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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
62/577,056	10/25/2017		260	047158.100032		

CONFIRMATION NO. 1561

FILING RECEIPT

132858
Hogan Lovells US LLP
609 Main Street
Suite 4200
Houston, TX 77002



0000000093448118

Date Mailed: 11/15/2017

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. 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)

Jared Oehring, Houston, TX;
Alexander James Christinzio, Houston, TX;
Brandon N. Hinderliter, Houston, TX;

Applicant(s)

U.S. Well Services, LLC, Houston, TX

Power of Attorney:

Taylor Evans--60506

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: 11/14/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 62/577,056**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

AUTOMATED FRACTURING PUMP SYSTEM

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).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

Provisional Application for Patent Cover Sheet					
This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)					
Inventor(s)					
Inventor 1					Remove
Given Name	Middle Name	Family Name	City	State	Country ;
Jared		Oehring	Houston	TX	US
Inventor 2					Remove
Given Name	Middle Name	Family Name	City	State	Country ;
Alexander	James	Christinzio	Houston	TX	US
Inventor 3					Remove
Given Name	Middle Name	Family Name	City	State	Country ;
Brandon	N.	Hinderliter	Houston	TX	US
All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add
Title of Invention		AUTOMATED FRACTURING PUMP SYSTEM			
Attorney Docket Number (if applicable)		047158.100032			
Correspondence Address					
Direct all correspondence to (select one):					
☒ The address corresponding to Customer Number			☐ Firm or Individual Name		
Customer Number			132858		

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.	
☒ No.	
Yes, the invention was made by an agency of the United States Government. The U.S. Government agency name is:	
Yes, the invention was under a contract with an agency of the United States Government. The name of the U.S. Government agency and Government contract number are:	

Entity Status

Applicant asserts small entity status under 37 CFR 1.27 or applicant certifies micro entity status under 37 CFR 1.29

- ☐ Applicant asserts small entity status under 37 CFR 1.27
- ☐ Applicant certifies micro entity status under 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
- ☒ No

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 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.

Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	Taylor P. Evans/			Date (YYYY-MM-DD)	2017-10-25
First Name	Taylor P.	Last Name	Evans	Registration Number (If appropriate)	60506

This collection of information is required by 37 CFR 1.51. 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 8 hours 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. **This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

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.

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	047158.100032
		Application Number	
Title of Invention	AUTOMATED FRACTURING PUMP SYSTEM		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

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

Inventor	1				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Jared		Oehring		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Houston	State/Province	TX	Country of Residence	US

Mailing Address of Inventor:

Address 1	c/o U.S. Well Services, LLC				
Address 2	770 South Post Oak Lane, Suite 410				
City	Houston	State/Province	TX		
Postal Code	77056	Country i	US		

Inventor	2				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Alexander	James	Christinzio		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Morgantown	State/Province	WV	Country of Residence	US

Mailing Address of Inventor:

Address 1	c/o U.S. Well Services, LLC				
Address 2	770 South Post Oak Lane, Suite 410				
City	Houston	State/Province	TX		
Postal Code	77056	Country i	US		

Inventor	3				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Brandon	N.	Hinderliter		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					

Application Data Sheet 37 CFR 1.76		Attorney Docket Number		047158.100032	
		Application Number			
Title of Invention	AUTOMATED FRACTURING PUMP SYSTEM				
City	Houston	State/Province	TX	Country of Residence	US
Mailing Address of Inventor:					
Address 1	c/o U.S. Well Services, LLC				
Address 2	770 South Post Oak Lane, Suite 410				
City	Houston	State/Province	TX		
Postal Code	77056	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	132858		
Email Address	hlusdocketing@hoganlovells.com	Add Email	Remove Email

Application Information:

Title of the Invention	AUTOMATED FRACTURING PUMP SYSTEM		
Attorney Docket Number	047158.100032	Small Entity Status Claimed	☐
Application Type	Provisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	5	Suggested Figure for Publication (if any)	

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	047158.100032
		Application Number	
Title of Invention	AUTOMATED FRACTURING PUMP SYSTEM		

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	132858		

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		Remove
Application Number	Continuity Type	Prior Application Number
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.		Add

Foreign Priority Information:

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

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.			Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	047158.100032
		Application Number	
Title of Invention	AUTOMATED FRACTURING PUMP SYSTEM		

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.	
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	047158.100032
	Application Number	
Title of Invention	AUTOMATED FRACTURING PUMP SYSTEM	

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	047158.100032
		Application Number	
Title of Invention	AUTOMATED FRACTURING PUMP SYSTEM		

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	U.S. Well Services, LLC	
Mailing Address Information For Applicant:		
Address 1	770 South Post Oak Lane	
Address 2	Suite 410	
City	Houston	State/Province TX
Country	US	Postal Code 77056
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	047158.100032
		Application Number	
Title of Invention	AUTOMATED FRACTURING PUMP SYSTEM		

