold and/or wellheads) and the fluid supply 810 or other fluid reservoir. In one

embodiment one or more safety valves 120 and/or control systems 200, 300, 700 may be provided in-line with one or more of the fluid lines 811, 831, 832, 833, 834 (including the manifold and/or wellheads). In one embodiment, one or more transducers 280 may be provided for measuring physical properties (e.g. pressure, temperature, flow rate, flow volume, etc.) of one or more of the fluid lines 811, 831, 832, 833, 834 (including the manifold and/or wellheads).

[0088] In operation, the pump 820 may be actuated to pump fluid from the fluid supply 810 to the manifold 830 via fluid line 811. The safety valve 120 may be actuated into a closed position using a working fluid as directed by the control systems 200, 300, 700 to prevent or substantially restrict fluid flow through fluid line 812. The pressurized fluid may therefore be directed from the manifold 830 to the wellheads 840, 841, 842, 843 via fluid lines 831, 832, 833, 834 for conducting a fracturing operation, such as in well formation 860. The safety valve 120 may be continuously monitored remotely using the computer system 150. The transducer 280 may also continuously monitor and measure physical properties, such as fluid pressure, in fluid line 811 and communicate the measured physical properties to the control system 200, 300, 700 for comparing to one or more predetermined conditions. In the event that the pressure in the fluid line 811 exceeds a predetermined condition (as programmed into the controller assembly of the control system), the control system is operable to release the working fluid from maintaining the safety valve 120 in the closed position, and the safety valve 120 is operable to automatically move into the open position (such as by spring 418 or other biasing member) to relieve the pressure in the fluid line 811 and dump the pressurized fluid back into the fluid supply 810 or other reservoir via fluid line 812. The well control system 800 is therefore operable to prevent over pressurization or other conditions of the fluid lines 811, 831, 832, 833, 834 (including the manifold and/or wellheads) that can lead to failure.

[0089] After any remedial operations necessary to remove any restriction to flow to the wellheads, the control system 200, 300, 700 may be operable to actuate the safety valve 120 into the closed position to continue with one or more wellbore

operations. Advantages of the well control system 800 include the ability to relieve high fluid volume, flow, and pressure quickly, efficiently, and repeatedly to prevent failure of the wellbore system. Additional advantages include the ability to remotely monitor and control the system 800.

[0090] In one embodiment, the control system 200, 300, 700 may be configured to actuate the safety valve 120 at a predetermined condition, such as a set pressure, which is below the rated working pressure of one or more of the fluid lines, manifolds, and/or wellheads. In the event that the pressure in the fluid lines reach or exceed the predetermined set pressure (as measured by the transducer 280), the control system 200, 300, 700 will actuate the safety valve 120 into the open position to relieve the excessive fluid pressure. In one embodiment, the control system 200, 300, 700 may be configured with a predetermined condition, such as a reset pressure. For example, in the event of actuation of the safety valve 120 due to a failure, the control system 200, 300, 700 may prevent operation of the safety valve 120 back into the closed position until the transducer 280 measures the predetermined reset pressure in the fluid lines.

[0091] In one embodiment, the control system 200, 300, 700 may be configured to actuate the safety valve 120 in anticipation of a failure. For example, the control system 200, 300, 700 may include an electronic wave generator for generating a wave signal that corresponds to fluid flow volume, rate, pressure, etc., and which is monitored by the controller assembly for any changes or fluctuations that indicate a failure at one or more points in the well control system 800. In the event of an indication of failure, the control system 200, 300, 700 can operate the safety valve 120 for actuation into the open position.

[0092] In one embodiment, the control system 200, 300, 700 can monitor, track, and record the operation of the safety valve 120 and/or the transducer 280 measurements. In one embodiment, the control system 200, 300, 700 may be configured with one or more mechanical and/or electrical overrides for independent, manual, or direct operation of the safety valve 120. In one embodiment, a transducer

280 may be coupled to the safety valve 120 to monitor the working pressure within the valve actuator, which can help determine life of the valve, force required to actuate, and whether maintenance is required.

[0093] In one embodiment, the control system 200, 300, 700 may be configured to trigger or actuate one or more alarms or alerts (audio/visual) to indicate a potential or actual failure; that the safety valve 120 has been actuated; and/or one or more other conditions have been detected, such as H₂S (or other harmful gases), fire, and/or damage to the control system. In one embodiment, the alarms or alerts may be communicated through the computer system 150. In one embodiment, the control system 200, 300, 700 may be configured to prevent remote operation in the event that the safety valve 120 has been actuated, and may require manual re-setting of the system.

[0094] In one embodiment, the control system 200, 300, 700 may include a geographical positioning system for tracking the location of the control system and the safety valves, which may be displayed, monitored, and tracked using the computer system 100. In one embodiment, the control system 200, 300, 700 may store information related to a particular wellbore operation, including maintenance and operational history, employee contact information, and/or status of the safety valve. In one embodiment, the control system 200, 300, 700 may be configured to open and/or close the safety valve 120 within a predetermined time frame. In one embodiment, the control system 200, 300, 700 may be configured to actuate the safety valve 120 at one or more predetermined time intervals.

[0095] Figure 15 illustrates the well control system 800 according to one embodiment. The well control system 800 includes a gate valve 402 and a valve actuator 401, the operations of which are described above with respect to at least Figures 4-12. A pilot valve 870 (or other functionally similar type of mechanical, electrical, and/or hydraulic sensor) may be coupled to the valve actuator 401, and may be operable to control fluid communication between the valve actuator 401 and a fluid reservoir 875 via fluid line 872. A pump 876 may be provided to pump

actuator fluid from the reservoir 875 to the valve actuator 401 to actuate the valve 402 into the closed position.

[0096] Upon actuation of the pilot valve 870, the actuator fluid may be released from the valve actuator 401 back to the reservoir 875, such that the valve 402 may be automatically biased into the open position. The pilot valve 870 may be actuated by fluid pressure via fluid line 871, which is in communication with fluid line 811. In the event that fluid pressure directed to the wellheads 840-843 exceeds a predetermined amount, the fluid pressure will actuate the pilot valve 870 (via fluid line 871) to release the actuator fluid from the valve actuator 401 to the reservoir 875 (via fluid line 872), and thereby automatically bias the valve 402 into the fail safe open position to release the excessive fluid pressure back to the fluid supply 810 (via fluid line 812) as described above.

[0097] In one embodiment, the pilot valve 870 may operate as a check valve or one-way valve when in an un-actuated or first position, to allow actuator fluid to be pumped into the valve actuator 401 while preventing actuator fluid flow out of the valve actuator 401. When the pilot valve 870 is in an actuated or second position, actuator fluid may flow out of the valve actuator 401 to the reservoir 875. The pilot valve 870 may monitor and be in communication with the fluid pressure in any one of the flow lines 811 and 830-834. In one embodiment, the actuator fluid may be forced into the reservoir 875 by the biasing member 418 acting on the operating member 412 as described above.

[0098] While the foregoing is directed to embodiments of the invention, other and further embodiments of the invention may be devised without departing from the basic scope thereof, and the scope thereof is determined by the claims that follow.

Claims:

1. A control system for controlling fluid flow through a flow line at a wellsite, the control system comprising:
 - a fluid supply;
 - a first fluid line in fluid communication with the fluid supply;
 - a pump in fluid communication with the first fluid line and configured to pump fluid from the fluid supply to one or more wellheads through the first fluid line;
 - a second fluid line in fluid communication with the first fluid line at a location downstream of the pump and configured to return fluid from the first fluid line to the fluid supply or another reservoir;
 - a safety valve in-line with the second fluid line and having a gate normally maintained in a closed position to close fluid flow through the second fluid line;
 - a valve actuator configured to move the gate into the closed position by fluid supplied into the valve actuator and configured to move the gate into an open position by a biasing member disposed in the valve actuator;
 - an electronic controller assembly programmed with a predetermined condition and configured to receive a signal from a transducer connected to the first fluid line, wherein the signal corresponds to a measured physical property;
 - a valve assembly in communication with the controller assembly; and
 - a fluid drive assembly in communication with the controller assembly, wherein the controller assembly is operable to actuate the fluid drive assembly to supply fluid into the valve actuator to move the gate into the closed position, and wherein the controller assembly is operable to actuate the valve assembly in response to a comparison of the measured physical property to the predetermined condition to release the fluid from the valve actuator so that the biasing member moves the gate into the open position, forces the fluid out of the valve actuator, and thereby opens fluid flow through the second fluid line to return fluid in the first fluid line back to the fluid supply or another reservoir.

