

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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GODBERSEN-SMITH CONSTRUCTION COMPANY  
d/b/a/ GOMACO CORPORATION  
Petitioner

v.

GUNTERT & ZIMMERMAN CONST. DIV., INC.,  
Patent Owner

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Case IPR2021-00235  
Patent No. 10,196,101

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**PETITION FOR INTER PARTES REVIEW**

## TABLE OF CONTENTS

I.	PRELIMINARY STATEMENT .....	1
II.	THE '101 PATENT .....	3
	A. Overview .....	3
	B. Prosecution History .....	5
	C. Effective Filing Date .....	6
III.	STATEMENT OF PRECISE RELIEF REQUESTED .....	14
	A. Prior Art.....	14
	B. Grounds of Unpatentability .....	14
IV.	DISCRETIONARY DENIAL IS NOT WARRANTED.....	15
	A. Factor 1: Whether the court granted a stay or evidence exists that one may be granted upon institution .....	16
	B. Factor 2: Proximity of the court's trial date to the Board's projected statutory deadline for a final written decision.....	18
	C. Factor 3: Investment in the parallel proceeding .....	18
	D. Factor 4: Overlap between issues in the petition and the parallel proceeding .....	19
	E. Factor 5: Whether the petitioner and district-court defendant in the parallel proceeding are the same party .....	20
	F. Factor 6: Other circumstances impacting the Board's exercise of discretion, including the merits .....	20
V.	LEVEL OF ORDINARY SKILL IN THE ART .....	21
VI.	CLAIM CONSTRUCTION .....	21
VII.	BACKGROUND ON FEEDBACK LOOPS .....	22

VIII. DETAILED EXPLANATION AND EVIDENCE .....	26
A. Ground 1: Guntert in view of Dorsett Renders Claims 4-7 and 15-19 Obvious .....	26
1. Guntert Summary .....	26
2. Dorsett Summary .....	27
3. Rationale for Combining Guntert and Dorsett.....	30
4. Independent Claim 1 .....	36
5. Claim 3: “The paving machine of claim 1, wherein one or more of the power drives comprise first and second diametrically opposed helical worm drives engaging and driving a ring gear disposed between them.” .....	46
6. Claim 4:.....	47
7. Claim 5: “The paving machine of claim 4, wherein the desired orientation is alignment of the crawler tracks along a paving direction.” .....	56
8. Claim 6: “The paving machine of claim 4, wherein the desired orientation is alignment of the crawler track of one of the swing leg assemblies to the crawler track orientation of each other swing leg assembly.” .....	57
9. Claim 7: “The paving machine of claim 4, wherein the processor, the power drive, and the first transducer, and the second transducer from each swing leg assembly form a feedback loop for maintaining an orientation of the crawler track independently of angular inclinations of the crawler track relative to the module frame.” .....	58
10. Independent Claim 11 .....	59
11. Claim 14.....	65
12. Claim 15 .....	69

13.	Claim 16: “The paving machine of claim 15, wherein the desired orientation is alignment of the crawler tracks along a paving direction.” .....	72
14.	Claim 17: “The paving machine of claim 15, wherein the desired orientation is alignment of the crawler track of one of the swing leg assemblies to the crawler track orientation of each other swing leg assembly.” .....	72
15.	Claim 18: “The paving machine of claim 15, wherein the second transducers and the hydraulic actuators form a feedback loop for maintaining an orientation of the swing leg assembly independently of angular inclinations of the swing leg relative to the module frame.” .....	72
16.	Claim 19: “The paving machine of claim 18, wherein the feedback loop further includes the first transducers and the power drive for further maintaining an orientation of the crawler track independently of angular inclinations of the crawler track relative to the module frame.” .....	73
IX.	MANDATORY NOTICES .....	73
A.	Real Party-in-Interest .....	73
B.	Related Matters Under 37 C.F.R. § 42.8(b)(2) .....	73
C.	Lead and Back-Up Counsel.....	74
D.	Service Information Under 37 C.F.R. § 42.8(b)(4).....	75
X.	GROUND FOR STANDING.....	76
XI.	CONCLUSION.....	76

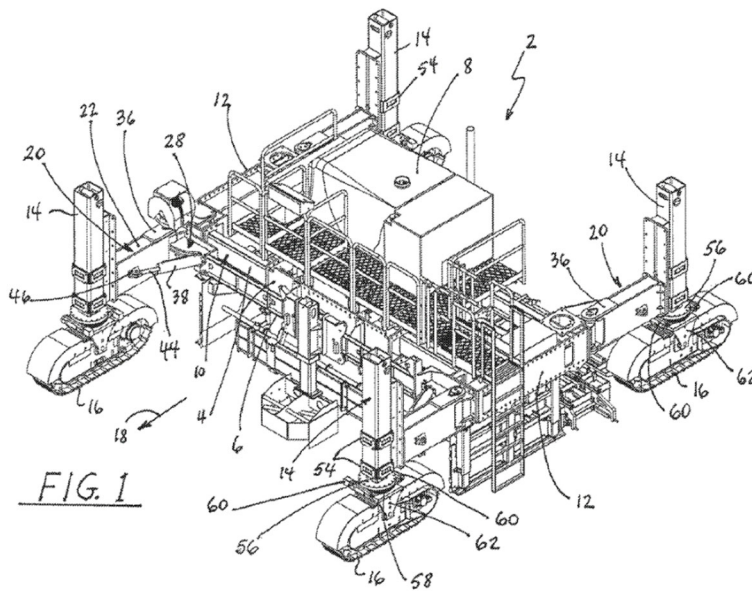
### TABLE OF EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 10,196,101
1002	Declaration of William Singhose, Ph.D. (“Singhose”)
1003	Curriculum Vitae of William Singhose, Ph.D.
1004	Prosecution History for U.S. Patent No. 10,196,101 (downloaded from PAIR)
1005-1014	RESERVED
1015	Plaintiff Guntert & Zimmerman Const. Div., Inc.’s Initial Disclosure of Infringement Contentions, <i>Guntert &amp; Zimmerman Const. Div., Inc. v. GOMACO Corp.</i> , Case No. 5:20-cv-4007-CJW-KEM (N.D. Iowa) (June 19, 2020)
1016-1017	RESERVED
1018	Docket Sheet for <i>Guntert &amp; Zimmerman Const. Div., Inc. v. GOMACO Corp.</i> , Case No. 5:20-cv-4007-CJW-KEM (N.D. Iowa) (downloaded Sept. 24, 2020)
1019	Trial Management Order, <i>Guntert &amp; Zimmerman Const. Div., Inc. v. GOMACO Corp.</i> , Case No. 5:20-cv-4007-CJW-KEM, ECF No. 35 (N.D. Iowa) (June 10, 2020)
1020	GOMACO’s Invalidity Contentions Cover Sheets, <i>Guntert &amp; Zimmerman Const. Div., Inc. v. GOMACO Corp.</i> , Case No. 5:20-cv-4007-CJW-KEM (N.D. Iowa) (Aug. 3, 2020)
1021	Joint Claim Construction Statement, <i>Guntert &amp; Zimmerman Const. Div., Inc. v. GOMACO Corp.</i> , Case No. 5:20-cv-4007-CJW-KEM (N.D. Iowa) (Oct. 2, 2020)
1022	John J. Craig, Introduction to Robotics Mechanics and Control (Pearson Education Inc.) (2005) (“Craig”)
1023	U.S. Patent No. 7,797,860 to Schoenmaker (“Schoenmaker”)
1024	Declaration of Kelley M. Hayes Greenhill
1025	MARC Record from the Library of Congress for Craig, downloaded from <a href="https://lccn.loc.gov/2004275113/marcxml">https://lccn.loc.gov/2004275113/marcxml</a> on November 9, 2020
1026	MARC record from the Library of the University of Wisconsin for Craig, downloaded from <a href="https://search.library.wisc.edu/catalog/9910980844202121">https://search.library.wisc.edu/catalog/9910980844202121</a> on November 9, 2020

<b>Exhibit No.</b>	<b>Description</b>
1027	RESERVED
1028	U.S. Patent Application Publication No. 2011/0236129 to Guntert et al. (“Guntert”)
1029	U.S. Patent No. 9,873,318 to Dorsett (“Dorsett”)
1030	U.S. Patent No. 9,908,571

## I. PRELIMINARY STATEMENT

GOMACO Corporation (“GOMACO”) requests *inter partes* review and cancellation of claims 4-7 and 15-19 of U.S. Patent No. 10,196,101 (“the ’101 patent”; Ex. 1001), assigned to Guntert & Zimmerman Const. Div., Inc. (“G&Z”). The ’101 patent describes a slipform paver for laying concrete.



Ex. 1001, Fig. 1. These pavers have pivotable swing-legs (four are shown above) that allow the crawler tracks rolling along the ground to be positioned at various widths.

The ’101 patent was filed in 2018, nearly eight years after the original provisional patent application to which it claims priority. The ’101 patent’s priority chain includes several patent applications, one of which is a continuation in part filed on June 14, 2017, over seven years after the original provisional patent

application. The filing of this continuation-in-part application occurred mere months after GOMACO announced new designs for its machines (Ex. 1036), and the new matter added several figures and accompanying description (Ex. 1001, 15:54-22:36, Figs. 9-13E) for paver configurations that resemble machines GOMACO had been selling for years. Each application in the '101 patent's priority chain describes the paver's feedback loop at a high level, without detailing many of the steps that could be performed by a processor during that loop.

For the first time with the '101 patent, however, G&Z claims low-level steps purportedly performed by the paver's processor (down to the level of subtracting values from one another, which was never before mentioned in any of the family's patent applications). And as part of these new steps, G&Z claims an entirely new feature never before disclosed in its applications—one that allows the system to provide custom configurations for the swing leg and track orientations on the fly. But G&Z has never before disclosed this feature, and the inclusion of this feature in the claims constitutes new matter. This continues G&Z's trend of attempting to claim matter beyond the scope of its disclosure. As a result, many claims in the '101 patent are not entitled to the patent's claim of priority. This IPR petition challenges only those claims.

G&Z cannot claim priority back to the 2010 provisional application (or any other application in the priority chain), which means U.S. Patent Application

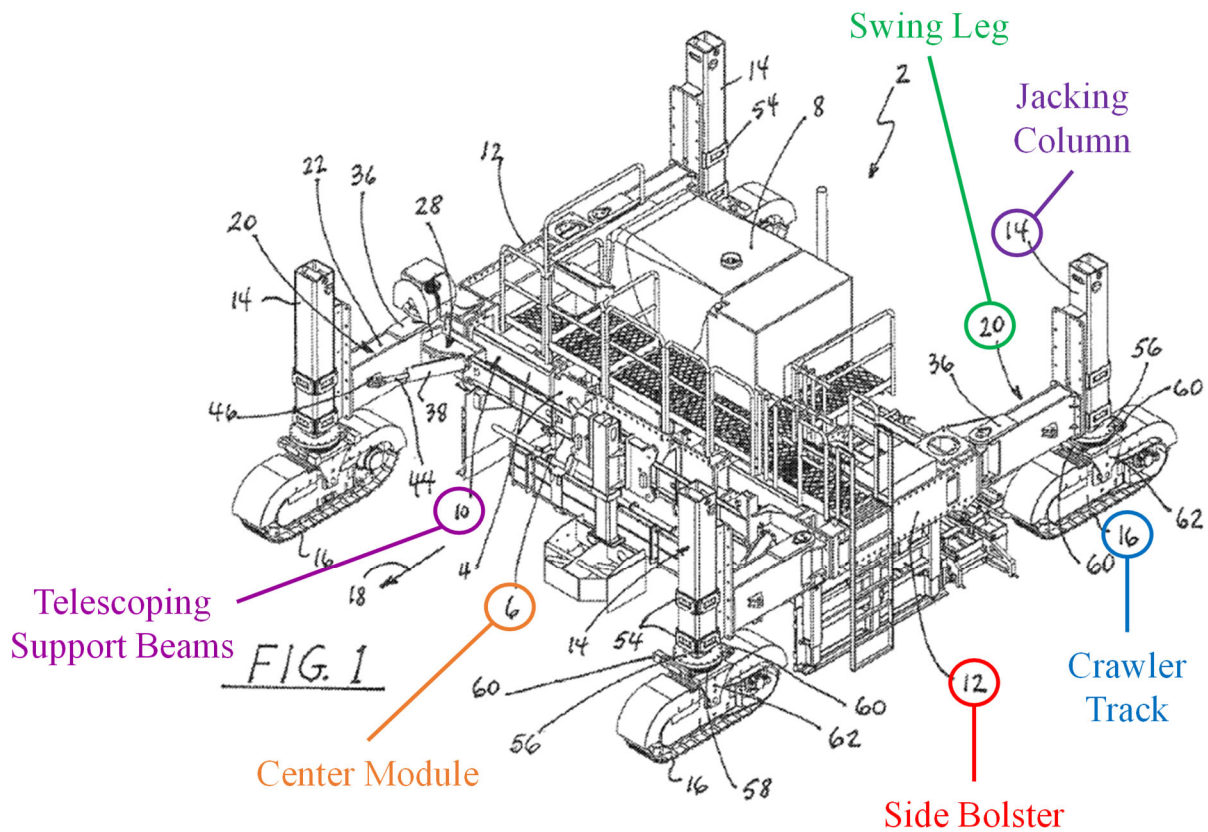


Publication No. 2011/0236129 to Guntert et al. (“Guntert”; Ex. 1028)—the publication of the 2011 application—is prior art to the ’101 patent. That application discloses nearly all the features of the challenged claims, with the exception of the new matter. U.S. Patent No. 9,873,318 to Dorsett (“Dorsett”; Ex. 1029) is prior art to the ’101 patent and discloses the new features that were added to the challenged claims. As discussed below, it would have been obvious to add these new features to Guntert’s paver based on Dorsett’s teachings. As a result, claims 4-7 and 15-19 of the ’101 patent should be canceled.

## **II. THE ’101 PATENT**

### **A. Overview**

The ’101 patent discloses a slipform paver having a center module, bolsters attached to telescoping support beams that move laterally relative to the center module, swing legs, jacking columns, and crawler tracks. Ex. 1001, 1:25-26, 8:55-61, 9:28-35. These features are shown in Fig. 1.



*Id.*, Fig. 1 (annotated). Each crawler track is “mounted to” and rotates relative its jacking column (two hollow tubes—outer 48 and inner 50) that telescope relative to each other in response to an internal hydraulic actuator to raise/lower the machine. *Id.*, 8:61-66, 11:18-37.

Each swing leg is fixed to the jacking column on one end, and pivotally connected to a forward or aft end of a bolster on the other end, allowing the swing leg to pivot horizontally. *Id.*, 9:28-35. When pivoting the leg, it swings the jacking column and crawler track to various positions. *Id.*, 10:50-67. Every feature

described above predates the '101 patent, as the specification admits. *Id.*, 1:25-5:58 (describing these features as “conventional” and “well known”).

Regarding the '101 patent's purported invention, the specification discloses an actuator that pivots the swing leg and a power drive that rotates the crawler track. *Id.*, 6:14-16, 6:33-359. Angular position transducers provide outputs to a processor, which uses those signals to control crawler track rotation as the swing leg pivots. *Id.*, 6:17-25. Accordingly, the crawler track's position remains “straight ahead” “no matter what the swing leg angle is.” *Id.*, 6:26-28. Crawler track orientation can be controlled while the machine is moving and the tracks are on the ground, or while the machine is “stationary” by “lifting each crawler track (one at a time) off the ground.” *Id.*, 6:50-58. Singhose,<sup>1</sup> ¶¶36-38.

