

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: David Armas
U.S. Patent No.: 10,533,300 Attorney Docket No. 57677-0001IP1
Issue Date: January 14, 2020
Appl. Serial No.: 16/055,094
Filing Date: August 4, 2018
Title: AUTOMATIC GRADER STABILIZER

Mail Stop Patent Board

Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 10,533,300 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

TABLE OF CONTENTS

I.	REQUIREMENTS FOR IPR—37 C.F.R. §42.104.....	1
A.	Grounds for Standing—37 C.F.R. §42.104(a).....	1
B.	Challenge and Relief Requested—37 C.F.R. §42.104(b)	1
II.	THE '300 PATENT	2
A.	Brief Overview.....	2
B.	Prosecution History.....	4
III.	LEVEL OF ORDINARY SKILL	4
IV.	CLAIM CONSTRUCTION—37 C.F.R. §42.104(b)(3)	5
V.	THE CHALLENGED CLAIMS ARE UNPATENTABLE.....	5
A.	GROUND 1A—Obviousness Over Funk, Lewis.....	5
1.	Funk (EX1004).....	5
2.	Lewis (EX1005)	6
3.	The Combination, Reasons to Combine, & Expectation of Success	7
4.	Claim Element Analysis.....	11
B.	GROUND 1B—Obviousness Over Funk, Lewis, Stratienko	27
1.	Stratienko (EX1008).....	27
2.	The Combination, Reasons to Combine, & Expectation of Success	28
3.	Claim Element Analysis.....	31
C.	GROUND 1C—Obviousness Over Funk, Lewis, Orser	35
1.	Orser (EX1009)	35

2.	The Combination, Reasons to Combine, & Expectation of Success	36
3.	Claim Element Analysis.....	39
D.	GROUND 1D—Obviousness Over Funk, Lewis, Stratienko, Orser	41
1.	Claim Element Analysis.....	42
E.	GROUND 2A—Obviousness Over Eckrote, Lumpkins	43
1.	Eckrote (EX1006).....	43
2.	Lumpkins (EX1007).....	44
3.	The Combination, Reasons to Combine, & Expectation of Success	45
4.	Claim Element Analysis.....	48
F.	GROUND 2B—Obviousness Over Eckrote, Lumpkins, Stratienko.....	63
1.	The Combination, Reasons to Combine, & Expectation of Success	64
2.	Claim Element Analysis.....	67
G.	GROUNDS 2C—Obviousness Over Eckrote, Lumpkins, Orser	71
1.	The Combination, Reasons to Combine, & Expectations of Success	71
2.	Claim Element Analysis.....	74
H.	GROUND 2D—Obviousness Over Eckrote, Lumpkins, Stratienko, Orser	76
1.	Claim Element Analysis.....	78
VI.	ANALYSIS ON DISCRETION.....	78
A.	35 U.S.C. §325(d)— <i>Advanced Bionics</i>	78
B.	35 U.S.C. §314(a)— <i>Fintiv</i>	79

VII. FEES—37 C.F.R. §42.103	80
VIII. MANDATORY NOTICES—37 C.F.R §42.8(a)(1)	80
A. Real Party-In-Interest—37 C.F.R. § 42.8(b)(1).....	80
B. Related Matters—37 C.F.R. § 42.8(b)(2)	80
C. Lead And Back-Up Counsel—37 C.F.R. § 42.8(b)(3).....	80
D. Service Information	81

EXHIBITS

Exhibit 1001	U.S. Patent No. 10,533,300
Exhibit 1002	U.S. Patent No. 10,533,300 File History
Exhibit 1003	Declaration of Dr. James Glancey, P.E.
Exhibit 1004	U.S. 2016/0273196 to Funk (“Funk”)
Exhibit 1005	U.S. 11,111,646 to Lewis (“Lewis”)
Exhibit 1006	U.S. 10,662,614 to Eckrote (“Eckrote”)
Exhibit 1007	U.S. 2006/0070746 to Lumpkins (“Lumpkins”)
Exhibit 1008	U.S. 4,185,539 to Stratienko (“Stratienko”)
Exhibit 1009	U.S. 5,169,277 to Orser (“Orser”)
Exhibit 1010	U.S. 8,118,111 to Armas
Exhibit 1011	U.S. 5,413,181 to Keigley
Exhibit 1012	U.S. 2008/0116403 to Shelbourn
Exhibit 1013	U.S. 2021/0355647 to Stocks
Exhibit 1014	U.S. 2016/0053459 to Webb
Exhibit 1015	U.S. 6,079,938 to Anderson
Exhibit 1016	C.B. Tatum et al., <i>Partially Automated Grading: Construction Process Innovation</i> , Journal of Construction Engineering and Management, Vol. 114, No. 1, March 1988

Exhibit 1017	U.S. 8,068,962 to Colvard
Exhibit 1018	U.S. 9,200,900 to Fessler
Exhibit 1019	U.S. 9,988,787 to Wang
Exhibit 1020	Introduction to Hydraulics, HWH Online Technical School, revision date April 22, 2016
Exhibit 1021	Bobcat® S510 Compact Loaders Specifications Sheet, © 2012 B 4474340-EN (12-12)
Exhibit 1022	Case Construction, Skid Steer Loaders Catalog, AP4102CCGB, 08/15
Exhibit 1023	U.S. 3,233,447 to Horrell
Exhibit 1024	U.S. 3,707,984 to Bantz
Exhibit 1025	U.S. 5,921,165 to Takahashi
Exhibit 1026	U.S. 4,090,396 to O'Brien
Exhibit 1027	U.S. 9,611,870 to Jeon
Exhibit 1028	<i>Public Health Statement: Hydraulic Fluid</i> , Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, September 1997
Exhibit 1029	U.S. 2017/0226717 to Cherney
Exhibit 1030	U.S. 2017/0138489 to Winkler
Exhibit 1031	U.S. 6,470,912 to Haynes
Exhibit 1032	U.S. 2012/0059554 to Omelchenko

- Exhibit 1033 Bobcat Press Release, *New Bobcat Heavy-Duty Grader Attachments Increase Versatility with Labor-Saving Features*, July 24, 2009 (retrieved from <https://news.thomasnet.com/fullstory/grader-attachments-have-blades-that-move-6-different-ways-563417>)
- Exhibit 1034 Backlash v. Lost Motion, DesignNews, August 4, 2002, www.designnews.com/industry/backlash-vs-lost-motion
- Exhibit 1035 U.S. 10,322,725 to Cunningham
- Exhibit 1036 Fan et al., *Reliability Analysis and Failure Prediction of Construction Equipment with Time Series Models*, Journal of Advanced Management Science, vol. 3, No. 3, Sept. 2015
- Exhibit 1037 U.S. 10,776,880 to Dalal
- Exhibit 1038 *The Dangers of Hydraulic Leaks*, Mac Hydraulics, January 16, 2017 (retrieved from <https://mac-hyd.com/2017/01/16/dangers-hydraulic-leaks/>)
- Exhibit 1039 *Two Simple Solutions to Prevent Hydraulic Cylinder Drift*, Aggressive Hydraulics, dated August 27, 2015 (retrieved from <https://www.aggressivehydraulics.com/two-simple-solutions-to-prevent-hydraulic-cylinder-drift/>)
- Exhibit 1040 U.S. 7,970,519 to Green
- Exhibit 1041 Richard & Vivalda, *Mathematical Analysis of Stability and Drift Behavior of Hydraulic Cylinders Driven by a Servovalve*, Transactions of the ASME, vol. 124, March 2002, pp. 206-213
- Exhibit 1042 Level Best Precision Grading Brochure, ATI Corporation, © 2018

Exhibit 1043 Stay Order, *David's Dozer V-Loc System Inc. v. Deere & Company*, 2:24-cv-01023-CJW-MAR (ND Iowa), Document 106 (July 15, 2024)

LISTING OF CLAIMS

Claim 1	
[1.pre]	A method for controlling a dozer blade controlled by an automatic grade control system on a skid steer vehicle comprising:
[1.1]	providing a skid steer vehicle having a main arm with a front side operably coupled to a dozer blade assembly;
[1.2]	providing a stop connected to the skid steer vehicle upon which a point of the main arm rests thereby defining a lower limit of movement of the main arm;
[1.3]	positioning the point of the main arm against the stop;
[1.4]	preventing the ability of the main arm from providing any lifting force by restricting the ability of a hydraulic that lifts the main arm;
[1.5]	operably connecting the automatic grade control system to a hydraulic that controls a pitch axis of movement of the dozer blade to affect a height of the dozer blade relative to a ground surface.
Claim 2	
[2.pre]	The method for controlling a dozer blade as in claim 1 further including:
[2.1]	locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.
Claim 3	
[3.pre]	The method for controlling a dozer blade as in claim 1 further including:
[3.1]	operating a valve to hydraulically isolate the hydraulic lift that lifts the main arm to further prevent any movement of the main arm.

Claim 4	
[4.pre]	The method for controlling a dozer blade as in claim 3 further including:
[4.1]	locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.

CONVENTIONS OF THE PETITION

- All emphasis is added unless noted otherwise;
- Quotations are generally from exhibits, not claim language; and
- The phrase “as discussed” and equivalent phrases incorporate fully the analysis of the cross-cited portion of the Petition.

Deere & Company (“Petitioner”) petitions for IPR of claims 1-4 (“Challenged Claims”) of U.S. Patent No. 10,533,300 (“the ’300 Patent”).

I. REQUIREMENTS FOR IPR—37 C.F.R. §42.104

A. Grounds for Standing—37 C.F.R. §42.104(a)

Petitioner certifies that the ’300 Patent is available for IPR, and that Petitioner is not barred or estopped from requesting IPR.

B. Challenge and Relief Requested—37 C.F.R. §42.104(b)

Petitioner requests IPR on Grounds 1A-2D listed below. A declaration from Dr. James Glancey, P.E. supports Grounds 1A-2D; EX1003, ¶¶1-273.

Grounds	Claims	Basis for Rejection
1A	1-4	§103—Funk, Lewis
1B	1-4	§103—Funk, Lewis, Stratienko
1C	2, 4	§103—Funk, Lewis, Orser
1D	2, 4	§103—Funk, Lewis, Stratienko, Orser
2A	1-4	§103—Eckrote, Lumpkins
2B	1-4	§103—Eckrote, Lumpkins, Stratienko
2C	2, 4	§103—Eckrote, Lumpkins, Orser
2D	2, 4	§103—Eckrote, Lumpkins, Stratienko, Orser

Every art reference advanced in Grounds 1A-2D precedes the ’300 Patent’s earliest claimed priority date, which is August 4, 2018.

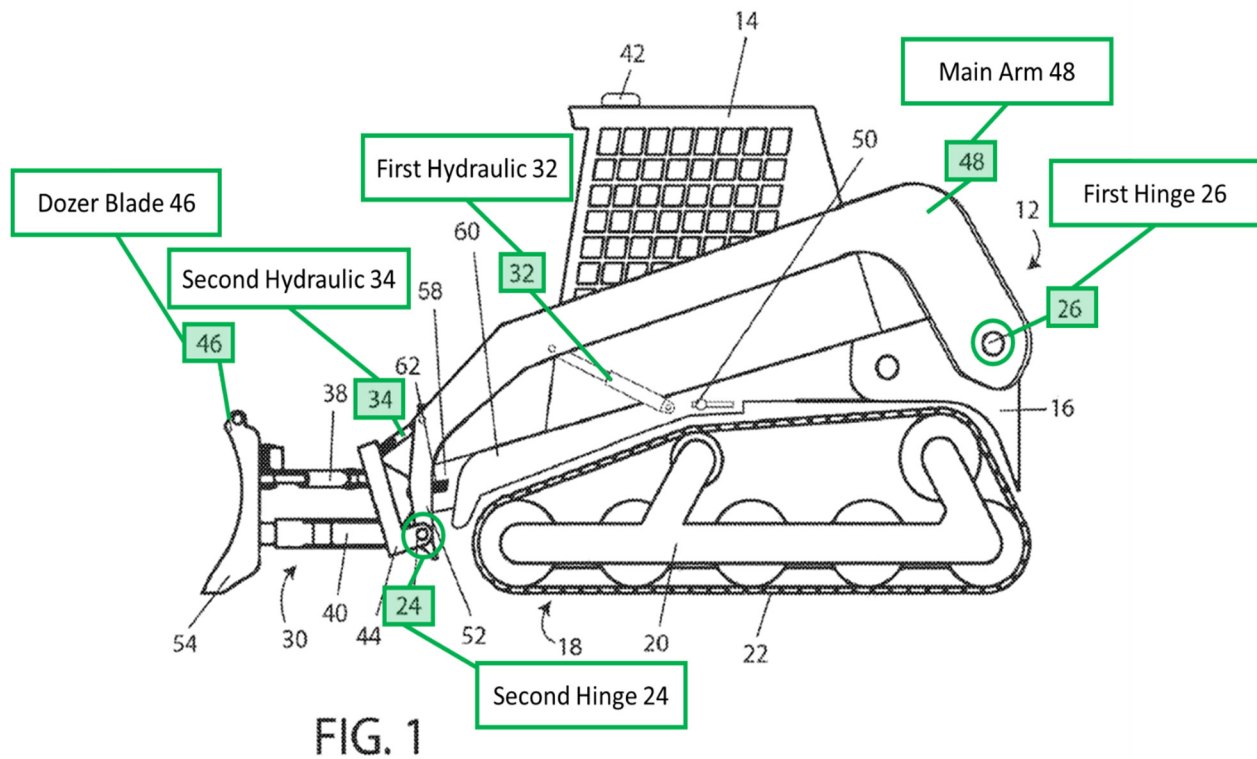
Reference	Prior Art Date	Status
EX1004: U.S. 2016/0273196 (“Funk”)	Published Sep 22, 2016	102(a)(1)
EX1005: U.S. 11,111,646 (“Lewis”)	Filed Feb 24, 2017	102(a)(2)

Reference	Prior Art Date	Status
EX1006: U.S. 10,662,614 (“Eckrote”)	Filed Feb 21, 2018	102(a)(2)
EX1007: U.S. 2006/0070746 (“Lumpkins”)	Published Apr 6, 2006	102(a)(1)
EX1008: U.S. 4,185,539 (“Stratienko”)	Published Jan 29, 1980	102(a)(1)
EX1009: U.S. 5,169,277 (“Orser”)	Published Dec. 8, 1992	102(a)(1)

II. THE ’300 PATENT

A. Brief Overview

The ’300 Patent is about “skid steer vehicles used to grade earth using a dozer blade...[and] automatic grade control equipment.” EX1001, Abstract; EX1003, ¶¶43-50 (explaining, among other things, that earth grading involves leveling or sloping a land surface). The ’300 Patent’s Figure 1 (annotated below) illustrates an exemplary skid-steer featuring a main arm 48 supporting a dozer blade attachment 46. EX1001, 4:39-48, 5:4-22. This exemplary skid-steer includes a first hydraulic 32 that tilts the main arm 48 about a first hinge 26 and a second hydraulic 34 that tilts the dozer blade 46 about a second hinge 24. EX1001, 4:39-48, 5:67-6:54, 7:1-25. The height of the bottom of the dozer blade 46 relative to the ground “controls the depth of the cut” during grading, and the blade height is “manipulated by [an] automatic grading computer” selectively actuating the second hydraulic 34. EX1001, 6:17-36, 8:21-26. As the second hydraulic 34 tilts the blade 46, the main arm 48 is immobilized, resting against a stop in a lowered position. EX1001, 5:23-45, 8:4-20, 8:26-39.



