

*Intelligent Wellhead Systems, Inc. v.
Downing Wellhead Equipment, LLC*

IPR2024-00300
Patent No. 11,560,070

PETITIONER'S ORAL ARGUMENT DEMONSTRATIVES

February 21, 2025

Tammy Terry and Lisa Margonis



U.S. Patent No. 11,560,770 (“the ’770 Patent”)

(12) United States Patent Kuehn et al.	(10) Patent No.: US 11,560,770 B2 (45) Date of Patent: *Jan. 24, 2023
(54) HYDRAULIC FRACTURING PLAN AND EXECUTION OF SAME	(52) U.S. Cl. CPC <i>E21B 34/02</i> (2013.01); <i>E21B 17/006</i> (2013.01); <i>E21B 33/068</i> (2013.01); <i>E21B 41/00</i> (2013.01); <i>E21B 43/11</i> (2013.01); <i>E21B 43/26</i> (2013.01); <i>E21B 43/2607</i> (2020.05); <i>F16K 3/36</i> (2013.01); (Continued)
(71) Applicant: Downing Wellhead Equipment, LLC , Oklahoma City, OK (US)	(58) Field of Classification Search CPC <i>E21B 33/068</i> ; <i>E21B 34/02</i> ; <i>E21B 41/00</i> ; <i>E21B 43/11</i> ; <i>E21B 43/26</i> ; <i>E21B 43/2607</i> ; <i>F16K 3/36</i> ; <i>F16N 11/00</i> ; <i>F16N 2210/00</i> ; <i>F16N 2210/02</i> ; <i>F16N 29/02</i> ; <i>F16N 39/00</i> ; <i>F16N 7/38</i> ; <i>F16N 7/40</i> See application file for complete search history.
(72) Inventors: Jordan Kuehn , Forest Park, IL (US); Austin Johnson , Edmond, OK (US); Ronnie B. Beason , Lexington, OK (US); Nicholas J. Cannon , Washington, OK (US)	(56) References Cited U.S. PATENT DOCUMENTS 10,174,584 B2 * 1/2019 Kajaria <i>F16K 17/16</i> 10,563,778 B2 * 2/2020 Painter <i>E21B 34/00</i> (Continued)
(73) Assignee: DOWNING WELLHEAD EQUIPMENT, LLC , Oklahoma City, OK (US)	<i>Primary Examiner</i> — Daniel P Stephenson (74) <i>Attorney, Agent, or Firm</i> — Haynes and Boone, LLP
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days. This patent is subject to a terminal disclaimer.	(57) ABSTRACT
(21) Appl. No.: 17/878,493	
(22) Filed: Aug. 1, 2022	
(65) Prior Publication Data US 2022/0364435 A1 Nov. 17, 2022	

(Ex. 1001)

U.S. Patent No. 11,560,770 (“the ‘770 Patent”)

Related U.S. Application Data

(63) Continuation of application No. 17/388,716, filed on Jul. 29, 2021, now Pat. No. 11,401,779, which is a (Continued)

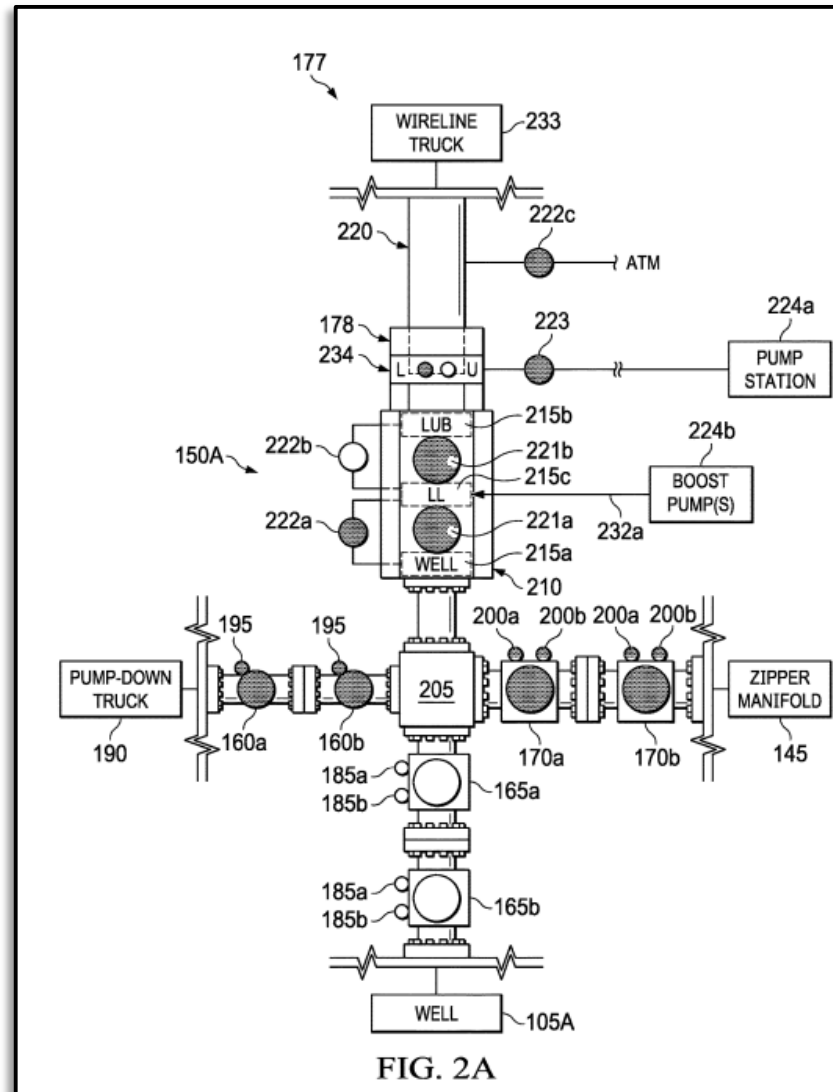
Related U.S. Application Data

continuation-in-part of application No. 17/319,854, filed on May 13, 2021, which is a continuation-in-part of application No. 16/855,749, filed on Apr. 22, 2020, now Pat. No. 11,480,027, which is a continuation-in-part of application No. 16/248,648, filed on Jan. 15, 2019, now Pat. No. 10,724,682, said application No. 16/855,749 is a continuation-in-part of application No. 16/803,156, filed on Feb. 27, 2020, now Pat. No. 11,242,724, which is a continuation-in-part of application No. 16/248,633, filed on Jan. 15, 2019, now Pat. No. 10,584,552, said application No. 16/803,156 is a continuation-in-part of application No. 16/436,623, filed on Jun. 10, 2019, now Pat. No. 11,208,856, said application No. 16/803,156 is a continuation-in-part of application No. 16/100,741, filed on Aug. 10, 2018, now Pat. No. 10,689,938.

Provisional application No. 63/189,663, filed on May 17, 2021, provisional application No. 62/836,761, filed on Apr. 22, 2019, provisional application No. 62/617,443, filed on Jan. 15, 2018, provisional application No. 62/617,438, filed on Jan. 15, 2018, provisional application No. 62/755,170, filed on Nov. 2, 2018, provisional application No. 62/638,688, filed on Mar. 5, 2018, provisional application No. 62/638,681, filed on Mar. 5, 2018, provisional application No. 62/637,220, filed on Mar. 1, 2018, provisional application No. 62/637,215, filed on Mar. 1, 2018, provisional application No. 62/598,914, filed on Dec. 14, 2017.

(Ex. 1001)

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(Ex. 1001)

POSITA and Claim Construction

- No dispute regarding the level of ordinary skill in the art for a person of ordinary skill in the art (POSITA)
- POSITA “would have had an engineering degree and two or more years’ well-related operations experience, or equivalent education/experience.”

(Paper 10, 10 (*citing* Paper 1, 8))
- No request for or proffered claim construction(s)
 - Ordinary and customary meanings

(Paper 10, 7)

U.S. Patent No. 11,560,770 (“the ’770 Patent”)

Of the 38 Challenged Claims:

- Claims 1, 14, and 27 are independent
- Claims 2–13 depend from claim 1
- Claims 15–26 depend from claim 14
- Claims 28–38 depend from claim 27

(Ex. 1001)

U.S. Patent No. 11,560,770 (“the ’770 Patent”)

What is claimed is:

1. A method, comprising:

communicating fluid to a first well via a manifold and a first valve, the first valve being associated with both the manifold and the first well; and

in response to determining that the fluid communicated via the manifold has satisfied one or more conditions: opening a second valve;

communicating fluid to a second well via the second valve; and

closing the first valve after opening the second valve.

(Ex. 1001)

U.S. Patent No. 11,560,770 (“the ’770 Patent”)

1. [1.1] A method, comprising: communicating fluid to a first well via a manifold and a first valve, the first valve being associated with both the manifold and the first well; and
[1.2] in response to determining that the fluid communicated via the manifold has satisfied one or more conditions:
[1.3] opening a second valve; communicating fluid to a second well via the second valve; and
[1.4] closing the first valve after opening the second valve.