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. ☒			
Organization Name	U.S. Well Services, LLC		
Mailing Address Information For Assignee including Non-Applicant Assignee:			
Address 1	770 South Post Oak Lane		
Address 2	Suite 410		
City	Houston	State/Province	TX
Country ⁱ	US	Postal Code	77056
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:

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	/Taylor P. Evans/		Date (YYYY-MM-DD)	2017-10-25
First Name	Taylor P.	Last Name	Evans	Registration Number
				60506
Additional Signature may be generated within this form by selecting the Add button. Add				

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	047158.100032
		Application Number	
Title of Invention	AUTOMATED FRACTURING PUMP SYSTEM		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PROVISIONAL PATENT APPLICATION

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AUTOMATED FRACTURING PUMP SYSTEM

AUTOMATED FRACTURING PUMP SYSTEM

[1] This disclosure relates generally to hydraulic fracturing and more particularly to systems and methods for fracturing treatments in which various components involved in the treatment process are integrated and automated.

BACKGROUND

[2] With advancements in technology over the past few decades, the ability to reach unconventional sources of hydrocarbons has tremendously increased. Horizontal drilling and hydraulic fracturing are two such ways that new developments in technology have led to hydrocarbon production from previously unreachable shale formations. Hydraulic fracturing (fracturing) operations typically require powering numerous components in order to recover oil and gas resources from the ground. For example, hydraulic fracturing usually includes pumps that inject fracturing fluid down the wellbore, blenders that mix proppant into the fluid, cranes, wireline units, and many other components that all must perform different functions to carry out fracturing operations.

[3] However, current operations are performed by individual components that do not share feedback and intelligence with one another, thus requiring a large amount of operator intervention to diagnose, respond to, adjust, and otherwise control operating conditions of the various components. Thus, some equipment conditions may not be detected soon enough to prevent further damage to the equipment or to prevent system failures from occurring, when such failures may have been preventable had the equipment conditions been detected sooner.

BRIEF DESCRIPTION OF DRAWINGS

[4] The foregoing aspects, features, and advantage of embodiments of the present disclosure will further be appreciated when considered with reference to the following description of embodiments and accompanying drawings. In describing embodiments of the disclosure illustrated in the appended drawings, specific terminology will be used for the sake of clarity. However, the disclosure is not intended to be limited to the specific terms used, and it is to be understood that each specific term includes equivalents that operate in a similar manner to accomplish a similar purpose.

[5] FIG. 1 is a plan schematic view of an embodiment of an automated hydraulic fracturing system positioned at a well site, in accordance with embodiments of the present disclosure.

[6] FIG. 2 illustrates an instrumented fracturing pump system, in accordance with embodiments of the present disclosure.

[7] FIG. 3 illustrates a diagram illustrating a connected automated fracturing system, in accordance with various embodiments, in accordance with embodiments of the present disclosure;

[8] FIG. 4 illustrates a diagram illustrating a communications network of the automated fracturing system, in accordance with various embodiments.

[9] FIG. 5 illustrates a method of controlling an automated fracturing system, in accordance with various embodiments.

DETAILED DESCRIPTION

[10] The foregoing aspects, features, and advantages of the present disclosure will be further appreciated when considered with reference to the following description of embodiments and accompanying drawings. In describing the embodiments of the disclosure illustrated in the appended drawings, specific terminology will be used for the sake of clarity. However, the disclosure is not intended to be limited to the specific terms used, and it is to be understood that each specific term includes equivalents that operate in a similar manner to accomplish a similar purpose.

[11] When introducing elements of various embodiments of the present disclosure, the articles "a", "an", "the", and "said" are intended to mean that there are one or more of the elements. The terms "comprising", "including", and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements. Any examples of operating parameters and/or environmental conditions are not exclusive of other parameters/conditions of the disclosed embodiments. Additionally, it should be understood that references to "one embodiment", "an embodiment", "certain embodiments", or "other embodiments" of the present disclosure are not intended to be interpreted as excluding the existence of additional embodiments that also incorporate the recited features. Furthermore, reference to terms such as "above", "below", "upper", "lower", "side", "front", "back", or other terms regarding orientation or direction are made with reference to the illustrated embodiments and are not intended to be limiting or exclude other orientations or directions. Additionally, recitations of steps of a method should be understood as being capable of being performed in any order unless specifically stated otherwise. Furthermore, the steps may be performed in series or in parallel unless specifically stated otherwise.

[12] Embodiments of the present disclosure describe an integrated and automated fracture pumping system that utilized specified hardware, control protocols, networked systems, and condition

monitoring in order to complete the entire pumping process. That would include everything starting from the supplied water, sand storage and chemical storage, to the mixing process in the blender and then pumping process of the high pressure pumps. This would be a new process allow equipment to communicate with each other as well as over the internet to ensure the pumping process is completed effectively, consistently and safely. The fracture pumping system includes components instrumented with sensors and actuators that enable readings to be taken automatically and/or remotely via the sensors and various aspects of the components to be controlled automatically and/or remotely via the actuators. The components may include any devices, tools, systems, involved in the fracturing or fracturing pumping process, including but not limited to hydration units, blenders, sand storage and delivery systems, chemical storage and delivery systems, water storage and delivery systems, manifolds and manifold trailers, pumps, discharge irons, high and low pressure flow systems, well heads, etc. The components may be communicable amongst each other, allowing components to adjust their settings and controls based on data (e.g., sensor readings, conditions, actions) received from other components, thereby minimizing operator intervention and related time delays. The components may also be communicable with a central control unit. The central control unit may receive data from one or more of the components and monitor the conditions of one or more of the components, and control one or more components accordingly. The central control unit may also transmit notifications or information to another device.