EX1001, Fig. 1 (annotated)

The '300 Patent concedes that using skid-steers with dozer blades for earth grading was known. EX1001, 1:14-28 (discussing the “Armas prior art”), 3:33-39. The '300 Patent further concedes that automatic grading systems were known and used to control such skid-steers. *Id.*, 1:18-45, 3:44-45 (“commonly commercially available”), 3:61-66; EX1003, ¶¶73-75. Indeed, the inventor of the '300 Patent disclosed these concepts in a commonly-owned prior patent—U.S. 8,118,111. *Id.*; *see also generally* EX1010.

The '300 Patent’s only distinction from this admitted prior art is “stabiliz[ing] the dozer blade attachment assembly by limiting the main arm...movement,” a well-

known and rudimentary idea that the inventor employed by leveraging the technological advances already achieved by others. EX1001, 1:43-2:3. But the '300 Patent's inventor came to this common-sense conclusion too late to justify the broad scope of the Challenged Claims. By the time of the '300 Patent, Eckrote and Lewis had already disclosed the idea of supporting a skid-steer main arm on a stop while inhibiting its movement to enhance stability.

B. Prosecution History

The Examiner allowed the Challenged Claims without raising even a single rejection. EX1002, 18-24. According to the Examiner, the “prior art lacks [a] teaching for having provided the stop with the steps of positioning [the point of the main arm against the stop] and preventing [the ability of the main arm from providing any lifting force] in the manner claimed.” EX1002, 23. But the Examiner was wrong, proven so by Grounds 1A-2D of this Petition. As shown below in Section V, the Challenged Claims are obvious multiple times over, and this conclusion would have been apparent had the Examiner more thoroughly searched the prior art and vetted the Challenged Claims.

III. LEVEL OF ORDINARY SKILL

The range of qualifications for a POSITA would have included (1) a bachelor's degree in mechanical engineering or a comparable field, and (2) at least two years of professional experience working with hydraulic systems and/or

earthmoving equipment and vehicles. EX1003, ¶¶40-72. Additional years of experience could substitute for an advanced-level degree (and vice versa). *Id.*

IV. CLAIM CONSTRUCTION—37 C.F.R. §42.104(b)(3)

The claim interpretations on which this Petition depends are incorporated in and apparent from the prior art mapping analysis below. *Infra*, §V. While, presently, no claim terms need be construed to resolve issues of controversy raised by this Petition, *see Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011), Petitioner reserves the right to address and respond to any construction advanced by Patent Owner or the Board.

V. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. GROUND 1A—Obviousness Over Funk, Lewis

1. Funk (EX1004)

Funk describes a skid-steer vehicle featuring an “automatic leveling control system for a machine having a work attachment adapted for leveling as the machine is propelled about a worksite.” EX1004, Abstract; EX1003, ¶76. For example, Funk discloses “[a] controller [that] is configured for generating a control signal...to adjust at least one of a height of the lift arms and the tilt angle of the work attachment mounting structure such that a grading edge of the work attachment is maintained at elevation as the machine is propelled about the worksite.” EX1004, [0013].

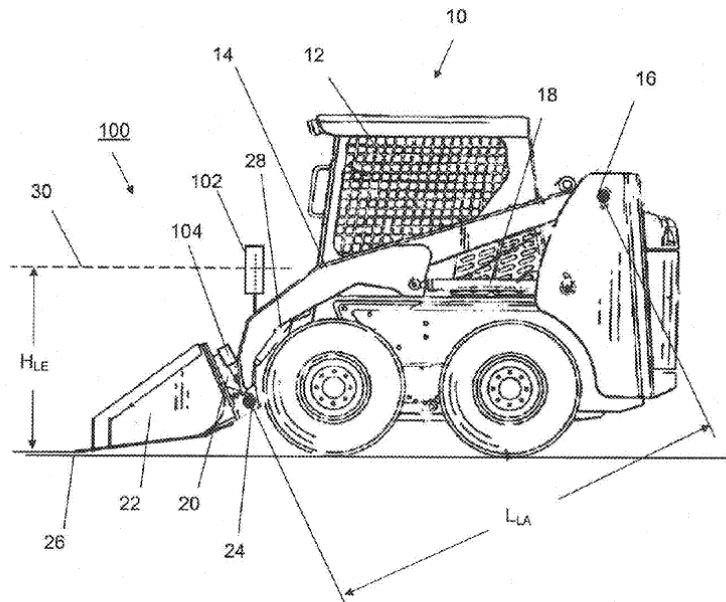


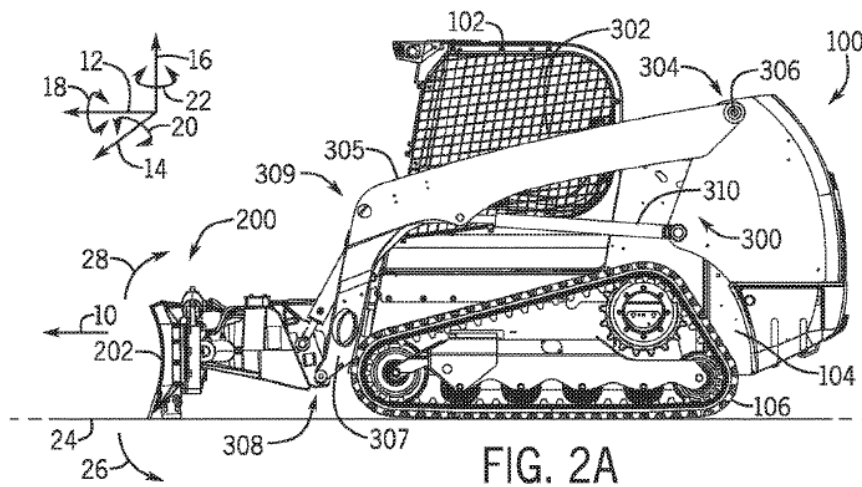
Figure. 1a

EX1004, Fig. 1A

2. Lewis (EX1005)

Like Funk, Lewis is about a control system for a skid-steer vehicle. Lewis recognizes that “[b]locking upward movement of the arm beyond [a set] intermediate position may enable the maximum horizontal load rating of the arm/arm assembly.” EX1005, 4:34-36; EX1003, ¶77. “In certain embodiments, the intermediate position of the arm may correspond to the lowered position of the arm,” such that “the arm may contact the chassis of the work vehicle or a stop coupled to the chassis of the work vehicle.” EX1005, 6:54-61. For example, “[i]n certain embodiments disclosed herein, while a restricted-height implement, such as a dozer blade, is coupled to the arm, upward movement of the arm beyond the intermediate

position is blocked, thereby enabling the maximum horizontal load rating of the arm/arm assembly to be increased while the restricted-height implement is coupled to the arm.” *Id.*, 4:54-60.



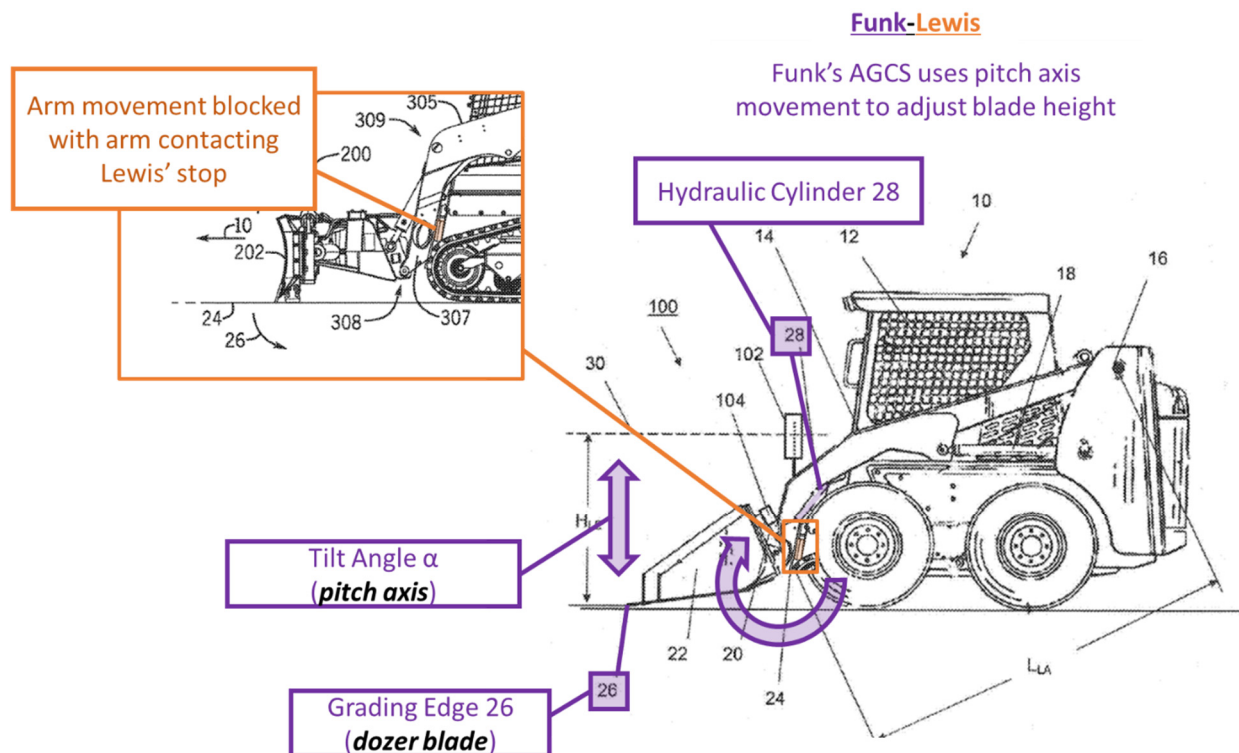
EX1005, Fig. 2A

3. The Combination, Reasons to Combine, & Expectation of Success

The Funk-Lewis combination represents the predictable result of applying Lewis’s supplemental teachings about blocking upward movement of the skid-steer’s main arm in the context of Funk’s teachings about skid-steer vehicles with an automatic grade control system for adjusting the height and tilt angle of a mounting structure to maintain the work attachment at a particular elevation.¹ From

¹ Here and throughout this Petition, Petitioner proposes combining the respective teachings of the art references, not a bodily incorporation or physical integration.

a POSITA's perspective in 2018, integrating the supplemental teachings of Lewis with Funk's skid-steer automatic grade control system would have involved nothing more than applying known solutions to known problems in the field of hydraulic systems for earthmoving equipment and vehicles to achieve a predictable outcome—namely, a skid-steer vehicle where the main arm is immobilized and rests on a stop while an automatic grade control system adjusts the height of a dozer blade via pitch axis movements. EX1003, ¶¶78-90, 45-62. The fundamental aspects of Funk's disclosure would remain intact, bolstered by the well-known and beneficial teachings of Lewis to arrive at the '300 Patent's claimed invention. *Id.*, ¶¶91-96.



EX1004, Fig. 1a (annotated) (modified to include EX1005, Fig. 2a, inset)

A POSITA would have been motivated to pursue the Funk-Lewis combination and possessed a reasonable expectation of its success in arriving at the claimed invention for at least the following independent reasons. EX1003, ¶¶78-96.

First, a POSITA would have understood that the integration of Lewis's teaching to block upward movement of the main arm with Funk's skid-steer vehicle would have the predictable advantage of maximizing the horizontal load rating of the arm assembly during grading (just as Lewis teaches). EX1003, ¶¶80-83; EX1005, 4:34-37 ("Blocking upward movement of the arm beyond the intermediate position may enable the maximum horizontal load rating of the arm/arm assembly to be increased while a restricted-height implement is coupled to the arm."), 5:22-35, 6:54-7:5, 5:59-6:15, 11:5-24. A POSITA, understanding that skid-steer vehicles can be subject to high horizontal loads during earth grading, would have been motivated to increase the horizontal load rating of Funk's design by implementing Lewis's teaching to rest the main arm against a chassis stop while preventing movement of the main arm. EX1003, ¶83.

Second, a POSITA would have understood that Funk invites the proposed Funk-Lewis combination by explaining that automatic grade control can be achieved with adjustments to "at least one" of lift arm height or blade tilt. EX1003, ¶84; EX1004, Abstract, [0013], [0033]. In this way, Funk encourages the POSITA to seek out and explore the predictable result of integrating the supplemental teaching

from Lewis to immobilize the main arm, leaving just “one” of Funk’s two adjustment mechanisms—blade tilt—available for grade control. EX1003, ¶84.

Third, a POSITA would have appreciated that Lewis’s teaching to increase the horizontal load rating by simply preventing movement of the main arm aligns with Funk’s desire to provide systems that are easily implemented “as a retro-fit to a pre-existing skid steer unit.” EX1004, [0006]; EX1003, ¶85. In other words, Lewis’s idea of immobilizing the main arm in a lowered position against a stop “does not rely upon custom bucket attachments” and leverages “the factory produced excavation attachments with the full primary hydraulics.” EX1004, [0006], [0004]. Rather than promoting customized attachments, Lewis’s approach abides Funk’s instruction “to provide an automatic leveling control system that [leverages] customization of the hydraulic response of the grading equipment.” EX1004, [0006]; *see also* [0004], [0009], [0019]; EX1005, 4:21-5:6; EX1003, ¶86.