## **B. Prosecution History**

The '101 patent was filed as a continuation application in a chain of several applications that include a continuation-in-part of U.S. Patent No. 9,708,020. During prosecution, the Examiner issued a double patenting rejection. Ex. 1004,

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<sup>1</sup> Citations to “Singhose” refer to the Declaration of William Singhose, Ph.D., Ex. 1002.

91-92. The claims were then allowed after the applicant filed a terminal disclaimer to overcome the rejection. *Id.*, 102-03, 125.

**C. Effective Filing Date**

Claims 4-7 and 15-19 of the '101 patent are entitled to an effective filing date of June 20, 2018, the filing date of the application that directly issued as the '101 patent. Singhose, ¶¶40-51. The effective filing date of a claimed invention is the patent's actual filing date unless the patentee can show entitlement to an earlier priority date under, *inter alia*, §§ 119 or 120. 35 U.S.C. § 100(i)(1); *Nat. Alts. Int'l, Inc. v. Iancu*, 904 F.3d 1375, 1380 (Fed. Cir. 2018).

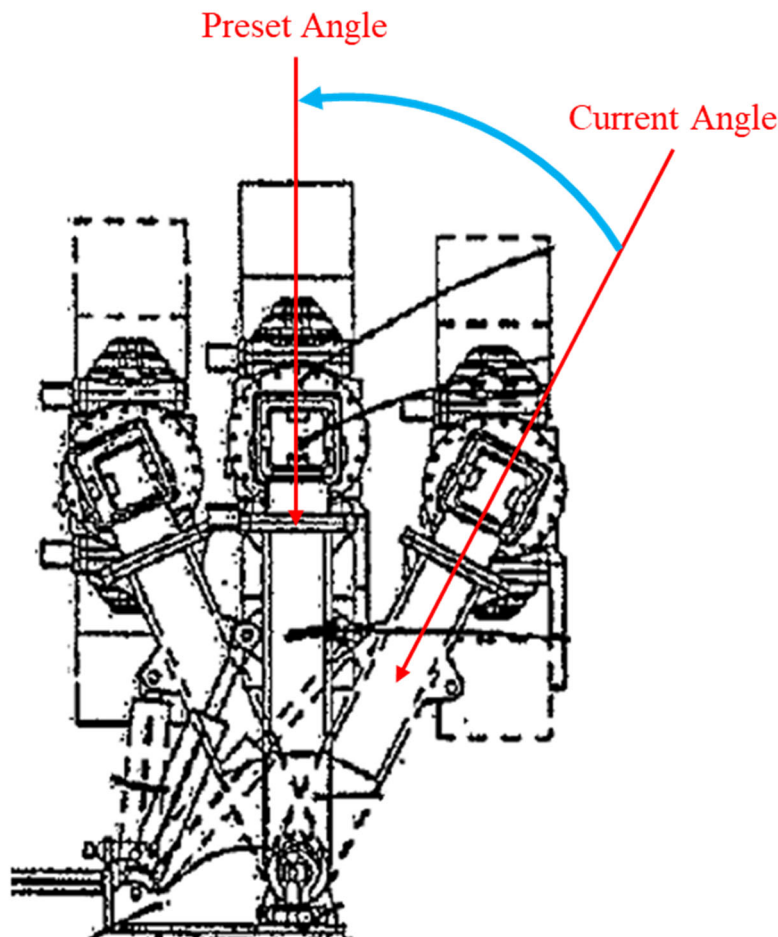
The '101 patent issued from an application that is a continuation of U.S. Application No. 15/873,757 (now U.S. Patent 10,029,749), which in turn is a continuation of U.S. Application No. 15/623,012 that was filed on June 14, 2017, and issued as U.S. Patent No. 9,908,571 (Ex. 1030). The '571 patent originated from a continuation-in-part application that added new matter related to additional slipform paver configurations, including eleven new figures (Ex. 1030, Figs. 9-13E) and several pages of description (*id.*, 15:53-22:36). The new matter in claims 4-7 and 15-19 of the '101 patent did not appear in the '571 patent, however. It appeared for the first time in the claims of the application leading to the '101 patent itself.

Claim 4 recites “storing the first signal and second signal from each swing leg assembly and thereby updating the respective stored first signal and the respective stored second signal for each respective swing leg assembly” and “calculating the difference between the first signal and second signal, and the stored first signal and stored second signals respectively, for each respective swing leg assembly.” Ex. 1001, Claim 4. Claim 15 similarly recites “storing the first signal and second signal from each swing leg assembly as the respective stored first signal and the respective stored second signal for each respective swing leg assembly” and “calculating the difference between the first signal and second signal, and the stored first signal and stored second signals respectively.” Ex. 1001, Claim 15. No application to which the ’101 patent claims priority provides written description for either of these limitations, where the sensor signals are stored and then used to calculate the differences between stored/desired and actual positions. Singhose, ¶42.

Guntert, which is the publication of the first non-provisional application in the priority chain, does disclose a “feedback loop” formed from “[o]nboard computer or processor 82 and the associated transducers 70, 78” in which “the computer receives the angular position signal from swing leg transducer 78.” Guntert, ¶[0052]. However, it does not disclose the two limitations above.

Comparing the claims to Guntert's disclosure reveals the full extent of the new matter. In the context of the claims discussed above, the "first signal" is emitted by "a first angular position transducer" and indicates "an angular orientation of the crawler track relative to the jacking column." Ex. 1001, Claim 1. The "second signal" is emitted by a "second angular position transducer" and indicates "an angular orientation of the swing leg relative to the module frame." *Id.* Guntert discloses that these signals are used in conjunction with moving the swing leg and tracks. Singhose, ¶44.

For example, Guntert discloses that "onboard computer always maintains the swing leg angle at a fixed, preset angle." Guntert, ¶[0017]. It continues, noting that "[i]f the swing leg migrates away from a preset angle, the swing leg hydraulic cylinder is actuated to maintain the preset angle." *Id.* While Guntert does not disclose how the "second signal" is used in this operation, taking a generous view of Guntert's disclosure may suggest the second signal is used to maintain the swing leg at a fixed preset angle. Singhose, ¶45. This can be illustrated using Guntert's Figure 2 as an example. As shown below in that figure, there are three example swing leg positions shown, each of which has a different angle relative to the frame. Singhose, ¶45.



Guntert, Fig. 2 (annotated).

In the case where the center swing leg is the “preset angle,” the mode of operation described in Guntert would attempt to move the swing leg to the “preset angle.” Singhose, ¶45. Once again, taking a generous view of Guntert, a POSITA would understand the control system would accomplish this by using the preset angle and the current angle (which is emitted from the second angular position transducer). Singhose, ¶45. In particular, the system would monitor the current angle from the sensor to determine if it differs from the “preset angle.” Singhose,

¶45. If the system identifies a difference between those two values, then the feedback loop will drive the swing leg toward the preset angle. Singhose, ¶45. As discussed in Section VII, this “difference” is often called an error value. As the swing leg is driven toward the preset angle (which is often referred to as a “desired” position), the system will continuously monitor whether there is still a difference or “error” between the current angle and the preset angle. Singhose, ¶45. When the angular position error is reduced to 0, the system knows it has reached its “desired” position (or preset angle) and it will cease moving the swing leg. Singhose, ¶45.

Guntert also discloses a similar process for the crawler tracks. Singhose, ¶46. In particular, it explains a scenario where the swing leg is relocated, after which “the crawler track will automatically go back to the straight-ahead position.” Guntert, ¶[0043]. As with the swing leg example shown above, a POSITA would understand that there is a “desired” angle to which the feedback loop drives the crawler track by monitoring the current position of the track, as identified by the first angular transducer. Singhose, ¶46.

While Guntert discloses these features of feedback control, it never discloses how the “preset” or “desired” values *are created* and thus does not disclose the identified portions of claims 4 and 15. Singhose, ¶47. In particular, it does not disclose storing the first and second signal (i.e., the values emitted from the



transducers) and then using those stored values to calculate the difference between the stored first/second signal and the current value from the transducers. Singhose, ¶47.

In the examples above, a POSITA would understand there is a stored desired swing-leg angle or track angle, but the claims are more specific than simply having a stored value. Singhose, ¶48. The claims recite how the stored values come into being. They require storing the “first and second signals” which are the signals emitted from the transducers. Singhose, ¶48. The claims then further require calculating the difference between those stored transducer signals and the current transducer signals.

As discussed in Ground 1, a potential use of this type of technique would be to store a desirable configuration for future use. Singhose, ¶49. If an operator moved the swing leg and track to a desirable position that needed to be reused on occasion, then they could choose to memorize or store that configuration. Singhose, ¶49. The machine would read the current values from the sensors/transducers (the first and second signals) and store them in memory to remember the precise location of the track and swing leg. Singhose, ¶49. This would allow those positions to be recalled at a later time. Singhose, ¶49.

If the swing leg had moved away from the saved position when the position is recalled, the feedback loop would calculate the difference between the

stored/memorized swing leg angle (first stored signal) and the current swing leg angle from the sensor (first signal). Singhose, ¶49. The system would drive that error or difference toward zero until the current swing leg angle from the sensor (first signal) matched the stored/memorized swing leg angle. Singhose, ¶49. A similar process could also be used for the track angle. Singhose, ¶49.

Neither Guntert, nor any patent in the priority chain, however, discloses anything of the sort. Singhose, ¶50. In the examples discussed previously with the swing leg's "preset angle," the specification never discusses how that value is created and certainly does not disclose storing the current sensor value (the first signal) to set the value. Singhose, ¶50. In one of the few examples in the patent, it describes moving the swing legs "90° from the paving direction 18 towards a position that is laterally outward of bolsters 12" so that it "can be transported by truck and trailer to a new location." Guntert, ¶[0041]. The specification refers to this position for the swing legs and tracks as "the transport position" in which "the swing legs and crawlers are parallel to and extend past the respective lateral ends of the paving machine." Guntert, ¶[0059]. While the patent describes this as a "preset" angle, there is no disclosure in the patent of the creation of this value or it being stored based on the first or second signal values. *Id.* There is likewise no corresponding disclosure of "calculating the difference between the first signal and

second signal, and the stored first signal and stored second signals respectively.”

Singhose, ¶50.

In another example, the specification describes the onboard computer “calculat[ing] by how much the crawler track’s angle must be changed relative to the jacking column (which has also been angularly offset relative to the transport direction by the swivel motion of the swing leg) to reset the crawler track suspended from yoke 62 to the angular orientation of the desired paving direction.” Guntert, ¶[0052]. While, again, a POSITA would understand this process to involve a “desired” paving direction, Guntert never discloses how that value is created. *Id.* And, again, there is no disclosure of a value corresponding to that orientation being stored based on the first or second signal values, and there is likewise no corresponding disclosure of “calculating the difference between the first signal and second signal, and the stored first signal and stored second signals respectively.” *Id.*

The above-identified limitations appeared for the first time in claims submitted with the filing of U.S. Application No. 16/013,864, which issued as the ’101 patent. Ex. 1004, 44, 46-47. Given the lack of disclosure of the above-identified claim limitations in any application preceding the ’101 patent, these additions to the ’101 patent are new matter that was added on the filing date of the application leading to the ’101 patent, June 20, 2018. Singhose, ¶51. Therefore,

claims 4 and 15, as well as their dependent claims 5-7 and 16-19, are not entitled to an effective filing date earlier than June 20, 2018.<sup>2</sup>

### III. STATEMENT OF PRECISE RELIEF REQUESTED

Claims 4-7 and 15-19 are unpatentable and should be canceled because of the following prior-art references and grounds:

#### A. Prior Art

- Guntert, published on September 29, 2011; prior art under § 102(a)(1).
- Dorsett, filed on May 27, 2016 and issued on January 23, 2018; prior art under § 102(a)(1) and § 102(a)(2).

#### B. Grounds of Unpatentability

Ground	Challenged Claims	Basis	Prior Art
1	4-7 and 15-19	103	Guntert and Dorsett

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<sup>2</sup> The '571 patent, which issued from the continuation-in-part application, also does not disclose the identified missing features. But even if it did, it would not be material to this IPR petition. The application for the '571 patent was filed on June 14, 2017. Even with that priority date, the claims would still be unpatentable, as the references in this petition (Guntert and Dorsett) would still be prior art.

#### IV. DISCRETIONARY DENIAL IS NOT WARRANTED

Petitioner has not previously challenged the '101 patent in any AIA trial, no other AIA trial or Patent Office proceeding is pending against the '101 patent (other than the concurrently filed IPR petition in IPR2021-00234), and Dorsett was not presented to the Patent Office during prosecution. *See* Ex. 1001, (56) (References Cited). While Guntert is listed on the face of the patent, the Examiner did not apply it in any substantive rejection. “The Board has consistently declined exercising its discretion under Section 325(d) when the only fact a Patent Owner can point to is that a reference was disclosed to the Examiner during the prosecution.” *Amgen Inc. v. Alexion Pharm., Inc.*, IPR2019-00739, Paper 15 at 62 (PTAB Aug. 30, 2019); *see also* *Amber.io, Inc. v. 72Lux, Inc.*, IPR2020-00015, Paper 8 at 19-20 (PTAB Apr. 1, 2020) (evaluating reference disclosed in IDS under *Advanced Bionics*<sup>3</sup> and *Becton Dickinson*<sup>4</sup> before concluding that a citation of a reference in an IDS alone, without any substantive consideration of that reference during prosecution, did not warrant a discretionary denial under Section

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<sup>3</sup> *Advanced Bionics, LLC v. MED-EL Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6, 7 (PTAB Feb. 13, 2020).

<sup>4</sup> *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017).

325(d)). Therefore, the facts here do not support a discretionary denial under *General Plastic*<sup>5</sup> or 35 U.S.C. § 325(d). The stage of the corresponding district court litigation also does not support a discretionary denial under *NHK Spring*<sup>6</sup> or the *Fintiv*<sup>7</sup> factors, as discussed below.

**A. Factor 1: Whether the court granted a stay or evidence exists that one may be granted upon institution**

GOMACO will seek to stay the district court case after filing IPR petitions against all asserted patents in the case. The Board has stated that it “decline[s] to infer” regarding “how the District Court would rule should a stay be requested by the parties in the parallel case.” *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 at 12 (PTAB May 13, 2020) (informative). Thus, at a minimum, Factor 1 is neutral.

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<sup>5</sup> *General Plastic Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (PTAB Sept. 6, 2017) (precedential).

<sup>6</sup> *NHK Spring Co., Ltd. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018) (precedential).

<sup>7</sup> *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv I*”).

Factor 1 ultimately favors institution, however, because instituting will resolve several invalidity issues presented in district court, may resolve the entire district-court case on the '101 patent, and may simplify other issues even if the Board confirms the challenged claims. As Federal Circuit Judge Bryson explained when sitting by designation, “the most important factor” regarding “whether to grant a stay” is “the prospect that the [IPR] proceeding will result in simplification of the issues.” *NFC Techs. LLC v. HTC Am., Inc.*, 2015 WL 1069111, \*4 (E.D. Tex. Mar. 11, 2015). Judge Bryson explained this simplification can take several forms, including:

- alleviating “discovery problems relating to prior art;”
- possible lawsuit dismissal;
- possible settlement and conservation of court resources;
- streamlining “[i]ssues, defenses and evidence” for trial;” and
- reduced costs for the parties and the court.