(Ex. 1001)

U.S. Patent No. 11,560,770 (“the ’770 Patent”)

14. An apparatus, comprising:
a non-transitory computer readable medium; and
a plurality of instructions stored on the non-transitory computer readable medium and executable by one or more processors, wherein, when the instructions are executed by the one or more processors, the following steps are executed:
communicating fluid to a first well via a manifold and a first valve, the first valve being associated with both the manifold and the first well; and
in response to determining that the fluid communicated via the manifold has satisfied one or more conditions:
opening a second valve;
communicating fluid to a second well via the second valve; and
closing the first valve after opening the second valve.

(Ex. 1001)

U.S. Patent No. 11,560,770 (“the ’770 Patent”)

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a non-transitory computer readable medium; and
a plurality of instructions stored on the non-transitory computer readable medium and executable by one or more processors, wherein, when the instructions are executed by the one or more processors, the following steps are executed:
communicating fluid to a first well via a manifold and a first valve, the first valve being associated with both the manifold and the first well; and
in response to determining that the fluid communicated via the manifold has satisfied one or more conditions:
opening a second valve;
communicating fluid to a second well via the second valve; and
closing the first valve after opening the second valve.

(Ex. 1001)

U.S. Patent No. 11,560,770 (“the ’770 Patent”)

27. A system, comprising:
a first valve via which fluid is communicated from a manifold to a first well;
a second valve via which fluid is adapted to be communicated to a second well; and
one or more controllers,
configured to:
 open the second valve to thereby communicate fluid to the second well via the second valve; and
 close the first valve after opening the second valve, in response to:
 determining that the fluid communicated via the manifold has satisfied one or more conditions.

(Ex. 1001)

U.S. Patent No. 11,560,770 (“the ’770 Patent”)

27. A system, comprising:

a first valve via which fluid is communicated from a manifold to a first well;

a second valve via which fluid is adapted to be communicated to a second well; and

one or more controllers,

configured to:

open the second valve to thereby communicate fluid to the second well via the second valve; and

close the first valve after opening the second valve, in response to:

determining that the fluid communicated via the manifold has satisfied one or more conditions.

(Ex. 1001)

'770 Claim 1 Compared to Parent '779 Claim 1

'770's/'493 Application's Claim 1:	'779's/'716 Application's Claim 1:
1. A method, comprising: communicating fluid to a first well via a manifold and a first valve, the first valve being associated with both the manifold and the first well; and	1. A method, comprising: (a) permitting performance of a first hydraulic fracturing operation on a first well, which first hydraulic fracturing operation comprises pumping fluid into the first well via a first valve associated with the first well, and
	measuring a flow rate of the fluid being pumped into the first well;
in response to determining that the fluid communicated via the manifold has satisfied one or more conditions:	(b) determining that the flow rate of the fluid being pumped into the first well is below a flow rate threshold and has been below the flow rate threshold for a threshold amount of time;
opening a second valve;	(c) during pumping of the fluid into the first well via the first valve, opening a second valve associated with a second well;

'770's/'493 Application's Claim 1:	'779's/'716 Application's Claim 1:
communicating fluid to a second well via the second valve; and	(d) permitting performance of a second hydraulic fracturing operation on the second well, which second hydraulic fracturing operation comprises pumping fluid into the second well via the second valve; and
closing the first valve after opening the second valve.	(e) during pumping of the fluid into the second well via the second valve, closing the first valve associated with the first well;
	wherein, during each of steps (a), (b), (c), (d), and (e), fluid is continuously pumped to the first valve, the second valve, or both the first valve and the second valve.

(Paper 1, 10-11)

Asserted Grounds of Unpatentability

GROUND(S)	CHALLENGED CLAIMS (1-38)	35 U.S.C. §	REFERENCE(S)
1	All	102	<i>Krupa</i>
2	All	103	<i>Krupa</i>
3	All	102	<i>Carr</i>
4	All	103	<i>Carr</i>
5	All	103	<i>Carr and Beuterbaugh</i>
6	5, 6, 9, 18, 19, 22, 31, 32	103	<i>Carr, Beuterbaugh, and Jackson</i>
7	All	102	<i>Tolman</i>
8	All	103	<i>Tolman</i>

(Paper 1, 3)

“Carr”

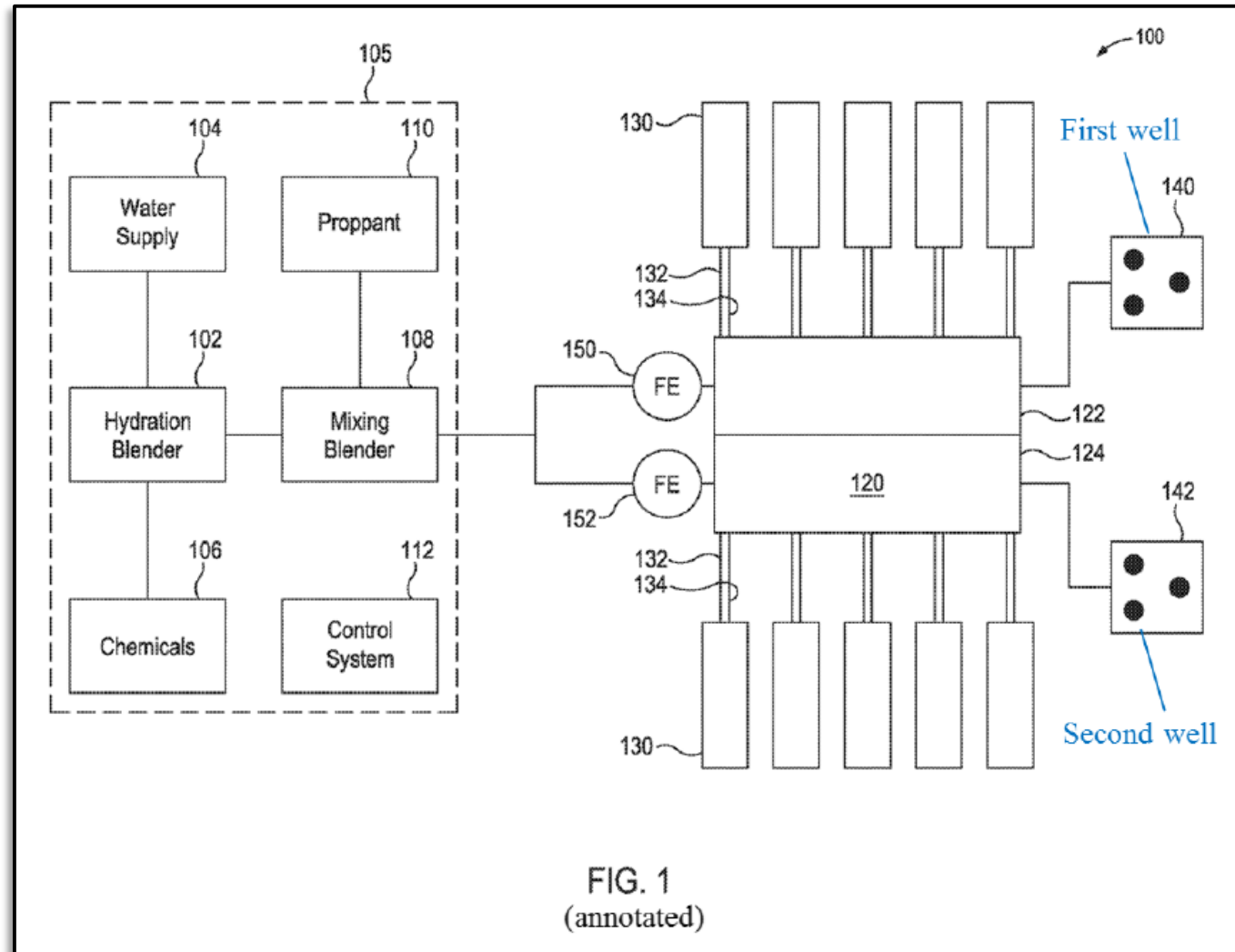
U.S. Patent Pub. No. 2019/0233275
(Ex. 1004)

- § 102(a)(1)-prior art
- Directed to methods and systems for controlling and “monitoring fluid flow from a centralized location to multiple wells.” Carr, [0015].