Fourth, a POSITA would have understood that Lewis’s teaching to prevent movement of the skid-steer’s main arm during use would enhance the accuracy of Funk’s automatic leveling control system by narrowing the degrees of freedom. EX1003, ¶¶87-89; EX1004, Abstract, [0013], [0033]; EX1005, 4:34-:5-6,6:54-7:5. By moving only the dozer blade during grading operations, the blade position can be adjusted more quickly than it would be if both the main arm and blade were

adjusted. More, the POSITA would have recognized that holding the main arm fixed during grading would facilitate additional benefits such as:

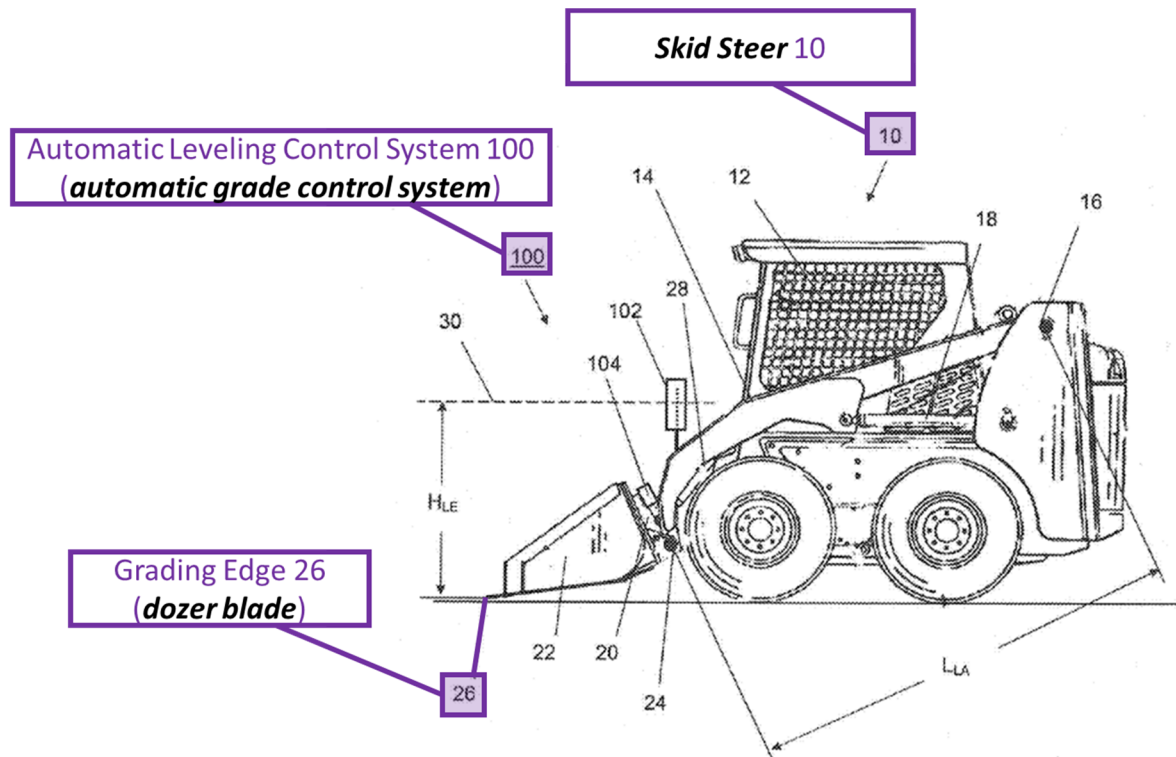
- Increasing the speed with which grading can be accomplished. EX1003, ¶¶90, 71-72.
- Reducing power usage, and thus fuel consumption, by limiting the movement of the heavier main arm. *Id.*
- Extending the life of the main arm hydraulic by reducing the number of cycles required of the hydraulic during grading operations. *Id.*

4. Claim Element Analysis

(a) Claim 1

Element [1.pre] A method for controlling a dozer blade controlled by an automatic grade control system on a skid steer vehicle comprising:

The Funk-Lewis combination renders obvious Element [1.pre]. EX1003, ¶¶97-99. For example, Funk discloses an “***automatic leveling control system*** 100 implemented using ***a skid-steer*** 10.” EX1004, [0031], [0028] (“automatic leveling control ***method***”); Figures 1a, 5. Specifically, Funk describes utilizing a “***grading edge*** 26 for leveling as the ***skid-steer*** 10 is propelled about a worksite.” *Id.*, [0031].



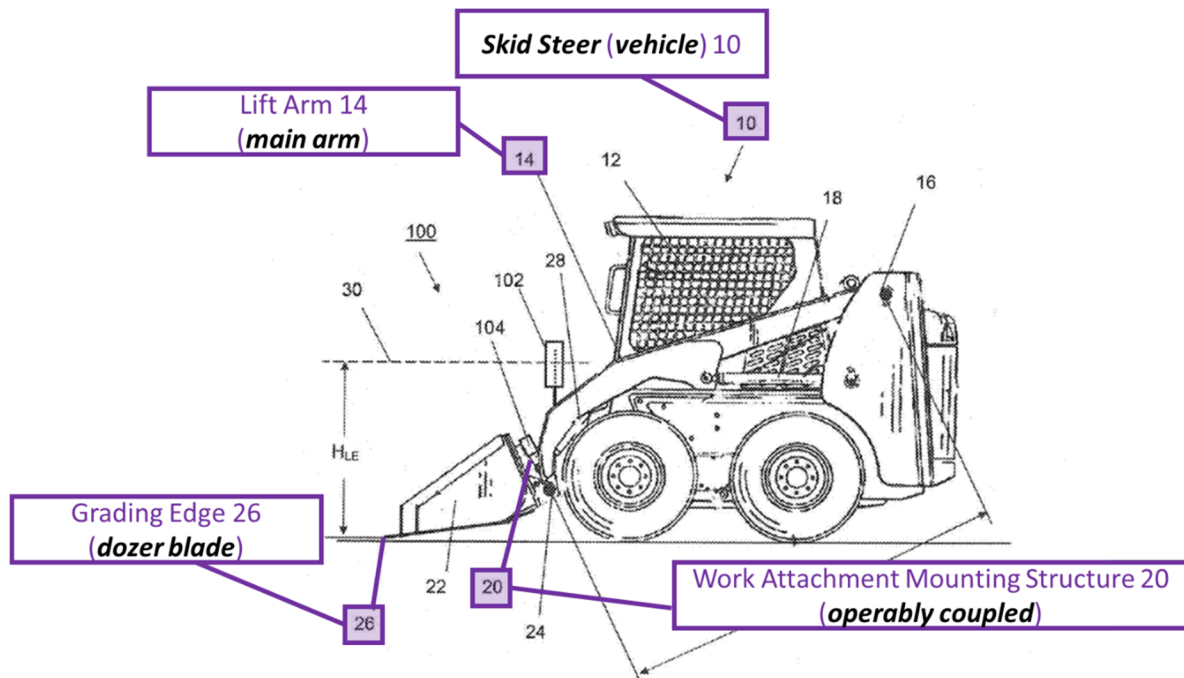
EX1004, Fig. 1a (annotated)

In Funk's system, "[a] level *grade* is achieved by movement of the unit around the work surface [while] maintaining the [grading] edge of the work attachment in a desired plane in relation to a laser plane projected at the worksite." EX1004, [0014]; *see also* [0033]. Thus, a POSITA would have understood and found obvious that Funk's conception of a system that achieves "automatic leveling control" by controlling the position of a "grading edge" provides an *automatic grade control system*. EX1003, ¶¶98, 45-50. The POSITA also would have understood and found obvious that Funk's disclosure of a "suitable front edge or working surface such as...[various] types of buckets and *blades*...for use with other types of machines

such as, for example, front loaders and bulldozers” implicates *a dozer blade*.
EX1003, ¶99; EX1004, [0030].

Element [1.1] providing a skid steer vehicle having a main arm with a front side operably coupled to a dozer blade assembly;

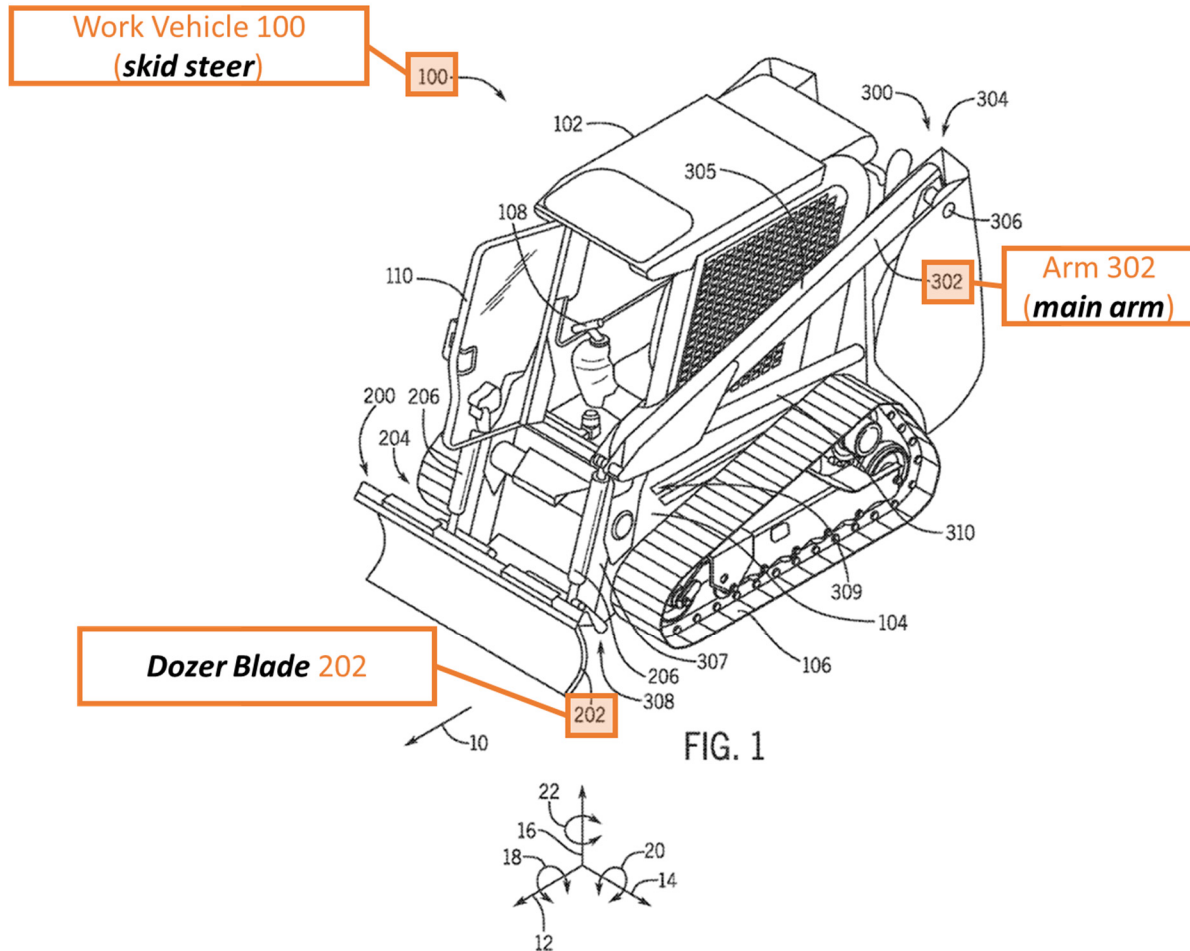
The Funk-Lewis combination renders obvious Element [1.1]. EX1003, ¶¶100-102. For example, Funk discloses a “*skid-steer* automatic laser grading attachment compris[ing] a grading [(*dozer*)] *blade* mounted [(*operably coupled*)] to a stabilizing boom [(*main arm*)].” EX1004, [0003]; *see also id.*, [0012] (similar).



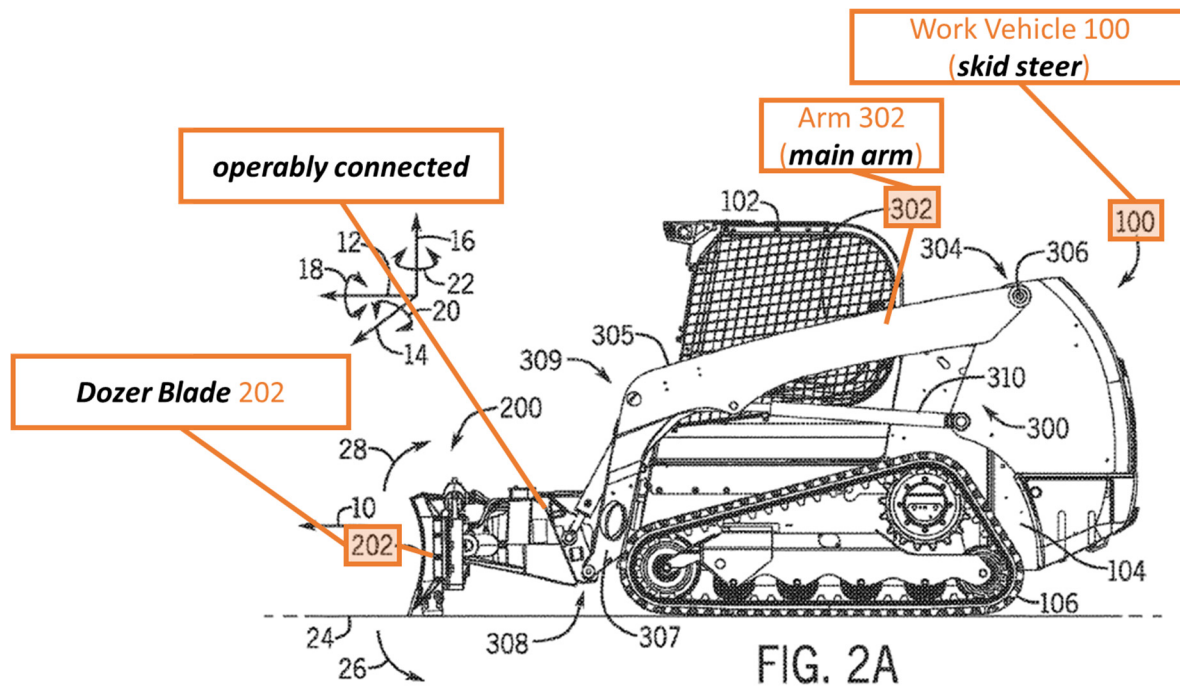
EX1004, Fig. 1a (annotated)

Lewis similarly discloses that “[c]ertain work vehicles (e.g., *skid steers*) have an *arm* movably coupled to the chassis and configured to support an implement (e.g.,

dozer blade, grapple, etc.). For example, the arm may support a *dozer blade* to facilitate earth-moving operations.” EX1005, 1:9-22, 2:39-60, 3:4-38.