[13] In particular, instrumented components (e.g., engines, transmissions., PE, FE, suction manifolds, discharge irons) can automatically detect when faults occur and communicate with one another as well as a central control unit or operators to prevent catastrophic failures when faults are detected. In some embodiments, sensors may be embedded into individual bores to monitor individual bore pressures, such as compression. This can enable fault detection, such as wear and/or failure in

valves and seats, and potentially packing. In some embodiments, various flow components, such as valves, pipes, and the like may be instructed with flow meters in order to determine flow rates and diversion rates. Sensor instrumentation may also be used to determine concentrations of various components in fluids, such as fracturing fluid and/or to determine sand volumes. Additionally, the inside of iron may be coated with various corrosion prevention materials to prevent corrosive damage to the iron.

[14] FIG. 1 is a plan schematic view of an embodiment of an automated hydraulic fracturing system 10 positioned at a well site 12. In the illustrated embodiment, pump trucks 14, which make up a pumping system 16, are used to pressurize a slurry solution for injection into a wellhead 18. A hydration unit 20 receives fluid from a fluid source 22 via a line, such as a tubular, and also receives additives from an additive source 24. There may be one or more additive sources for one or more different types of additives. For example, there may be an additive source for a chemical additive and another additive source for sand. In an embodiment, the fluid is water and the additives are mixed together and transferred to a blender unit 26 where proppant from a proppant source 28 may be added to form the slurry solution (e.g., fracturing slurry) which is transferred to the pumping system 16. The pump trucks 14 may receive the slurry solution at a first pressure (e.g., 80 psi to 100 psi) and boost the pressure to around 15,000 psi for injection into the wellhead 18. In certain embodiments, the pump trucks 14 are powered by electric motors.

[15] After being discharged from the pump system 16, a distribution system 30, such as a missile, receives the slurry solution for injection into the wellhead 18. The distribution system 30 consolidates the slurry solution from each of the pump trucks 14 and includes discharge piping 32 coupled to the wellhead 18. In this manner, pressurized solution for hydraulic fracturing may be injected into the wellhead 18.

[16] In the illustrated embodiment, one or more instrumentation devices 34 are arranged throughout the hydraulic fracturing system 10 and coupled to one or more of the aforementioned components. The instrumentation 34 may include various sensors and actuators, which may be different for different components. For example, the instrumentation packages 34 may include hardware features such as, low pressure transducer (low and high frequency), high pressure transducers (low and high frequency), low frequency accelerometers, high frequency accelerometers, temperature sensors, external mounted flow meters such as Doppler and sonar sensors, magnetic flow meters, turbine flow meters, proximity probes and sensors, speed sensors, tachometers, capacitive, doppler, inductive, optical, radar, ultrasonic, fiber optic, and hall effect sensors, transmitters and receivers, stroke counters, GPS location monitoring, fuel consumption, load cells, PLCs, and timers. In some embodiments, the devices of an instrumentation package 34 may be installed on the components dispersed in various locations and may not necessarily be physically together in a “package”

[17] The components may also communication means that enable all the sensor packages, actuation devices, and equipment components to communicate with each other allowing for real time conditional monitoring. This would allow equipment to adjust rates, pressure, operating conditions such as engine, transmission, power ends RPMs, sand storage compartment gates, valves, and actuators, sand delivery belts and shoots, water storage compartments gates, valves, and actuators, water delivery lines and hoses, individual fracture pump’s rates as well as collective system rates, blender hydraulics such as chemical pumps, liquid and dry, fan motors for cooling packages, blender discharge pumps, electric and variable frequency powered chemical pumps and auger screws, suction and discharge manifold meters, valves, and actuators. Equipment can prevent failures, reduce continual damage, and control when it is allowed and not allowed to continue to operate based on live

and continuous data readings. Each component may be able to provide troubleshooting codes and alerts that more specifically narrow down the potential causes of issues. This allows technicians to more effectively service equipment, or for troubleshooting or other processes to be initialized automatically. Conditional monitoring will identify changes in system components and will be able to direct, divert, and manage all components so that each is performing its job the most efficiently

[18] In some embodiments, the sensors may transmit data to a data van 38 for collection and analysis, among other things. In some embodiment, the sensors may transmit data to other components, to the central processing unit, or to devices and control units remote from the site. The communications between components, sensors, and control devices may be wired, wireless, or a combination of both. Communication means may include fiber optics, electrical cables, WiFi, Bluetooth, radio frequency, and other cellular, nearfield, Internet-based, or other networked communication means.