(Paper 1, 6)

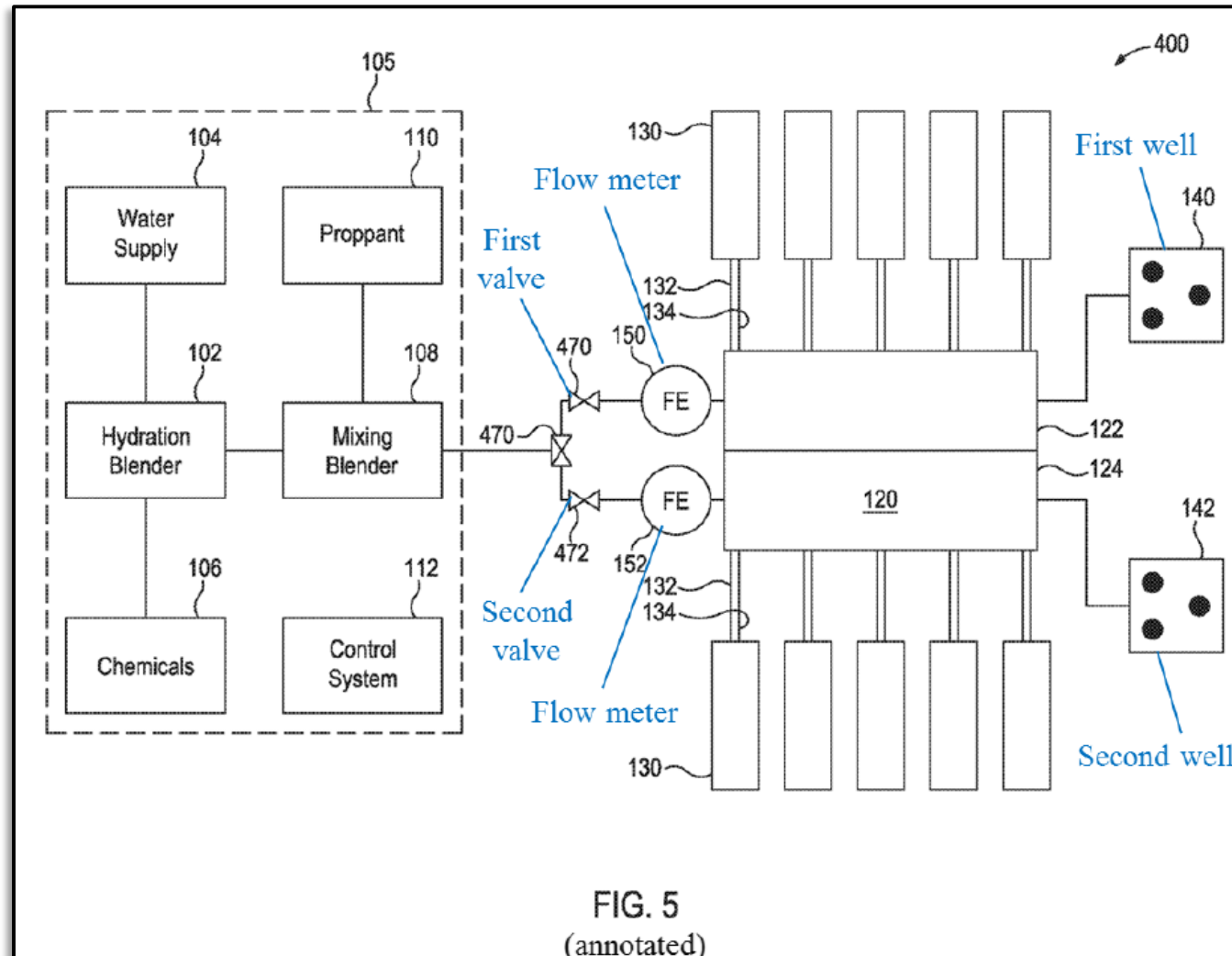
"Carr"

U.S. Patent Pub. No. 2019/0233275
(Ex. 1004)



(Paper 1, 57, 58, 61)

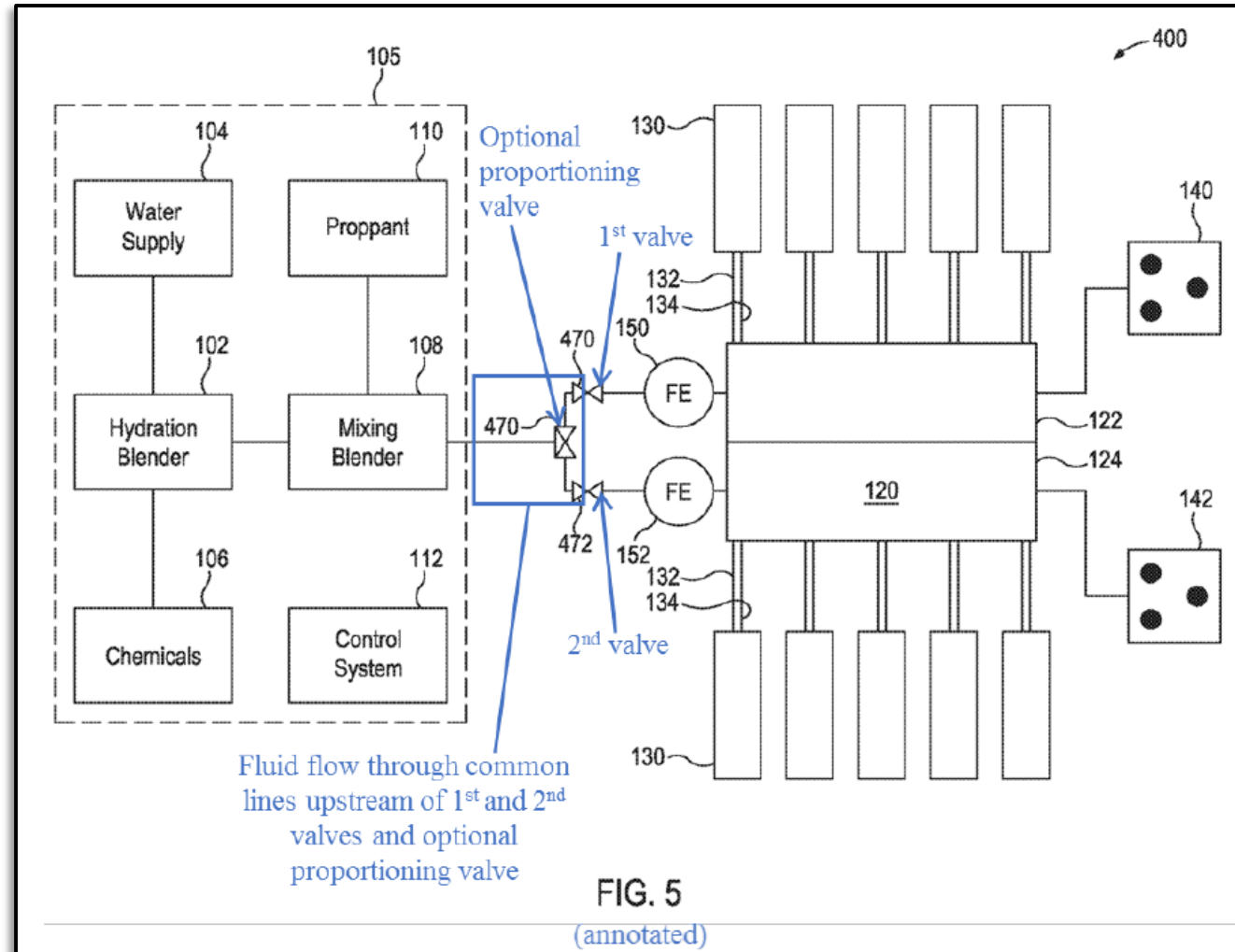
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(Ex. 1004)



(Paper 1, 7, 60)

"Carr"