EX1005, Fig. 1 (annotated)



EX1005, Fig. 2a (annotated)

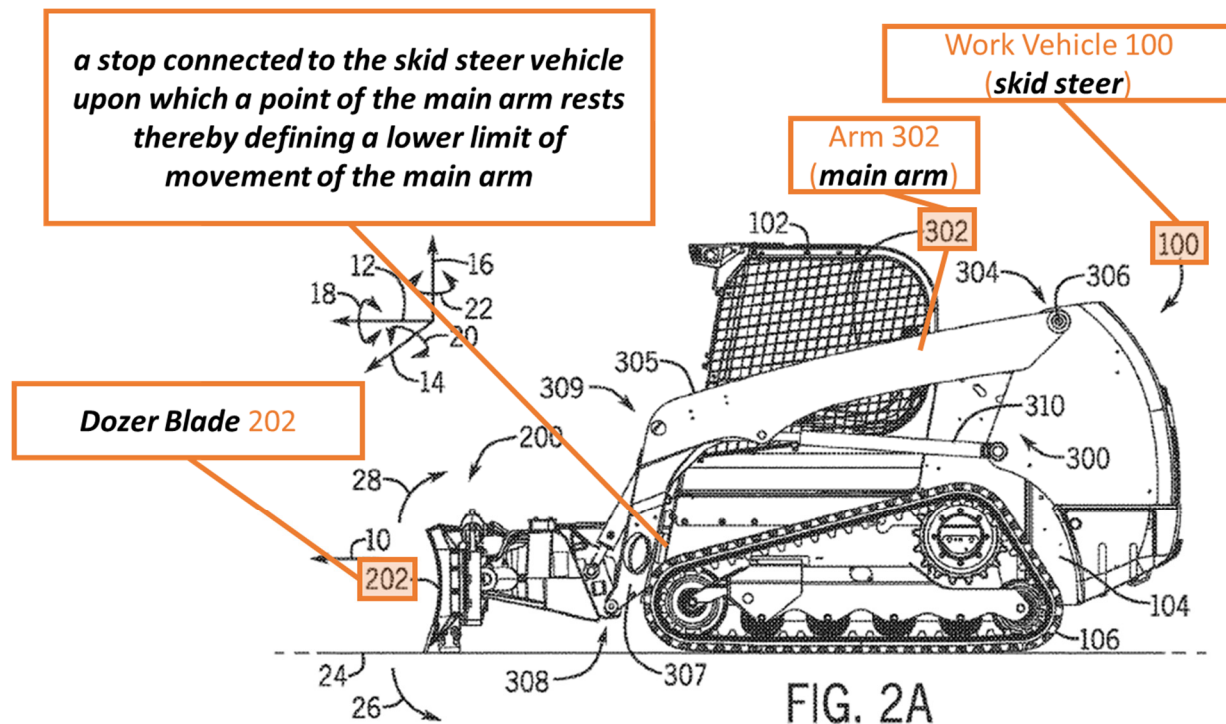
As shown and described in both Funk and Lewis, the *dozer blade* is *operably coupled* to the *front* side of the main arm, which a POSITA would have identified as a common configuration for skid-steers. EX1003, ¶102; EX1004, Fig. 1a; EX1005, 3:4-67, Fig. 2a.

Element [1.2] providing a stop connected to the skid steer vehicle upon which a point of the main arm rests thereby defining a lower limit of movement of the main arm;

Element [1.3] positioning the point of the main arm against the stop;

The Funk-Lewis combination renders obvious Elements [1.2], [1.3]. EX1003, ¶¶103-110. As discussed at §V.A.3, this combination incorporates Lewis's teaching of immobilizing the *main arm* in a *lowered* position.

For example, Lewis illustrates in Fig. 2A (below) that “*the arm 302* of the arm assembly 300 is in a *lowered* position” in which “the lowered position of the arm 302 corresponds to the minimum height of the dozer blade 202 relative to the ground 24 along the vertical axis 16.” EX1005, 5:20-39. Lewis additionally describes that the “intermediate position of the arm”—the position beyond which “upward movement” is “block[ed]”—“may correspond to *the lowered position*,” where the arm is “configured to support the greatest horizontal load.” *Id.*, 6:54-55, 4:19-5:6, 5:20-39; EX1003, ¶¶104-105.



EX1005, Fig. 2A (annotated)

Lewis’s Fig. 2A (above) further illustrates that when the arm is in the *lowered* position, it *rests against a “stop,”* such that further downward movement of the arm

is “blocked.” EX1005, 5:20-39; *see also* 6:59-61 (“***the arm may contact*** the chassis of the work vehicle or ***a stop coupled to the chassis of the work vehicle*** while the arm is in the lowered position”). Accordingly, Lewis’s figures and description plainly teach the feature of ***positioning and resting a point of the main arm against a stop connected to the skid-steer vehicle***. EX1003, ¶106.

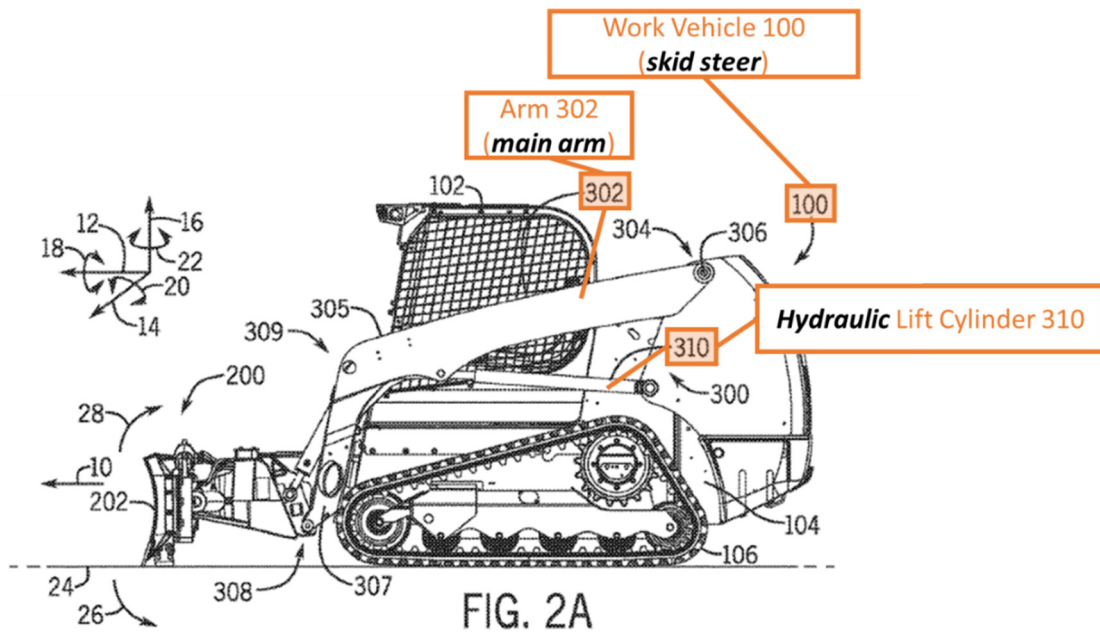
To the extent Patent Owner contests the mapping analysis above, it still would have been exceedingly obvious in view of Lewis’s disclosure to ***position and rest a point of the main arm against a stop connected to the skid-steer vehicle***. EX1003, ¶¶107-109. Lewis identifies two design options for transferring a horizontal load from the arm to the chassis—[1] positioning the arm against the chassis itself; or [2] positioning the arm against “a stop coupled to the chassis.” EX1005, 6:54-7:5. When, as here, the prior art identifies a rudimentary element of the claimed invention as one of a “finite number of identified, predictable solutions,” that element is obvious. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007); *see also Uber Techs., Inc. v. XOne, Inc.*, 957 F.3d 1334, 1339-41 (Fed. Cir. 2020) (“faced a simple design choice between the two”). Moreover, a POSITA would have been motivated to implement Lewis’s proposal to position a skid-steer arm against a stop because doing so was a well-known solution to the equally well-known design problem of supporting the arm against external loads. EX1003, ¶¶108-110 (discussing various technical benefits and advantages).

For all the reasons discussed above, a POSITA would have gleaned from Lewis's disclosure that, when the arm is in the *lowered* position, the arm *rests against a stop that defines the lower limit of arm movement*.

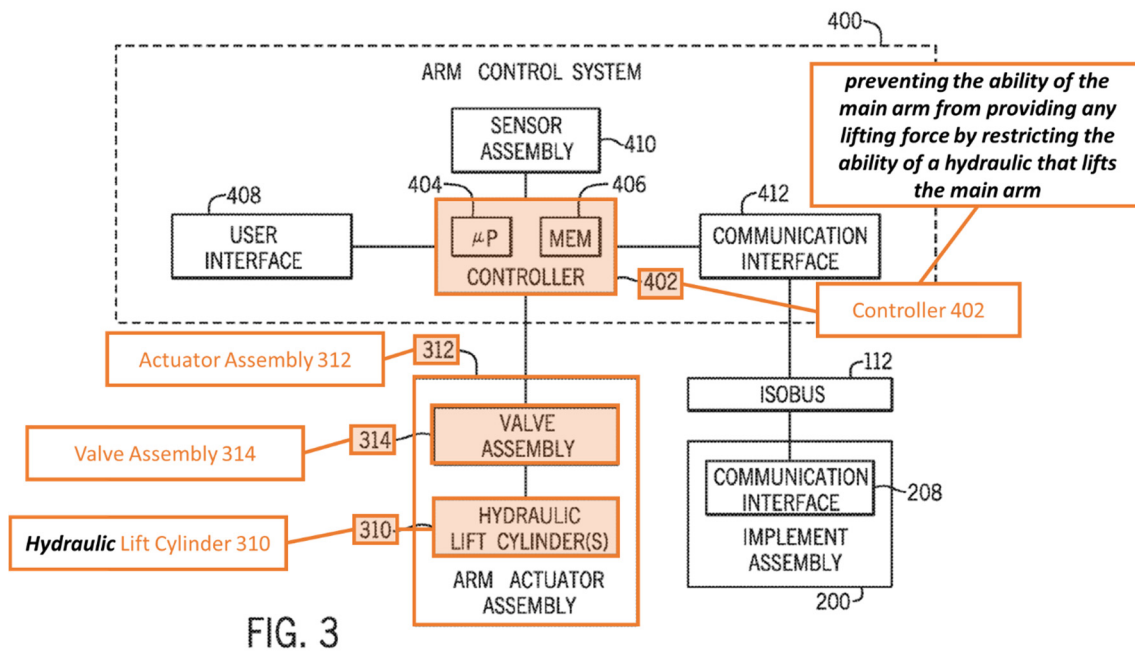
*Element [1.4] preventing the ability of the main arm from providing any lifting force by restricting the ability of a hydraulic that lifts the main arm;*²

The Funk-Lewis combination renders obvious Element [1.4]. EX1003, ¶¶111-112. For example, Lewis discloses that “[t]he controller 402 is configured to control movement of the arm by outputting a signal (e.g., a second signal) to the actuator assembly 312 [including] the *hydraulic lift cylinder(s) 310, which are configured to move the arm of the work vehicle*, and a valve assembly 314 fluidly coupled to the hydraulic lift cylinder(s) 310.” EX1005, 9:34-53.

² Patent Owner could not reasonably contest this argument because it is consistent with Patent Owner's infringement allegations. To the extent the Board or any party argues for a narrower interpretation of this claim limitation, *see* Grounds 1B and 1D. For example, Petitioner may pursue a narrower interpretation in district court.



EX1005, Fig. 2a (annotated)



EX1005, Fig. 3 (annotated)

Lewis discloses that “the controller 402 is configured to output a signal to the valve assembly indicative of instructions to move the arm or *to block movement of the arm.*” EX1005, 9:43-45 Lewis further discloses “*to block movement of the arm,* the controller 402 may instruct the valve assembly 314 to *block fluid flow to and from the hydraulic lift cylinder(s) 310.*” *Id.*, 9:50-53, 5:40-58 (describing use of a mechanical stop to block upward movement of the arm). A POSITA would have understood that blocking fluid flow to and from the hydraulic lift cylinders 310, as Lewis discloses, would restrict the ability of the hydraulic lift cylinders “which are configured to move the arm of the work vehicle.” EX1003, ¶¶112, 51-62. Further, a POSITA would have known that blocking fluid flow to the lift cylinders disables their ability to change the position of the arm. *Id.*

Element [1.5] operably connecting the automatic grade control system to a hydraulic that controls a pitch axis of movement of the dozer blade to affect a height of the dozer blade relative to a ground surface.

The Funk-Lewis combination renders obvious Element [1.5]. EX1003, ¶¶113-119. As discussed at Element [1.pre], Funk provides an “*automatic leveling [grade] control system* 100 implemented using a skid-steer 10” with a *dozer blade* attachment. EX1004, [0031].

Funk’s “automatic leveling [grade] control system” manipulates the dozer blade’s “grading edge 26” to create a level grade by selectively actuating the

hydraulic cylinder(s) that control the pitch axis of movement of the dozer blade.³ See EX1004, [0014], [0033]; EX1003, ¶¶114-115. Funk's automatic grade control system uses hydraulics to control blade height. EX1004, [0015]. For example, Funk's system generates a "control signal to the skid-steer hydraulic control controlling actuation of hydraulic cylinders 18, 28 to adjust at least one of a height of the lift arms 14 and the tilt [(pitch)] angle of the work attachment mounting structure 20 such that the grading edge 26 [(of the dozer blade)] is maintained at an elevation [(height relative to a ground surface)] substantially corresponding to the predetermined level 31 as the machine is propelled about the worksite." EX1004, [0033]; *see also* [0043] (similar), Figure 1b.

As illustrated below in Figure 1a, Funk's hydraulic cylinder 18 moves the main arm, and the hydraulic cylinder 28 adjusts the pitch of the dozer blade about *a pitch axis*. EX1004, Fig. 1a, [0033]; EX1003, ¶¶116-117 (explaining that a POSITA would have understood Funk's adjustment of the blade about pivot 24 to be an adjustment about a pitch axis).