2. A control system for controlling fluid flow through a flow line at a wellsite, the control system comprising:

- a fluid supply;

- a first fluid line in fluid communication with the fluid supply;

- a pump in fluid communication with the first fluid line and configured to pump fluid from the fluid supply to one or more wellheads through the first fluid line;

- a second fluid line in fluid communication with the first fluid line at a location downstream of the pump and configured to relieve fluid from the first fluid line;

- a safety valve in-line with the second fluid line and normally maintained in a closed position to close fluid flow through the second fluid line;

- a valve actuator configured to move the safety valve into the closed position by fluid supplied to the valve actuator and configured to move the safety valve into an open position by a biasing member disposed in the valve actuator;

- an electronic controller assembly programmed with a predetermined condition and configured to receive a signal from a transducer connected to the first fluid line, wherein the signal corresponds to a measured physical property;

- a valve assembly in communication with the controller assembly; and

- a fluid drive assembly in communication with the controller assembly, wherein the controller assembly is operable to actuate the fluid drive assembly to supply fluid to the valve actuator to move the safety valve into the closed position, and wherein the controller assembly is operable to actuate the valve assembly in response to a comparison of the measured physical property to the predetermined condition to release fluid from the valve actuator so that the biasing member moves the safety valve into the open position, forces fluid out of the valve actuator, and thereby opens fluid flow through the second fluid line to relieve fluid from the first fluid line.

3. The system of claim 2, further comprising a housing for supporting the controller assembly, the valve assembly, and the fluid drive assembly.

4. The system of claim 3, wherein the fluid supplied into the valve actuator by the fluid drive assembly is supplied from a reservoir disposed outside of the housing.

5. The system of claim 2, wherein the fluid drive assembly is a compressor and the fluid is a pneumatic fluid.
6. The system of claim 2, wherein the fluid drive assembly is a pump and the fluid supplied into the valve actuator by the fluid drive assembly is a hydraulic fluid.
7. The system of claim 2, further comprising a power source for supplying power to the controller assembly, the valve assembly, and the fluid drive assembly.
8. The system of claim 2, further comprising a housing for supporting the fluid drive assembly, and a filter attached to the housing for filtering fluid entering the housing by the fluid drive assembly.
9. The system of claim 2, wherein the fluid supplied into the valve actuator by the fluid drive assembly is ambient air.
10. The system of claim 2, wherein the controller assembly is operable to communicate a signal corresponding to the measured physical property to a remote computer system.
11. The system of claim 2, wherein the controller assembly is a programmable logic controller.
12. The system of claim 2, wherein the measured physical property is pressure in the first fluid line.
13. A method for controlling fluid flow through a flow line at a wellsite, the method comprising:
 - providing a control system comprising:
 - a fluid supply;
 - a first fluid line in fluid communication with the fluid supply;

a pump in fluid communication with the first fluid line and configured to pump fluid from the fluid supply to one or more wellheads through the first fluid line;

a second fluid line in fluid communication with the first fluid line at a location downstream of the pump and configured to relieve fluid from the first fluid line;

a safety valve in-line with the second fluid line,

a valve actuator configured to actuate the safety valve,

an electronic controller assembly,

a fluid drive assembly, and

a valve assembly;

supplying fluid to the valve actuator using the fluid drive assembly to actuate the valve actuator to move the safety valve into a closed position;

maintaining the safety valve in the closed position to close fluid flow through the second fluid line;

monitoring a physical property in the first fluid line using the controller assembly; and

actuating the valve assembly using the controller assembly to release fluid from the valve actuator so that a biasing member disposed in the valve actuator moves the safety valve into an open position, forces fluid out of the valve actuator, and thereby opens fluid flow through the second fluid line based upon a comparison of the monitored physical property to a predetermined condition to relieve fluid from the first fluid line.

14. The method of claim 13, wherein the fluid supplied to the valve actuator by the fluid drive assembly is a pneumatic fluid disposed external to the housing, and further comprising filtering the pneumatic fluid as it enters the housing by the fluid drive assembly.

15. The method of claim 13, wherein the fluid supplied to the valve actuator by the fluid drive assembly is a hydraulic fluid disposed in a reservoir within the housing that is in fluid communication with the fluid drive assembly.

16. The method of claim 13, further comprising measuring the physical property using a transducer configured to communicate a signal corresponding to the measured physical property to the controller assembly.

17. The method of claim 13, wherein the fluid supplied to the valve actuator by the fluid drive assembly is a pneumatic fluid, and wherein the fluid drive assembly is a compressor.

18. The method of claim 13, wherein the fluid supplied to the valve actuator by the fluid drive assembly is a hydraulic fluid, and wherein the fluid drive assembly is a pump.

19. The method of claim 13, further comprising communicating a signal from the controller assembly to a remote computer system, wherein the signal corresponds to an operational characteristic of the safety valve.

20. The method of claim 13, further comprising actuating the safety valve by communicating a signal from a remote computer system to the controller assembly.

21. The method of claim 13, wherein the measured physical property is pressure in the first fluid line.

22. A control system for controlling fluid flow through a flow line that extends from a pump to a wellhead, the control system comprising:

a safety valve configured to relieve pressurized fluid from the flow line;

a valve actuator configured to actuate the safety valve between an open position and a closed position;

a transducer configured to measure pressure in the flow line;

an electronic controller assembly programmed with a predetermined condition and configured to receive a signal from the transducer corresponding to the measured pressure in the flow line;

a fluid drive assembly in communication with the electronic controller assembly, wherein the electronic controller assembly is configured to actuate the fluid drive assembly to supply fluid to the valve actuator to actuate the safety valve to the closed position; and

a valve assembly in communication with the electronic controller assembly, wherein the electronic controller assembly is configured to actuate the valve assembly in response to a comparison of the measured pressure to the predetermined condition to release fluid from the valve actuator to actuate the safety valve to the open position to relieve fluid from the flow line.

ABSTRACT OF THE DISCLOSURE

A safety valve control system may include a remotely operable control assembly, a first transducer, a valve assembly, and a compressor assembly in communication with the control assembly. The control assembly is operable to actuate the pump and valve assemblies to supply fluid to actuate the safety valve into open and closed positions, in response to one or more signals received from the first transducer. A method of operation may include maintaining the safety valve in an open or closed position while sensing a physical property with the control system; communicating a signal corresponding to the sensed physical property to the control system; and automatically closing or opening the safety valve in response to a comparison of the sensed physical property to a pre-set condition.