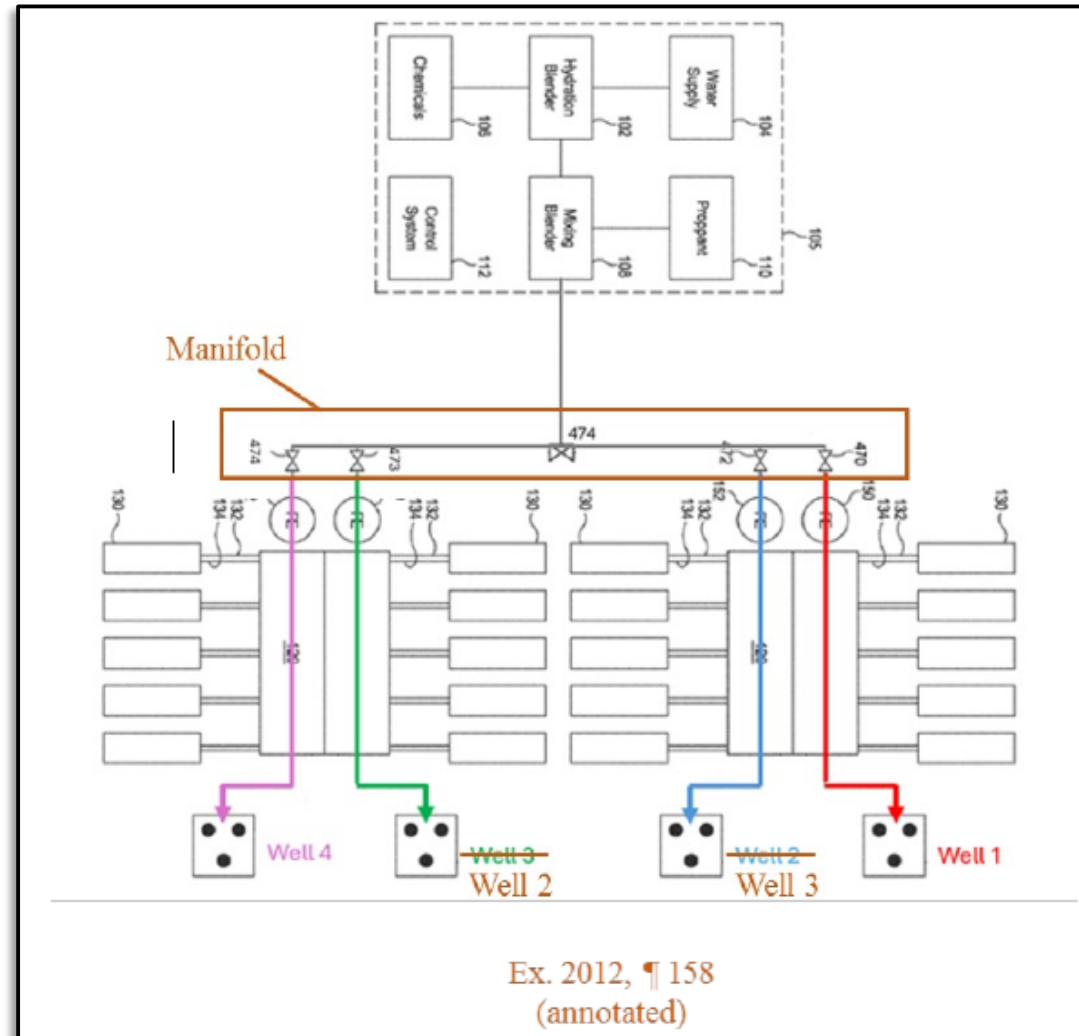
U.S. Patent Pub. No. 2019/0233275
(Ex. 1004)



(Paper 1, 48, 51-52; Ex. 2013, 141:12-21; Ex. 1044, ¶¶ 16-17, 19; Ex. 1045; Paper 25, 4)

“Carr”

U.S. Patent Pub. No. 2019/0233275
(Ex. 1004)



(Paper 20 (POR), 29); see *also*, Ex. 2012, ¶ 90 (Hughett defining “a manifold” as “a pipe that connects multiple other pipes in various ways.”); Ex. 1044, ¶¶ 26-27; Paper 25, 8)

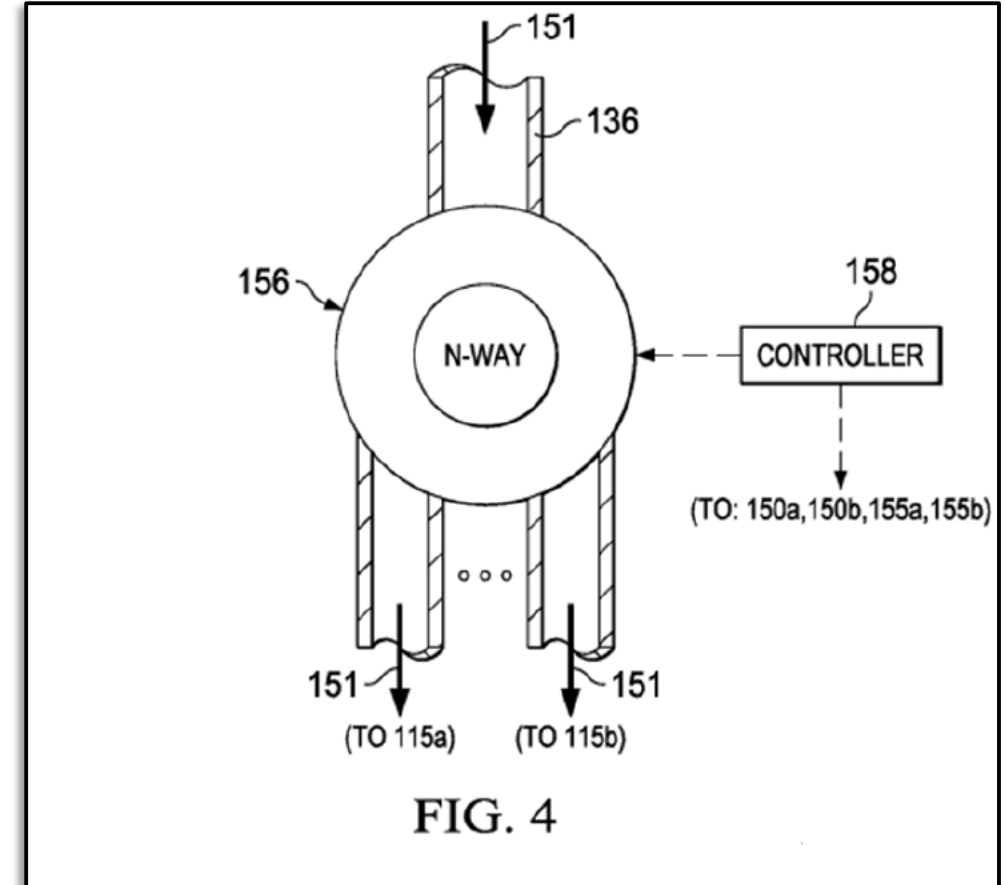
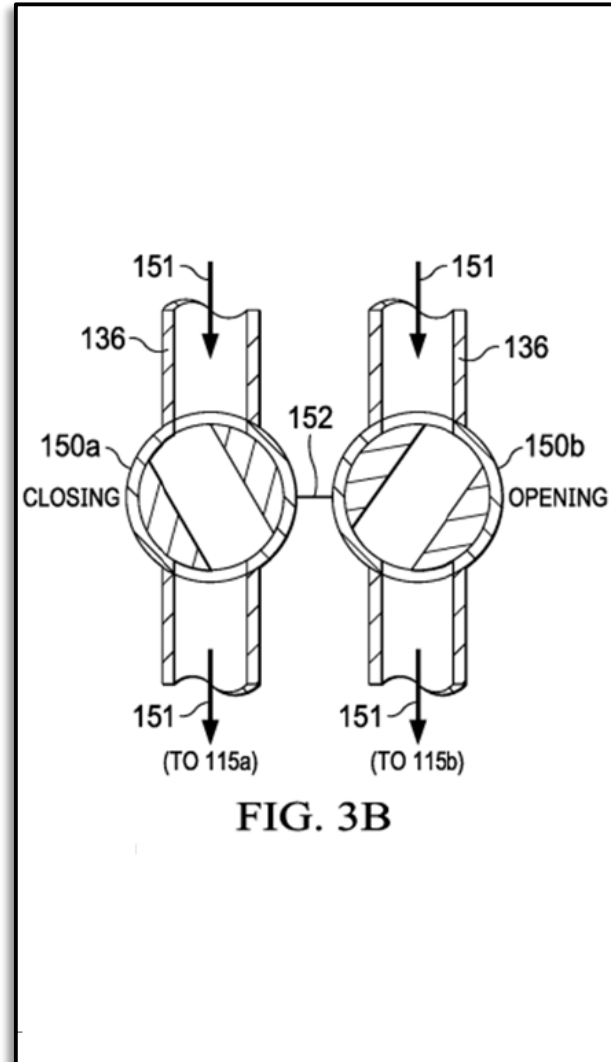
- § 102(a)(1)-prior art
- Discloses fracking multiple wells by alternately opening and closing valves to the wells using switching and plug valves to divert high pressure “fracturing fluid near instantaneously from one well to the other well.”
- Discloses “fracturing fluid to one or more switching valves and repeatedly opening and closing the one or more switching valves to divert the fracturing fluid...from one well to the other well...for fracturing subterranean formations.”

(Paper 1, 7, 63; Ex. 1005, Abstract, [0018], [0022], [0027])

“Beuterbaugh”

WO2020145978
(Ex. 1005)

Beuterbaugh discloses controlling valves and other components in the system using “a computerized controller.”