*Id.* Here, institution is likely to achieve these benefits given the overlap in the issues and the statutory estoppel that will apply when the Board issues its Final Written Decision.

**B. Factor 2: Proximity of the court's trial date to the Board's projected statutory deadline for a final written decision**

The district court trial is scheduled to occur at around the presumed deadline for the Board to issue its Final Written Decision in this case. Given the November 25, 2020 filing date of this IPR and assuming one week for the Board to issue its Notice of Filing Date Accorded, the Final Written Decision is presumed due in the first week of June 2022. The district court trial is scheduled for April 2022. Ex. 1019, 3. Moreover, while the Board's decisions generally have not been delayed by COVID-19, numerous district court schedules have been delayed already, and the ripple effects are expected to cause delays for years. Thus, at best, the district court trial is scheduled around the same time as the Board's Final Written Decision, and the court may delay the trial further given the circumstances and Gomaco's upcoming request for a stay. This factor, therefore, weighs in favor of institution.

**C. Factor 3: Investment in the parallel proceeding**

To date, the parties and district court have invested a small fraction of the resources required to take that case through trial. G&Z filed its original complaint in February 2020 and served it in March 2020. *See* Ex. 1018. But that complaint did not meet federal pleading requirements. After GOMACO filed a motion to dismiss, G&Z filed an amended complaint in June 2020. *Id.* The parties have since



exchanged initial contentions, with G&Z serving its initial infringement contentions on June 19, 2020—approximately five months ago. Ex. 1015, 2. As the Board has explained, “[i]f the evidence shows that the petitioner filed the petition expeditiously, such as promptly after becoming aware of the claims being asserted, this fact has weighed against exercising the authority to deny institution under *NHK*.” *Fintiv I*, at 11. Thus, this factor weighs in favor of institution.

**D. Factor 4: Overlap between issues in the petition and the parallel proceeding**

GOMACO’s invalidity contentions in district court identify prior art used in this petition, but that art is listed alongside several other prior-art disclosures, many of which are not present in this petition. *See* Ex. 1020 (collecting cover sheets from GOMACO’s district-court invalidity contentions on the ’101 patent, showing numerous prior-art combinations not at issue here, including several relying on prior-art machines as base references that cannot be asserted here). The Board has declined to deny institution in similar situations because “there is no guarantee” the district court will ultimately consider the prior-art references or combinations asserted in the petition. *Intel Corp. v. VLSI Tech. LLC*, IPR2019-01192, Paper 15 at 12 (PTAB Jan. 9, 2020). And as discussed regarding Factor 1, the presence of overlapping issues increases the likelihood of a stay. Consequently, this factor is either neutral or weighs in favor of institution.

**E. Factor 5: Whether the petitioner and district-court defendant in the parallel proceeding are the same party**

GOMACO is the defendant in the parallel litigation and petitioner here. The Board has noted, however, that this “is far from [] unusual.” *Sand Revolution II, LLC, v. Cont’l Intermodal Grp.-Trucking LLC*, IPR2019-01393, Paper 24 (PTAB June 16, 2020) (informative). At worst, this factor should be deemed neutral. Moreover, because GOMACO filed this IPR as Congress intended and authorized by statute (i.e., as a litigation defendant), this factor should favor institution.

**F. Factor 6: Other circumstances impacting the Board’s exercise of discretion, including the merits**

The challenged claims are unpatentable as explained below, and none of the prior art in the grounds (except Guntert) has been before the Patent Office. Regarding Guntert, there is no evidence that the Examiner substantively considered this reference in the manner proposed in this petition. Additionally, GOMACO’s IPR is the only challenge to the ’101 patent that has ever been before the Board (other than the concurrently filed petition in IPR2021-00234), which favors institution. *See, e.g., Google LLC v. Uniloc 2017 LLC*, IPR2020-00115, Paper 10 at 6 (PTAB May 12, 2020) (a “crucial fact” when exercising discretion to deny is whether “the challenged patent is currently the subject of [other] instituted IPRs”). Moreover, there is a strong public interest against “leaving bad patents enforceable,” which also favors institution. *Thryv, Inc. v. Click-To-Call Techs., LP*,

140 S. Ct. 1367, 1374 (2020).

Because five of the six *Fintiv I* factors are neutral or favor institution, and the remaining factor (Factor 5) *should* favor institution, GOMACO respectfully requests that the Board institute IPR.

## **V. LEVEL OF ORDINARY SKILL IN THE ART**

A person of ordinary skill in the art (“POSITA”) pertinent to the ’101 patent would have had at least a four-year degree in mechanical engineering or a closely related field and at least two years of experience designing, developing, or operating heavy machinery, including their components and control systems. Additional education could substitute for professional experience and significant work experience—such as working with, servicing, or operating heavy machinery in the field—could substitute for formal education. *Singhose*, ¶22.

## **VI. CLAIM CONSTRUCTION**

The parties dispute constructions of claim terms in the district court.<sup>8</sup> The Board need not resolve these disputes here, however, because the asserted prior art discloses embodiments within the scope of both parties’ constructions. Accordingly, the Board need not construe the outer bounds of the claims here.

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<sup>8</sup> G&Z identified “feedback loop” for construction, and GOMACO identified “swing leg.” Ex. 1021, 8.

*Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”).

## **VII. BACKGROUND ON FEEDBACK LOOPS**

The '101 patent states that its control system uses a “feedback loop,” but it provides few details regarding how its feedback loop is implemented. Ex. 1001, 12:41-44. Feedback loops, however, were well known and commonly used in the industry. For example, feedback loops are discussed at length in a textbook titled “Introduction to Robotics Mechanics and Control” by John J. Craig (“Craig”; Ex. 1022).<sup>9</sup> Singhose, ¶31.

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<sup>9</sup> Craig, which has a 2005 copyright date (Craig, 3), was catalogued by the Library of Congress and University of Wisconsin on November 10, 2004, according to MARC records (Ex. 1024, ¶¶12-16; Exs. 1025-1026). As explained by library science expert Kelley M. Hayes Greenhill, “[a]fter an item is cataloged, the public may access the item by searching the catalog and requesting the item from the library. Standard library practice is to then shelve the item within a few days or weeks of cataloging it.” Ex. 1024, ¶9. This evidence shows that Craig was publicly accessible well in advance of March 26, 2010, which is the earliest priority date claimed on the face of the '101 patent.

Craig discusses feedback loops in the context of moving a robot manipulator that uses actuators to control the joints. Craig, 263. Craig explains that, “[g]enerally, the only way to build a high-performance control system is to make use of feedback from joint sensors,” as indicated in the block diagram representation shown in Figure 9.1. Craig, 264; Singhose, ¶32.

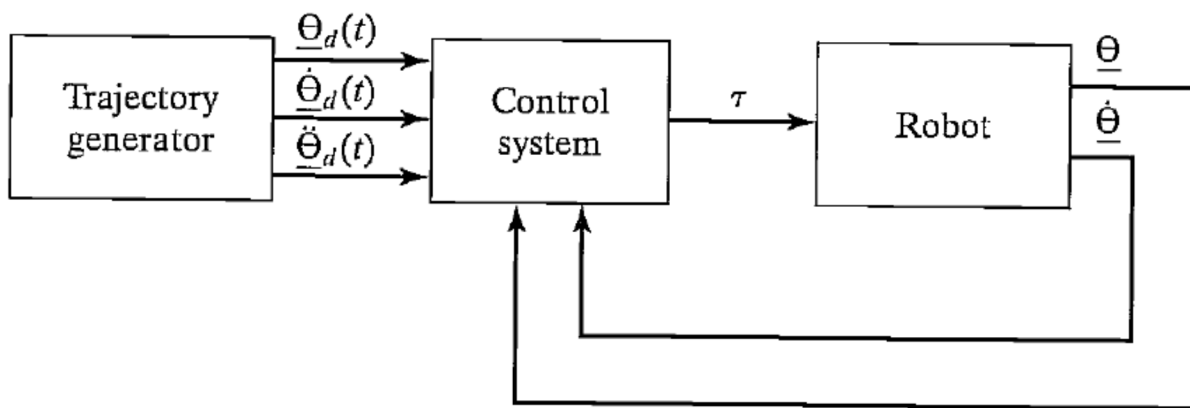


FIGURE 9.1: High-level block diagram of a robot-control system.

*Id.*, 263, Fig. 9.1. Fig. 9.1 corresponds to a manipulator instrumented with sensors at each joint to measure the joint angle and that has an actuator at each joint to apply a torque on the neighboring link. Craig, 263. As shown in Fig. 9.1 above, the actual joint positions  $\underline{\Theta}$  measured by the joint sensors are fed back to the controller, which also has the desired or target joint positions  $\underline{\Theta}_d$ ; Singhose, ¶32.

Craig further explains that this feedback is used to compute any **servo error** by finding the difference between the desired and actual position. Craig, 264. Craig

provides an equation for the difference between the target and actual joint positions, shown below. Singhose, ¶33.

$$\begin{aligned} E &= \Theta_d - \Theta, \\ \dot{E} &= \dot{\Theta}_d - \dot{\Theta}. \end{aligned} \tag{9.2}$$

*Id.*, Eq. (9.2). In equation 9.2, the error in the angular positions is represented by  $E$  and is determined as a difference between the desired angular positions  $\Theta_d$  and the actual angular positions  $\Theta$ . This “error” is nonzero when the structure that the control system wishes to move has not yet reached its *desired* position (i.e., there is a difference between the current position and the desired position). *Id.*; Singhose, ¶33.

Craig explains that these types of control systems compute the amount of torque required, as a function of the servo error, such that the computed torque reduces the angular position errors. Craig, 264. The control system disclosed by Craig is illustrated in an annotated version of Fig. 10.5 below. Singhose, ¶34.

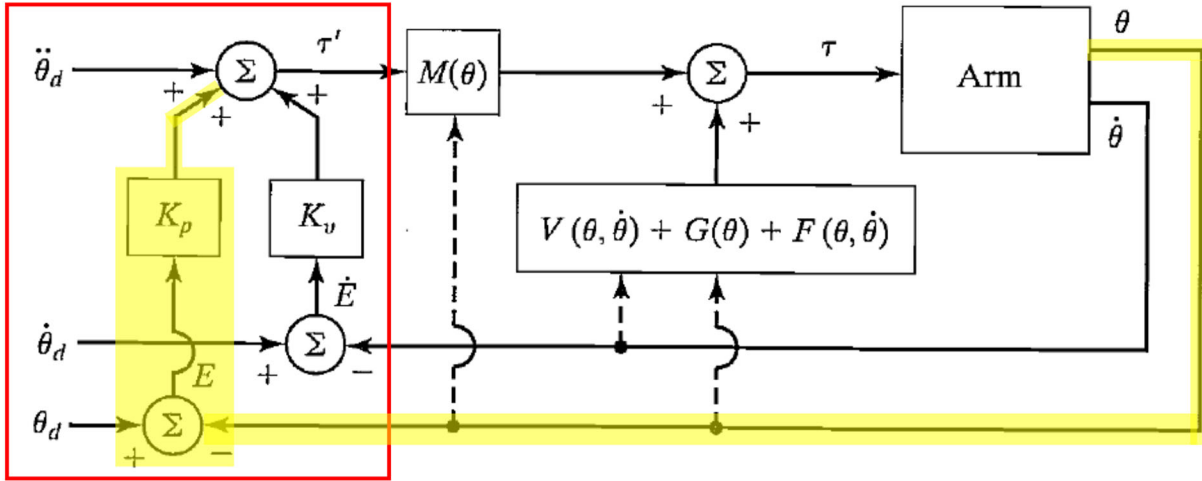


FIGURE 10.5: A model-based manipulator-control system.

*Id.*, 296, Fig. 10.5 (annotated). As illustrated in the highlighted portion of the feedback loop, the actual angular positions  $\theta$  are measured by a sensor. The actual positions  $\theta$  measured by sensors are provided to the controller (marked in red). The controller also has the desired angular position  $\theta_d$ . The summation symbol,  $\Sigma$ , shows that the positive value of  $\theta_d$  (the desired angles) are summed with the negative value of  $\theta$  (the actual angles) to calculate the *error* in those values. See *id.*, Equation 10.16; Singhose, ¶34. That error is then used to drive the links to new positions, and the actual sensed positions of the links are *fed back* into the loop to continuously determine whether a difference exists between the desired positions and the current positions. If a difference exists, then that is an *error* representative of how far the structure is from the desired configuration. When the error is

reduced to zero, the system knows the structure has reached the desired location.

Singhose, ¶34.

While other aspects of feedback loops may differ (for example, additional variables such as the speed of the joint rotation,  $\dot{\theta}$ , may be used, as in the above diagram), a consistent aspect of feedback loops is that they compare the current state of the structure being monitored with the desired state of that structure to determine if it has reached its destination. Singhose, ¶35.

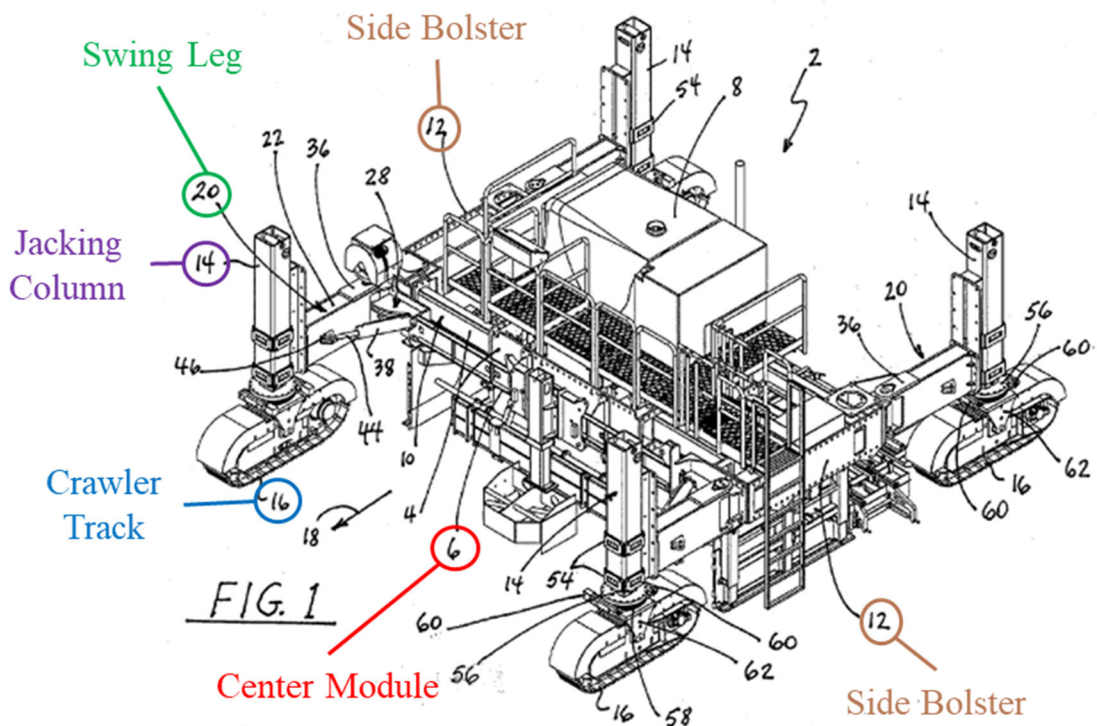
## **VIII. DETAILED EXPLANATION AND EVIDENCE**

### **A. Ground 1: Guntert in view of Dorsett Renders Claims 4-7 and 15-19 Obvious**

#### **1. Guntert Summary**

Guntert is the publication of the application that issued as U.S. Patent No. 8,459,898, to which the '101 patent claims priority (but is not entitled to such priority, see Section II.C). Accordingly, its disclosure is similar to that of the '101 patent, though it lacks the disclosures at Ex. 1001, 15:54-22:36 and Figures 9-13E. For example, it discloses a slipform paver with a center module, a side bolster on each lateral side of the center module, a swing leg on each forward and aft end of the side bolsters, and a jacking column and crawler track coupled to the free end of each swing leg. Guntert, ¶¶[0015], [0033], [0036]; Singhose, ¶¶54, 36-38.