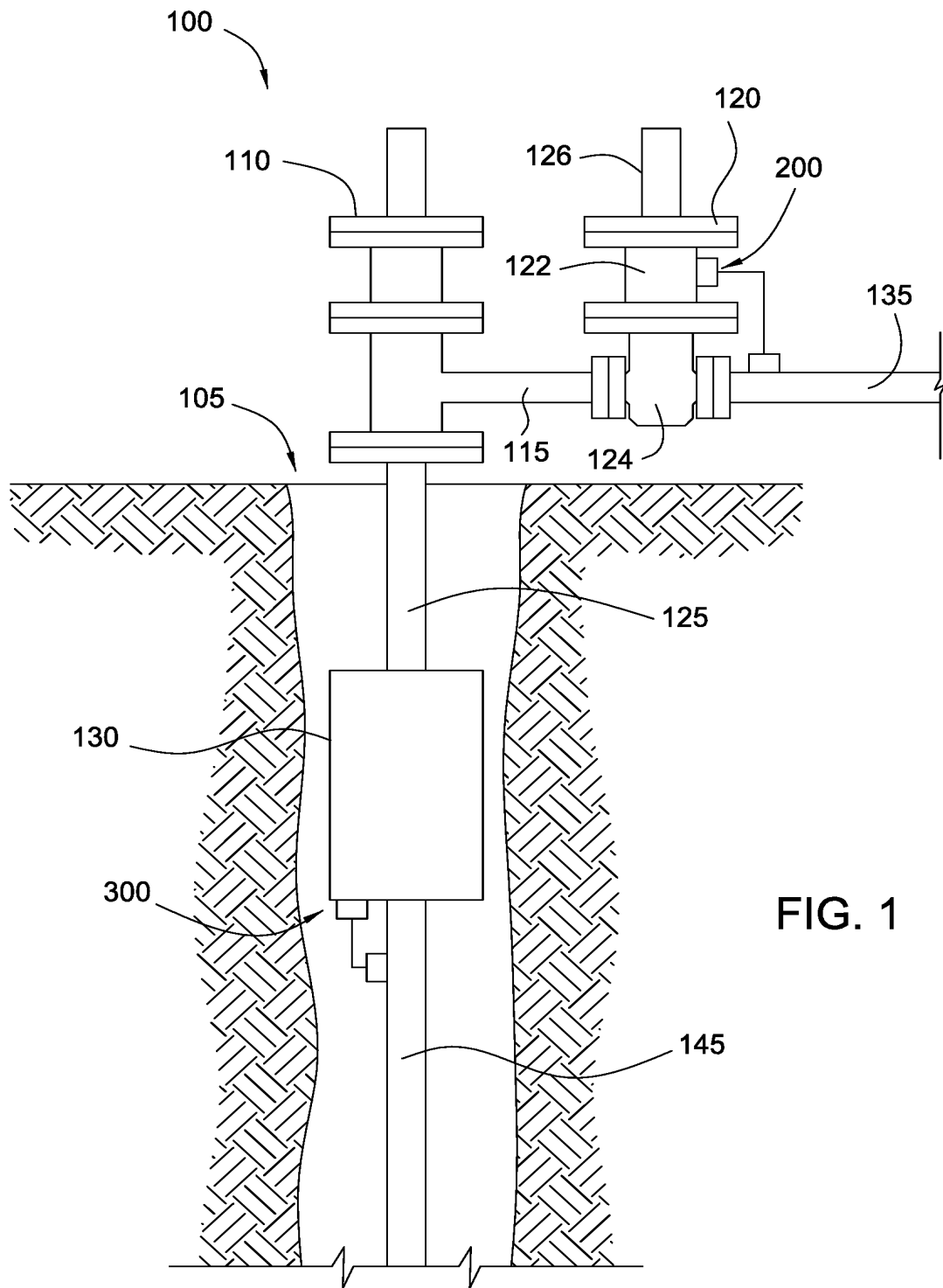


FIG. 1

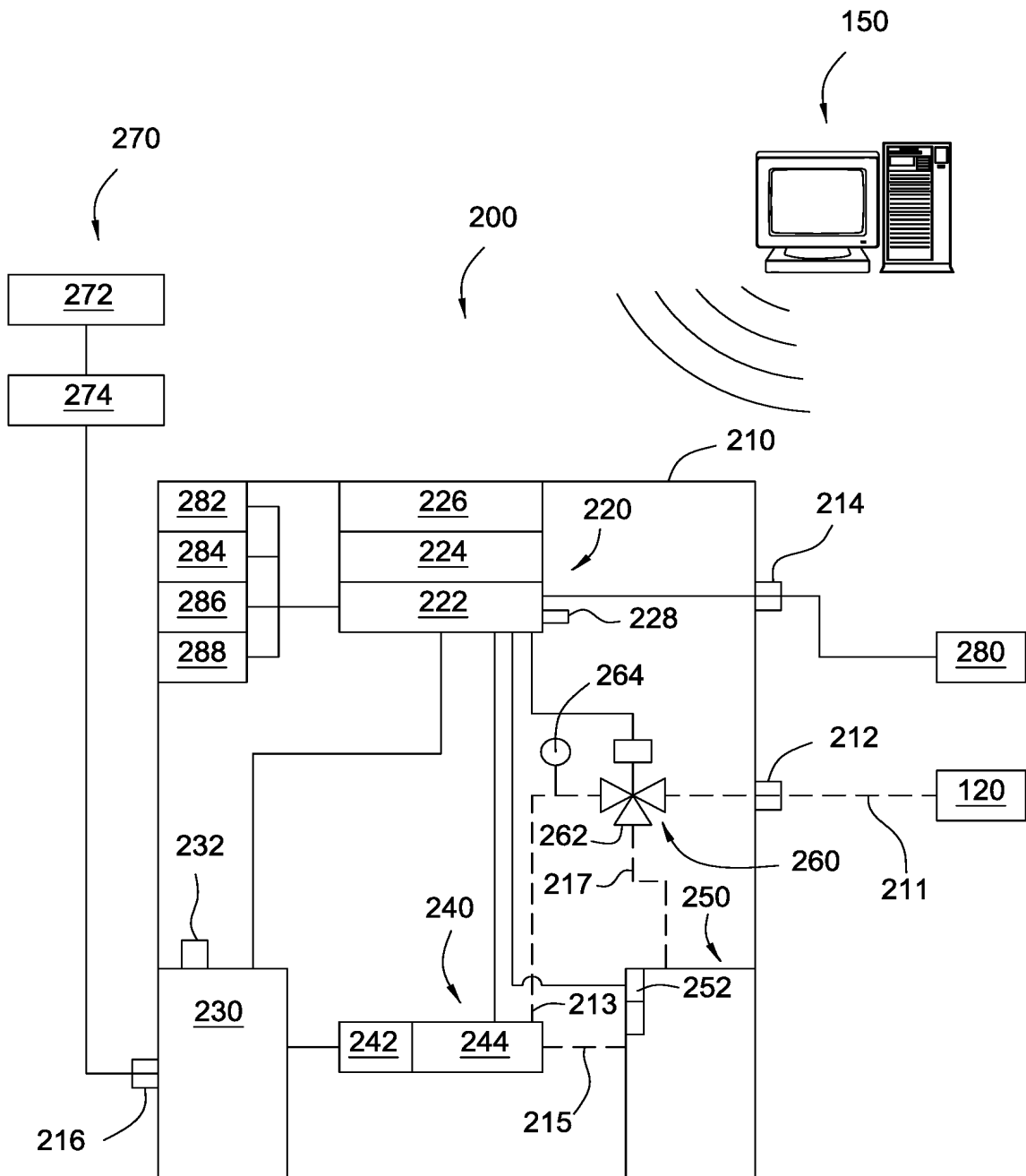