[19] The features of the present disclosure may allow for remote monitoring and control from diverse location, not solely the data van 38. Fracturing control may be integrated in with the sensor and monitoring packages 34 to allow for automated action to be taken when/if needed. Equipment may be able to determine issues or failures on its own, then relay that message with a specified code and alarm. Equipment may also be in control to shut it self-down to prevent failures from occurring. Equipment may monitor itself as well as communicate with the system as a whole. This may allow whole system to control equipment and processes so that each and every component is running at its highest efficiency, sand, water, chemical, blenders, pumps, and low and high pressure flow lines. Features of the present disclosure may capture, display, and store data, which may be visible locally and remotely. The data may be accessible live during the data collection and historical data may also

be available. Each component to this system can be tested individually with simulation as well as physical function testing.

[20] Operating efficiencies for each individual component and the system 10 may be greatly improved. For example, sand storage and delivery to the blender can be monitored with load cells, sonar sensors and tachometers to determine storage amounts, hopper levels, auger delivery to the tub. Pump efficiencies may be monitored with flow sensors, accelerometers, pressure transducer and tachometers to optimize boost and rate while minimizing harmful conditions such as cavitation or over rating. Failure modes such as wash outs, cutting, valve and/or seat failures, packing issues and supply blockage can be captured and then prevented. Flow lines, both suction supply and discharge can be monitored with flow meters to distribute and optimize flow rates and velocities while preventing over pumping scenarios. Feedback loops of readings from blender to supply manifolds and to pumps can work with each other to optimize pressure and flow. Dropping out of an individual pump may occur preventing further failures, when this occurs the system as a whole may automatically select the best pumps to make up that needed rate. These changes and abilities solve equipment issues and prevent down time as well as provide a means to deliver a consistent job.

[21] In some embodiments, sensors (any of the above describe monitoring devices) can be imbedded, mounted, located in various locations such as in line with flow vessels like hoses, piping, manifolds, placed on pump components such as fluid ends, power ends, transmission, engines, and any component within these individual pieces, mounted external to piping and flow vessels, mounted on under or above sand and water storage containers. Blender hoppers could be dual equipped with hopper proximity level sensors as well as a load cell to determine amount of sand in the hopper at any given time.

[22] As illustrated in FIG. 2, a fracturing pump system 100 has instrumented components, including an engine 114, a transmission, a variable frequency drive (VFD) 115, pumps 110, a power end, and a fluid end. The fluid end may further include instrumented components such as packings, valves, seats, stay rod bolts, suction manifold, suction hoses, and discharge flow iron. These components may include embedded or retrofitted hardware devices which are configured to sense various conditions and states associated with the components. Example hardware devices include low pressure transducer (low and high frequency), high pressure transducers (low and high frequency), low frequency accelerometers, high frequency accelerometers, temperature sensors, external mounted flow meters such as doppler and sonar sensors, magnetic flow meters, turbine flow meters, proximity probes and sensors, speed sensors, tachometers, capacitive, doppler, inductive, optical, radar, ultrasonic, fiber optic, and hall effect sensors, transmitters and receivers, stroke counters, gps location monitoring, fuel consumption, PLCs, and timers. The system may be attached to a trailer 114 or a skid.

[23] The fracturing pump components may also include various types of communications devices such as transmitters, receivers, or transceivers, using various communication protocols. This enables components of the fracturing pump components to communicate amongst each other or with a central control unit or remote device so monitor conditions, ensuring that the pumping process is completed effectively and consistently. Communication between the equipment can be both wired and/or wireless, such as through Ethernet, WiFi, Bluetooth, cellular, among other options. Data captured by the hardware can be displayed live locally, stored locally, displayed live remotely, or stored remotely. Such data may be accessed in real-time as well as stored and retrieved at a later time as historical data. In some embodiments, data from one component can be used to determine real time actions to be taken by another component to ensure proper functionality of each component. Specifically, this

may allow equipment to adjust rates, pressure, operating conditions such as engine, transmission, power end rotations per minute (RPMs), valves, actuators, individual fracturing pump rates as well as collective system rates, fan motors for cooling packages, electric and variable frequency drive (VFD) powered electric motors for pumps, suction and discharge manifold meters, valves, and actuators. Equipment can prevent failures, reduce continual damage, and control operation based on live and continuous data readings.

[24] Additionally, each component may be able to provide troubleshooting codes and alerts that more specifically provides information regarding the potential causes of issues or current conditions. This information may allow technicians to more effectively service equipment. Conditional monitoring can be used to identify changes in system components and can direct, divert, and manage all components such that each component performs its function with optimal efficiency and/or effectiveness. Catastrophic failures may be reduced because of the ability to automatically shut down equipment based on continuous real-time readings from various sensors. Equipment can monitor itself as well as communicate with the system as a whole.