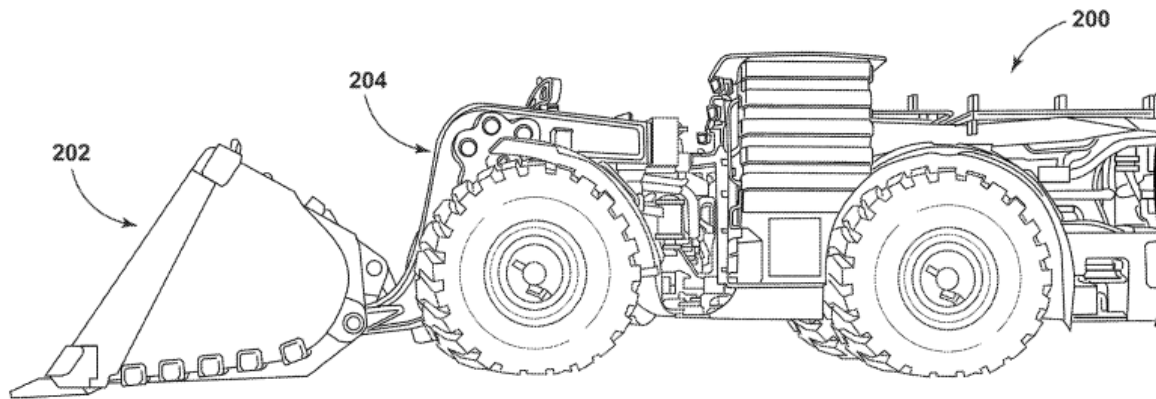




Id., Fig. 1 (annotated).

## 2. Dorsett Summary

Dorsett relates to heavy machinery equipment and specifically details implementation of certain mining equipment such as a front-end loader. Dorsett, Abstract, 1:14-37. Figure 21, reproduced below, shows a “load haul dump” that includes a bucket 202 supported by one or more arms 204. *Id.*, 4:17, 15:27-28.



**FIG. 22**

*Id.*, Fig. 22

Dorsett explains that bucket 202 and arms 204 can be moved “using one or more actuators.” *Id.*, 15:30-34; *see also id.* 18:8-29 (arms raising or lowering the bucket), 15:28-30, 18:8-13 (referring to rolling the bucket), 16:9-12 (decreasing the angle of the bucket). Dorsett also discloses monitoring the position of both the arms and the bucket using sensors. *Id.*, 16:41-45.

Dorsett explains that its machine has “an automatic return-to-dig functionality.” *Id.*, 15:41-43. When commanded by the operator, the machine’s controller can “automatically control[] the one or more actuators associated with the bucket 202 to reposition the bucket 202 to a predetermined dig position (for

example, a predetermined height, a predetermined angle, or the combination thereof.” *Id.*, 15:55-62. Dorsett further explains that the “operator may manually adjust the predetermined dig position (for example, the predetermined height, the predetermined angle, or the combination thereof) to suit the operator’s preference or the operating environment.” *Id.*, 16:31-35. To do this, the operator “signals when the bucket 202 is in a desired dig position.” *Id.*, 16:35-36. The controller then “saves the current position of the bucket 202 (for example, the current height, the current angle, or the combination thereof).” *Id.*, 16:39-41. It explains that the controller can “determine the current position based on data collected by one or more sensors communicating with the controller 150.” *Id.*, 16:41-45.

If commanded by the operator, the “stored position information” may be “recalled and applied” to move the bucket to the stored position. *Id.*, 16:45-47. To move the bucket, the controller will access the stored dig position in memory and “compare the stored predetermined dig position to a current position of the bucket.” *Id.*, 15:63-67. “When the positions differ, the controller 150 may control the one or more actuators to change the current position of the bucket to match the stored predetermined dig position.” *Id.*, 17:2-5. “For example, when the current height of the bucket 202 is greater than the height included in the predetermined dig position, the controller 150 may control the one or more actuators to lower the bucket 202.” *Id.*, 17:5-9. “Similarly, when the current angle of the bucket 202 is

greater than the angle included in the predetermined dig position, the controller 150 may control the one or more actuators to decrease the angle of the bucket 202.” *Id.*, 17:9-12.

Throughout this process, “the controller 150 may repeatedly compare a current position of the bucket 202 to the stored predetermined dig position while moving the bucket 202 until the positions align.” *Id.*, 17:13-16. “Alternatively or in addition, the controller 150 may initially compare a current position of the bucket 202 to the stored predetermined dig position and determine an amount of movement necessary to bring the bucket 202 in align with the stored predetermined dig position.” *Id.*, 17:16-21. In “either configuration, the controller 150 translates a difference between the current position and the stored position into one or a series of commands to the one or more actuators simulating commands received from an operator control.” *Id.*, 17:23-27.

Dorsett explains that, by automating this process, this “allows the operator to concentrate on driving the LHD [load haul dump] 200 without having to also perform multiple joystick movements to return the bucket 202 to a dig position.” *Id.*, 17:25-30.

### **3. Rationale for Combining Guntert and Dorsett**

As explained below, a POSITA would have been motivated to combine Guntert and Dorsett and would have had a reasonable expectation of success in

doing so. Singhose, ¶¶61-69. It would have been obvious to use Dorsett’s memorization and recall feature in Guntert’s paver.

To start, Guntert and Dorsett are analogous art to the ’101 patent. Guntert is in the same field as the ’101 patent and addresses the very same problem as the ’101 patent, as Guntert’s disclosure relating to slipform paving mirrors portions of the ’101 patent. Like the ’101 patent, Guntert aims to automate the manual process of moving the swing leg and tracks of a slipform paver. Singhose, ¶61; *see* Guntert, generally. Dorsett is also in the same field of endeavor as the ’101 patent because they both describe construction machinery. *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1237 (Fed. Cir. 2010); Singhose, ¶¶55-61; Dorsett, Abstract, 1:14-37, 4:17.

Dorsett also addressed similar problems that the ’101 patent purports to solve, namely the “costly” and “time-consuming” processes associated with adjustments to construction machines, which often required extensive manual intervention. Ex. 1001, 1:66-2:1, 4:65-67, 7:20-26; Singhose, ¶63. Dorsett eliminated similar hardships as the ’101 patent—by automating positioning portions of a construction machine. Singhose, ¶63. Indeed, by using Dorsett’s memorization and recall feature, the reference recognizes that it “allows the operator to concentrate on [other issues] without having to also perform multiple” manual adjustments. Dorsett, 17:25-30; Singhose, ¶63. Thus, both references are

aimed at reducing time-consuming, costly, and potentially error-prone manual adjustments.

The '101 patent, Guntert, and Dorsett are also concerned with control systems for similar mechanisms used on work machines. Guntert and the '101 patent move a pivotable arm (or swing leg) coupled to the frame, rotate a track at its end, and use sensors to monitor the positions of those structures. '101 patent, Fig. 1, 6:14-20, 10:8-11, 11:38-59, 12:4-34; Guntert, ¶¶[0016], [0040], [0045], [0047]-[0050]; Singhose, ¶62. Dorsett likewise includes a pivotable arm attached to the machine frame, a bucket that rotates at its end, and sensors used to monitor the positions of those structures. Dorsett, 15:28-34, 16:41-45, 18:8-29, Fig. 21; Singhose, ¶62.

As discussed previously, Guntert (like the '101 patent) aims to automate the manual process of moving its swing leg and tracks, reducing the time required to maneuver the machine. Guntert, ¶[0019]. Guntert discloses automatically pivoting the machine's swing legs to a "preset angle." *Id.*, ¶[0017]. It discloses similar functionality for a track's angle. *Id.*, ¶[0043]. Guntert does not, however, indicate how that preset angle is established or provide the operator any flexibility in establishing unique configurations. Using Guntert, an operator would be severely limited, as its machine provides no ability for an operator to define unique configurations for the swing leg and track to automatically return. Singhose, ¶65.

Thus, an operator who wanted to return to a unique configuration would be forced to do so manually, which can be time consuming and may lead to errors. Singhose, ¶65.

Dorsett solved this problem by permitting a user to configure the positions of its arms and bucket based on the current monitored sensor readings and automate movement to those positions. Singhose, ¶66. In particular, Dorsett discloses allowing an operator to move machinery components to desired positions. Dorsett, 15:55-62. Importantly, Dorsett also provides the operator with the ability to configure the locations that may be necessary for “the operator’s preference or the operating environment.” *Id.*, 16:31-35. To accomplish this, once the operator has moved the machinery components to a desired position, the controller saves or memorizes the current positions using sensor data. Dorsett, 16:39-415. Thus, for a unique position that the operator finds desirable, Dorsett allows the operator to save that position using sensor data and automatically return to it at a later time. Singhose, ¶66. Like Guntert and the ’101 patent’s aim to reduce time-consuming manual adjustments, Dorsett similarly recognizes that this feature saves time and effort by the operator. *Id.*, 17:25-30 (noting the feature “allows the operator to concentrate on driving the LHD 200 without having to also perform multiple joystick movements to return the bucket 202 to a dig position.”); Singhose, ¶66.

A POSITA would have recognized that this sensor-based memorization and return feature would be beneficial and equally applicable to the Guntert paver. Singhose, ¶67. Indeed, just like Dorsett, Guntert monitors two position signals related to its monitored structural members (a swing leg pivot signal and a track rotation signal). Guntert, ¶¶[0047]-[0050]. A POSITA would have understood that, just like Dorsett, those signals in Guntert could be stored to memorize any particular swing-leg and crawler track location. Singhose, ¶67. Indeed, Guntert already discloses moving to preset angles of the track and swing leg. *Id.*, ¶¶[0017], [0043]. Guntert lacks any teaching, however, that would allow a user to store a configuration using sensor readings and later return to the stored configuration. Singhose, ¶67. In light of Dorsett’s teachings, and in addition to Guntert’s preset angles, it would have been obvious to also allow a user to store the current sensor readings for the track and swing-leg angles and to use those values as the “desired” angles when returning to a desired configuration. Singhose, ¶67.

This would have benefited the operator by allowing the operator the ability to configure any number of chosen positions. Singhose, ¶68. Indeed, as explained by Dorsett, such a feature would allow the operator to use values that “suit the operator’s preference or the operating environment.” Dorsett, 16:31-35. A POSITA would recognize the benefit this would provide the operator of Guntert’s machine, as it would allow an operator to choose a desired swing-leg position (via the



swing-leg angle) and desired track heading (via the track rotation angle) and easily return to the desired configuration for a job without needing to worry about potential errors due to manual movement. Singhose, ¶68. Nor would an operator need to memorize a proper configuration for the job at hand if it was one that differed from the normal paving configurations. Singhose, ¶68.

Other situations where this feature would be beneficial include when a particular configuration is required by a job, but an obstacle requires moving the track to a new position temporarily until the obstacle is cleared. Singhose, ¶68. Dorsett's memorization and return feature would allow an operator to save the current configuration, move the swing leg to avoid an obstacle, and quickly and easily return to the memorized position when it was safe to do so. Singhose, ¶68. Similarly, when a unique job requiring a particular configuration is completed over several days, Dorsett's return feature would allow an operator to save the unique configuration and easily return to the memorized position on subsequent days. Singhose, ¶68. Finally, if circumstances of a job would benefit from a new configuration, the operator could position the swing leg and track in the new position and save the new configuration to update the saved position for future recall. Singhose, ¶68.

Implementing Dorsett's memorization and return feature on the Guntert paver would have constituted nothing more than a combination of well-known

prior art elements according to known methods to yield predictable results.

Singhose, ¶69. Indeed, Guntert’s position memorization and recall feature was well known. *See, e.g.*, U.S. Patent No. 7,797,860 to Schoenmaker (“Schoenmaker”; Ex. 1023), 18:14-28 (disclosing that an “operator may establish or program a preset position via the user interface” and later “return to position”). A POSITA would also have had a reasonable expectation of success. Singhose, ¶69. The storage of sensor position values and moving to those positions would have functioned in the same predictable manner on a Guntert paver as they did in Dorsett. Singhose, ¶69. Thus, a POSITA would have recognized that Dorsett’s memorization and return feature would both be beneficial to a Guntert paver and would function as expected when implemented on the Guntert machine. Singhose, ¶69.

#### **4. Independent Claim 1**

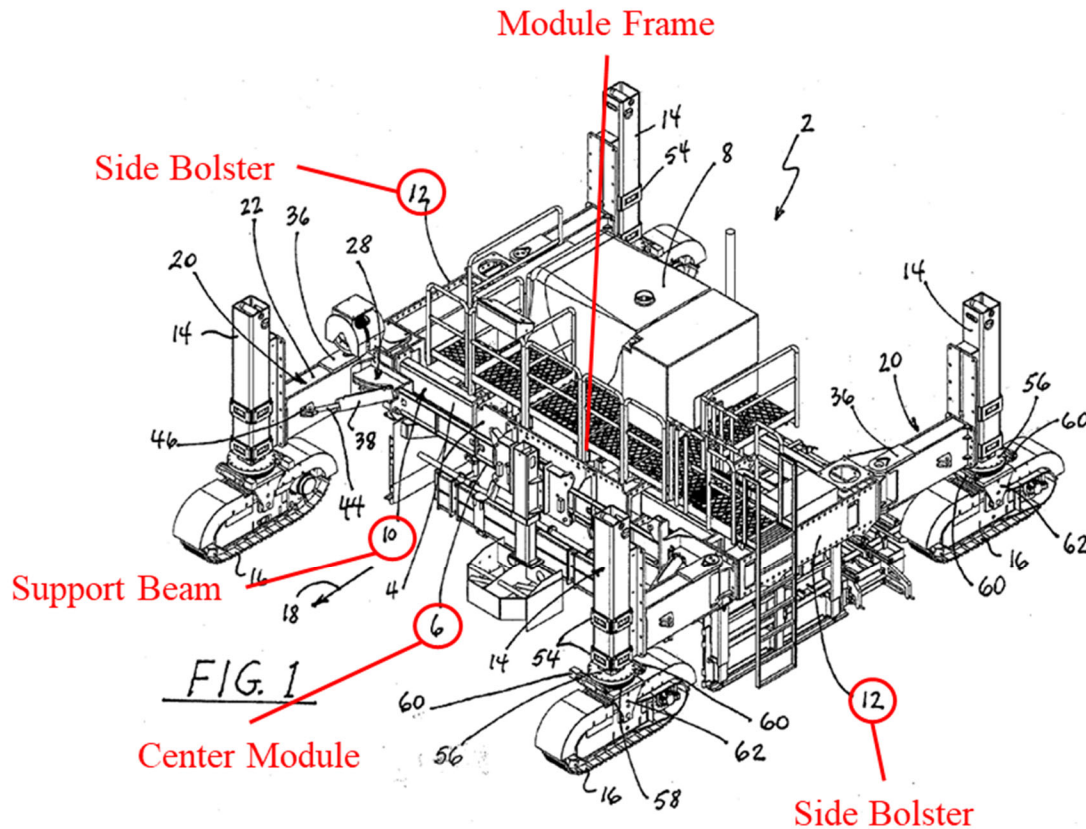
Claims 4-7 depend from claim 1. Therefore, claim 1 is presented below to establish unpatentability of claims 4-7. As shown below, Guntert discloses many of the claimed features verbatim or nearly verbatim.