³ Funk's automatic leveling control system uses a controller to generate the control signal to adjust a height of the arm and communicate the control signal to the hydraulics. See EX1004, [0015]-[0016], [0033].

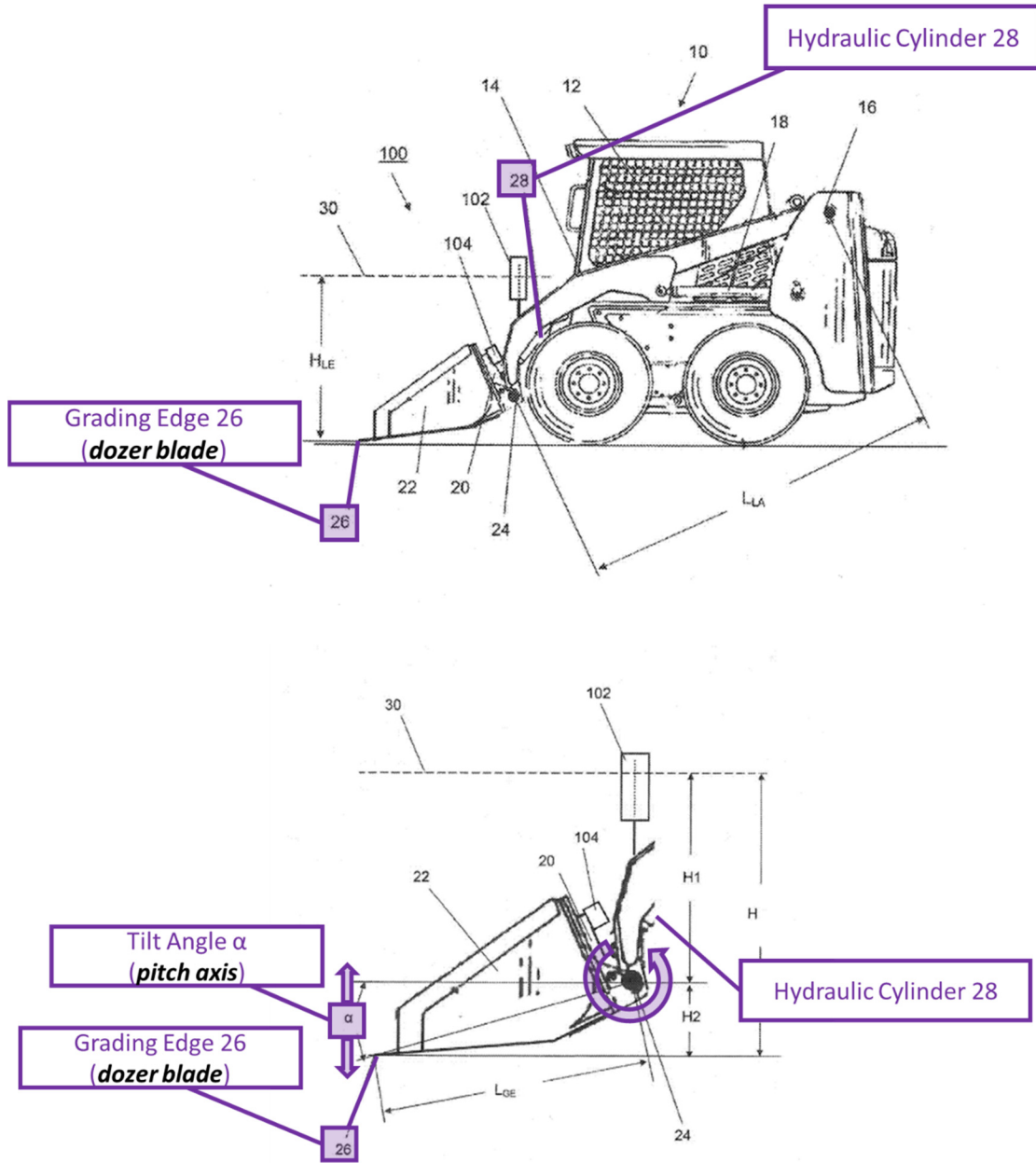
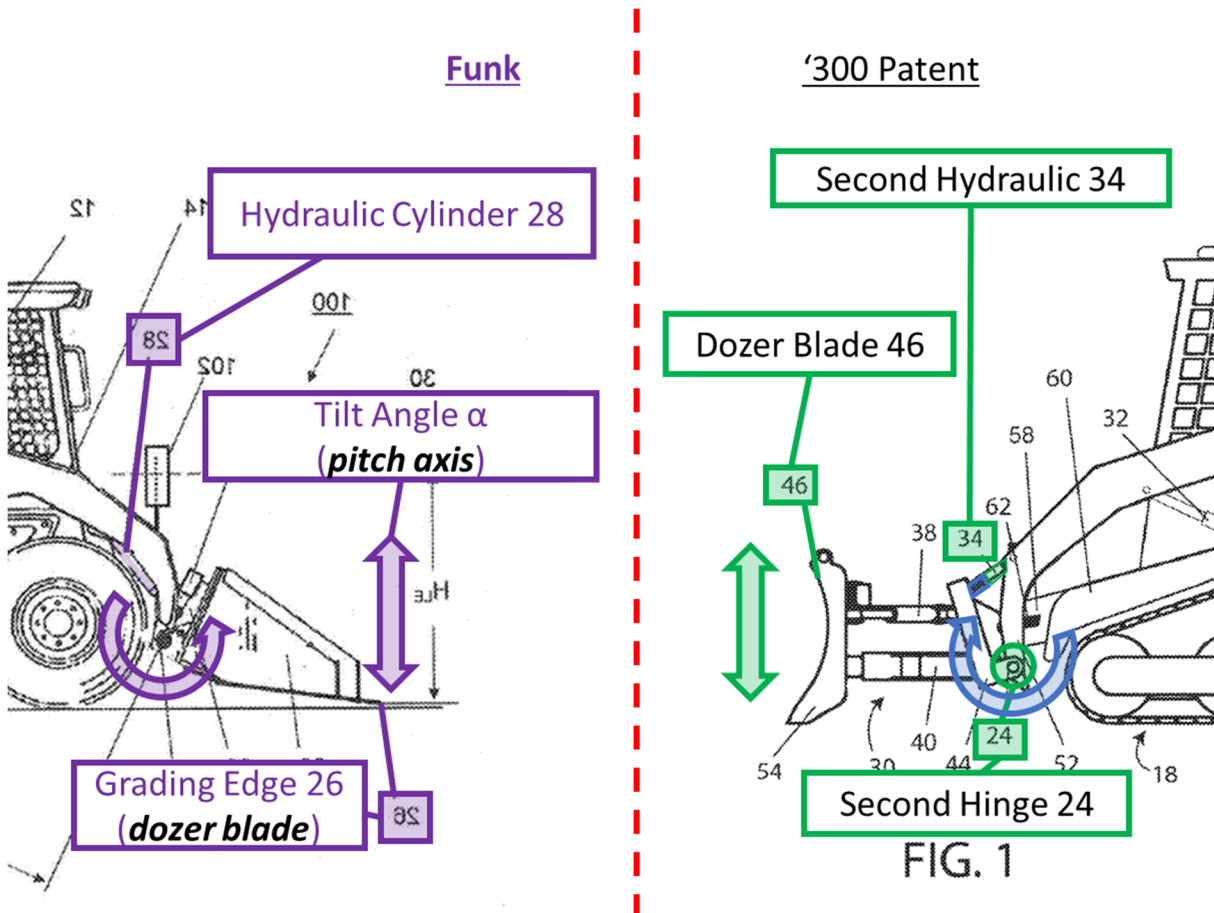


Figure. 1b

EX1004, Figs. 1a and 1b (annotated)

Funk’s reference to a “tilt angle” is consistent with the ’300 Patent’s reference to movement about a pitch axis. EX1003, ¶117. For one, the ’300 Patent makes

clear that “pitch” movement is forward/backward “tilt.” See EX1001, 4:33-38 (discussing the “pitch axis, or forward tilt of the dozer blade”). And this mapping is further confirmed by the similarity between Funk’s tilt cylinder 28 and the ’300 Patent’s pitch hydraulic 34 (see comparison below). EX1003, ¶¶117-118.



Left: EX1004, Fig 1a (annotated)

Right: EX1001, Fig. 1 (annotated)

In the Funk-Lewis combination, the main arms are held still, leaving the pitch axis hydraulic as the lone mechanism by which blade height is controlled. EX1004, [0033], [0043]; EX1005, 5:20-39, 6:54-7:5; EX1003, ¶119. Given that the automatic

grade control system issues control instructions (i.e., signals) for actuating the pitch axis hydraulic, a POSITA would have understood that the system is *operably connected* to the hydraulic. EX1004, [0015], [0016], [0033], [0043]; EX1003, ¶119.

(b) **Claim 2**

Element [2.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [2.1] locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.⁴

The Funk-Lewis combination renders obvious Elements [2.pre] and [2.1], including for similar reasons discussed above at Elements [1.2], [1.3], and [1.4]. EX1003, ¶¶120-121. For example, Lewis's controller blocks movement of (*locks*) *the main arms at a lower limit of movement* that is *against the stop* by outputting a signal to the valve assembly to block fluid flow to and from the hydraulic lift cylinders that would otherwise move the arm. EX1005, 5:20-39, 6:54-7:5, Fig. 2a; EX1003, ¶¶120-121, 51-62; *see also supra*, Elements [1.2], [1.3], [1.4].

⁴ To the extent the Board or the parties assert that a mechanical lock of some form is required to meet this claim limitation, *see* Grounds 1B-1D.

Claim 3

Element [3.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [3.1] operating a valve to hydraulically isolate the hydraulic lift that lifts the main arm to further prevent any movement of the main arm.

The Funk-Lewis combination renders obvious Elements [3.pre] and [3.1], including for similar reasons discussed above at Elements [1.2], [1.3], and [1.4]. EX1003, ¶¶122-124. As discussed, Lewis's controller blocks arm movement (*prevents movement of the arm*) by outputting a signal to the valve assembly to block fluid flow to and from the hydraulic lift cylinders that would move the arm. *Supra*, Elements [1.2], [1.3], [1.4]; EX1003, ¶¶111-112, 51-62; EX1005, 9:34-53, Figs. 2a and 3. Lewis describes that the system includes "hydraulic lift cylinder(s) 310, which are configured to move the arm of the work vehicle, and a valve assembly 314 fluidly coupled to the hydraulic lift cylinders [and] configured to control fluid flow...to the lift cylinder(s)." EX1005, 9:34-53.

From a POSITA's perspective, it would have been apparent or obvious to operate Lewis's valve assembly by using the controller to output a signal to ***operate a valve***, as claimed. Indeed, this understanding finds support in Lewis's disclosure that the controller "is configured to output a signal to the valve assembly indicative of instructions to move the arm or to block movement of the arm." EX1005, 9:34-53, Fig. 3; EX1003, ¶123. A POSITA would have further understood Lewis's

controller's signal to the valve assembly to be a signal operating the valve, and therefore controlling fluid flow to and from the hydraulic lift cylinder. EX1003, ¶123; EX1005, 9:34-53. Lewis describes that "to block movement of the arm, the controller 402 may instruct the valve assembly 314 to block fluid flow to and from the hydraulic lift cylinder(s)." EX1005, 9:50-53. It would have also been obvious to a POSITA that blocking fluid flow to and from the hydraulic lift cylinders results in *hydraulically isolating* the cylinder, and therefore preventing actuation of, the *hydraulic lifts that moves the main arms*. EX1003, ¶¶124, 51-62.

(c) **Claim 4**

Element [4.pre] The method for controlling a dozer blade as in claim 3 further including:

Element [4.1] locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.⁵

The Funk-Lewis combination renders obvious Elements [4.pre] and [4.1] for the same reasons discussed above at Elements [3.1] and [2.1]. EX1003, ¶125.

⁵ To the extent the Board or the parties assert that a mechanical lock of some form is required to meet this claim limitation, *see* Grounds 1B-1D.

B. GROUND 1B—Obviousness Over Funk, Lewis, Stratienko

Ground 1B incorporates the analysis of Ground 1A for several claim elements. Stratienko's supplementary teachings provide an additional/alternative basis for finding Element [1.4] of Claim 1 and Claims 2-4 obvious.

1. Stratienko (EX1008)

Stratienko describes a “mechanical locking device for locking a rod in a conventional hydraulic actuator, such as a hydraulic cylinder.” EX1008, Abstract; *see also* 2:33-66, 3:50-4:36, 5:14-6:30, Figures 3-4; EX1003, ¶¶127-130 (detailing Stratienko's locking device).

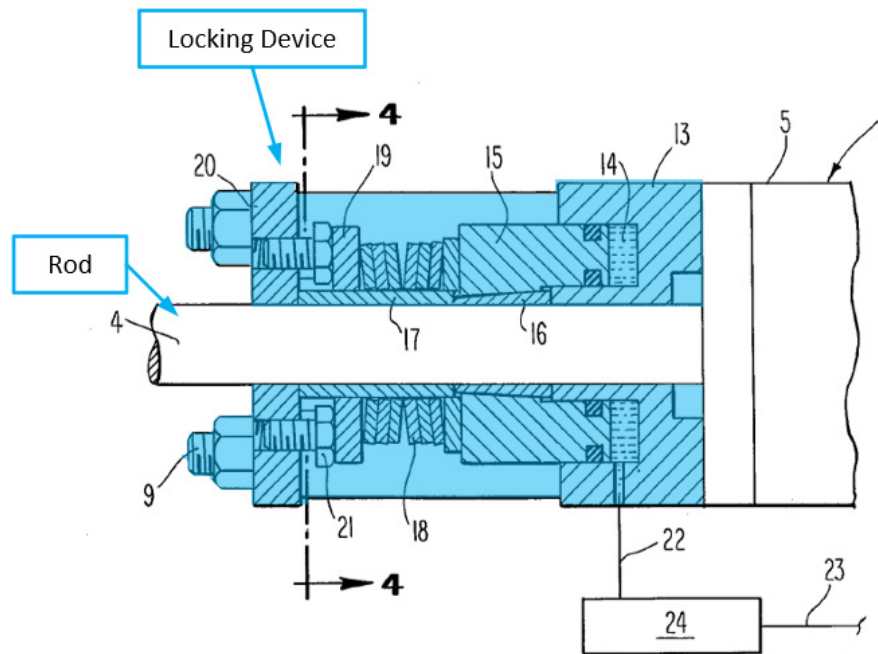


Fig. 3

EX1008, Fig. 3 (annotated)

Stratienko’s “rod locking device is capable of automatic operation” and is “universally adaptable to standard hydraulic actuators,” including “hydraulic cylinders [that] are capable of exerting very large forces, [such as] hundreds of thousands of pounds.” EX1008, 2:55-3:9, 3:28-49. The locking device also “provides the advantage of infinite position locking”—meaning it can lock the hydraulic cylinder rod “at any point of stroke”—“yet is compact, simple, and inexpensive.” EX1008, 2:67-3:9, 1:62-63.