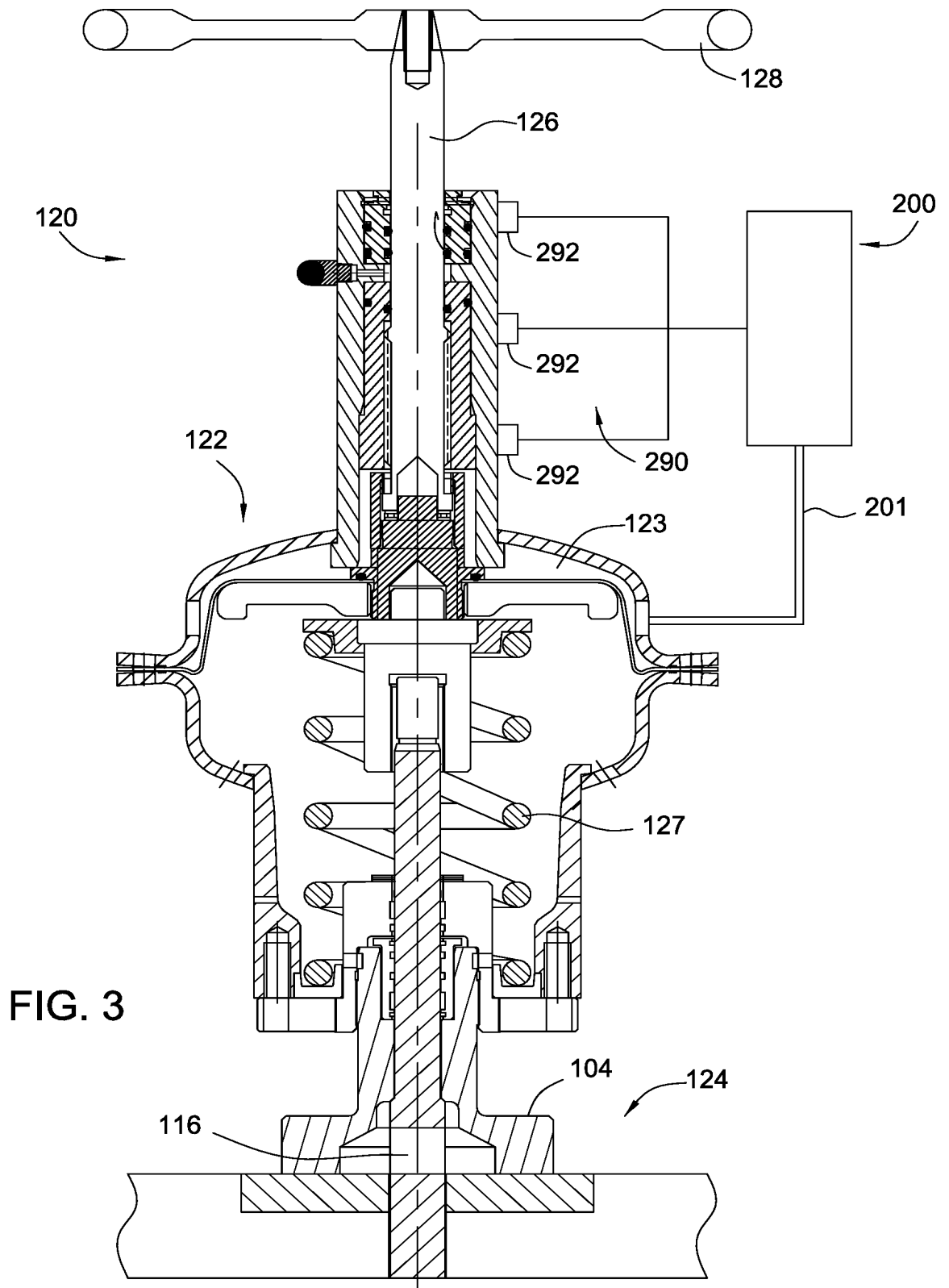
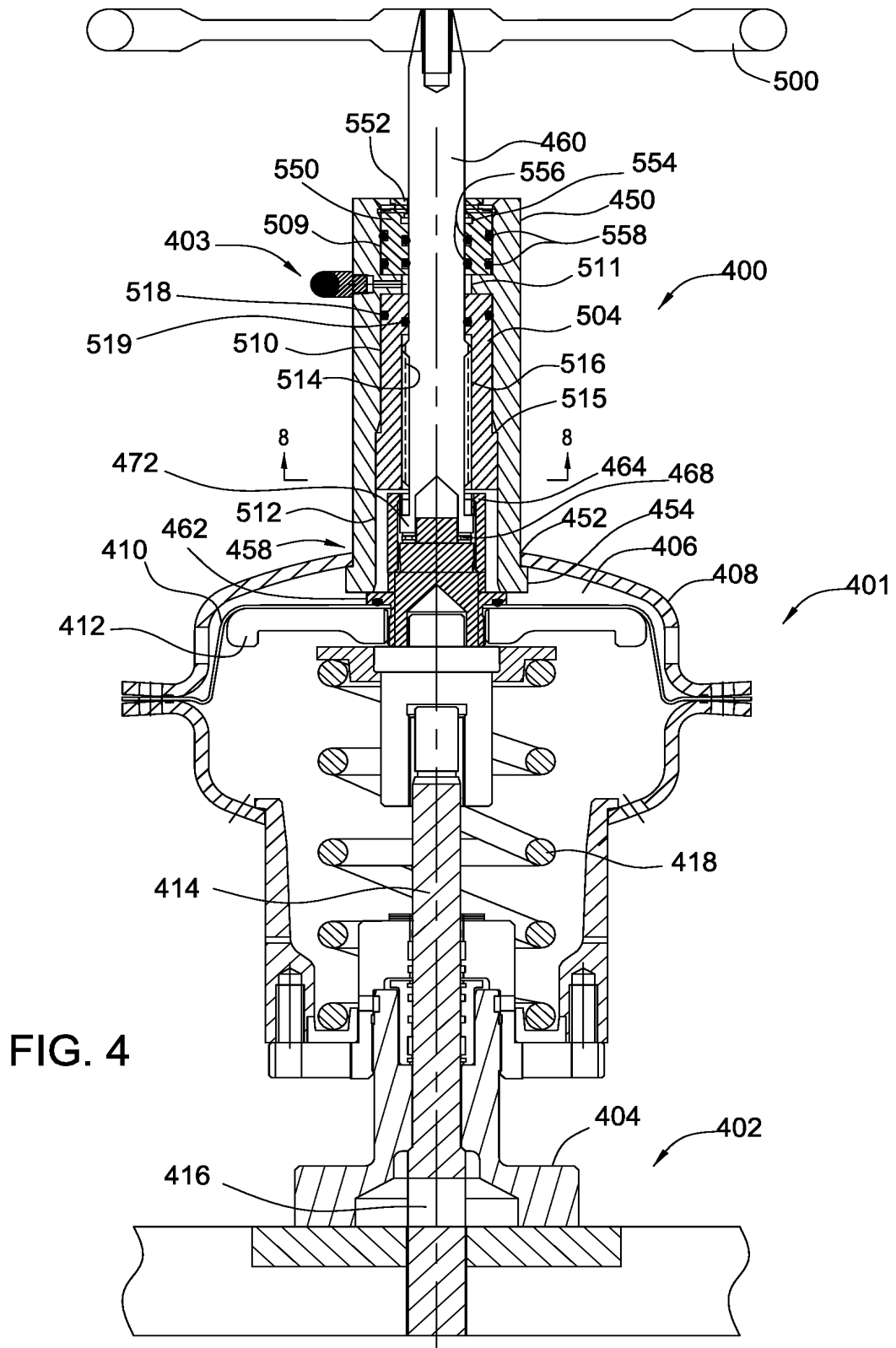
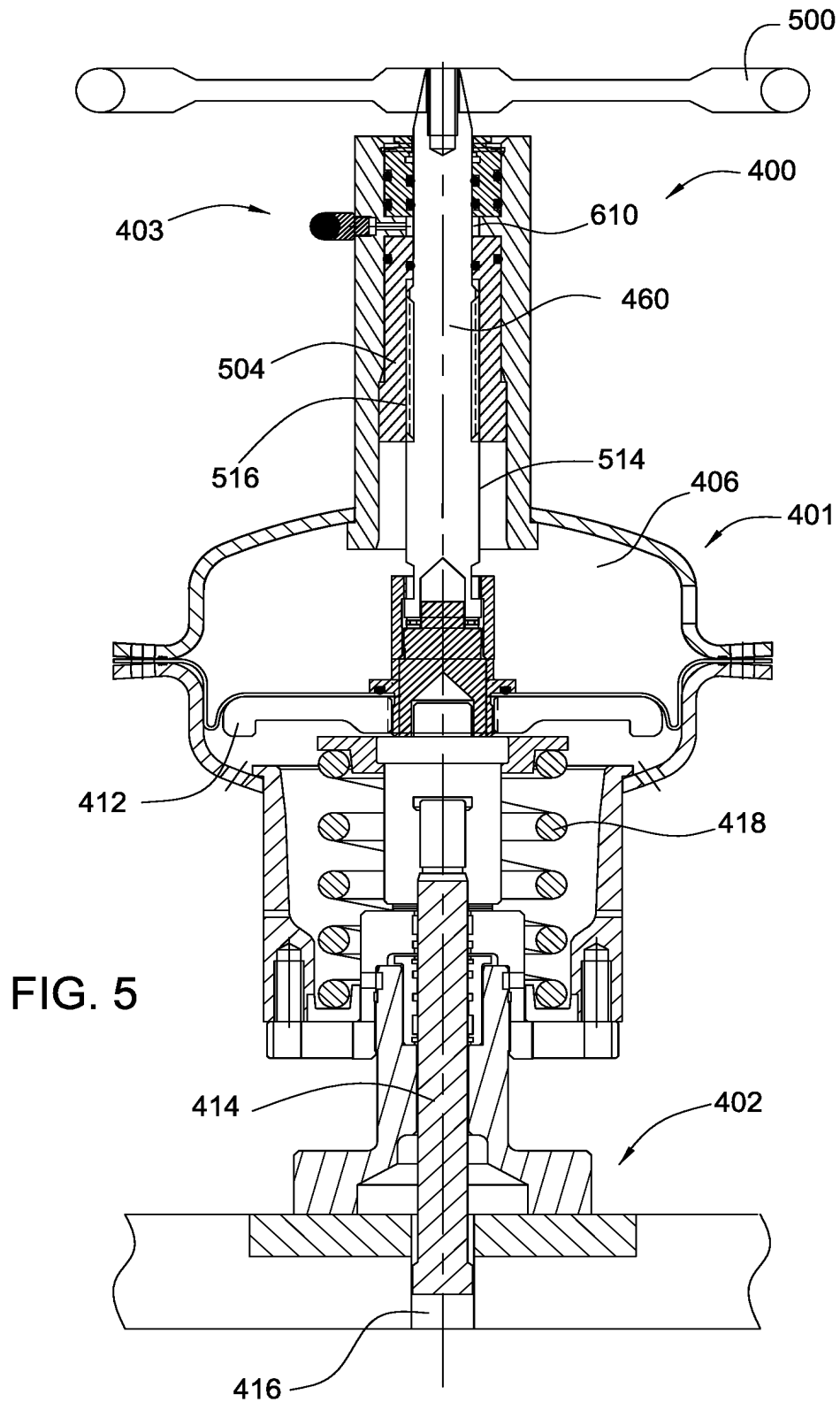