- a. **[1a]: “A paving machine configured to move in a paving direction for spreading, leveling and finishing concrete into a form having a generally upwardly exposed, finished concrete surface and terminating in lateral concrete sides, the paving machine comprising:”**

If the preamble is limiting, Guntert discloses its features. Guntert discloses a paving machine “configured to move in a paving direction for spreading, leveling and finishing concrete into a form having a generally upwardly exposed, finished concrete surface and terminating in lateral concrete sides.” Guntert, Abstract; *see also id.*, ¶¶[0002]-[0003], [0035], Claim 1. Guntert discloses that “sideforms mounted on each side of the slipform paving kit shape and confine the sides of the slab during the slipform paving process.” *Id.*, ¶[0003]; Singhose, ¶71.

- b. **[1b]: “a module frame;”**

Guntert discloses this element. Guntert discloses “main tractor frame 4” (“module frame”) that includes a center module 6, telescoping male support beams 10 that “extend outwardly in a lateral direction,” and side bolsters 12 that “are secured to the respective outboard ends of the support beams.” Guntert, ¶[0033]; *see id.*, ¶[0005] (disclosing that tractor frames “typically are extendable/retractable in the lateral direction to change the widths of the tractor frame”); Singhose, ¶72. The module frame, including the center module, support beams, and side bolsters, is shown in the annotated version of Figure 1 provided below.



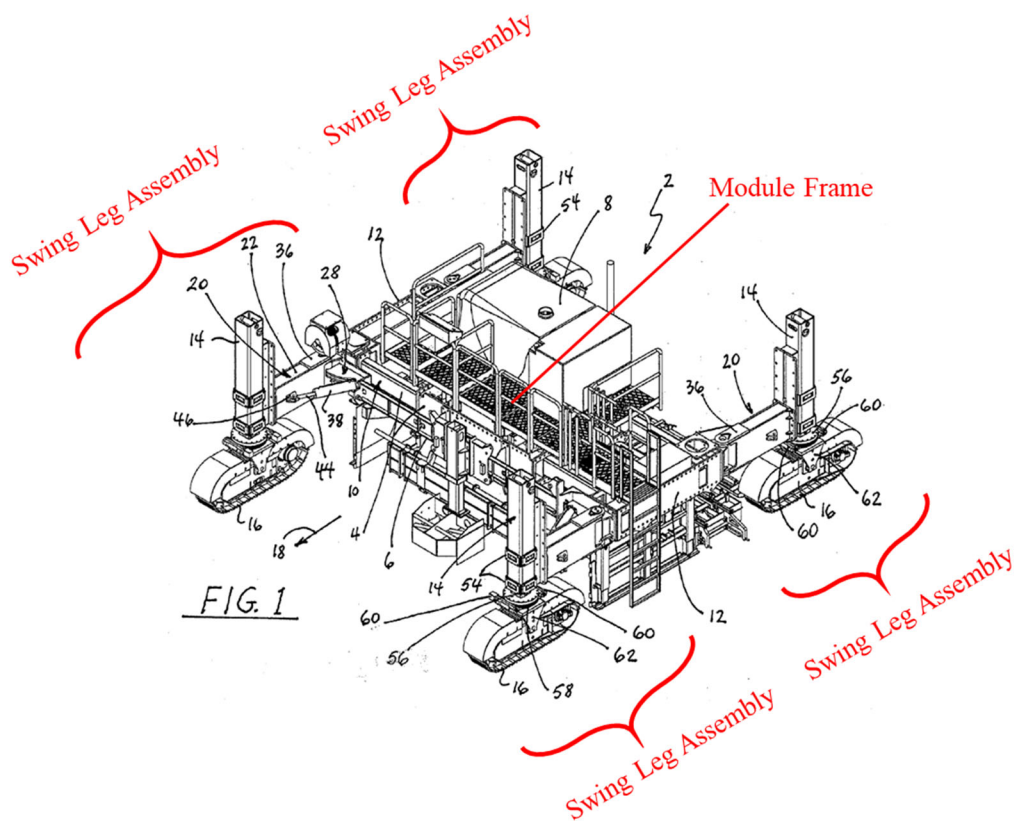
*Id.*, Fig. 1 (annotated); Singhose, ¶72.

- c. [1c]: “two or more swing leg assemblies mechanically coupled to the module frame, each swing leg assembly comprising:”

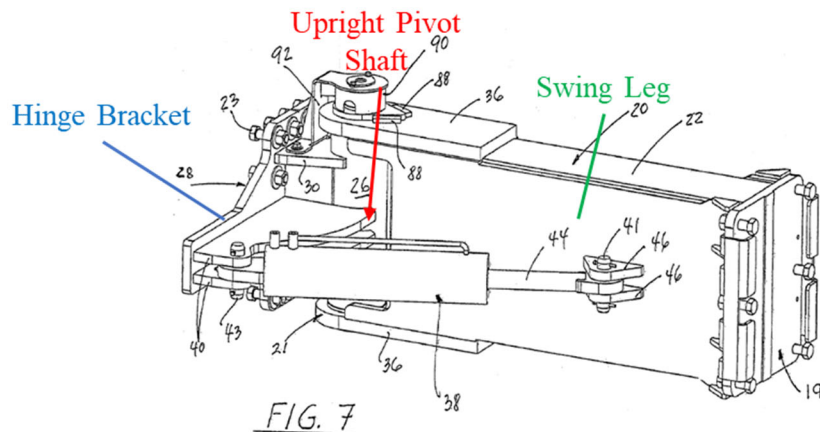
Guntert discloses four swing assemblies. Specifically, Guntert discloses “each crawler 16 and the associated jacking column 14 are mounted to a free end 19 (shown in FIG. 7) of a bolster swing leg 20.” Guntert, ¶[0036]. “[E]ach bolster swing leg is pivotally mounted on a hinge bracket that is secured to the front (or aft) ends of the side bolsters of the paving machine” (“two or more swing leg assemblies mechanically coupled to the module frame”). *Id.*, ¶[0015]. Guntert

explains that the swing leg is pivotal about a vertically oriented pivot shaft 24.

Guntert, ¶[0036]. As illustrated in Figs. 1 and 7, below, Guntert's paving machine includes four swing-leg assemblies, each of which is mechanically coupled to the module frame at a side bolsters 12 via the hinge bracket and includes a jacking column 14, crawler track 16, and a swing leg 20. Singhose, ¶73.



Guntert, Fig. 1 (annotated).



*Id.*, Fig. 7 (annotated).

d. [1d]: “a swing leg;”

[1e]: “a crawler track;”

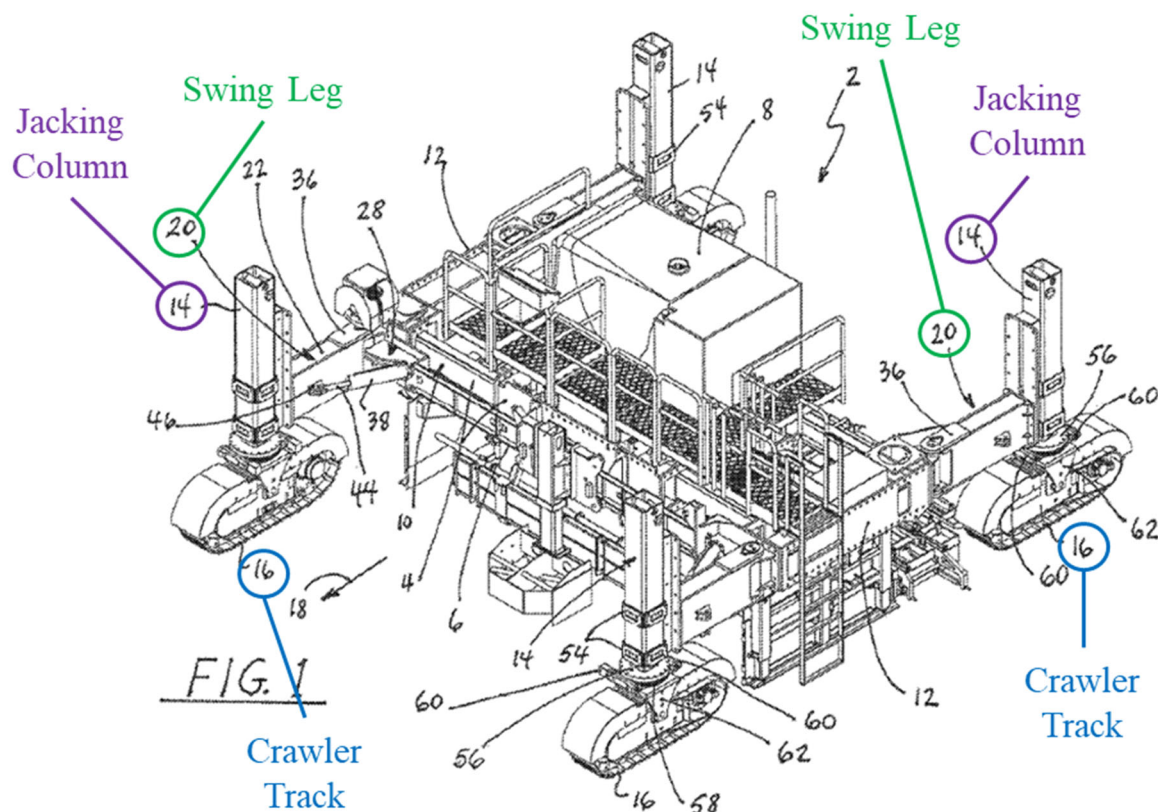
[1f]: “an upright jacking column secured to the swing leg, having a rotary connection between the jacking column and the crawler track permitting relative rotational movements of the crawler track with regard to the jacking column about a first upright axis;”

[1i]: “a power drive unit arranged to translate relative rotational movements between the jacking column and the crawler track;”

Guntert discloses these elements. Guntert discloses four swing legs, four crawler tracks, and four upright jacking columns. With respect to the jacking columns, Guntert states that “[u]pright jacking columns 14 are mounted in the vicinity of respective front and aft ends of the bolsters, and crawlers 16 are

conventionally secured to the lower ends of the jacking columns.” Guntert, ¶[0033] (“an upright jacking column”); Singhose, ¶74.

Guntert further discloses that “each crawler 16 and the associated jacking column 14 are mounted to a free end 19 (shown in FIG. 7) of a bolster swing leg 20.” Guntert, ¶[0036] (“a swing leg”), (“a crawler track”), (“an upright jacking column secured to the swing leg”); Singhose, ¶75. This configuration is shown below.



Guntert, Fig. 1 (annotated).

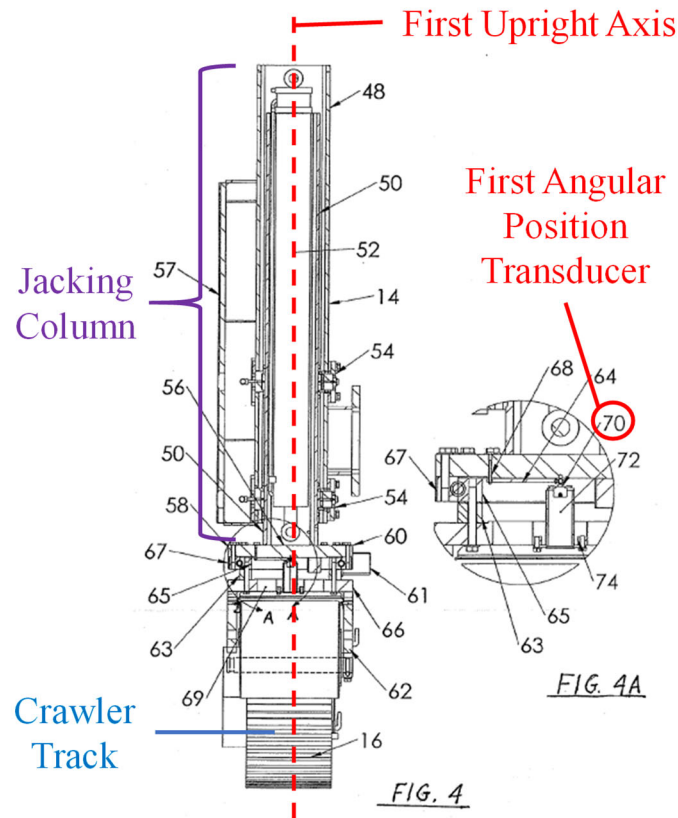
Guntert's jacking columns are hydraulically raise and lower the machine and are mounted to the free end 19 of a swing leg 20. Guntert, ¶¶[0033], [0036]. "The crawlers are mounted to the lower ends of the jacking columns, and they are rotatable relative to the jacking columns about vertical axes" ("an upright jacking column secured to the swing leg, having a rotary connection between the jacking column and the crawler track permitting relative rotational movements of the crawler track with regard to the jacking column about a first upright axis"). Guntert, ¶[0033]; *see also id.*, ¶[0020] ("a connection between the jacking column and the crawler track permits rotational movements of the crawler track and the jacking column about an upright axis"). A "rotary actuator (slew gear)" is employed "as the power drive between the crawler track and the jacking column" to rotate the crawlers "about the vertical jacking column axis" ("a power drive unit arranged to translate relative rotational movements between the jacking column and the crawler track"). *Id.*, ¶¶[0019], [0045], [0052], [0057]; Singhose, ¶76.

- e. **[1g]: "a first angular position transducer configured to emit a first signal which is indicative of an angular orientation of the crawler track relative to the jacking column;"**

Guntert discloses a first angular position transducer emitting a first position signal which is indicative of the crawler track's angular orientation relative to the first jacking column. Guntert, Claim 2, ¶¶[0046]-[0047], Fig. 4; Singhose, ¶77. For



example, Guntert discloses “[a]n angular position transducer or sensor 70 is arranged inside an upwardly open can 72 (provided to protect the sensor) that is disposed within an opening 69 in the transverse portion 66 of yoke 62.” Guntert, ¶[0046]. “The transducer cooperates with a trigger pin 68 extending downwardly from the under side of plate 56 and a suitable actuator arm that turns the transducer.” *Id.* The transducer 70 “generates a signal that indicates the angular position of yoke 62 relative to jacking column 14 and any changes in the angular position due to rotational movements of the yoke.” *Id.*, ¶[0047]. The position of yoke 62 is indicative the crawler track’s orientation relative to the first jacking column. Singhose, ¶77. Figures 4 and 4A depict the arrangement of the jacking column, angular position transducer, and crawler track. Singhose, ¶77.