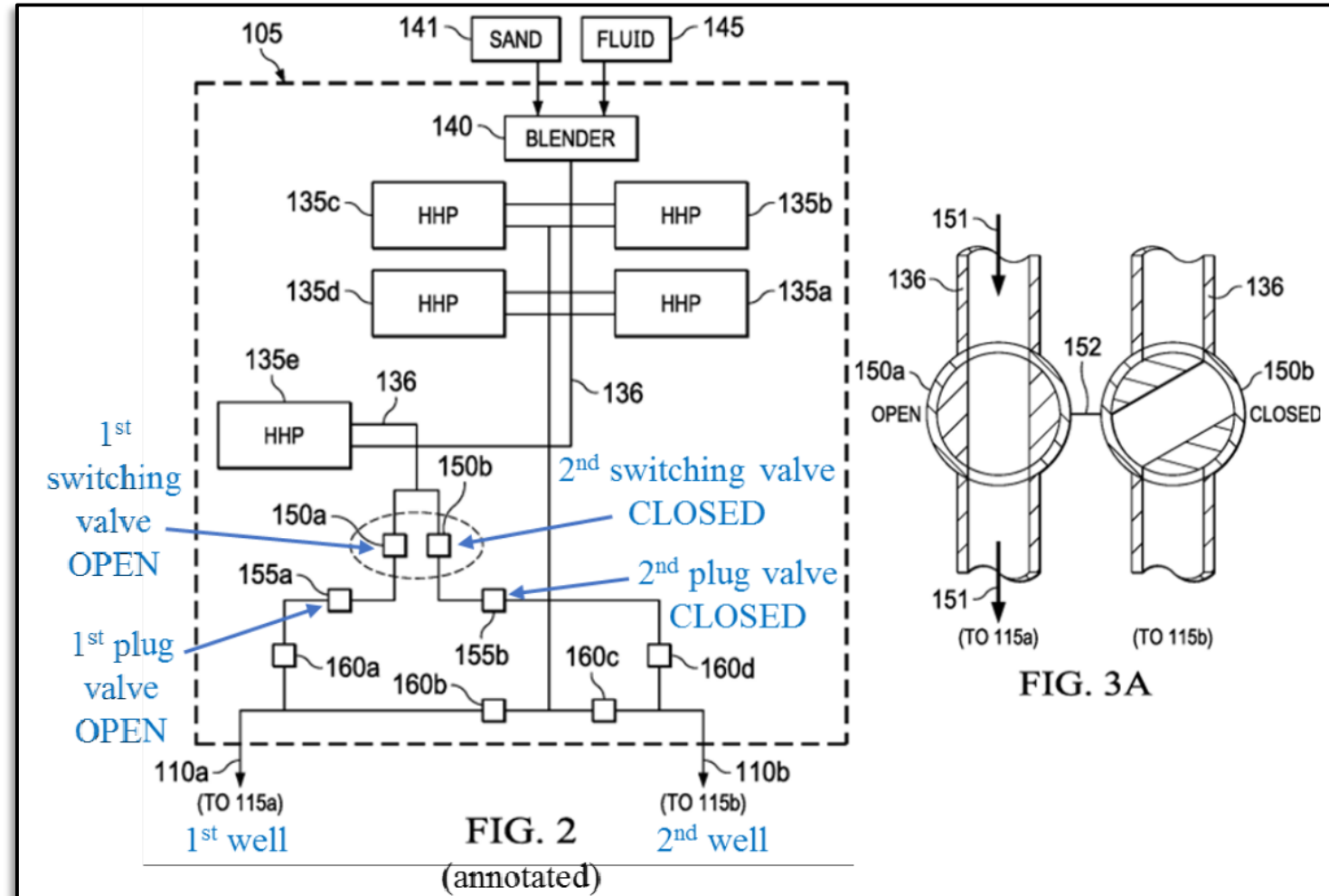


(Ex. 1005, [0022], [0025]; Paper 1, 62)

“Beuterbaugh”

WO2020145978
(Ex. 1005)

(1) “as a first state, opening [first] switching valve 150a and [first] plug valve 155a such that the flow rate of the fracturing fluid...is directed to the first wellhead 115a, delivering a pulse, while [second] switching valve 150b and associated [second] plug valve [155b] are closed preventing fluid flow 151 to the second wellhead 115b.”

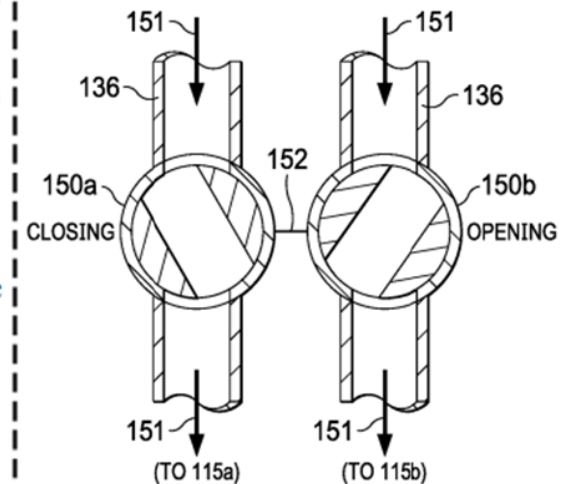
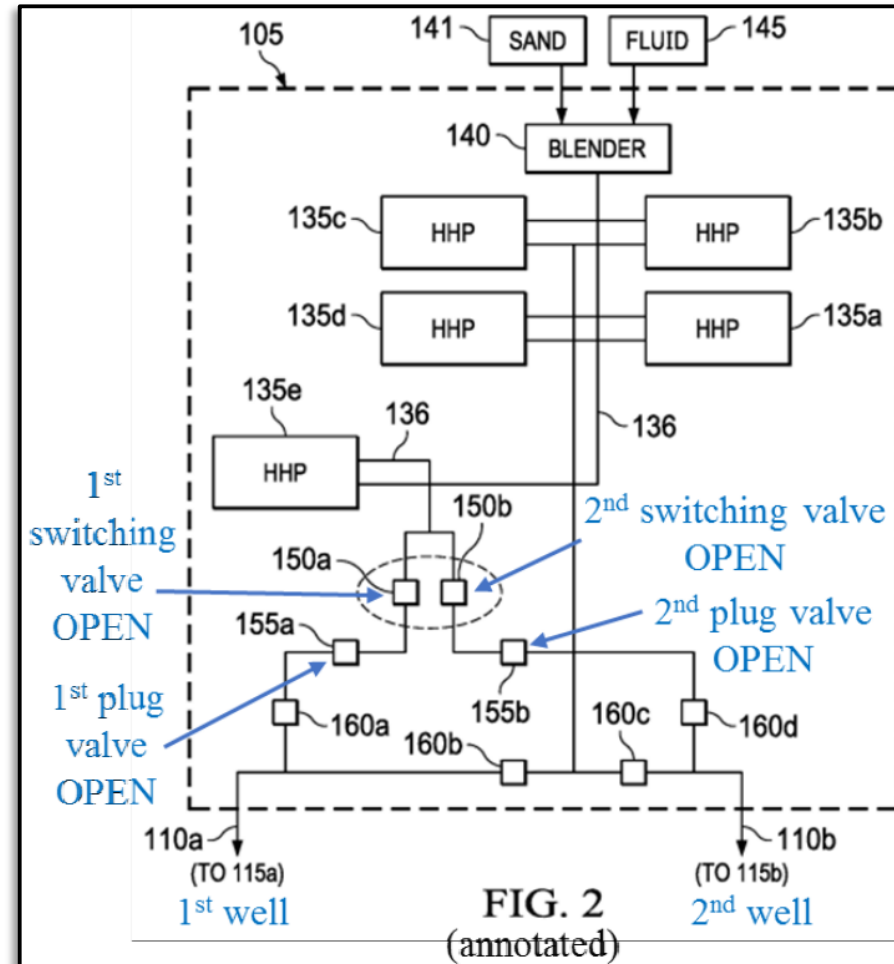


(Ex. 1005, [0021]; Paper 1, 63-64)

“Beuterbaugh”

WO2020145978
(Ex. 1005)

(2) “[n]ext...opening the [second] plug valve 155b downstream of the [second] switching valve 150b” and “then [second] switching valve 150b is opened as [first] switching valve 150a is being closed.”