2. The Combination, Reasons to Combine, & Expectation of Success

The Funk-Lewis-Stratienko combination represents the predictable result of applying Stratienko’s supplemental teachings about an infinite position mechanical locking device for selectively preventing movement of a hydraulic cylinder rod to the Funk-Lewis combination, which provides for immobilizing the main lift arm of a skid-steer in a lowered position during automatic grading. EX1003, ¶¶131-141. In effect, Stratienko’s device provides a mechanism for mechanically locking the hydraulic cylinder rod that, in turn, controls and prevents movement of the skid-steer’s main lift arm in the Funk-Lewis combination. EX1003, ¶131. From a POSITA’s perspective in 2018, applying Stratienko’s supplemental teachings in this way would have involved nothing more than applying a known mechanical solution to the known mechanical problem of preventing “undesirable movements of the

rod,” (EX1008, 1:22-27)—a problem suggested by Lewis’s teaching to “[b]lock upward movement of the arm,” EX1005, 4:34-5:6. EX1003, ¶132. A POSITA would have understood that combining known mechanical systems in this way provides predictable and reliable results. EX1003, ¶¶131-141.

A POSITA would have been motivated to pursue the Funk-Lewis-Stratienko combination and possessed a reasonable expectation of its success in arriving at the claimed invention for at least the following independent reasons.

First, Lewis’s teaching to block movement of the skid-steer main arm driven by a hydraulic cylinder would have prompted a POSITA to look to references, such as Stratienko, that disclose solutions to the problem of preventing “undesirable movements” of a hydraulic cylinder rod. EX1008, 1:22-27; EX1005, 4:34-5:6, 9:34-53; EX1003, ¶134. A POSITA would have understood that locking a cylinder rod is a known technique for solving the problem that Lewis’s teaching introduces—i.e., preventing movement of the main arm. EX1003, ¶135; EX1008, 1:21-34. To a POSITA, Stratienko’s mechanical cylinder lock presents a suitable solution to this problem—either in place of or in conjunction with Lewis’s suggestion to block hydraulic fluid flow—because Stratienko’s cylinder lock is specifically designed to work with large, high-capacity hydraulic cylinders, such as those on a skid-steer. EX1003, ¶136; EX1005, 9:34-53; EX1008, 2:67-3:9, 3:28-49, 2:33-39. Stratienko’s lock can be engaged at any point of the cylinder stroke, including when the cylinder

is contracted and the lift arm is in the lowered position, and even in its lowest position. EX1008, 6:59-62; EX1003, ¶137. A POSITA would have been motivated to use Stratienko's lock for this purpose as a suitable addition to the Funk-Lewis design to prevent the main arm from moving. EX1003, ¶136-137.

Second, a POSITA would have appreciated that there are particular advantages to using Stratienko's lock in the Funk-Lewis combination. EX1003, ¶¶138-141. For example, while Lewis describes the idea of hydraulically isolating the cylinder to keep it from moving (EX1005, 9:34-53), Stratienko recognizes that fluid leak across the seals could still cause unwanted movements of the arm. EX1008, 1:22-27; EX1003, ¶¶138, 51-62. A POSITA would have understood that inadvertent movement of the vehicle arm during grading caused by fluid leak would be inefficient because areas may need to be re-graded. EX1003, ¶138; EX1004, [0002] ("the ground has to be leveled with high accuracy"). Further, a POSITA would have understood that while Lewis's hydraulic control may be susceptible to fluid leakage that would allow some movement of the cylinder and lift arm, Stratienko's mechanical lock suffers from no such susceptibility. EX1003, ¶139. A mechanical lock—such as the cylinder lock Stratienko teaches—solves this problem as well as others that may arise due to inadvertent lift arm movements. *Id.* Additionally, Stratienko describes that mechanical locks are durable, and that his specific design is compact, simple, and inexpensive. EX1008, 1:29-31; 2:3-6; 2:67-

3:1. Further still, Stratienko describes that the cylinder lock “is used in conventional hydraulic actuators” (*id.*, 2:34-35) and “is universally adaptable to standard hydraulic actuators and can be easily adapted to fit different size rods for a particular hydraulic actuator.” *Id.*, 3:3-6; EX1003, ¶¶140-141.

3. Claim Element Analysis

(a) Claim 1

Elements [1.pre], [1.1], [1.2], and [1.3]

The Funk-Lewis-Stratienko combination renders obvious Elements [1.pre], [1.1], [1.2], and [1.3] for the same reason discussed above at §V.4 (discussion of Elements [1.pre], [1.1], [1.2], [1.3]). EX1003, ¶142.

Element [1.4] preventing the ability of the main arm from providing any lifting force by restricting the ability of a hydraulic that lifts the main arm;

The Funk-Lewis-Stratienko combination renders obvious Element [1.4]. EX1003, ¶¶143-144. As discussed, this combination incorporates Stratienko’s disclosure of an automatically operated “infinite position type” mechanical hydraulic cylinder rod lock as a supplemental means of immobilizing the main arm of the Funk-Lewis skid-steer vehicle in a lowered position against a mechanical stop. EX1008, 1:62-63; *see also id.*, 2:33-3:9, 3:50-4:36, 5:14-60, Figs. 3-4, *supra*, §V.B.1 (summary of Stratienko), §V.B.2 (motivation-to-combine). As a POSITA would have understood, in the Funk-Lewis-Stratienko combination, when Stratienko’s

mechanical lock grips the rod of the hydraulic cylinder controlling the main arm, the *main arm is prevented from providing any lifting force* because the *hydraulic that lifts the main arm is restricted* from moving. EX1003, ¶¶143-144; §V.B.2.

Element [1.5] operably connecting the automatic grade control system to a hydraulic that controls a pitch axis of movement of the dozer blade to affect a height of the dozer blade relative to a ground surface.

The Funk-Lewis-Stratienko combination renders obvious Element [1.5] for the reasons discussed above at §V.A.4 (discussion of Element [1.5]). EX1003, ¶145.

(b) **Claim 2**

Element [2.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [2.1] locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.

The Funk-Lewis-Stratienko combination renders obvious Elements [2.pre] and [2.1]. EX1003, ¶146. As discussed, this combination incorporates Stratienko's disclosure of an "infinite position type" mechanical hydraulic cylinder rod lock for immobilizing the main arm of the Funk-Lewis skid-steer vehicle in a lowered position against a mechanical stop. EX1008, 1:62-63; *see also id.*, 2:33-3:9, 3:50-4:36, 5:14-60, Figs. 3-4, *supra*, §V.B.1 (summary of Stratienko), §V.B.2 (motivation-to-combine). As a POSITA would have understood, in the Funk-Lewis-Stratienko combination, Stratienko's infinite position lock prevents the rod of the

hydraulic cylinder from axial movement (i.e., no extension or retraction), and thus locks the main arm in place by preventing the main arm from moving. EX1008, 5:40-62; EX1003, ¶146. Accordingly, a POSITA would have understood that in the Funk-Lewis-Stratienko combination, engaging Stratienko's mechanical hydraulic cylinder rod lock *locks the main arm against the stop at the lower limit of movement of the main arm*. EX1003, ¶146.

(c) Claim 3

Element [3.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [3.1] operating a valve to hydraulically isolate the hydraulic lift that lifts the main arm to further prevent any movement of the main arm.

The Funk-Lewis-Stratienko combination renders obvious Elements [3.pre] and [3.1], including for similar reasons discussed above at §V.A.4 Elements [1.2], [1.3], and [1.4]. EX1003, ¶¶147-154. As discussed, this combination incorporates Stratienko's disclosure of an automatically operated "infinite position type" mechanical hydraulic cylinder rod lock as a supplemental means of immobilizing the main arm of the Funk-Lewis skid-steer vehicle in a lowered position against a mechanical stop. EX1008, 1:62-63; *see also id.*, 2:33-3:9, 3:50-4:36, 5:14-60, Figs. 3-4; *supra*, §V.B.1 (summary of Stratienko), §V.B.2 (motivation-to-combine).

In the Funk-Lewis-Stratienko combination, a POSITA would have been motivated to apply Stratienko's cylinder lock *in addition to* Lewis's instructions to

block fluid flow to or from the hydraulic cylinder that controls the main arm. EX1005, 9:34-53, 5:40-58 (describing a mechanical means to block upward movement of the arm); *supra* §V.A.2 (summary of Lewis), §V.B.2 (motivation-to-combine); EX1003, ¶148. A POSITA would have understood that redundant mechanisms are applied to important systems as a matter of routine practice. EX1003, ¶¶148, 71-72. Additionally, a POSITA would have understood that blocking hydraulic fluid flow to and from the hydraulic cylinder might still lead to unintentional movements when fluid leaks across seals in the system and would have been motivated to employ both hydraulic and mechanical locks as a result. EX1008, 1:22-31, 2:3-6, 2:67-3:1; EX1003, ¶¶149-150, 63-69. Accordingly, a POSITA would have appreciated that in the Funk-Lewis-Stratienko combination, Lewis's controller *operates a valve* assembly to block fluid flow to and from the hydraulic lift cylinders resulting in *hydraulically isolating* the cylinder and preventing actuation of the *hydraulic lifts that moves the main arm*. EX1003, ¶150; *supra* §V.A.4 at Element [3.1].

It would have further been obvious to a POSITA to utilize *both* mechanical locking systems (like Stratienko's cylinder lock) and hydraulic locking mechanisms (like Lewis's hydraulic control system) to prevent the movement of the arm during grading for efficient grading. EX1003, ¶¶151-154. Where possible, multiple redundant mechanisms are used at a worksite. *Id.*, ¶¶151-153. Accordingly, in the

Funk-Lewis-Stratienko combination, Lewis’s hydraulic control system would be used to isolate the hydraulic lift to prevent any undesirable movement of the arm *and* Stratienko’s cylinder lock would be used as a redundant failsafe to provide a mechanical lock to further prevent the movement of the arm. *Id.*, ¶¶149-154.

(d) Claim 4

Elements [4.pre] and [4.1]

The Funk-Lewis-Stratienko combination renders obvious Elements [4.pre] and [4.1] for the reasons discussed above at §V.B.3 Elements [3.1] and [2.1]. EX1003, ¶155.

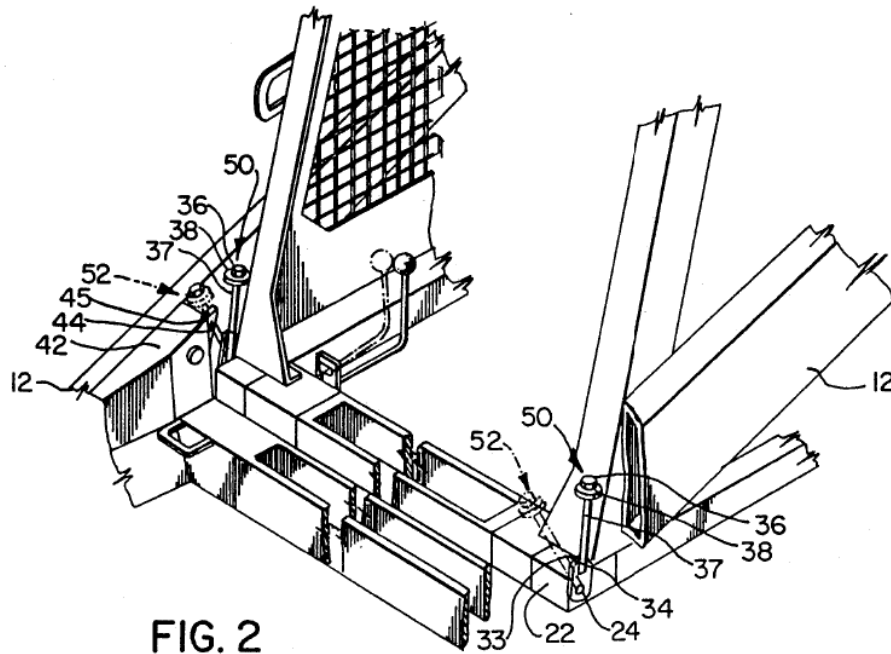
C. GROUND 1C—Obviousness Over Funk, Lewis, Orser

Ground 1C incorporates the analysis of Ground 1A for several claim elements. Orser’s supplementary teachings provide an additional/alternative basis for finding Elements [2.1] and [4.1] obvious.

1. Orser (EX1009)

Orser describes a “lift arm lock down apparatus for a load lifting vehicle.” EX1009, Abstract; EX1003, ¶157. Specifically, Orser mentions that the lock is employed to secure “one or more lift arms of a front end loader...in a *lowered position*.” EX1009, 1:6-11. Orser’s lock accomplishes this goal by manually locking “the lift arm to the vehicle body, when lowered.” EX1009, 2:30-36. An operator moves the locking device into position when the arms are lowered to engage a

manual lock that prevents movement of the lift arms in a vertical direction. EX1009, 4:19-39.



EX1009, Fig. 2

2. **The Combination, Reasons to Combine, & Expectation of Success**

The Funk-Lewis-Orser combination represents the predictable result of applying Orser's supplemental teachings about a mechanical lift arm lock to the Funk-Lewis combination, which provides, through hydraulic locking, for immobilizing the main arm of a skid-steer in a lowered position during automatic grading. EX1003, ¶¶158, 78-96. In effect, Orser's device provides a mechanism for mechanically locking the skid-steer's main arm to the stop on the skid-steer chassis

in the Funk-Lewis combination. EX1003, ¶158; EX1009, 2:9-14. From a POSITA's perspective in 2018, applying Orser's supplemental teachings in this way would have involved nothing more than applying a known solution to the known problem of preventing movement of the main arm—a problem suggested by Lewis's teaching to "[b]lock upward movement of the arm." EX1005, 4:34-5:6; EX1003, ¶¶159-160. The fundamental aspects of Funk's disclosure would remain intact, bolstered by the well-known and beneficial teachings of Lewis. EX1003, ¶¶158-166.