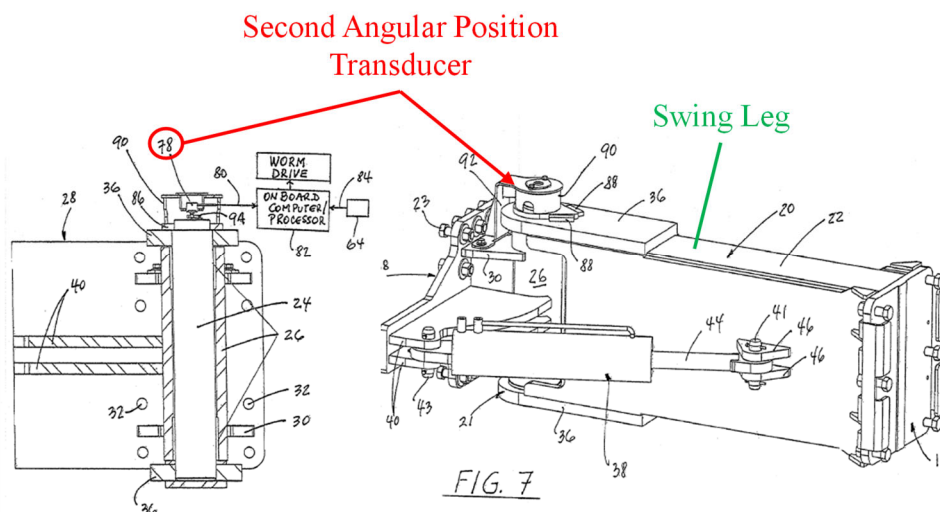


Guntert, Figs. 4-4A (annotated).

- f. [1h]: “a second angular position transducer configured to emit a second signal which is indicative of an angular orientation of the swing leg relative to the module frame; and”

Guntert discloses a second angular position transducer emitting a second signal which is indicative of the first swing leg’s angular orientation relative to the module frame.” Guntert, Claim 2, ¶¶[0048]-[0050] (“angular position transducer 78 to generate an angular position signal which reflects the angular inclination between the pivot shaft and the hinge bracket, and which changes when the bolster swing leg 20 changes its angular position relative to the hinge bracket 28, and

therewith also relative to bolster 12 and tractor frame 4.”). The angular position transducer 78 is mounted inside a protective can 90 that is bolted to the hinge bracket. Guntert, ¶[0049]. Guntert discloses that the hinge bracket is secured to respective end surfaces 34 of side bolsters 12. Guntert, ¶[0037]. Guntert also discloses that male support beams 10 extend from frame 4 and that side bolsters 12 are secured to the support beams. Guntert, ¶[0033]. Thus, because the hinge bracket is itself attached to the frame, the second signal, which is indicative of an angular orientation of the swing leg relative to the hinge bracket, is also indicative of an angular orientation of the swing leg relative to the module frame. Singhose, ¶78.



Guntert, Figs. 5, 7 (annotated).

- g. **[1j]: “a processor operable to receive the first and second signals from each swing leg assembly and configured to generate and emit a control signal for instructing the power drive of each swing leg assembly, and thereby rotationally move each respective crawler track relative to its respective jacking column.”**

Guntert discloses “a processor receiving the first and second signals and emitting a control signal for activating the power drive and thereby rotationally moving the crawler tracks,” including the first crawler track, “relative to the associated jacking columns for keeping the crawler tracks oriented in the paving direction in response to changes of the first signal caused by pivotal motions of the swing leg about the pivot shaft.” Guntert, Claim 2, ¶¶[0051]-[0052]. Guntert further discloses this with respect to the tracks for each swing-leg assembly. *Id.*, ¶[0052] (“onboard computer then signals by how much worm gear drive 60 must rotationally adjust the orientation of yoke 62 and crawler tracks 16 to again align the crawler tracks with the paving direction”); Singhose, ¶¶79-81.

5. **Claim 3: “The paving machine of claim 1, wherein one or more of the power drives comprise first and second diametrically opposed helical worm drives engaging and driving a ring gear disposed between them.”**

Claims 4-7 depend from claim 3. Therefore claim 3 is presented to establish the unpatentability of claim 4.

As discussed in Section VIII.A.4.d, Guntert discloses a rotary actuator (“power drive”). Guntert discloses that the rotary actuator comprises a worm gear drive having “a ring gear 58 that is driven by a pair of diametrically opposite, hydraulically activated helical worm drives 61” (“the first power drive further comprises a first helical worm gear drive and a second helical worm gear drive, diametrically opposed, wherein the first and second helical worm gear drives engage and drive a ring gear disposed between them”). Guntert, ¶[0045], Claim 4; Singhose, ¶84.

**6. Claim 4:**

- a. [4a]: “The paving machine of claim 3, wherein the processor configured to receive the first and second signals and to generate and emit the control signal for each swing leg assembly is further configured to have a stored first signal and a stored second signal for each respective swing leg assembly, further wherein the control signal is generated by”**

For the same reasons discussed with respect to limitation [1j], Guntert discloses a processor configured to receive the first and second signals and to generate and emit a control signal for each swing-leg assembly. *See* Section VIII.A.4.g; Singhose, ¶86.

As discussed in Sections II.C and VIII.A.3, a POSITA would understand that Guntert discloses having a preset pivot value for pivoting the swing leg to a desired position and a preset rotation value for rotating the crawler track to a

desired angle. Guntert, ¶¶[0017] (“onboard computer always maintains the swing leg angle at a fixed, preset angle. If the swing leg migrates away from a preset angle, the swing leg hydraulic cylinder is actuated to maintain the preset angle”), [0043] (“the crawler track will automatically go back to the straight-ahead position”). These values would correspond to the “fixed, preset angle” for the swing leg and to an angle corresponding to the “straight-ahead position” for the crawler track. Singhose, ¶87. These stored “fixed, preset angles” should not be confused with a stored first signal and stored second signal, however, as there is no disclosure how the fixed angles are created. Singhose, ¶87.

As discussed in Section VIII.A.2, Dorsett discloses that a user can configure the positions to which its arms and bucket automatically move based on the current monitored sensor readings. Singhose, ¶88. In particular, Dorsett’s “operator may manually adjust the predetermined dig position (for example, the predetermined height, the predetermined angle, or the combination thereof) to suit the operator’s preference or the operating environment.” Dorsett, 16:31-35. To do this, the operator “signals when the bucket 202 is in a desired dig position.” *Id.*, 16:35-36. The controller then “saves the current position of the bucket 202 (for example, the current height, the current angle, or the combination thereof).” *Id.*, 16:39-41. It explains that the controller can “determine the current position based on data collected by one or more sensors communicating with the controller 150.” *Id.*,

16:41-45. Thus, for a unique position the operator finds desirable, Dorsett allows the operator to save that position using sensor data (“configured to have a stored first signal and a stored second signal”). Singhose, ¶88. The system can then automatically return to that saved position at a later time. *Id.*, 15:55-62.

For the reasons discussed in Section VIII.A.3, it would have been obvious to also allow a user to store the current sensor readings for Guntert’s track and swing-leg angles and to use those values as the “desired” angles when returning to a desired swing-leg or track angle. Singhose, ¶89.

**b. [4b]: “calculating the difference between the first signal and second signal, and the stored first signal and stored second signals respectively, for each respective swing leg assembly”**

Limitation [4b] recites “calculating the difference between the first signal and second signal, and the stored first signal and stored second signals *respectively*” (emphasis added). Given the recitation of “respectively,” this petition interprets the recited “differences[s]” to mean (1) the difference between the first signal and the first stored signal and (2) the difference between the second signal and the second stored signal. Singhose, ¶90. This limitation is rendered obvious by Guntert in view of Dorsett.

As discussed in Section II.C, a POSITA would understand that Guntert discloses calculating the difference between a preset pivot value for pivoting the

swing leg and a preset rotation value for rotating the crawler track to a desired angle. Singhose, ¶91. For example, Guntert discloses that an “onboard computer always maintains the swing leg angle at a fixed, preset angle. If the swing leg migrates away from a preset angle, the swing leg hydraulic cylinder is actuated to maintain the preset angle.” Guntert, ¶[0017]. As explained in Section II.C, a POSITA would understand that this would involve determining the difference between the preset angle (where the machine desires the swing leg to be) and the second signal (where the swing leg currently is) (this is an “error” or “difference,” where a non-zero difference indicates that the system is not yet at its desired position). Singhose, ¶91. The machine will continuously calculate this difference and move the swing leg to try to reduce it to zero (meaning the swing leg has reached its desired angle). Singhose, ¶91. This calculation, however, is performed by comparing the current second signal to a fixed preset value. In contrast, the claim requires calculating the difference between the current pivot sensor signal and a *stored pivot sensor* signal. Singhose, ¶91.

Likewise, for the crawler track, Guntert discloses that “the crawler track will automatically go back to the straight-ahead position.” Guntert, ¶[0043]. Singhose, ¶92. A POSITA would similarly understand that this compares the current rotation sensor signal to some preset value (e.g., a straight ahead angle), and that the system will calculate the difference until the “error” between those values is 0. Singhose,



¶92. This does not, however, disclose calculating the difference between the current rotation sensor signal and a *stored rotation sensor* signal, as required by the claims. Singhose, ¶92.

Dorsett discloses this limitation. As discussed with respect to limitation [4a] and in Section VIII.A.3, Dorsett discloses storing values from sensors corresponding to positions for recall at a later time. *See* Dorsett, 16:31-45. The stored sensor signals can include at least two values for Dorsett’s bucket, including “the predetermined height” and “the predetermined angle.” *Id.*

When an operator wishes to recall the stored position, the system will “compare the stored predetermined dig position [(“stored first signal” and “stored second signal”)] to a current position of the bucket [(“first signal” and “second signal”)].” *Id.*, 15:63-67; Singhose, ¶94.

Dorsett explains how this comparison calculates the *difference* between these values, noting that “[w]hen the positions *differ*, the controller 150 may control the one or more actuators to change the current position of the bucket to match the stored predetermined dig position.” *Id.*, 17:2-5 (emphasis added). It further explains that the controller 150 may repeatedly compare a current position of the bucket 202 to the stored predetermined dig position while moving the bucket 202 until the positions align.” *Id.*, 17:13-16. “Alternatively or in addition, the controller 150 may initially compare a current position of the bucket 202 to the

stored predetermined dig position and determine an amount of movement necessary to bring the bucket 202 in align with the stored predetermined dig position.” *Id.*, 17:16-21. In “either configuration, the controller 150 translates a ***difference between the current position and the stored position*** into one or a series of commands to the one or more actuators simulating commands received from an operator control.” *Id.*, 17:23-27 (emphasis added). Thus, Dorsett discloses “calculating the difference between the first signal and second signal, and the stored first signal and stored second signals, respectively.” Singhose, ¶94.

For the reasons discussed in Section VIII.A.3, it would have been obvious to include Dorsett’s position memorization and recall feature on each of the swing-leg assemblies of Guntert’s paver, so as to also allow Guntert to recall positions based on stored sensor data and to calculate the differences as discussed using the stored first signal and stored second signals. Singhose, ¶95.

**c. [4c]: “calculating the angle to reset each crawler track to its respective jacking column along a desired orientation for each respective swing leg assembly”**

Guntert discloses this element. For example, Guntert discloses: “Computer 82 calculates by how much the angle of the crawler track has to be changed relative to the jacking column (which has also been angularly offset relative to the transport direction by the swivel motion of the swing leg) to reset the crawler track

suspended from yoke 62 to the angular orientation of the desired paving direction.”  
Guntert, ¶[0052]; Singhose, ¶96.

**d. [4d]: “determining the respective worm drive that operates each respective crawler track in each respective swing leg assembly;”**

Guntert discloses this feature. As discussed previously, Guntert discloses that “[c]omputer 82 calculates by how much the angle of the crawler track has to be changed relative to the jacking column (which has also been angularly offset relative to the transport direction by the swivel motion of the swing leg) to reset the crawler track suspended from yoke 62 to the angular orientation of the desired paving direction.” Guntert, ¶[0052]. Guntert, however, discloses four crawler tracks with associated worm drives. *See id.*, Fig. 1, ¶[0045]. Thus, for Guntert to be able to instruct any one of them regarding their respective rotation, the control system must be able to determine the respective worm drive that operates each respective crawler track in each respective swing-leg assembly. Singhose, ¶97. Indeed, Guntert explains that the process of “reset[ting] the crawler track” “is repeated each time the angular position of the swing leg is changed, or when for other reasons the angular orientation of the crawler tracks becomes misaligned from the desired paving direction of the machine.” Guntert, ¶[0052]. And Guntert discloses that this relocation process can occur “one swing leg/crawler track at a time.” *Id.*, ¶[0043]. For the processor to be able to instruct the crawler track that

corresponds to the moved swing leg, a POSITA would have understood the processor must determine the respective worm drive that operates each respective crawler track in each respective swing leg assembly as claimed. Singhose, ¶97.

- e. **[4e]: “calculating the rotation of each worm drive to align the respective crawler track along the desired orientation in each respective swing leg assembly; and;”**

Guntert discloses this element. For example, Guntert discloses that its “onboard computer then signals by how much worm gear drive 60 must rotationally adjust the orientation of yoke 62 and crawler tracks 16 to again align the crawler tracks with the paving direction.” Guntert, ¶[0052]. Thus, Guntert discloses that its computer determines the rotation of each worm drive required to align the respective crawler track along the desired orientation in each respective swing leg assembly. Singhose, ¶98.

- f. **[4f] “storing the first signal and second signal from each swing leg assembly and thereby updating the respective stored first signal and the respective stored second signal for each respective swing leg assembly;”**

Dorsett discloses this limitation. As discussed previously, Dorsett discloses that a user can configure the positions to which its components automatically move based on the current monitored sensor readings. In particular, Dorsett’s “operator may manually adjust the predetermined dig position (for example, the predetermined height, the predetermined angle, or the combination thereof) to suit

the operator's preference or the operating environment." Dorsett, 16:31-35. To do this, the operator "signals when the bucket 202 is in a desired dig position." *Id.*, 16:35-36. The controller then "saves the current position of the bucket 202 (for example, the current height, the current angle, or the combination thereof)." *Id.*, 16:39-41. It explains that the controller can "determine the current position based on data collected by one or more sensors communicating with the controller 150." *Id.*, 16:41-45. Thus, for a unique position the operator finds desirable, Dorsett allows the operator to save that position using sensor data. Singhose, ¶99.

Dorsett also explains that the operator can reset the position to a default value. Dorsett, 16:56-59. And the operator would likewise be able to store another position of their choosing. *Id.*, 16:39-41. Thus, Dorsett discloses "storing the first signal and second signal from each swing leg assembly and thereby updating the respective stored first signal." Singhose, ¶99.

For the reasons discussed in Section VIII.A.3, it would have been obvious to combine Guntert and Dorsett such that Guntert's processor is configured to store the first signal and second signal from each swing-leg assembly and thereby update the respective stored first signal.