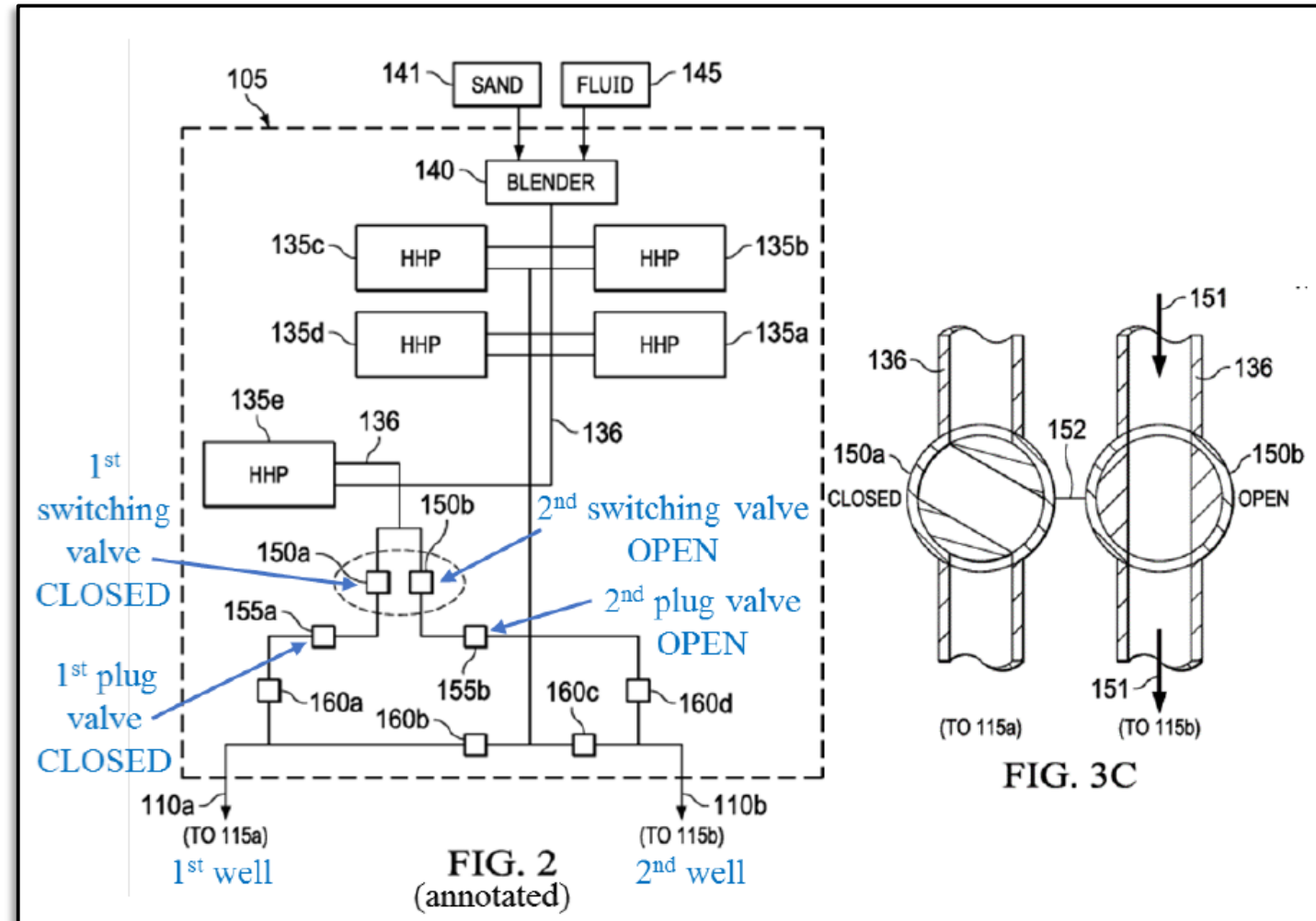


(Ex. 1005, [0021]; Paper 1, 64-65)

“Beuterbaugh”

WO2020145978
(Ex. 1005)

(3) “After [second] switching valve 150b is fully opened and [first] switching valve 150a is fully closed” and a fluid pulse is sent down second well 120b, “the [first] plug valve 155a downstream of [first] switching valve 155a is closed.”



(Ex. 1005, [0021]; Paper 1, 65-66)

Motivations to Combine

- *Carr* and *Beuterbaugh* considered in combination
- *Beuterbaugh* discloses that valve sequencing generally was a known technique for allowing the “overlap of fluid flows to each well [to] be controlled to optimize the downhole pressure waves and minimize the surface impacts.”
- Carr discloses simultaneously treating multiple wells from a centralized location by controlling the flowrate via first valve 470 and second valve 472 to the first, second, or both wells simultaneously.

(Paper 1, 63, 66; Ex. 1005 ¶ 24; Ex. 1002 ¶¶ 488–512);
Ex. 1004, ¶ 33)

“Jackson”

U.S. Publication No. 2007/0023184
(Ex. 1007)

- § 102(a)(1)-prior art
- Discloses fracturing processes using gas (fluid) injections at different flowrates within set thresholds for set durations.

(Paper 1, 8; Ex. 1007, Abstract, ¶¶ [0012], [0017], [0045]-[0046], [0053], [0056]-[0059])

“Jackson”

U.S. Publication No. 2007/0023184
(Ex. 1007)

- Jackson relates to
 - “moving between fracking stages” (Ex. 2012, ¶ 187)
 - “based on flowrate thresholds”
- Jackson teaches determining the end of a stage using thresholds regardless of stage location (Ex. 1002, ¶¶ 528-529; Ex. 1044, ¶ 32; Ex. 1043, 24:17-25:15)
- In multi-well systems a first stage is performed on a first well followed by the next stage on a second well (Ex. 1002, ¶¶ 73-78; Ex. 1044, ¶ 32; Ex. 1043, 24:24-25:20)

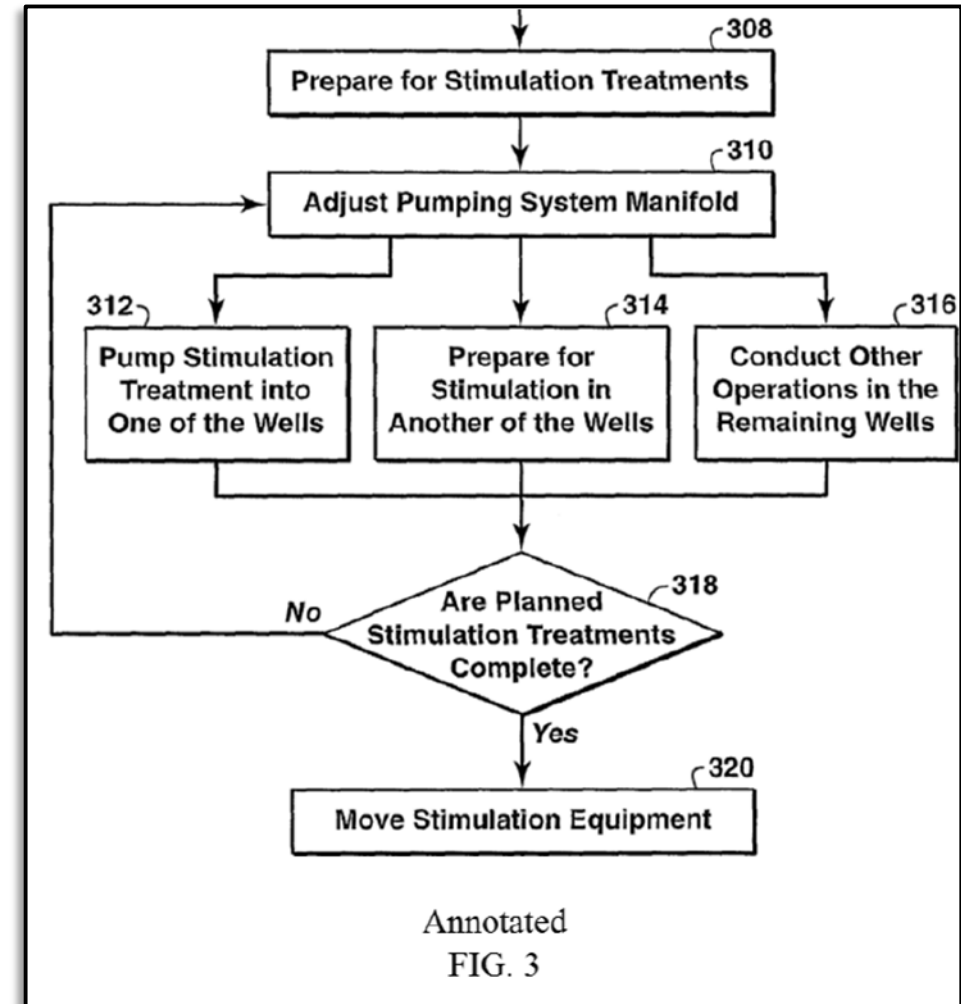
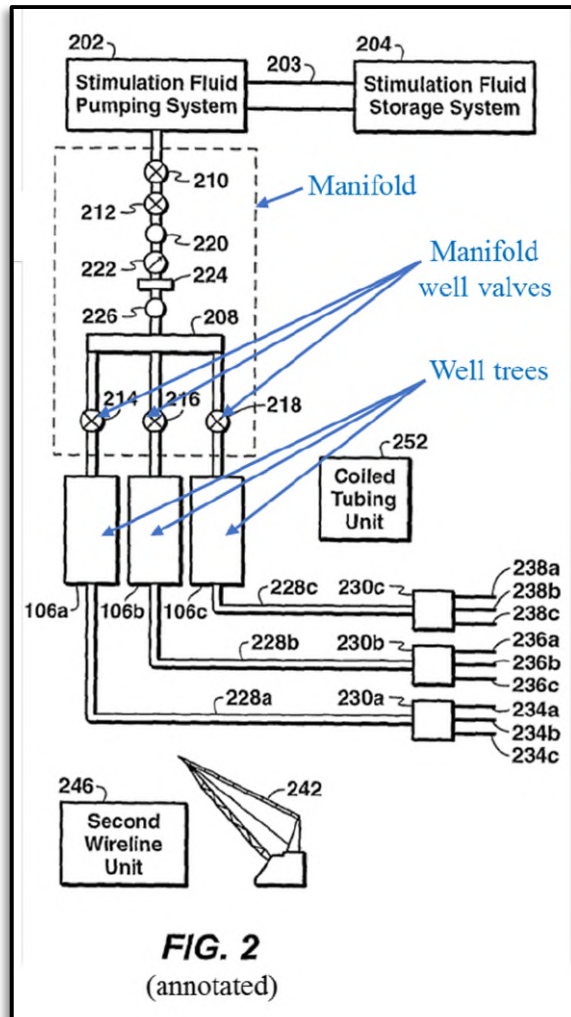
“Tolman”
U.S. Patent 8,490,685
(Ex. 1006)