FIG. 2







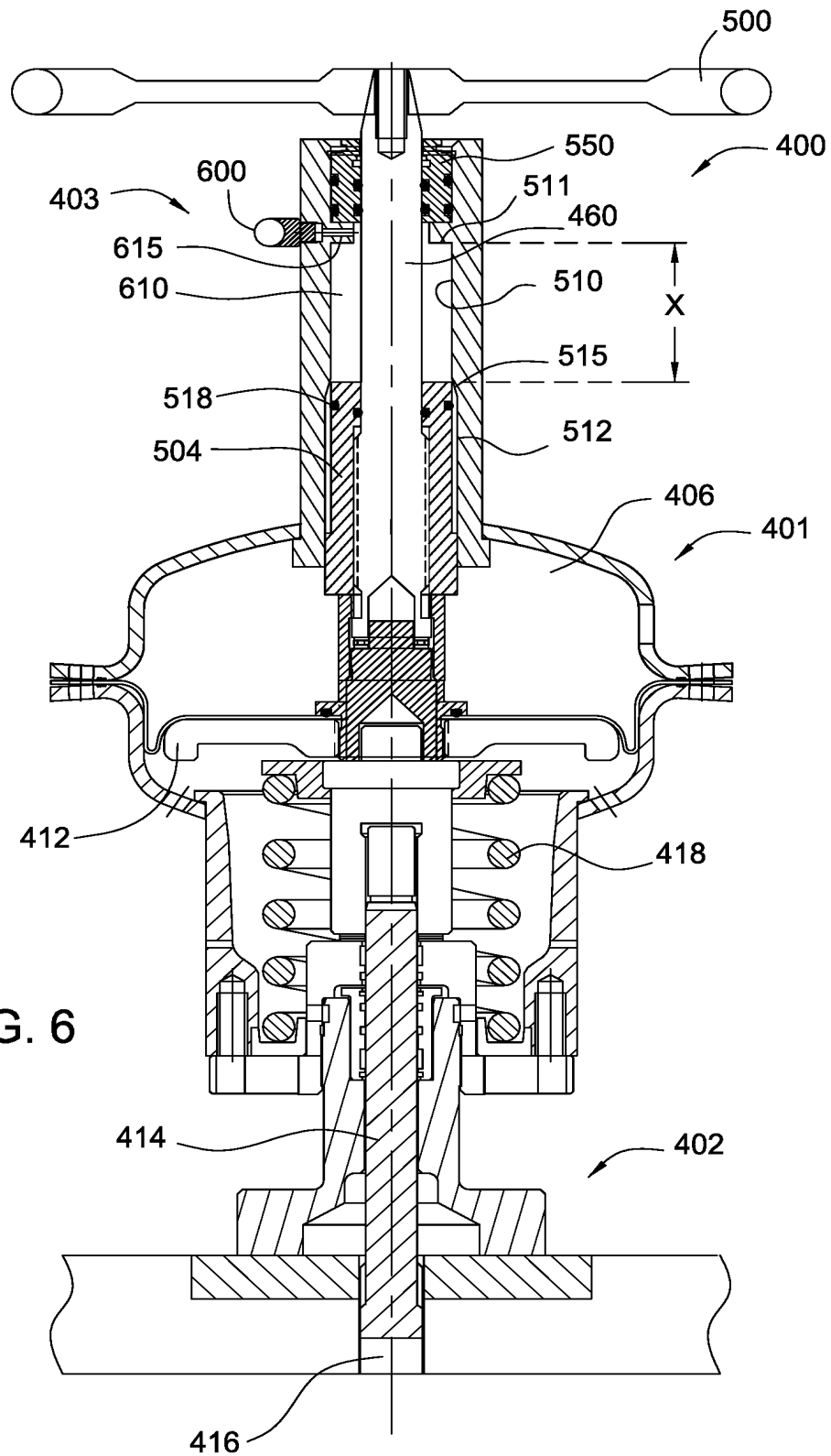
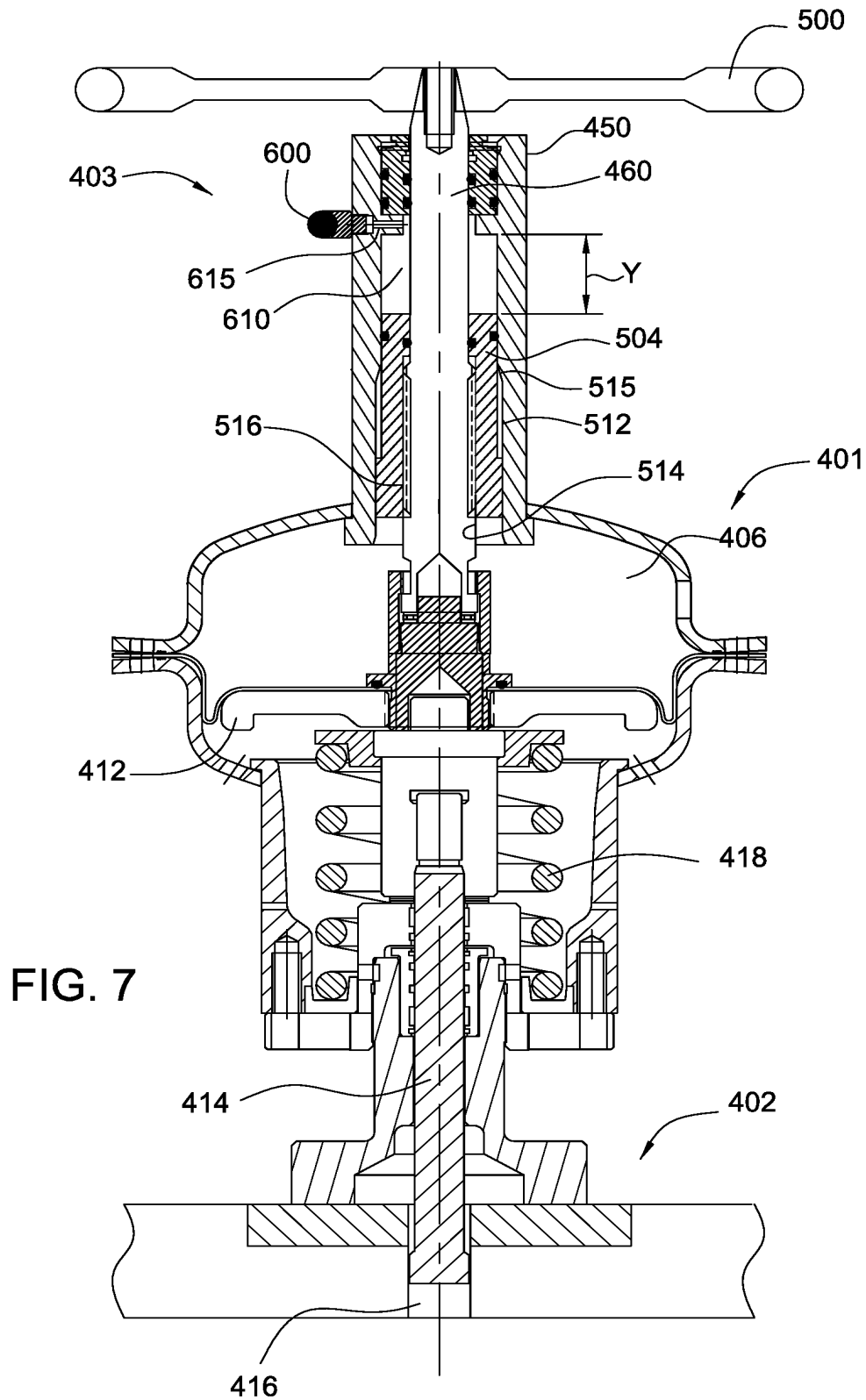