**7. Claim 5: “The paving machine of claim 4, wherein the desired orientation is alignment of the crawler tracks along a paving direction.”**

Guntert discloses this limitation. For example, Guntert discloses that when the angular orientation of the crawler tracks becomes angularly inclined relative to paving direction 18, the computer of Guntert’s paver calculates how much the angle of the crawler tracks has to be changed to align the crawler tracks with the paving direction. Guntert, ¶[0052] (“Computer 82 calculates by how much the angle of the crawler track has to be changed relative to the jacking column (which has also been angularly offset relative to the transport direction by the swivel motion of the swing leg) to reset the crawler track suspended from yoke 62 to the angular orientation of the desired paving direction”). Singhose, ¶101.

Additionally, it would have been obvious for a POSITA to store a desired track orientation (as described above regarding claim 4, Section VIII.A.6) for each of the crawler tracks that aligns along the paving direction, as Guntert suggests that such a position is beneficial. *See* Guntert, Abstract (“keeps the crawler tracks oriented in the paving direction”), ¶[0016] (“the crawler track stays straight ahead in the paving direction and position”), ¶[0052] (“adjust the orientation of yoke 62 and crawler tracks 16 to again align the crawler tracks with the paving direction”); Singhose, ¶102. Thus, Guntert in view of Dorsett discloses that the desired orientation can be alignment of the crawler tracks along a paving direction.

**8. Claim 6: “The paving machine of claim 4, wherein the desired orientation is alignment of the crawler track of one of the swing leg assemblies to the crawler track orientation of each other swing leg assembly.”**

As discussed with respect to claim 5, Guntert discloses aligning each of the four crawler tracks of its paver with the paving direction. A POSITA would recognize that by doing so, Guntert discloses aligning the crawler track of one swing-leg assembly with the crawler track of another swing-leg assembly. *See also, e.g.,* Guntert, ¶[0043] (“adjusting the angular orientation of the crawler track by an amount that depends on or is a function of the angular displacement of the swing legs relative to the hinge bracket 28 so that the crawler tracks always remain in alignment with paving direction 18 of the paving machine.”); *see also id.*, ¶[0052] (“adjust the orientation of yoke 62 and crawler tracks 16 to again align the crawler tracks with the paving direction”). Thus, claim 6 is met for the same reasons discussed with respect to claim 5. *See* Section VIII.A.7; Singhose, ¶103.

Furthermore, Guntert discloses “at least one additional crawler track being rotationally movable relative to the associated jacking column about an upright axis for directionally aligning the at least one additional crawler track with the first and second crawler tracks.” Guntert, claim 7.

Thus, Guntert discloses the limitations of claim 6. Singhose, ¶¶103-04.

9. **Claim 7: “The paving machine of claim 4, wherein the processor, the power drive, and the first transducer, and the second transducer from each swing leg assembly form a feedback loop for maintaining an orientation of the crawler track independently of angular inclinations of the crawler track relative to the module frame.”**

Guntert discloses that “processor 82 and the associated transducers 70, 78 form a feedback loop in which the computer receives the angular position signal from swing leg transducer 78.” Guntert, ¶[0052]. As explained in Section VIII.A.4.e, transducer 70 constitutes the first angular position transducer. As explained in Section VIII.A.4.f, transducer 78 constitutes the second angular position transducer. Thus, Guntert discloses that its feedback loop includes the first and second transducers and a processor. Singhose, ¶105. Guntert also discloses that a “closed loop feedback system that connects the hydraulic actuator for the swing leg, the rotary power drive for the crawler, and the onboard computer always maintains the swing leg angle at a fixed, preset angle.” Guntert, ¶[0017]. Thus, the feedback loop also includes the power drive. Singhose, ¶105.

Guntert further discloses that when the swing leg changes angular positions, “[c]omputer 82 calculates by how much the angle of the crawler track has to be changed relative to the jacking column (which has also been angularly offset relative to the transport direction by the swivel motion of the swing leg) to reset the crawler track suspended from yoke 62 to the angular orientation of the desired



paving direction.” Guntert, ¶[0052]. The worm gear then rotates the track “to again align the crawler tracks with the paving direction.” *Id.* Guntert states that this “process is repeated each time the angular position of the swing leg is changed, or when for other reasons the angular orientation of the crawler tracks becomes misaligned from the desired paving direction of the machine.” *Id.*

Thus, Guntert discloses “wherein the processor, the power drive, and the first transducer, and the second transducer from each swing leg assembly form a feedback loop for maintaining an orientation of the crawler track independently of angular inclinations of the crawler track relative to the module frame.” Singhose, ¶¶105-06.

## 10. Independent Claim 11

Claims 15-19 depend from claim 11. Therefore, claim 11 is presented below to establish unpatentability of claims 15-19.

- a. **[11a]: “A paving machine configured to move in a paving direction for spreading, leveling and finishing concrete into a form having a generally upwardly exposed, finished concrete surface and terminating in lateral concrete sides, the paving machine comprising:”**

Limitation [11a] is obvious based on Guntert for the same reasons discussed with respect to limitation [1a]. *See* VIII.A.4.a; Singhose, ¶¶108-09.

**b. [11b]: “a module frame;”**

Limitation [11b] is obvious based on Guntert for the same reasons discussed with respect to limitation [1b]. *See* VIII.A.4.b; Singhose, ¶¶110-11.

**c. [11c]: “two or more swing leg assemblies having a pivotal connection to the module frame to allow for pivotal movements of the swing leg assemblies relative to the module frame, each swing leg assembly comprising:”**

Limitation [11c] is obvious based on Guntert for substantially the same reasons discussed with respect to limitation [1c]. Section VIII.A.4.c; Singhose, ¶¶112-13. Additionally, Guntert discloses that the “swing leg is typically formed as a box beam 22 and has another end 21 (shown in FIG. 7) that is pivotal about a vertically oriented pivot shaft 24 which extends through a bearing bushing 26 that is supported in its vertical orientation on a hinge bracket 28 with spaced-apart support webs 30.” Guntert, ¶[0030]; *see also id.*, Figs. 1, 2, 7. Guntert also discloses that the hinge bracket is secured to respective end surfaces 34 of side bolsters 12. Guntert, ¶[0037]. And the male support beams 10 extend from frame 4 to side bolsters 12. Guntert, ¶[0033]. Thus, a POSITA would recognize that Guntert’s swing-leg assemblies have a pivotal connection to the frame to allow for pivotal movements of the swing-leg assemblies relative to the module frame. Singhose, ¶113.

d. [11d]: “a swing leg;”

[11e]: “a crawler track;”

[11f]: “an upright jacking column secured to the swing leg, having a rotary connection between the jacking column and the crawler track permitting relative rotational movements of the crawler track with regard to the jacking column about a first upright axis;”

[11i]: “a power drive unit arranged to translate relative rotational movements between the jacking column and the crawler track;”

Limitations [11d], [11e], [11f], and [11i] are obvious based on Guntert for the same reasons discussed with respect to limitations [1d], [1e], [1f], and [1i]. *See* Section VIII.A.4.d; Singhose, ¶¶114-19, 124-25.

e. [11g]: “a first angular position transducer configured to emit a first signal which is indicative of an angular orientation of the crawler track relative to the jacking column;”

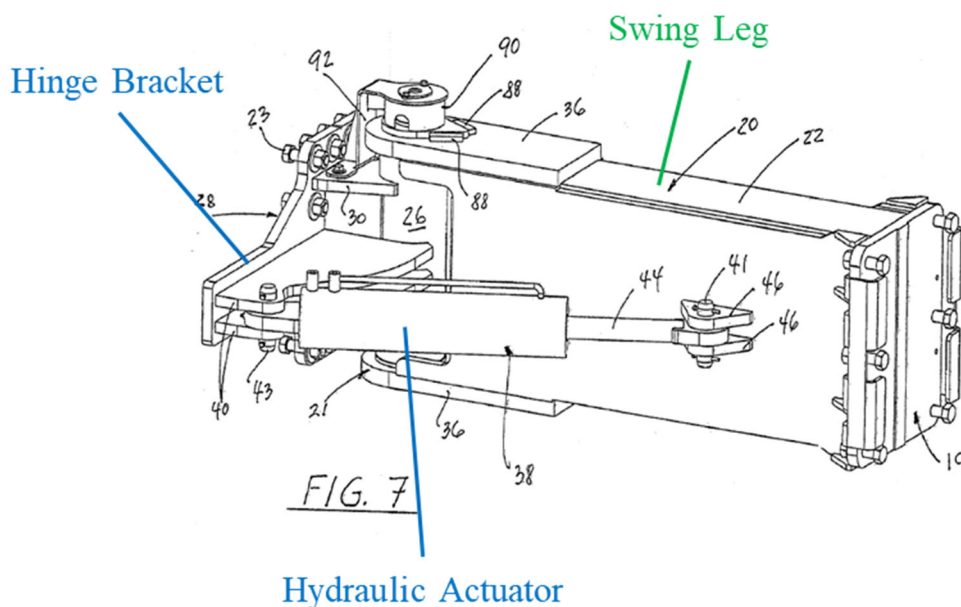
Limitation [11g] is obvious based on Guntert for the same reasons discussed with respect to limitation [1g]. *See* Section VIII.A.4.e; Singhose, ¶¶120-21.

f. [11h]: “a second angular position transducer configured to emit a second signal which is indicative of an angular orientation of the swing leg relative to the module frame;”

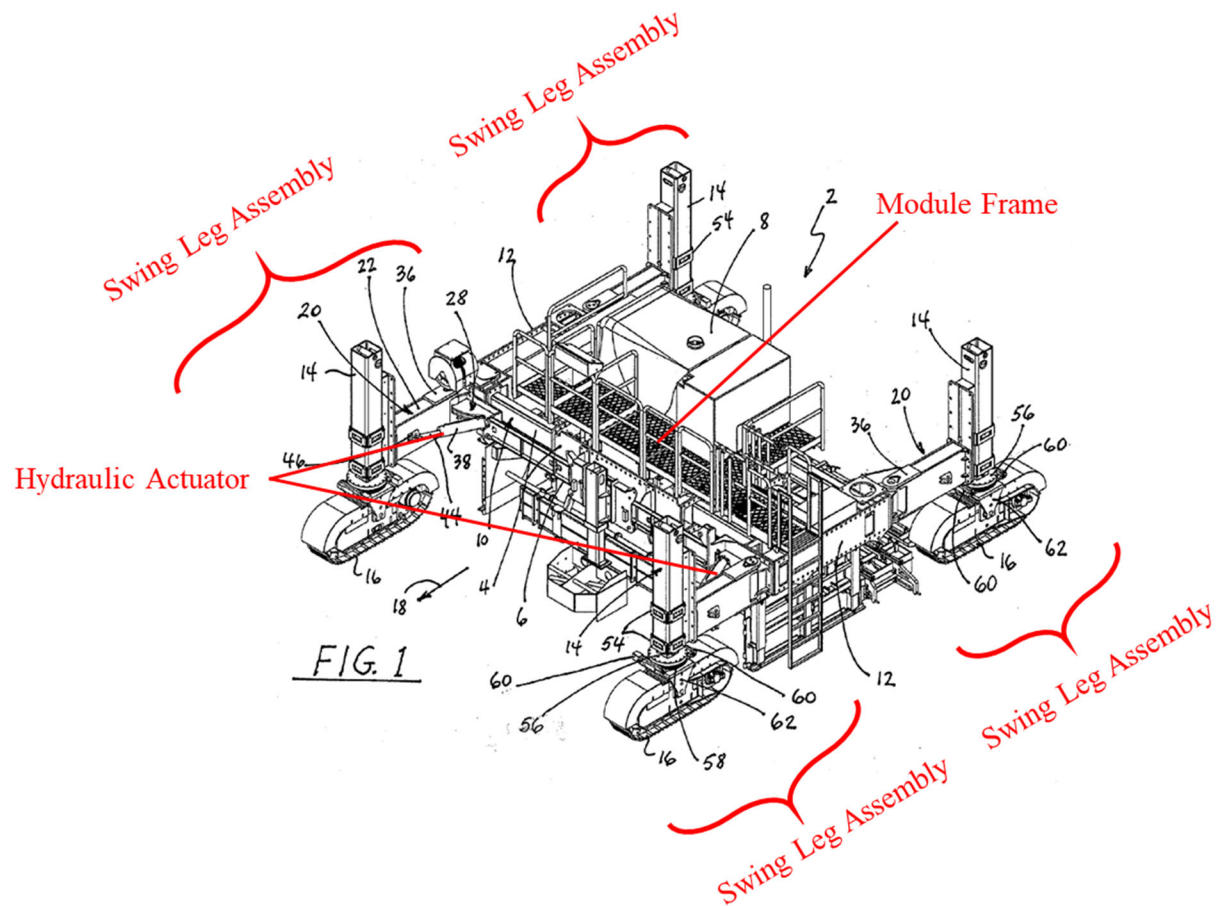
Limitation [11h] is obvious based on Guntert for the same reasons discussed with respect to limitation [1h]. *See* Section VIII.A.4.f; Singhose, ¶¶122-23.

- g. [11j] “a hydraulic actuator for each swing leg assembly, mounted between the module frame and each swing leg assembly; and”

Guntert discloses that a hydraulic actuator 38 is “pivotally pinned” to the hinge bracket and “can be energized to pivot bolster swing leg 20 in a horizontal plane.” Guntert, ¶[0040]. Guntert discloses that the hinge bracket is secured to respective end surfaces 34 of side bolsters 12. Guntert, ¶[0037]. Guntert also discloses that male support beams 10 extend from frame 4 and that side bolsters 12 are secured to the support beams. Guntert, ¶[0033]. Thus, because the hinge bracket is itself attached to the frame, the hydraulic actuator is mounted between the module frame and each swing-leg assembly. Singhose, ¶126. This arrangement is shown below.



Guntert, Fig. 7 (annotated). The positioning of Guntert's hydraulic actuator between the module frame and each swing assembly is also shown in Fig. 1, below.



*Id.*, Fig. 1 (annotated).

Thus, Guntert discloses a hydraulic actuator for each swing-leg assembly, mounted between the module frame and each swing-leg assembly. Singhose, ¶126.

- h. [11k]: “a processor operable to receive the first and second signals from each swing leg assembly and configured to generate and emit a control signal for instructing the hydraulic actuator to actuate, thereby pivotally moving each swing leg assembly in relation to the module frame.”**

Guntert discloses this element. Guntert discloses that “[t]he output signal of the position transducer 78 is fed via lead 80 to an onboard computer 82 of the paving machine, or another suitable processor, which receives as its second input the output signal of position transducer 70 between jacking column 14 and crawler tracks 16 via a lead 84.” Guntert, ¶[0051]. Thus, Guntert discloses that its onboard computer receives both the first signal (from transducer 70) and second signal (from transducer 78). Singhose, ¶127. Guntert discloses that its onboard computer includes a processor 82. Guntert, ¶[0052]. Guntert also discloses that “the onboard computer always maintains the swing leg angle at a fixed, preset angle.” Guntert, ¶[0017]. Guntert explains that if the swing leg migrates away from a preset angle, then the swing leg hydraulic cylinder is actuated to maintain the preset angle. *Id.* Thus, Guntert discloses a processor operable to receive the first and second signals from each swing-leg assembly and configured to generate and emit a control signal for instructing the hydraulic actuator to actuate, thereby pivotally moving each swing-leg assembly in relation to the module frame. Singhose, ¶127.