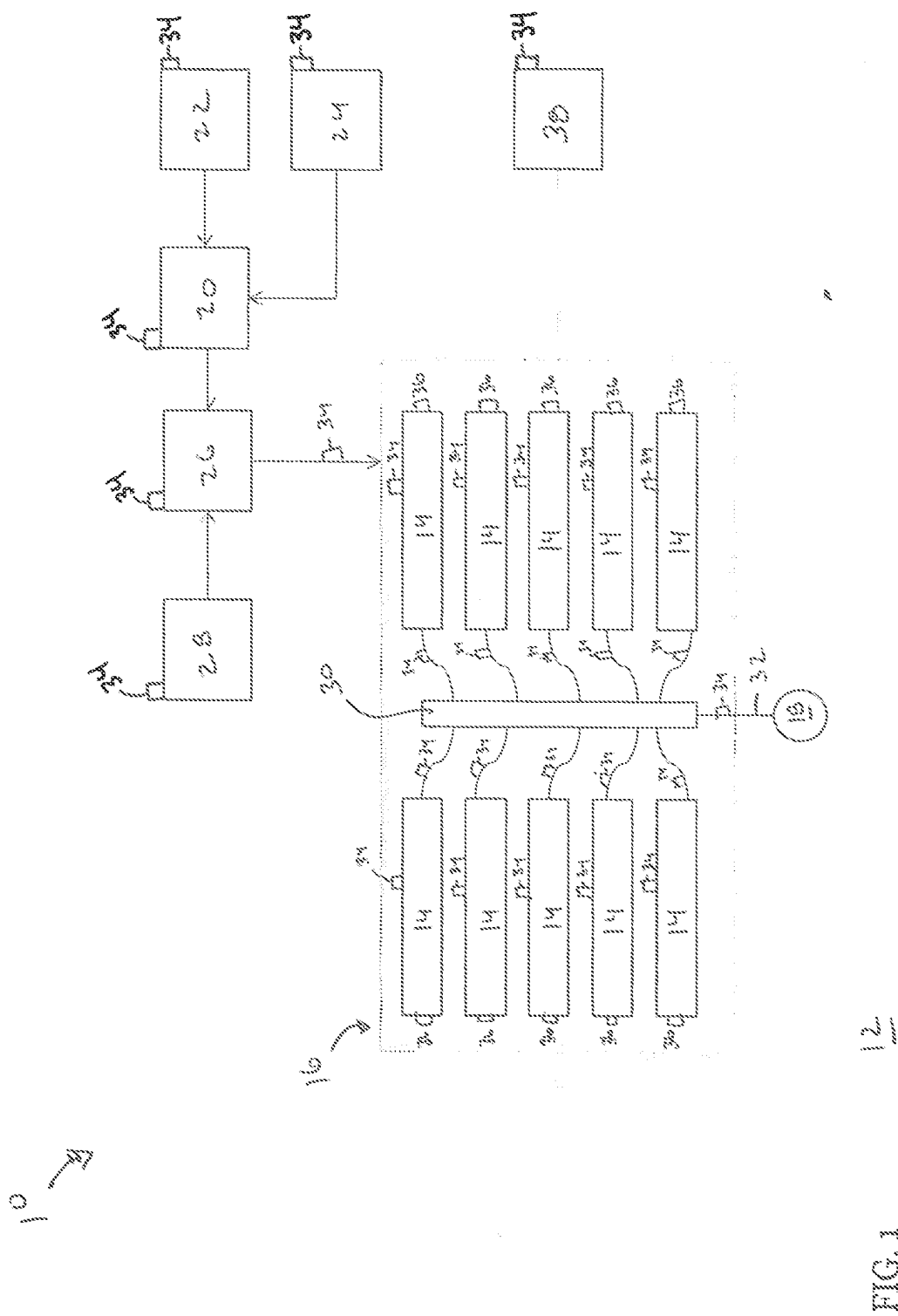
[25] Present systems and techniques may improve the operating efficiencies for each individual component and the system as a whole. For example, pump efficiencies can be monitored with flow sensors, accelerometers, pressure transducer and tachometers to optimize boost and rate while minimizing harmful conditions such as cavitation or over rating. Failure modes such as wash outs, cutting, valve and/or seat failures, packing issues and supply blockage, can be captured and then prevented. Flow lines, both suction supply and discharge can be monitored with flow meters to distribute and optimize flow rates and velocities while preventing over pumping scenarios. Feedback loops of readings from blender to supply manifolds and to pumps can work with each other to optimize pressure and flow.

[26] In various embodiments, for example, an individual pump may be dropped from operation to prevent further failures. When this occurs, the system as a whole may automatically select the best pump(s) to make up for the dropped pump. Power ends (pumps) may keep track of stroke counts and pumping hours. This data may be accompanied with maintenance logs which may help determine schedules and maintenance procedures. Transmissions may be monitored for each individual gear, duration and load may be logged as well as temperature. If any of these various components were to indicate an alarm that would be detrimental to the equipment, the signal from that sensor may relay the message to shut the entire pump down.