FIG. 6



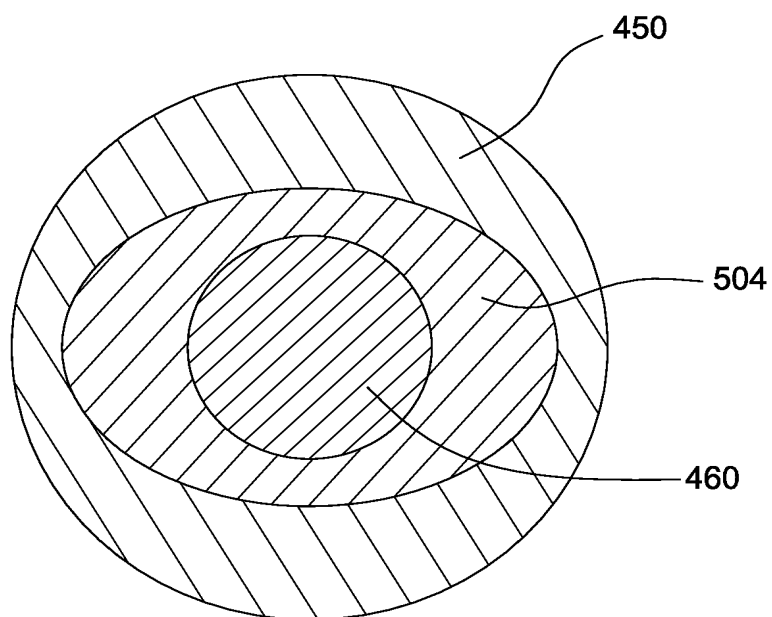


FIG. 8

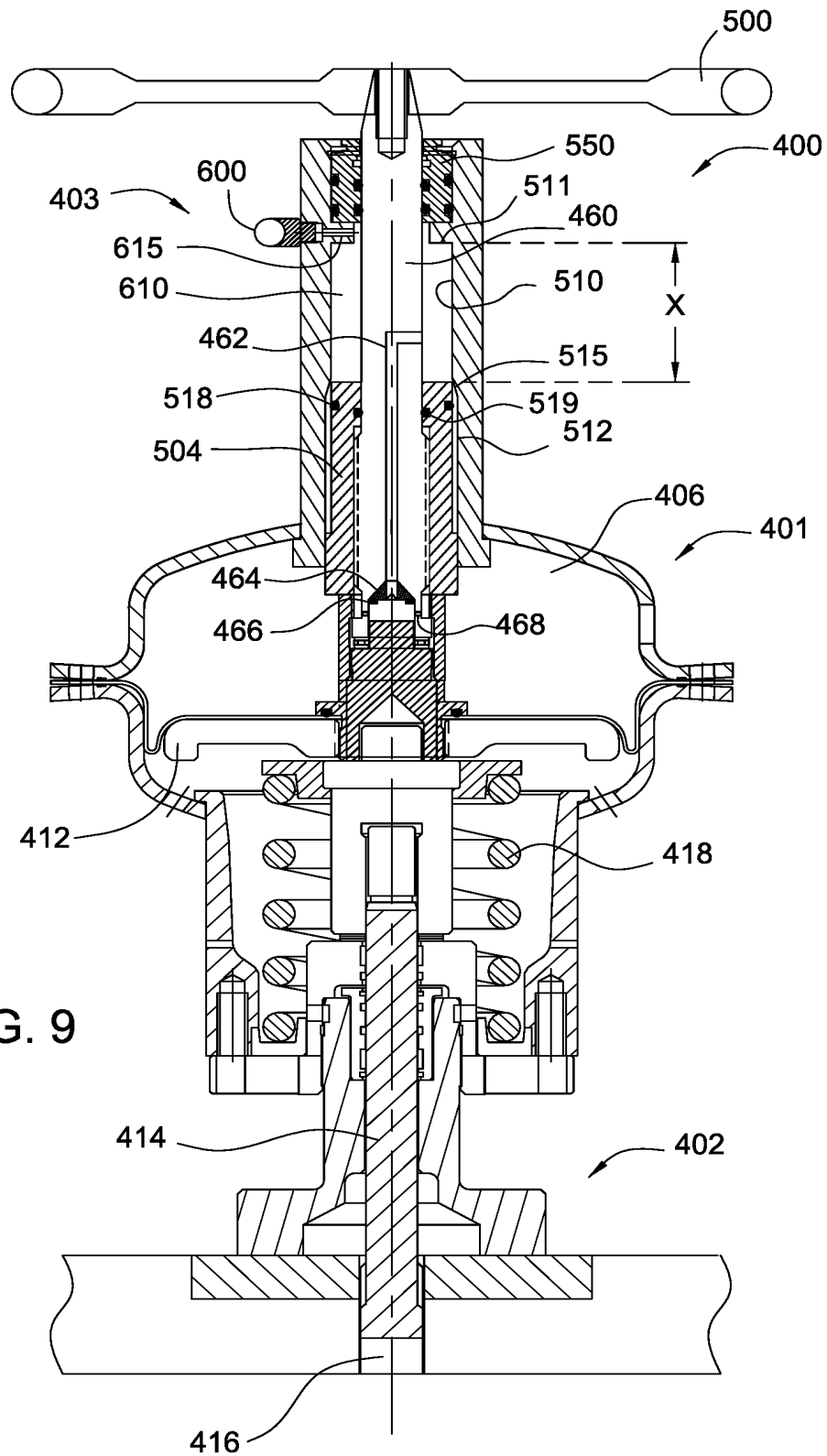
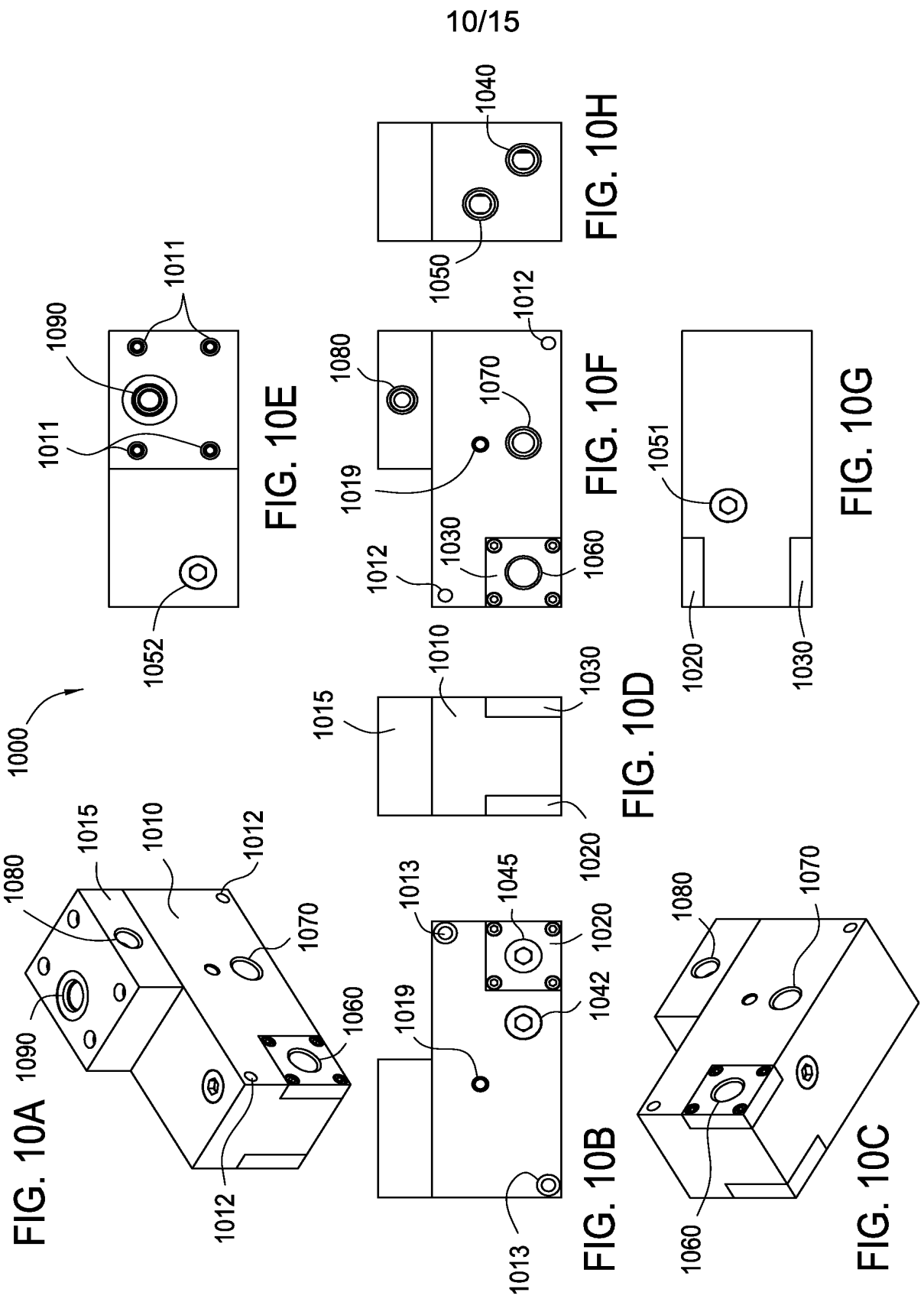