A POSITA would have been motivated to pursue the Funk-Lewis-Orser combination and possessed a reasonable expectation of its success in arriving at the claimed invention for at least the following independent reasons.

First, Lewis's teaching to block movement of the skid-steer main arm driven by a hydraulic cylinder would have prompted a POSITA to look to references, such as Orser, that disclose solutions to the problem of "[b]lock[ing] upward movement of the arm." EX1005, 4:34-:5-6; EX1009, 2:9-14; EX1003, ¶161. A POSITA would have understood that mechanically locking a main arm to the chassis of the skid-steer is a known technique for solving the problem that Lewis's teaching introduces—to prevent movement of the main arm. EX1003, ¶162. A POSITA would have understood that Orser's mechanical arm lock presents a suitable solution to the problem—either in place of or in conjunction with Lewis's suggestion to block hydraulic fluid flow—because Orser's arm lock is specifically designed to work with

an arm of a skid-steer. *Id.*; EX1005, 5:20-58; EX1009, 2:9-14, 2:34-39, 3:8-13, 3:32-47, Figs. 1-2. Orser's lock is "adapted to secure lift arm 12 to body 16 in a lowered position." EX1009, 3:37-38; EX1003, ¶162. A POSITA would have been motivated to use Orser's lock for this purpose as a suitable addition to the Funk-Lewis design to prevent the main arm from moving off the stops and from the lowered position. EX1003, ¶162.

Second, a POSITA would have appreciated that there are particular advantages to using Orser's arm lock in the Funk-Lewis combination. EX1003, ¶¶163-166. For example, a POSITA would have understood that Orser's arm lock provides an additional mechanism to secure the main arm in the lowered position that can be used independently from the hydraulic cylinders. EX1009, 2:19-26; EX1003, ¶164. A POSITA would have understood that it is typical to employ multiple mechanisms to provide redundant backups in important systems. *Id.*, ¶¶163, 71-72. Moreover, Orser's mechanical arm lock would prevent undesirable movements of the lift arm that could occur with Lewis's hydraulic locking. Using Orser's mechanical arm lock as an additional and separate lift arm locking mechanism with Lewis's hydraulic lock would prevent undesirable movement of the arm due to hydraulic leakage and the resulting drift of the hydraulic lift cylinder and lift arm. EX1003, ¶¶163, 63-69. Additionally, using Orser's lock to lock the lift arm directly to the stop on the skid loader chassis would eliminate potential

undesirable movement of the arm due to mechanical play within the pivot joints of the lift arm and hydraulic cylinder due to manufacturing clearances and wear of the joints over time (i.e., lost motion). EX1003, ¶¶163, 70 (explaining lost motion).

Third, and relatedly, a POSITA would have understood that Orser's arm lock provides a manual redundancy to Lewis's blocking of hydraulic fluid to the cylinder, yet another measure to allow operators of the skid-steer to prevent inadvertent movements of the main arm. EX1009, 1:13-37, 2:1-9; *see also* EX1008, 1:22-27; EX1003, ¶165. Orser's arm lock can be engaged from within the operator's cabin without requiring the operator to leave the operator's seat or to exit the skid-steer. EX1009, 5:68-6:14.

3. Claim Element Analysis

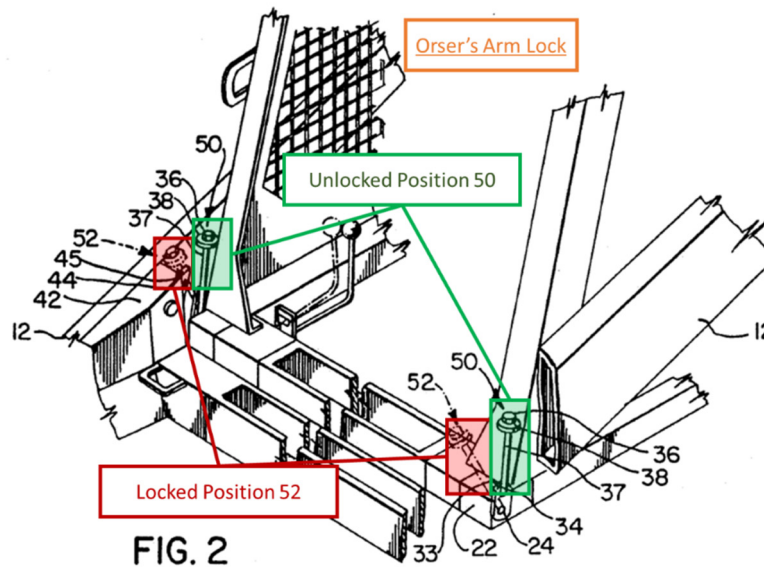
(a) Claim 2

Element [2.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [2.1] locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.

The Funk-Lewis-Orser combination renders obvious Elements [2.pre] and [2.1]. EX1003, ¶¶167-168. As discussed, this combination incorporates Orser's disclosure of an arm lock as a supplemental means of securing the main arm of the Funk-Lewis skid-steer in the lowered position against the mechanical stop. EX1009,

2:1-14; *see also id.*, 3:32-44, 1:13-37, Figs. 1-2; *supra*, §V.C.1 (summary of Orser), §V.C.2 (motivation-to-combine).



EX1009, Fig. 2 (annotated)

As a POSITA would have understood, in the Funk-Lewis-Orser combination, when Orser's arm lock is engaged, the main arm is secured against the stop, "**locking the lift arm** to the vehicle body in the **lowered position**." EX1009, Abstract, 1:6-11, 4:19-27; EX1003, ¶¶167-168.

(b) Claim 4

Elements [4.pre] and [4.1]

The Funk-Lewis-Orser combination renders obvious Elements [4.pre] and [4.1] for the reasons discussed above at §V.A.4 Element [3.1] and §V.C.3 Element [2.1]. EX1003, ¶169.

D. GROUND 1D—Obviousness Over Funk, Lewis, Stratienko, Orser

Ground 1D incorporates the analysis of Ground 1B for several claim elements. As discussed at Ground 1C, Orser's supplementary teachings provide an additional/alternative basis for finding Elements [2.1] and [4.1] obvious.

A POSITA would have been motivated to apply Orser's supplemental teachings about a mechanical arm lock for securing the main arm to a skid-steer body to the Funk-Lewis-Stratienko combination, which provides for immobilizing the main arm of a skid-steer in a lowered position during automatic grading by use of hydraulic controls and an infinite position cylinder lock. EX1003, ¶¶170-171; §V.B.2. Although Orser's mechanical arm lock provides an additional mechanical locking mechanism to the Funk-Lewis-Stratienko combination, Orser's mechanical lift arm lock is manually actuated and would have provided a failsafe for operators of the skid-steer in addition to the power-assisted cylinder lock taught by Stratienko. EX1003, ¶171. For example, because Orser's mechanical lock operates independently from the hydraulics of the system, the lock provides additional confidence that the arm will not unexpectedly move. *Id.* Orser's mechanical lock prevents unintentional and undesirable movements resulting not only from hydraulic leakage, but also prevents undesirable movements of the lift arm resulting from mechanical play in the mechanical joints of the lift arm and hydraulic cylinder. *Id.*,

¶¶171, 63-69. A POSITA would have understood that redundancy in securing the arm in a lowered position would provide backup mechanisms for preventing inadvertent movement of the main arm. EX1009, 1:13-37, 2:1-9, 5:68-6:14; EX1003, ¶172.

Additionally, a POSITA would have understood the relatively high costs associated with delays for equipment repair during a grading operation with on-site labor and would have been interested in exploring redundancies to minimize those costs. EX1003, ¶¶173-174. As would have been clear to a POSITA, further implementing Orser's manual lock in addition to Stratienko's cylinder lock and Lewis's hydraulic control system provides a low-cost redundancy solution that offers a manual mechanical option separate from the hydraulic system. *Id.* That way, in a scenario where the other lock mechanisms fail, the operator can step in and employ the manual lock to minimize delay and associated costs. *Id.*

1. Claim Element Analysis

(a) Claim 2

Elements [2.pre] and [2.1]

The Funk-Lewis-Stratienko-Orser combination renders obvious Elements [2.pre] and [2.1] for the reasons discussed above at §V.C.3. EX1003, ¶175.

(b) **Claim 4**

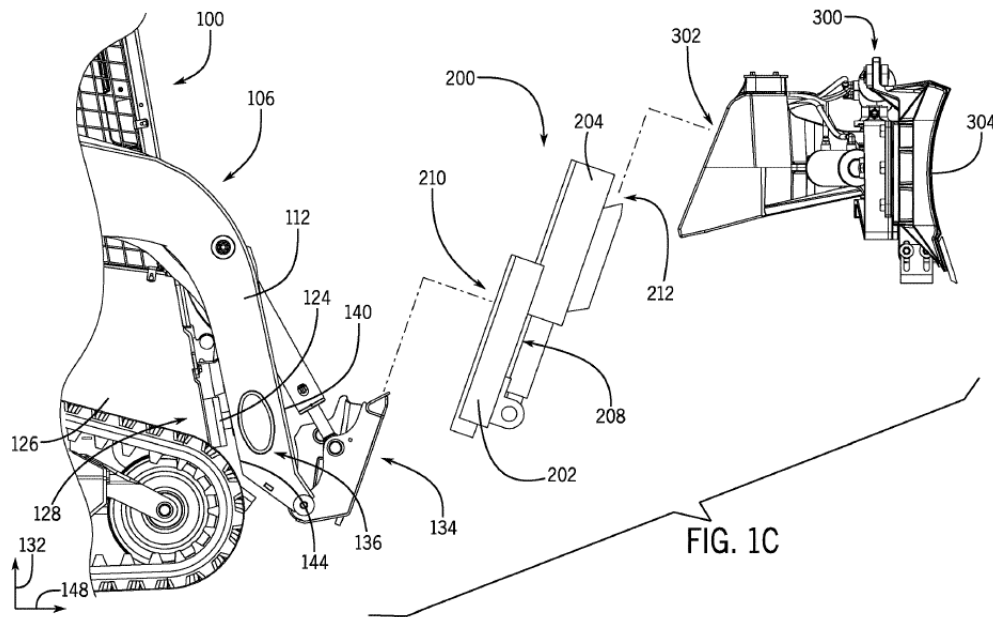
Elements [4.pre] and [4.1]

The Funk-Lewis-Stratienko-Orser combination renders obvious Element [4.pre], [4.1] for the reasons discussed above at §V.B.3 Element [3.1] and above at §V.D.1 Element [2.1] (which cross-references §V.C.3). EX1003, ¶176.

E. GROUND 2A—Obviousness Over Eckrote, Lumpkins

1. Eckrote (EX1006)

Eckrote explains that “[c]ertain work vehicles (e.g., skid steers) have an arm rotatably coupled to the chassis and configured to support an implement (e.g., dozer blade, grapple, etc.).” EX1006, 1:16-19; EX1003, ¶177. Eckrote describes attaching the work implement (dozer blade) to the skid-steer and placing the arms in a “lowered” position to rest against mechanical stops on the chassis so that “the dozer blade may support heavy loads.” EX1006, 4:2-14. Eckrote further describes a controller for controlling hydraulics associated with movement of the arms and the implement. *Id.*, Fig. 4, 10:60-11:12. According to Eckrote, “the controller may block movement of the arms” to ensure they remain in the lowered position. *Id.*, 10:60-11:12.



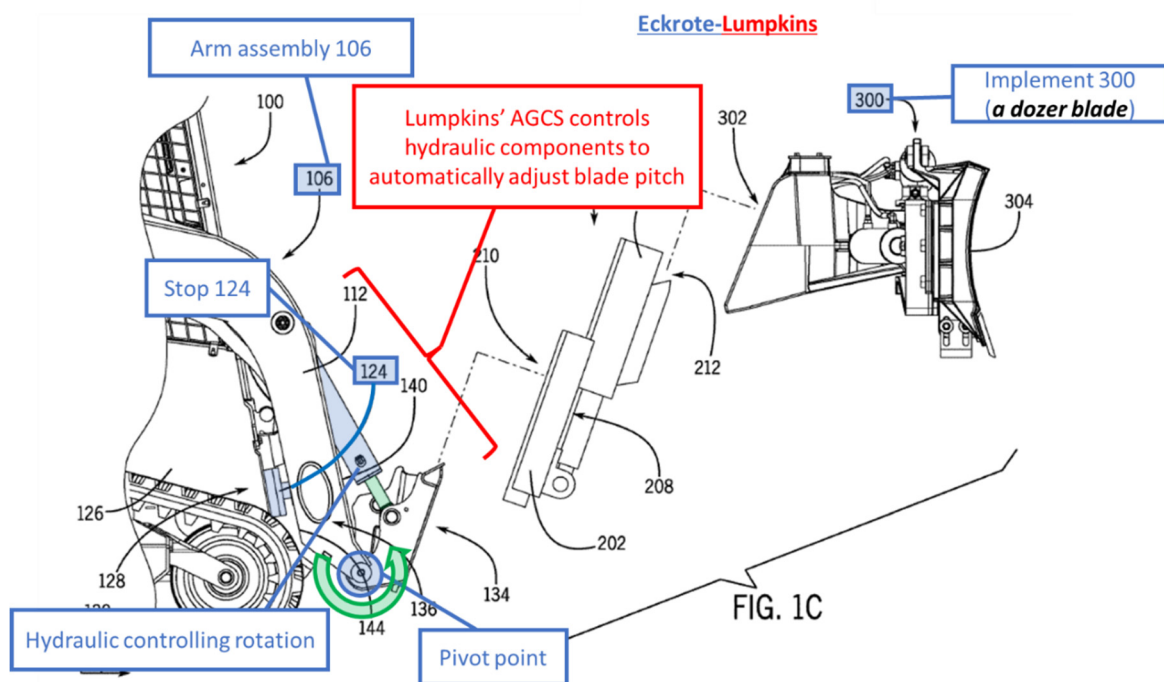
EX1006, Fig. 1C

2. Lumpkins (EX1007)

Lumpkins is about “a dozer blade control system [that] controls the position of a bulldozer blade.” EX1007, Abstract; EX1003, ¶¶178-179. As part of an automatic grading system, Lumpkins uses “a blade position sensor to provide a signal indicative of a position of the blade and an electronic controller coupled to the blade and to the at least one lift cylinder.” EX1007, [0011], [0060]. The controller automatically adjusts the blade position “in response to position signals received from the blade position sensor.” *Id.*

3. The Combination, Reasons to Combine, & Expectation of Success

Incorporating Lumpkins' teaching of an automatic grade control ("AGC") system for automatically adjusting blade position with Eckrote's disclosure of a skid-steer vehicle carrying a dozer blade fits the quintessential *KSR* paradigm of achieving a predictable result—i.e., a skid-steer vehicle with an automatic grading system for positioning the height/pitch of the dozer blade—by merely combining known prior art elements using known techniques. EX1003, ¶¶180-191, 45-50. As shown below, the predictable result of this combination applies Lumpkins' teaching of an automatic grading control system (AGCS) to control various hydraulics shown and described by Eckrote. EX1003, ¶¶180-183.