[27] FIG. 3 illustrates a diagram 40 illustrating a connected automated fracturing system, in accordance with various embodiments. In this example, one or more components 42 of a fracturing pump system, such as those described above, may include communication devices for transmitting and receiving data with each other and with a control device 44. FIG. 4 illustrates a diagram 50 illustrating a communications network of the automated fracturing system, in accordance with various embodiments. In this example, one or more components 52 of a fracturing system, such as those described above, may include communication devices for transmitting and receiving data over a wireless network 54. The components 52 can communicate with each other over the network 54 or with a control device 56 located locally or remotely from the components. The network may include various types of wireless communication protocols.

[28] FIG. 5 illustrates a method 60 of controlling an automated fracturing system, in accordance with various embodiments. In this embodiment, the method 60 includes receiving 62 data from one or more components of an automated fracturing system, such as those described above. The method 60 further includes determining 64 a condition of the system based on the received data. The method further includes controlling 66 one or more aspects of the system based on the determined condition.

[29] The foregoing disclosure and description of the disclosed embodiments is illustrative and explanatory of the embodiments of the invention. Various changes in the details of the illustrated embodiments can be made within the scope of the appended claims without departing from the true spirit of the disclosure. The embodiments of the present disclosure should only be limited by the following claims and their legal equivalents.