FIG. 9



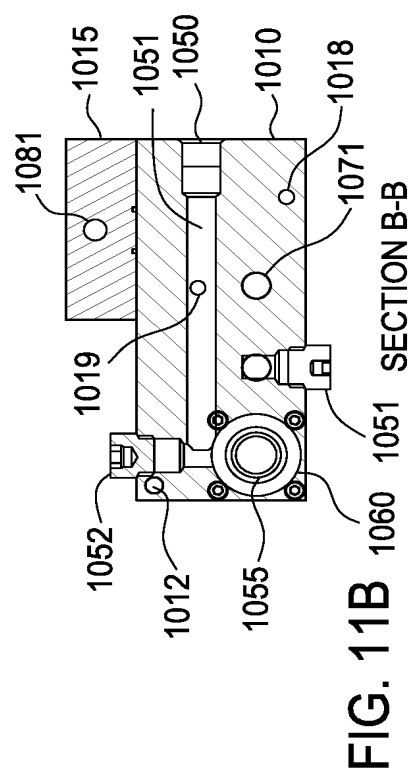
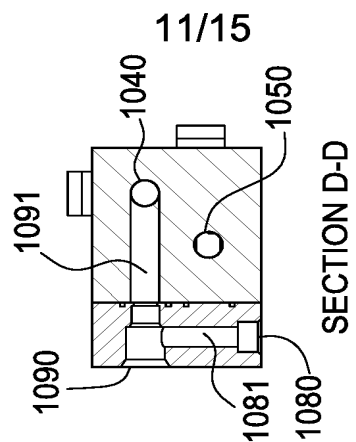
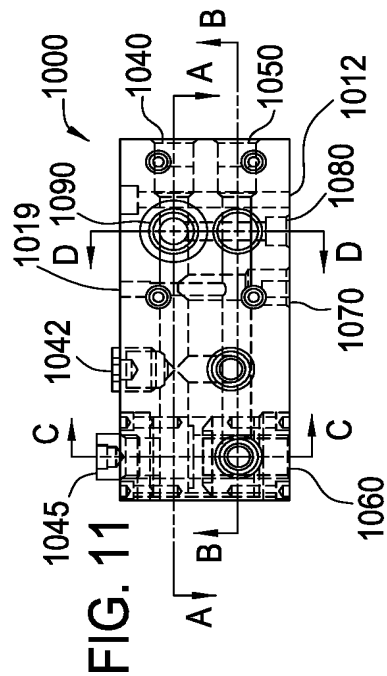
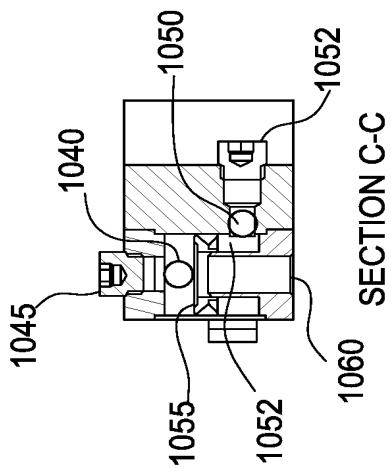
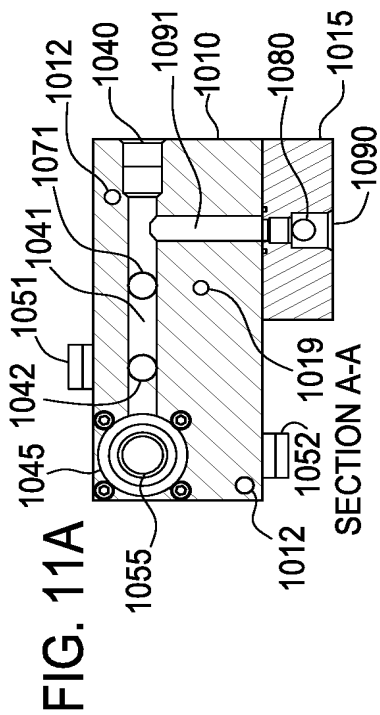
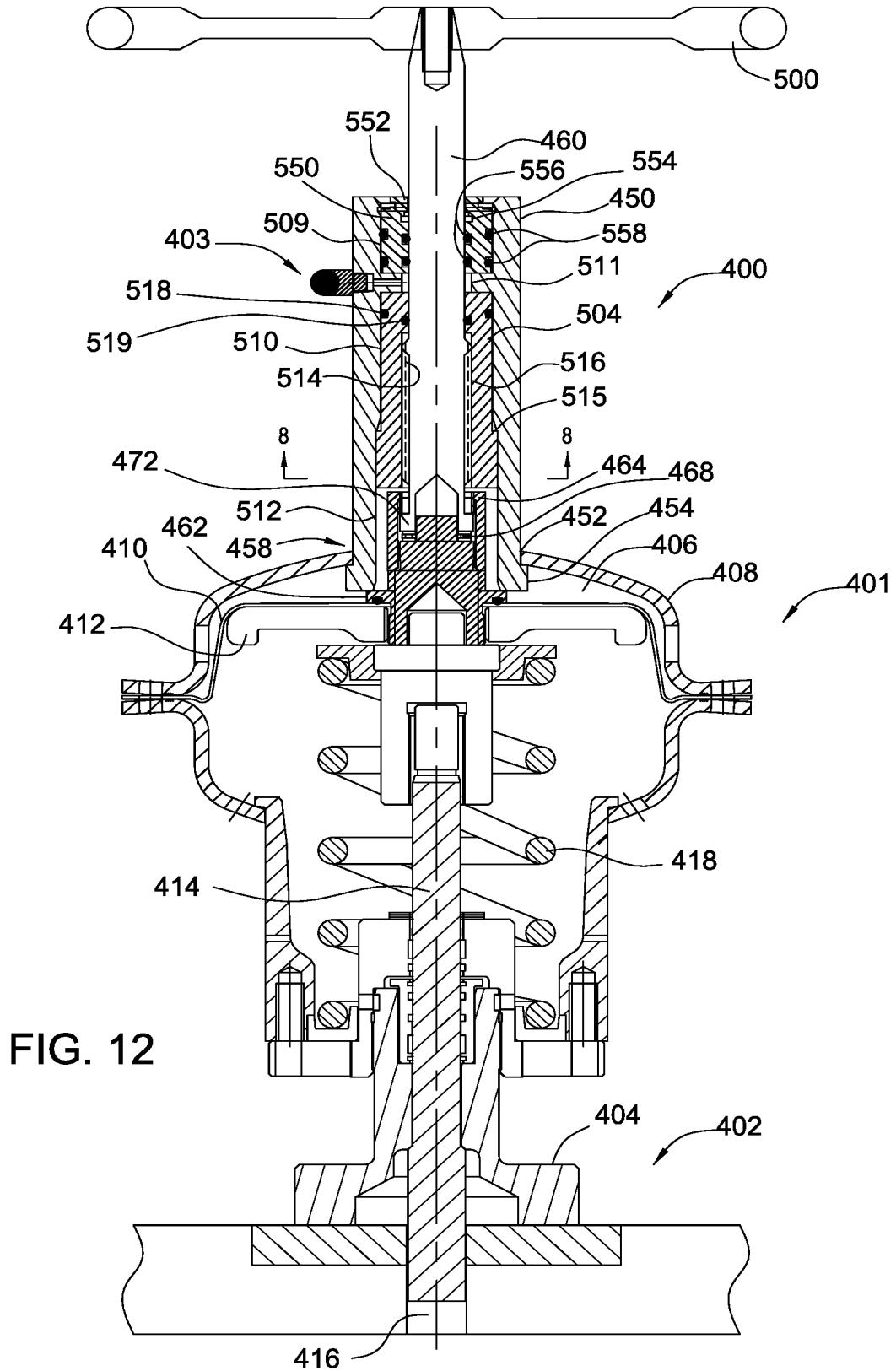


FIG. 11D

FIG. 11C





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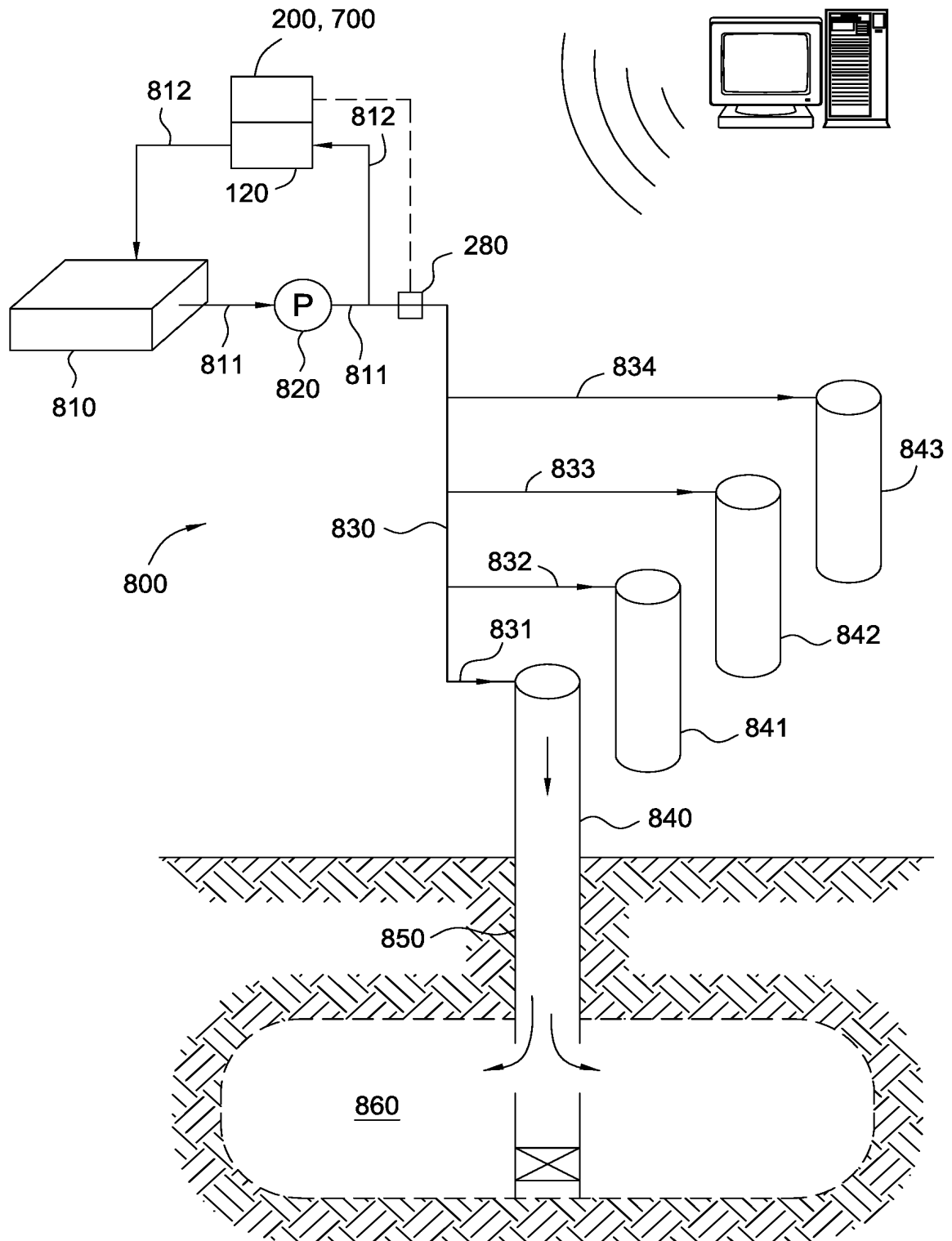