- § 102(a)(1)-prior art
- Discloses a system “enabling simultaneous or concurrent operations in the stimulation of multiple wells,” where a “manifold is configured to provide a flow path from the stimulation fluid pumping system into at least one selected well...and to isolate at least one non-selected well...from the stimulation fluid pumping system.”

(Paper 1, 8; Ex. 1006, 3:60-62)

"Tolman"

U.S. Patent 8,490,685
(Ex. 1006)



(Ex. 1006; Paper 1, 72-76)

“Tolman”

U.S. Patent 8,490,685
(Ex. 1006)

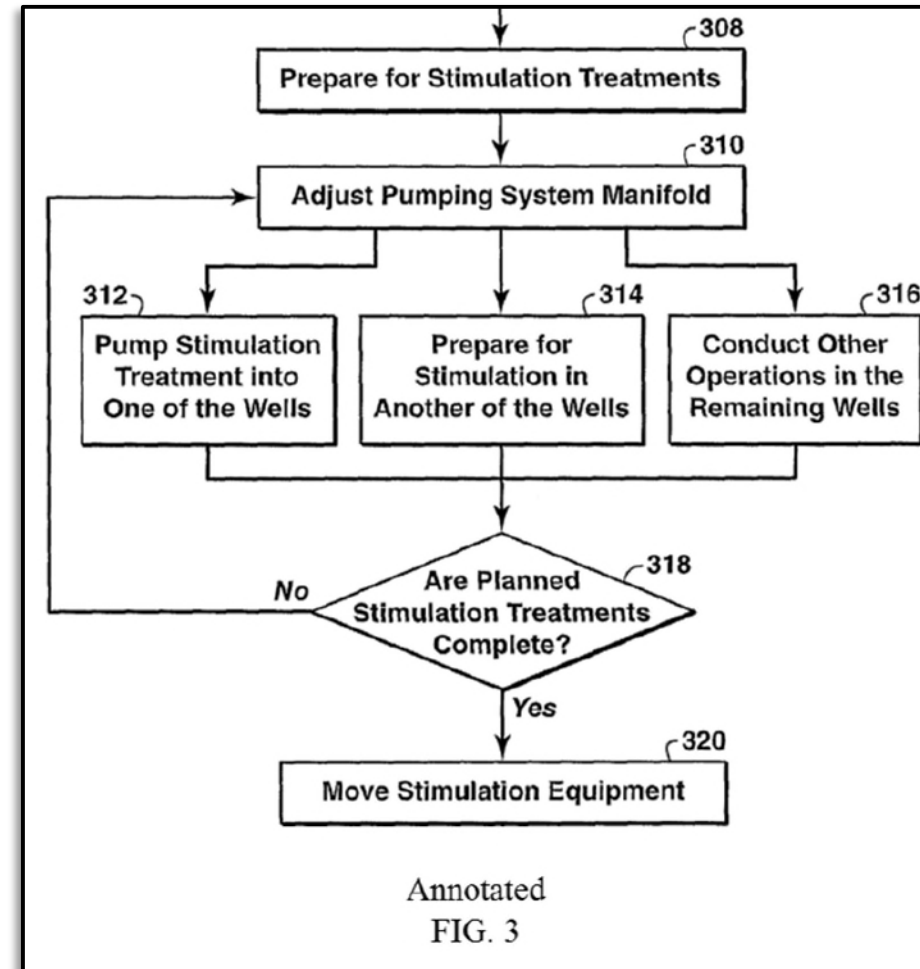
- Tolman’s first tree valve is
 - Open to allow fluid communication during treatment
 - Open to allow fluid communication during flowback
 - Closed to shut in the well
- During flowback of the first well, Tolman’s second tree valve and second manifold well valve are open to provide hydraulic fracture treatment to second well

(Ex. 1006, 9:62-11:49; Paper 25, 20; Ex. 1043, 46:1-54:9; Ex. 1044, ¶¶ 33-34, 37-42)

“Tolman”

U.S. Patent 8,490,685
(Ex. 1006)

- *Tolman* describes a method and apparatus for “connecting multiple wells to a stimulation fluid pumping system via a pumping system manifold.” Ex. 1006, Abstract.
- In *Tolman*’s pumping system a first stimulation treatment may be pumped into the first well concurrently with the preparation of the second well. *Id.*
- *Tolman*’s Figure 3 shows a flow chart of operations performed on a multi-well site, where “pumping,” “preparing,” and conducting “other operations” on different wells may be performed “in a concurrent or substantially simultaneous manner.” *Id.* at 7:48–56, Fig. 3.



(Paper 20, 29)

Downing's Expert's Testimony (*"Tolman"*)

- Tolman discloses stimulating the first well when valves 210, 214, and tree valves 106a are open to communicate fluid to first well.
- After stimulation, the first well is flowed back, and concurrently the second well receives fracture treatment via valves 210, 216, and well tree valves 106b.
- The first well's tree valve (*e.g.*, the master valve) is open during fracturing *and* flowback and, therefore, communicates fluid to the first well.
- The first well is shut-in (tree valve closed) after opening the second well's manifold valve and tree valves for communicating fluid (fracture treatment) to the second well.

(Paper 1, 71-72; Tolman, 10:29-35; Ex. 1043, 56:17-57:7; Paper 25, 23)

(Ex. 1043, 46:1-54:9)

(Paper 1, 75-76; Tolman, 11:4-21; Ex. 1043, 57:8-58:11; Ex. 1044, ¶ 40; Paper 25, 23-24)

(Paper 1, 77; Tolman, 11:46-49; Ex. 1043, 58:12-21; Ex. 1044, ¶¶ 38-42; Paper 25, 23-24)

“Tolman”
U.S. Patent 8,490,685
(Ex. 1006)

- After pumping stimulation fluid into a first well, “a determination is made whether the planned stimulation treatments...are completed.”
- A POSITA would have understood that determining if a stimulation treatment is complete would include determining whether the treatment fluid communicated via the manifold to the well has satisfied a condition (*e.g.*, determining a fluid condition of the treatment fluid).

(Paper 1, 75; Ex. 1006, 9:17-19; Ex. 1002, ¶¶ 546-549, 631, 670)

Downing's Expert's Testimony (*"Tolman"*)

- It was conventional for operators to determine the status of and make decisions for a frac job based on (*i.e.*, in response to) monitored parameters (*i.e.*, conditions) and the goals of a pumping plan.
- Monitored parameters (*e.g.*, flowrate) indicate the end of the frac stage if they match the pumping plan's indicated end-of-stage parameters.
- It was also known to move to a next stage in a frac job when the current frac stage is ending.

(Paper 25, 22-23; Ex. 1043, 21:19-25:20, 29:2-16; 18:11-13, 23:17-21; POR, 41; Ex. 2012, ¶¶ 185-190.)