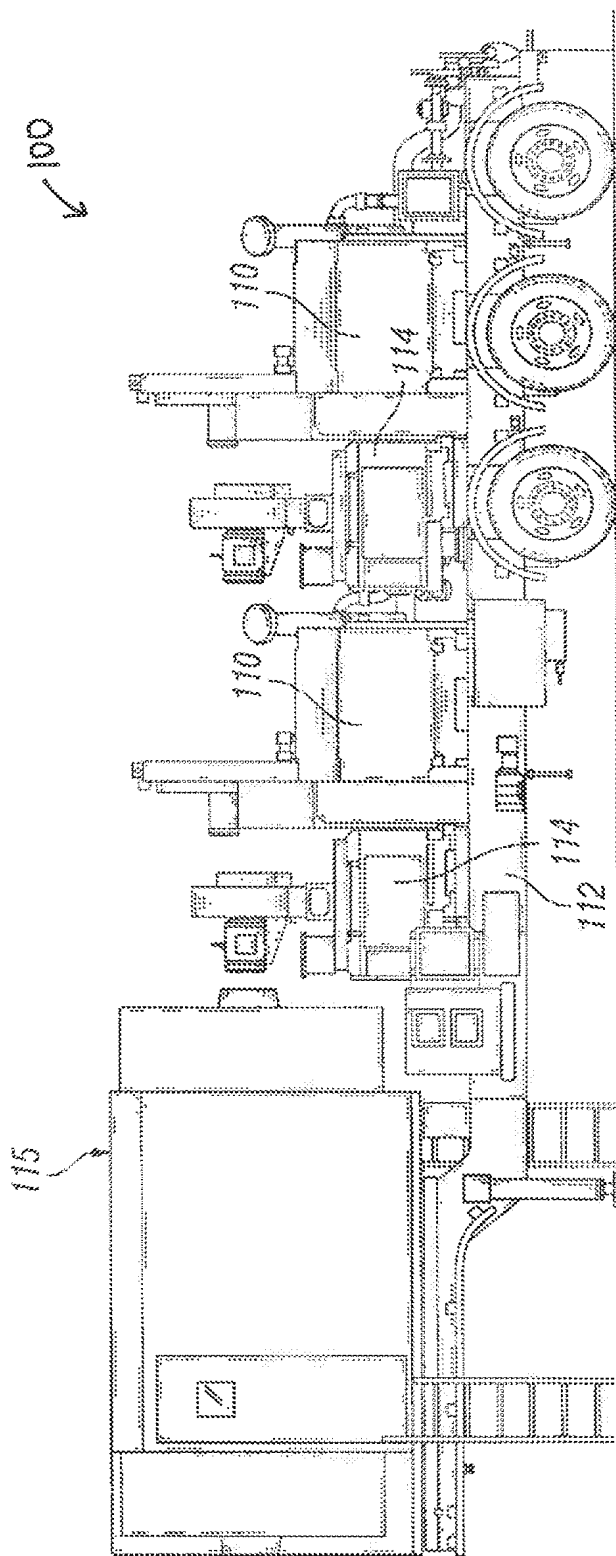


FIG. 2

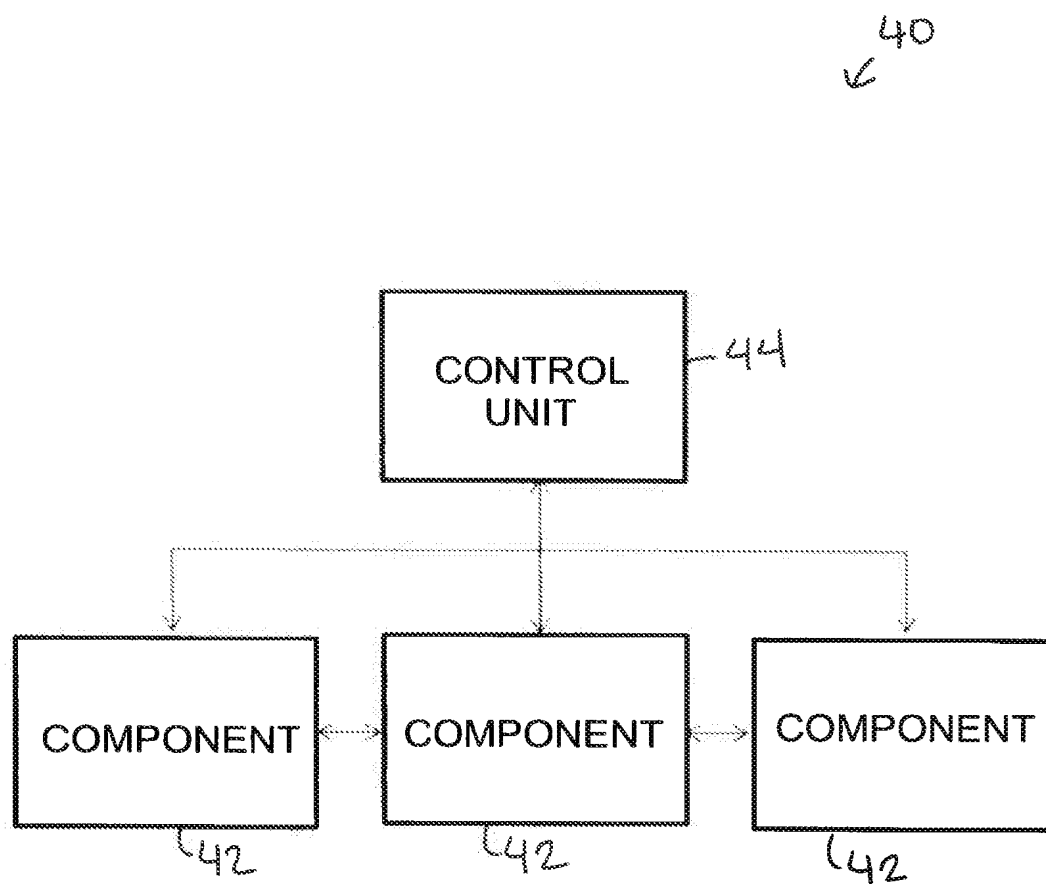


FIG. 3

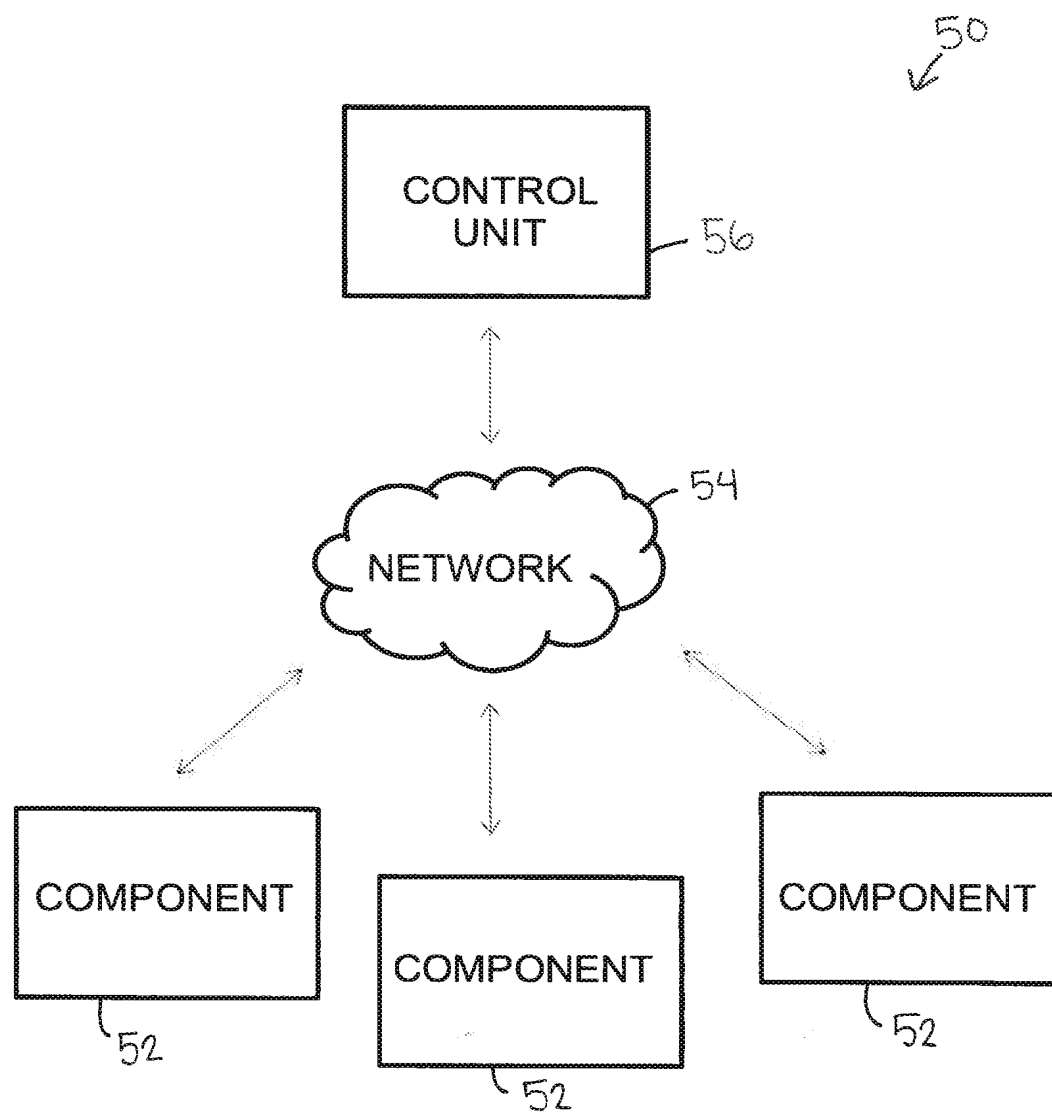


FIG. 4

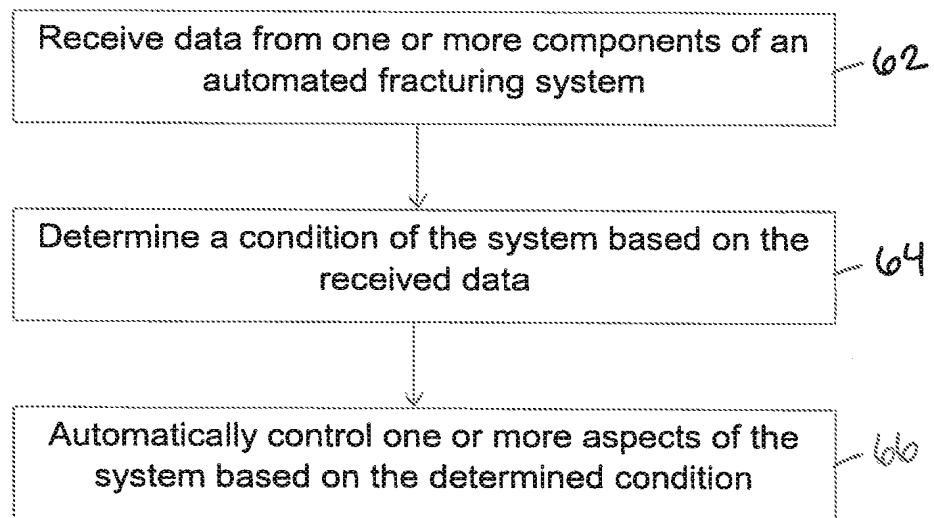


FIG. 5

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		AUTOMATED FRACTURING PUMP SYSTEM		
First Named Inventor/Applicant Name:		Jared Oehring		
Filer:		Taylor P. Evans/Stephanie McDonough		
Attorney Docket Number:		047158.100032		
Filed as Large Entity				
Filing Fees for Provisional				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
PROVISIONAL APPLICATION FILING	1005	1	260	260
Pages:				
Claims:				
Miscellaneous-Filing:				
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 (\$)				260

Electronic Acknowledgement Receipt

EFS ID:	30762580
Application Number:	62577056
International Application Number:	
Confirmation Number:	1561
Title of Invention:	AUTOMATED FRACTURING PUMP SYSTEM
First Named Inventor/Applicant Name:	Jared Oehring
Customer Number:	132858
Filer:	Taylor P. Evans/Stephanie McDonough
Filer Authorized By:	Taylor P. Evans
Attorney Docket Number:	047158.100032
Receipt Date:	25-OCT-2017
Filing Date:	
Time Stamp:	18:17:47
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$260
RAM confirmation Number	102617INTEFSW00005593506763
Deposit Account	506763
Authorized User	Stephanie McDonough

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37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Provisional Cover Sheet (SB16)	047158-100032_Transmittal.pdf	1477364	no	3
			7f96c62a403b73fc9fa0ef290493ab2c1a4f8360		
Warnings:					
Information:					
2	Application Data Sheet	047158-100032_ADS.pdf	1835968	no	9
			f2238cdc682afb058b8457fddff2e258356fd637		
Warnings:					
Information:					
3	Specification	047158-100032_Specification.pdf	52059	no	13
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Warnings:					
Information:					
4	Drawings-only black and white line drawings	047158-100032_Figures.pdf	109925	no	5
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Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	29999	no	2
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Warnings:					
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National Stage of an International Application under 35 U.S.C. 371

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

New International Application Filed with the USPTO as a Receiving Office

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