FIG. 14

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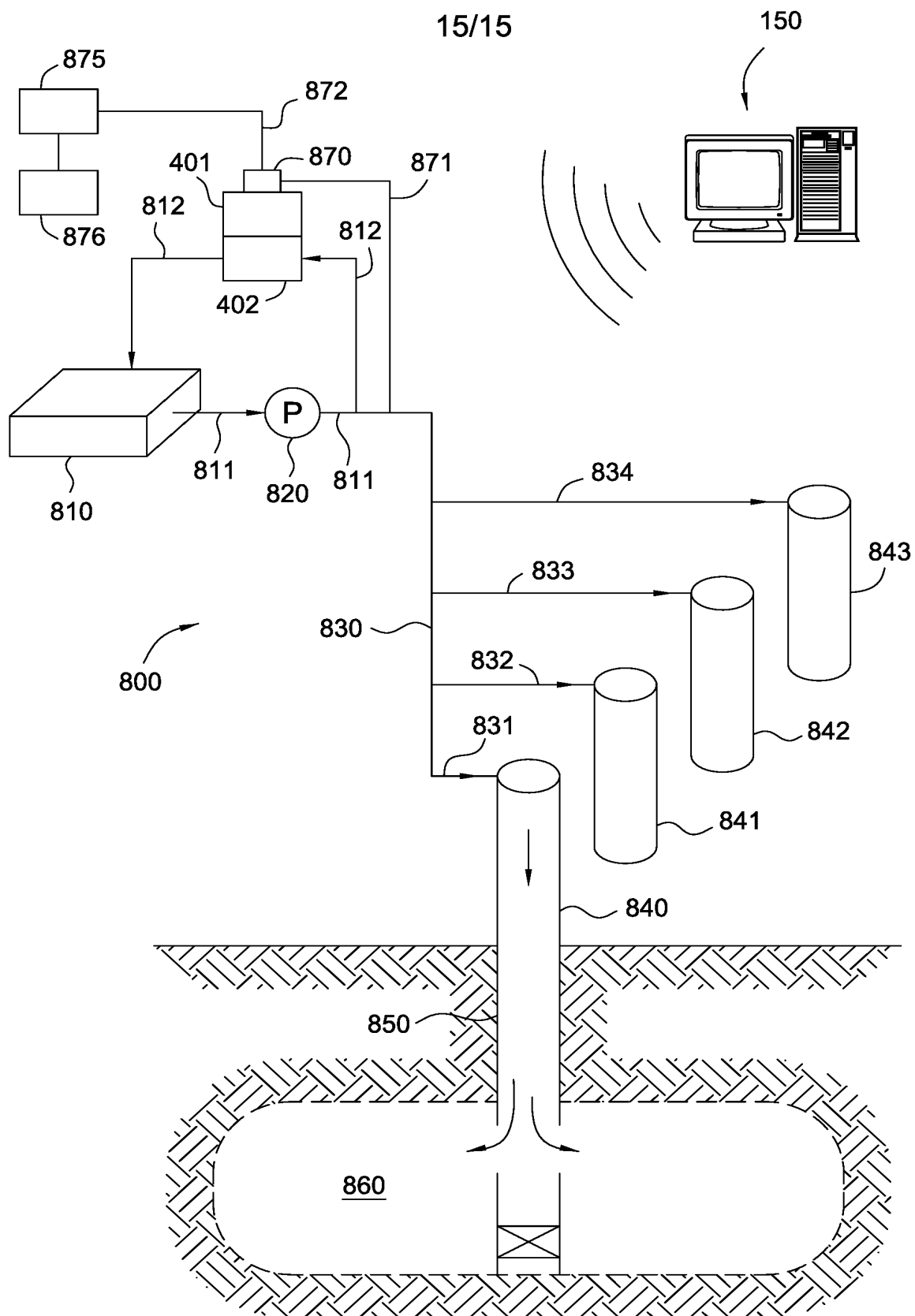


FIG. 15

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SAFO/0012USPC02
		Application Number	
Title of Invention	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE		
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.			

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☐ 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:

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For further information see 37 CFR 1.33(a).

KLX Energy Services LLC v. Safoco, Inc.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SAFO/0012USPC02
		Application Number	
Title of Invention	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE		

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

Customer Number	26290		
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Application Information:

Title of the Invention	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE		
Attorney Docket Number	SAFO/0012USPC02	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	15	Suggested Figure for Publication (if any)	14

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	26290		

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SAFO/0012USPC02
		Application Number	
Title of Invention	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE		

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	15/262642	2016-09-12
Prior Application Status	Patented	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
15/262642	Continuation of	13/480704	2012-05-25
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13/480704	Claims benefit of provisional	61/551319	2011-10-25
Prior Application Status	Abandoned	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13/480704	Continuation in part of	13/195662	2011-08-01
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13/195662	Claims benefit of provisional	61/415238	2010-11-18
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13/195662	Claims benefit of provisional	61/370721	2010-08-04
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SAFO/0012USPC02
		Application Number	
Title of Invention	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE		

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).

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	SAFO/0012USPC02
	Application Number	
Title of Invention	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE	

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SAFO/0012USPC02
		Application Number	
Title of Invention	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE		

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	Remove
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	SAFOCO, INC.	
Mailing Address Information For Applicant:		
Address 1	11421-A TODD ROAD	
Address 2		
City	Houston	State/Province TX
Country	US	Postal Code 77055
Phone Number		Fax Number
Email Address		
Additional Applicant Data may be generated within this form by selecting the Add button. Add		

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SAFO/0012USPC02
		Application Number	
Title of Invention	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE		

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.				
Remove				
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 ⁱ		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. Add				

Signature:[Remove](#)

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	/Jessie D. Herrera/		Date (YYYY-MM-DD)	2017-01-03
First Name	Jessie D.	Last Name	Herrera	Registration Number
				63,799
Additional Signature may be generated within this form by selecting the Add button. Add				

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SAFO/0012USPC02
		Application Number	
Title of Invention	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE		

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.**

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 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 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.

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE			
First Named Inventor/Applicant Name:	David LYMBEROPOULOS			
Filer:	Jessie D. Herrera/Stephanie Dominguez			
Attorney Docket Number:	SAFO/0012USPC02			
Filed as Small Entity				
Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	70	70
UTILITY SEARCH FEE	2111	1	300	300
UTILITY EXAMINATION FEE	2311	1	360	360
REQUEST FOR PRIORITIZED EXAMINATION	2817	1	2000	2000
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	2202	2	40	80
INDEPENDENT CLAIMS IN EXCESS OF 3	2201	1	210	210

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous-Filing:				
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				3090

Electronic Acknowledgement Receipt

EFS ID:	27958493
Application Number:	15397488
International Application Number:	
Confirmation Number:	1341
Title of Invention:	SAFETY VALVE CONTROL SYSTEM AND METHOD OF USE
First Named Inventor/Applicant Name:	David LYMBEROPOULOS
Customer Number:	26290
Filer:	Jessie D. Herrera/Stephanie Dominguez
Filer Authorized By:	Jessie D. Herrera
Attorney Docket Number:	SAFO/0012USPC02
Receipt Date:	03-JAN-2017
Filing Date:	
Time Stamp:	17:46:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 3090
RAM confirmation Number	010417INTEFSW17471300
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	TrackOne Request	SAFO_0012USPC02-Request_for_Prioritized_Examination.PDF	129929	no	2
			fd26fdc53deb5942ce51b3365365c8271f693a0c		
Warnings:					
Information:					
2		SAFO_0012USPC02_Specification.pdf	170341	yes	50
			7d0d6fc356f78ad2f1a4b0e6efa4da2611e8678f		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	43	
	Claims		44	49	
	Abstract		50	50	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	SAFO_0012USPC02_Drawings.PDF	473556	no	15
			419872a2082bcf6ab0f975175ffdf884fca02d96		
Warnings:					
Information:					
4	Application Data Sheet	SAFO_0012USPC02_ADS.PDF	1823220	no	9
			c9f06dd311a35b5af57c03bdd9f77a28ebc7796e		
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	43294	no	2
			29ea3e861576294451ba72eff0be8f3f4cc50263		
KLX Energy Services LLC v. Safoco, Inc.					

Warnings:	
Information:	
Total Files Size (in bytes):	2640340
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.	