## 11. Claim 14

Claims 15-19 depend from claim 14. Therefore, claim 14 is presented below to establish unpatentability of claims 15-19.

- a. **[14a]: “wherein the second signal is a relative angle between the swing leg and the module frame of the respective swing leg assembly, and”**

Limitation [14a] is obvious based on Guntert for the same reasons discussed with respect to limitation [1h]. *See* VIII.A.4.f; Singhose, ¶129.

- b. **[14b]: “wherein the processor has a stored value for a preset angle of each respective swing leg assembly relative to a lateral side of the module frame”**

Guntert discloses that its swing legs can have a preset angle. For example, Guntert discloses that “the onboard computer always maintains the swing-leg angle at a fixed, preset angle.” Guntert, ¶[0017]. A POSITA would understand that for the computer to maintain a fixed, preset angle, the angle must be a stored value to allow the feedback loop to determine whether there is a difference between the sensor’s current value of the swing leg and the “fixed, preset angle.” Singhose, ¶130; *see* Section II.C. Additionally, Guntert discloses that angular position transducer 78 “generate[s] an angular position signal which reflects the angular inclination between the pivot shaft and the hinge bracket, and therewith also relative to bolster 12 and tractor frame 4.” Guntert, ¶[0050]. As discussed in Sections VIII.A.4.d and VIII.A.10.g, Guntert’s hinge bracket is mounted to the

module frame. By emitting a signal indicative of a relative angle between the swing leg and the hinge bracket, therefore, Guntert's second angular position transducer emits a signal indicative of a relative angle between the swing leg and the respective lateral side of the module frame. *See* Guntert, ¶[0050]. Because the fixed, preset angle relates to the angle of the swing leg and is compared with the angle of the swing leg indicated by the signal from transducer 78 as discussed in Section II.C, a POSITA would understand that the preset angle represents an angle relative to a lateral side of the module frame. Singhose, ¶131.

**c. [14c]: “the control signal generation comprising receiving the second signal from each swing leg assembly”**

Limitation [14a] is obvious based on Guntert for the same reasons discussed with respect to limitations [11k], [1j]. *See* VIII.A.10.h, VIII.A.4.g; Singhose, ¶132.

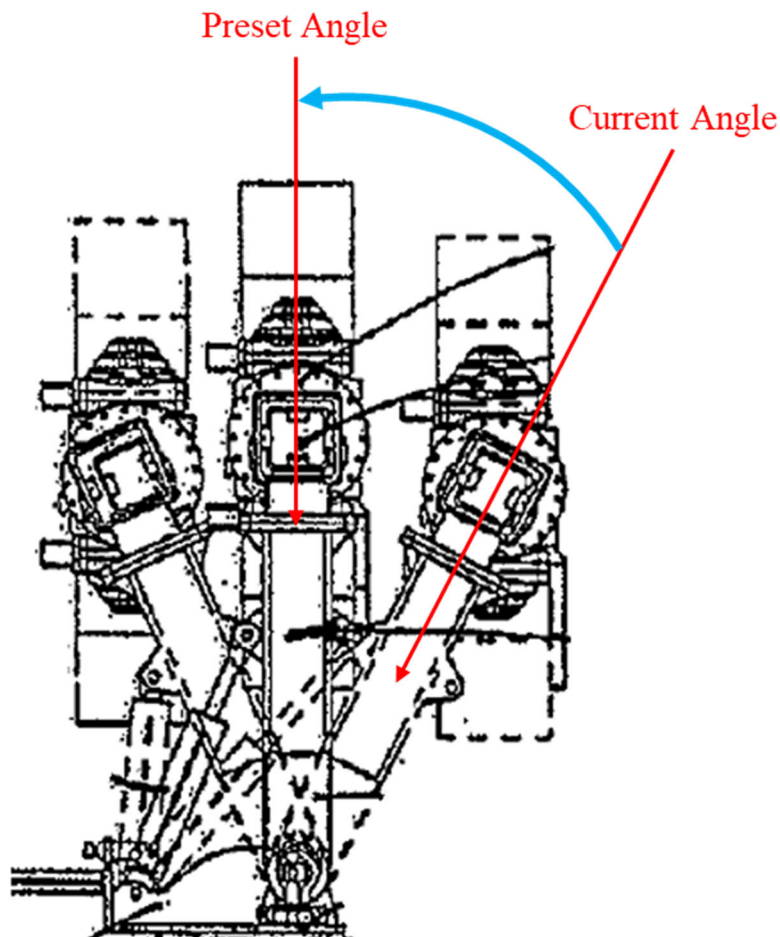
**d. [14d]: “calculating the difference between the second signal and the preset angle for each respective swing leg assembly; and”**

**[14e]: “calculating the actuation of a hydraulic actuator to move the respective swing leg so the second signal and the preset angle of each respective swing leg are in alignment.”**

Limitations [14d] and [14e] are disclosed by Guntert. In particular, Guntert discloses that the “onboard computer always maintains the swing leg angle at a fixed, preset angle.” Guntert, ¶[0017]. It continues, explaining that “[i]f the swing



leg migrates away from a preset angle, the swing leg hydraulic cylinder is actuated to maintain the preset angle.” *Id.* As discussed previously, Guntert describes the second transducer (the second signal) as emitting a signal indicative of the current angle of the swing leg. Singhose, ¶133. Given this teaching, a POSITA would understand that the second signal is part of a feedback loop that is used to maintain the swing leg at a fixed preset angle. Singhose, ¶133. This can be illustrated using Guntert’s Figure 2 as an example. As shown below in that figure, there are three example swing-leg positions shown, each of which has a different angle relative to the frame. In the case where the center swing leg is the “preset angle,” the mode of operation described in Guntert would attempt to move the swing leg to the “preset angle.” Singhose, ¶133.



Guntert, Fig. 2 (annotated).

A POSITA would understand the control system would accomplish this by using the swing leg's preset angle and the current angle (which is emitted from the first angular position transducer). In particular, the system would calculate the difference between the current angle from the sensor and the "preset angle." ("calculating the difference between the second signal and the preset angle for each respective swing leg assembly"); Singhose, ¶134. If the system identifies a difference between those two values, then the feedback loop will calculate the

actuation to drive the swing leg toward the preset angle. *See* Guntert, ¶[0017] (“[i]f the swing leg migrates away from a preset angle, the swing leg hydraulic cylinder is actuated to maintain the preset angle.”) (“calculating the actuation of a hydraulic actuator to move the respective swing leg so the second signal and the preset angle of each respective swing leg are in alignment”); Singhose, ¶134. As discussed in Section VII, this “difference” is often called an error value. As the swing leg is driven toward the preset angle (which is often referred to as a “desired” position), the system will continuously monitor whether there is still a difference or “error” between the current angle and the preset angle. Singhose, ¶134. When the “error” is reduced to 0, the system knows it has reached its “desired” position (or preset angle) and it will cease moving the swing leg. Singhose, ¶134.

## 12. Claim 15

- a. **[15a]: “The paving machine of claim 14, wherein the first signal is a relative angle between the crawler track and the jacking column of the respective swing leg assembly, and”**

This limitation is obvious for the same reasons discussed with respect to limitation [1g]. *See* Section VIII.A.4.e; Singhose, ¶137.

- b. **[15b]: “wherein the processor has a stored first signal and a stored second signal for each respective swing leg assembly, the control signal generation further comprising”**

This limitation is obvious for the same reasons discussed with respect to limitation [4a]. *See* Section VIII.A.6.a; Singhose, ¶¶138-39.

- c. **[15c]: “receiving the first signal and second signal from each swing leg assembly;”**

This limitation is obvious for the same reasons discussed with respect to limitation [1j]. *See* Section VIII.A.4.g; Singhose, ¶¶140-41.

- d. **[15d]: “storing the first signal and second signal from each swing leg assembly as the respective stored first signal and the respective stored second signal for each respective swing leg assembly.”**

This limitation is obvious for the same reasons discussed with respect to limitation [4f]. *See* Section VIII.A.6.f; Singhose, ¶¶142-43.

- e. **[15e]: “calculating the difference between the first signal and second signal, and the stored first signal and stored second signals respectively, for each respective swing leg assembly;”**

This limitation is obvious for the same reasons discussed with respect to limitation [4b]. *See* Section VIII.A.6.b; Singhose, ¶¶144-45.

- f. **[15f]: “calculating the angle to reset each crawler track to its respective jacking column along a desired orientation for each respective swing leg assembly;”**

This limitation is obvious for the same reasons discussed with respect to limitation [4c]. *See* Section VIII.A.6.c; Singhose, ¶¶146-47.

- g. **[15g]: “determining the respective power drive that operates each respective crawler track in each respective swing leg assembly; and”**

This limitation is obvious for the same reasons discussed with respect to limitation [4d]. *See* Section VIII.A.6.d; Singhose, ¶¶148-49. While this limitation recites a “power drive” instead of a “worm drive” like limitation [4d], a “worm drive” is a “power drive,” and thus for the same reasons discussed with respect to limitation [4d], Guntert discloses limitation [15g].

- a. **[15h]: “calculating the rotation of each power drive to align the respective crawler track along the desired orientation in each respective swing leg assembly.”**

This limitation is obvious for the same reasons discussed with respect to limitation [4e]. *See* Section VIII.A.6.e; Singhose, ¶¶150-51. While this limitation recites a “power drive” instead of a “worm drive” like limitation [4e], a “worm drive” is a “power drive,” and thus for the same reasons discussed with respect to limitation [4e], limitation [15h] is obvious based on Guntert and Dorsett.

- 13. Claim 16: “The paving machine of claim 15, wherein the desired orientation is alignment of the crawler tracks along a paving direction.”**

Claim 16 is obvious for the same reasons discussed with respect to claim 5.

*See* Section VIII.A.7; Singhose, ¶¶152-53.

- 14. Claim 17: “The paving machine of claim 15, wherein the desired orientation is alignment of the crawler track of one of the swing leg assemblies to the crawler track orientation of each other swing leg assembly.”**

Claim 17 is obvious for the same reasons discussed with respect to claim 6.

*See* Section VIII.A.8; Singhose, ¶¶154-55.

- 15. Claim 18: “The paving machine of claim 15, wherein the second transducers and the hydraulic actuators form a feedback loop for maintaining an orientation of the swing leg assembly independently of angular inclinations of the swing leg relative to the module frame.”**

Guntert discloses the limitations of claim 18. For example, Guntert discloses that “processor 82 and the associated transducers 70, 78 form a feedback loop in which the computer receives the angular position signal from swing leg transducer 78.” Guntert, ¶[0052]. As explained in Section VIII.A.4.f, transducer 78 constitutes the second angular position transducer. Thus, Guntert discloses that its feedback loop includes the second transducers. Singhose, ¶156. Guntert also discloses that a “closed loop feedback system that connects the hydraulic actuator for the swing leg, the rotary power drive for the crawler, and the onboard computer always

maintains the swing leg angle at a fixed, preset angle.” Guntert, ¶[0017]. Guntert explains that “[i]f the swing leg migrates away from a preset angle, the swing leg hydraulic cylinder is actuated to maintain the preset angle.” *Id.* Thus, Guntert discloses that the second transducers and the hydraulic actuators form a feedback loop for maintaining an orientation of the swing-leg assembly independently of angular inclinations of the swing leg relative to the module frame. Singhose, ¶156.

- 16. Claim 19: “The paving machine of claim 18, wherein the feedback loop further includes the first transducers and the power drive for further maintaining an orientation of the crawler track independently of angular inclinations of the crawler track relative to the module frame.”**

Claim 17 is obvious for the same reasons discussed with respect to claim 7.

*See* Section VIII.A.9; Singhose, ¶¶157-58.

## **IX. MANDATORY NOTICES**

### **A. Real Party-in-Interest**

The real party-in-interest is Godbersen-Smith Construction Company, for which GOMACO Corporation is a registered active fictitious name. No unnamed entity is funding, controlling, or otherwise has an opportunity to control or direct this petition or Petitioner’s participation in any resulting IPR.

### **B. Related Matters Under 37 C.F.R. § 42.8(b)(2)**

G&Z has asserted the ’101 patent in litigation captioned *Guntert & Zimmerman Const. Div., Inc. v. GOMACO Corp.*, Case No. 5:20-cv-4007-CJW-

KEM (N.D. Iowa). GOMACO has filed petitions for IPR on related U.S. Patent No. 10,029,749, captioned *Godbersen-Smith Construction Company d/b/a GOMACO Corporation v. Guntert & Zimmerman Const. Div., Inc.*, Case IPR2020-01698 (filed October 1, 2020); related U.S. Patent No. 9,708,020, captioned *Godbersen-Smith Construction Company d/b/a GOMACO Corporation v. Guntert & Zimmerman Const. Div., Inc.*, Case IPR2021-00050 (filed October 14, 2020); related U.S. Patent No. 9,908,571, captioned *Godbersen-Smith Construction Company d/b/a GOMACO Corporation v. Guntert & Zimmerman Const. Div., Inc.*, Case IPR2021-00135 (filed November 6, 2020) and *Godbersen-Smith Construction Company d/b/a GOMACO Corporation v. Guntert & Zimmerman Const. Div., Inc.*, Case IPR2021-00136 (filed November 6, 2020); and U.S. Patent No. 10,053,167, captioned *Godbersen-Smith Construction Company d/b/a GOMACO Corporation v. Guntert & Zimmerman Const. Div., Inc.*, Case IPR2021-00161 (filed November 6, 2020). GOMACO also filed a second petition for IPR of the '101 patent on the same day as the filing of this petition, captioned *Godbersen-Smith Construction Company d/b/a GOMACO Corporation v. Guntert & Zimmerman Const. Div., Inc.*, Case IPR2021-00234.

### **C. Lead and Back-Up Counsel**

Petitioner designates lead and back-up counsel as noted below. Powers of attorney pursuant to 37 C.F.R. § 42.10(b) accompany this Petition.



<b>Lead Counsel</b>	<b>Backup Counsel</b>
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**D. Service Information Under 37 C.F.R. § 42.8(b)(4)**

Please address all correspondence to counsel at the address above. Petitioner consents to electronic service by email at: Gomaco-IPRs@finnegan.com.

**X. GROUNDS FOR STANDING**

Petitioner certifies under 37 C.F.R. § 42.104(a) that the '101 patent is available for IPR and the Petitioner is not barred or estopped from requesting IPR.

**XI. CONCLUSION**

The challenged claims should be canceled for the reasons discussed above.

Dated: November 25, 2020

By: /Jason Stach/  
Jason Stach, Lead Counsel  
Reg. No. 54,464

**CERTIFICATION OF WORD COUNT**

Pursuant to 37 C.F.R. § 42.24(c) and (d), Petitioner certifies that the word count of Petitioner's Petition for Inter Partes Review (exclusive of any table of contents, table of authorities, mandatory notices under § 42.8, certificates of service and word count, and list of exhibits or claim listing) as measured by Microsoft Word is **13,948**.

Dated: November 25, 2020

By: /Jason Stach/  
Jason Stach, Lead Counsel  
Reg. No. 54,464

**CERTIFICATE OF SERVICE**

The undersigned certifies that the foregoing Petition for *Inter Partes* Review, the associated Power of Attorney, and Exhibits 1001-1004, 1015, 1018-1026, 1028-1030 were served on November 25, 2020, by FedEx Priority Overnight at the following address of record for the subject patent.

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