Downing's Expert's Testimony (*"Tolman"*)

- It was well-known that tree valves included master and other valves. (Ex. 1043, 48:2-54:9; Ex. 1042, ¶ 98; Ex. 2006, ¶ 98; Ex. 1038)
- It was conventionally understood that a master valve “is the ultimate valve for allowing or preventing flow into or out of the well,” and that a well is “shut-in” when the master valve is closed. (Ex. 1043, 46:18-47:19; 51:6-12; Ex. 1044, ¶¶ 33-34, 38)
- At least *Tolman's* master tree valve must be open to allow fluid communication during treatment and flowback of the first well and must be closed to shut-in the well. (Ex. 1043, 46:1-54:9; Ex. 1044, ¶¶ 33-34, 37-42)
- It was standard for wellheads/trees to have remotely-operated upper master valves, which were operated by controller(s). (Ex. 1043, 50:25-51:3; Ex. 1044, ¶¶ 33-34)

'770 Patent Dependent Claims

Description	Claims
Determining fluid has satisfied condition(s)	8, 21
Third and fourth wells	2, 3, 15, 16, 28, 29
Flow rate conditions and thresholds	4-6, 9, 17-19, 22, 30-32
Pumping	7, 20, 34
Hydraulic fracturing fluid	10, 13, 23, 26, 35, 38
Zipper valves	11, 24, 36
Manifold	33
2 nd valve associated with manifold and 2 nd Well	12, 25, 37

(Ex. 1001)

Institution Decision

(Paper 10)

- The Board found that “Carr teaches the structural components necessary to perform the steps claim 1 recites” because:
 - “Carr discloses a system for providing a well stimulation fluid that includes: a manifold 120 with associated first and second controllable valves (470, 472) through which fluid is communicated to a first and second well (140, 142), respectively, and that each of those flow paths may also include a first and second flow meter (150, 152), respectively. Ex. 1003 ¶ 33, Fig. 5.”
 - “In addition, Carr discloses a control system 112 that can: (1) receive information from the respective flow meters regarding the flow to each of the first and second wells for precise measurement and regulation, which allows for the enhanced control of treatment or fracturing in both wells; and (2) control the position of the first and second valves based on the flow data received. *Id.* ¶¶ 22–25, 33, 35.”

(Paper 10, 24-25)

U.S. Patent No. 11,560,770 (“the ’770 Patent”)

1. A method, comprising: communicating fluid to a first well via a manifold and a first valve, the first valve being associated with both the manifold and the first well; and in response to determining that the fluid communicated via the manifold has satisfied one or more conditions: opening a second valve; communicating fluid to a second well via the second valve; and closing the first valve after opening the second valve.	14. An apparatus, comprising: a non-transitory computer readable medium; and a plurality of instructions stored on the non-transitory computer readable medium and executable by one or more processors, wherein, when the instructions are executed by the one or more processors, the following steps are executed: communicating fluid to a first well via a manifold and a first valve, the first valve being associated with both the manifold and the first well; and in response to determining that the fluid communicated via the manifold has satisfied one or more conditions: opening a second valve; communicating fluid to a second well via the second valve; and closing the first valve after opening the second valve.	27. A system, comprising: a first valve via which fluid is communicated from a manifold to a first well; a second valve via which fluid is adapted to be communicated to a second well; and one or more controllers, configured to: open the second valve to thereby communicate fluid to the second well via the second valve; and close the first valve after opening the second valve, in response to: determining that the fluid communicated via the manifold has satisfied one or more conditions.
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(Ex. 1001)

Institution Decision

(Paper 10)

- The Board found that “Carr states, “[t]he first valve 470 and the second valve 472 can allow for the first well 140 and the second well 142 to each be stimulated individually *by opening the respective first valve 470 or the second valve 472 and closing the other valve.*” Ex. 1004 ¶ 33 (emphasis added).”
(Paper 10, 25)

- Patent Owner responds: “If any particular sequence should be imputed to Carr, it should be the valve sequence conventionally utilized in fracturing industry when sequentially fracturing two wells: *closing the valve of the first well and then opening the valve of the second well.* Ex.2012, ¶148.”
(Paper 20, 25)

Institution Decision

(Paper 10)

- The Board found Carr demonstrated skilled artisans would have known to perform the disclosed opening/closing valve sequence(s) in response to determining the fluid communicated via the manifold satisfies one or more conditions because:
 - “Carr teaches expressly that its control system collects fluid condition information that may be utilized to enhance the control of treatment and fracturing. Ex. 1004 ¶ 23.”
 - “Additionally, Carr teaches that the control system may utilize the flow data from the first flow meter and the second flow meter in light of fluid flow targets “to control the position” of the first and second valves. *Id.*”

(Paper 10, 25-26; see *also* Ex. 1004, [0023-0025], [0035])

Institution Decision

(Paper 10)

- The Board found Petitioner's reasoning for combining *Carr* and *Beuterbaugh* in the manner claimed has a rational underpinning, which is supported sufficiently by the cited evidence of record after considering what *Carr* and *Beuterbaugh* teach as a whole.
 - Patent Owner did not dispute that Beuterbaugh suggests valve sequencing was a known technique that can enhance well operations;
 - Patent Owner did not dispute that Carr discloses a control system that can control the sequence of opening and closing valves in response to determining that the fluid communicated via the manifold has satisfied one or more conditions.

(Paper 10, 27-28)

Secondary Considerations

- No evidence of what “Freedom Series” includes
 - No technical information
 - No schematics
 - No product information or design documentation
- No evidence of nexus
- No evidence of long felt but unmet need
- No evidence of commercial success
- No evidence of expert skepticism
- No evidence of other secondary considerations

(Paper 1, 89; Paper 20, 60-69; Paper 25, 26-27; Paper 31, 21-26; Ex. 2012, ¶¶ 233-241; Ex. 2032; Ex. 2019)

Secondary Considerations

From: Melissa Smith <Melissa.Smith@GulfEnergyInfo.com>
Sent: Thursday, August 29, 2024 6:42 AM
To: Tim Marvel <timmarvel@sef.energy>
Subject: RE: 2023 Gulf Energy Award Submission

Here you go!

Name of Technology or Individual (Company, Technology or Individual):
Freedom Series Completion System

Company Name (Associated with Technology or Individual):
Downing Wellhead Equipment

*Describe the nominee**

including space and pump

Downing, a leading technology

eliminates time between

(please note the difference

Downing identified the

transition time and pressure

maintenance and 4) safety

automated completion

between stages with new

pump for the duration of

the completion. Through

automation and interlocks

with wireline and frac

systems, the

system eliminates NPT

associated with gate

valves. The latest

addition to the system,

FS Hot Swap, enables

the

system eliminates NPT associated with gate valves. The latest addition to the system, FS Hot Swap, enables the exchange of pumps during frac operations without stopping the frac. Although the system does not directly solve logistic issues (i.e. sand and water shortages), the demonstrated consistency achieved using the system enables better planning of resources. The system has broken multiple pumping records across US basins including hours pumped continuously and stages completed. In addition, the system has over a dozen industry “firsts” that have changed completion operations. With the addition of FS Hot Swap, the automated completion system enables operators to frac 24/7. The base system was introduced more than 12 months ago. However, the latest addition to the system, FS Hot Swap, commercially introduced this year, enables the 24/7 pumping and therefore submitted the system in its entirety.

Through automation and interlocks with wireline and frac systems, the system eliminates NPT associated with gate valves. The latest addition to the system, FS Hot Swap, enables the exchange of pumps during frac operations without stopping the frac. Although the system does not directly solve logistic issues (i.e. sand and water shortages), the demonstrated consistency achieved using the system enables better planning of resources. The system has broken multiple pumping records across US basins including hours pumped continuously and stages completed. In addition, the system has over a dozen industry “firsts” that have changed completion operations. With the addition of FS Hot Swap, the automated completion system enables operators to frac 24/7. The base system was introduced more than 12 months ago. However, the latest addition to the system, FS Hot Swap, commercially introduced this year, enables the 24/7 pumping and therefore submitted the system in its entirety.

(Ex. 2019; Paper 25, 26 citing Paper 20, 60-64, 66-69
citing Ex. 2019; Ex. 1044, ¶¶ 43-44)

Secondary Considerations

21 Q Does hot swapping have anything to do with the
22 claimed CP swap?
23 A No, ma'am.

(Ex. 1043, 90:21-23; Paper 20, 60-69; Paper 25, 26-29; Ex. 1044, ¶¶ 43-44, Paper 31, 21-28)

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Claim Language from Representative Claim 1

What is claimed is:

1. A method, comprising:
communicating fluid to a first well via a manifold and a first valve, the first valve being associated with both the manifold and the first well; and
in response to determining that the fluid communicated via the manifold has satisfied one or more conditions:
opening a second valve;
communicating fluid to a second well via the second valve; and
closing the first valve after opening the second valve.

Patent-Owner-Alleged Features

1. "Hydraulic fracturing"
2. "Switching"
3. "Continuous pumping (CP)"
4. "CP Swap"
5. "Without any break in pumping operations"
6. "High-pressure pumping fluid"
7. "Zipper manifold"
8. "Shared zipper manifold"
9. "Common pressurized fluid flow"
10. "Interdependency between first and second wells"
11. "Shared fluid flow through a zipper manifold"
12. Zipper valves connected to the same "zipper manifold"
13. Fluid must be mixed and redirected from the manifold
14. Specific valve position in relation to the manifold
15. Wells cannot be hydraulically isolated
16. Eliminate/reduce non-pumping time
17. "After" requires specific time frame

(Paper 25, 1)

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- Evidence
- Arguments
- Weight of Expert Testimony

Thank you