EX1006, Fig. 1C (annotated and modified)

A POSITA would have been motivated to pursue the predictable combination of Eckrote-Lumpkins and possessed a reasonable expectation of its success in arriving at the claimed invention for at least the following independent reasons.

First, AGC systems had been known for decades and were ubiquitous by 2018. EX1003, ¶¶184-185, 45-50. Patent Owner has openly conceded this point in its patent filings. *E.g.*, EX1001, 1:19-54, 3:33-54 (“Grade control systems...are commonly commercially available.”); EX1010, 1:23-28 (citing US 4,923,015), 2:34-45 (citing US 5,375,663). Simply put, using an AGC system to control the height/pitch of a dozer blade attachment was an exceedingly well-known solution to the equally well-known problem of leveling a ground surface with a work vehicle. EX1003, ¶¶184-185, 45-50, 74-75. Lumpkins employs an AGC system for this purpose, and it would have been axiomatic for a POSITA to do the same in Eckrote. EX1003, ¶185.

Second, AGC systems had matured to the point of widespread commercial adoption by the time of the ’300 Patent. EX1003, ¶¶186, 45-50. Petitioner, Patent Owner, and many other competitors sold products consisting of, or including, AGC systems for use with skid-steers and other work vehicles long before 2018. EX1003, ¶186. Given the state of the marketplace at that time, a POSITA would have been motivated by market forces and design trends to supplement Eckrote’s disclosure of a skid-steer carrying a dozer blade attachment with Lumpkins’ further teaching of

an AGC system. EX1003, ¶186. Indeed, the POSITA would have appreciated that a skid-steer vehicle lacking AGC functionality would have been difficult to market in a competitive marketplace. EX1003, ¶186.

Third, a POSITA would have been prompted to integrate Lumpkins' disclosure about an AGC system based on Eckrote's teachings and suggestions regarding a "controller" that controls the height of a dozer blade attachment. EX1003, ¶187; EX1006, 10:12-28, 10:60-11:12, Fig. 4. Understanding that grading is one of the primary functions of a dozer blade attachment for a skid-steer, the POSITA would have understood that Eckrote's "controller" is obviously part of an AGC system because it automatically controls the position of the dozer blade based on instructions in the memory. EX1006, 10:12-28, EX1003, ¶187. Eckrote's suggestion of an AGC system would have prompted the POSITA to seek out supplemental teachings from references like Lumpkins that further expound on that subject. EX1003, ¶187.

Fourth, a POSITA would have understood that the addition of an AGC system like Lumpkins' would predictably improve a skid-steer vehicle carrying a dozer blade like Eckrote's. EX1003, ¶¶188-189. For example, the POSITA would have appreciated that each of the following advantages articulated by Lumpkins would also apply to Eckrote:

- “[A] system that at least partially relieves the operator of the burden of manually raising and lowering the blade as the vehicle pitches while traveling over the ground”;
- “[A] system that permits the operator to grade faster by automatically controlling blade pitching”;
- “[A] system that automatically controls blade pitching faster than an operator can manually control blade pitching.”

EX1007, [0010]; EX1003, ¶¶188-191.

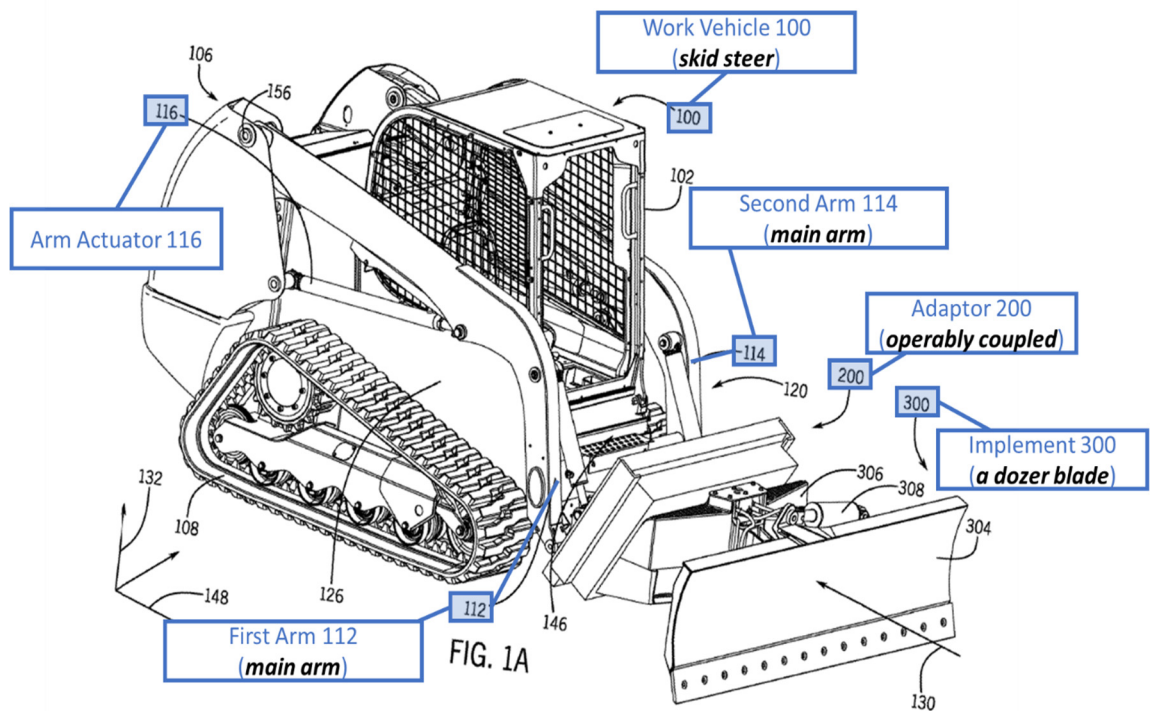
4. Claim Element Analysis

(a) Claim 1

Element [1.pre] A method for controlling a dozer blade controlled by an automatic grade control system on a skid steer vehicle comprising:

The Eckrote-Lumpkins combination renders obvious Element [1.pre]. EX1003, ¶¶192-199. For example, Eckrote discloses “[a] work ***vehicle*** 100” in the form of “***a skid steer.***” EX1006, 2:64-67, Figures 1A-1C; *see also* 3:25-46, 4:3-13. Eckrote further discloses “a work vehicle implement 300 (e.g., ***a dozer blade***) coupled to the work vehicle 100 by an adaptor 200.” *Id.*, 2:64-65. The adaptor 200 is part of a linkage that further includes “[an] arm assembly [featuring] a first arm 112 and a second arm 114,” “a tilt assembly configured to control rotation of the

adaptor 200,” and “a tilt assembly 306...configured to drive rotation of the [dozer blade] work implement.” *Id.*, 3:27-39, Figure 1A.



EX1006, Fig. 1A (annotated)

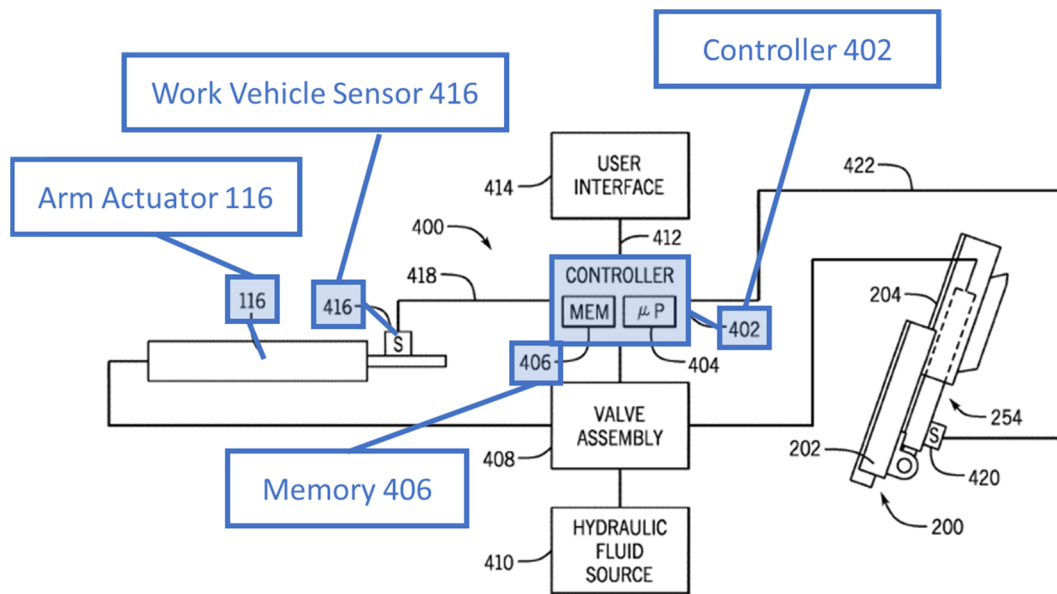


FIG. 4

EX1006, Fig. 4 (annotated)

A “*control system*” featuring a controller 402 and a memory device 406 effects “rais[ing] and lower[ing] the arms” and “mov[ing] the adaptor between the fully extended position and the fully retracting position, which respectively raises and lowers the work vehicle [dozer blade] implement[.]” EX1006, 9:65-10:28, Figure 4. According to Eckrote, the controller may send the instructions to effect these movements “in response to a user input signal” or *automatically* “based on instructions stored in the memory device.” *Id.*, 10:22-28. Thus, Eckrote teaches an *automatic control system*. EX1003, ¶¶192-194.

A POSITA would have understood Eckrote's teaching of a controller that automatically controls the position of a dozer blade on a skid-steer vehicle to

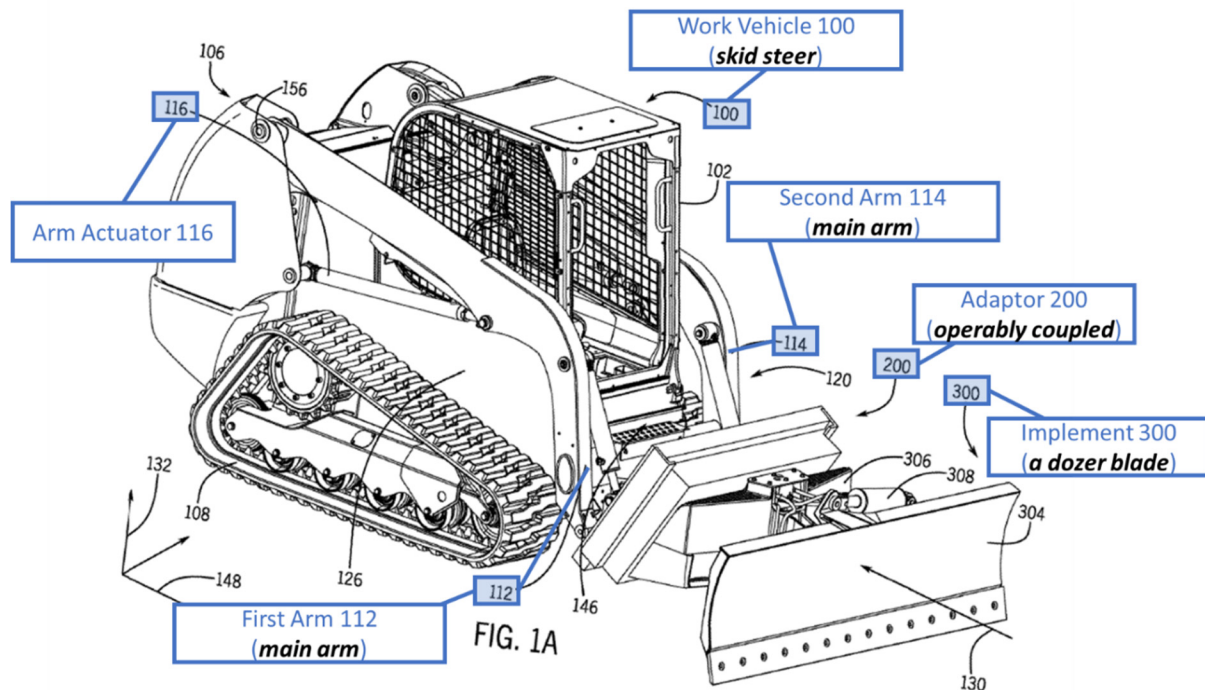
describe, or at least suggest, an *automatic grade control (AGC) system*. EX1003, ¶¶194, 45-50. First, the POSITA would have understood that grading is one of the primary functions of a dozer blade attachment for a skid-steer vehicle. EX1003, ¶196. Accordingly, it would have been apparent that Eckrote’s *system* for controlling the position of a dozer blade is purpose-built or at least suitable for facilitating *AGC*. *Id.* Second, the POSITA would have recognized that automatically adjusting the position of a dozer blade is a hallmark feature an *AGC system*. EX1003, ¶197. Third, the POSITA would have appreciated the prevalence of *AGC systems* by 2018. EX1003, ¶¶198, 45-50, 74-75. In this context, the POSITA would have reasonably inferred that Eckrote’s automatic control system for positioning a dozer blade is an AGC system. *Id.*

Alternatively, and as discussed above at §V.E.3 (combination), this Eckrote-Lumpkins combination incorporates Lumpkins’ express teachings regarding “a system that permits the operator to *grade* faster by *automatically controlling blade* pitching”—namely, an AGC system. EX1007, [0010]; *see also id.*, [0021], [0038], [0040], [0057], [0060], [0062]-[0065]; EX1003, ¶199.

Element [1.1] providing a skid steer vehicle having a main arm with a front side operably coupled to a dozer blade assembly;

The Eckrote-Lumpkins combination renders obvious Element [1.1]. EX1003, ¶¶200-201. For example, and as discussed at Element [1.pre], Eckrote discloses “[a]

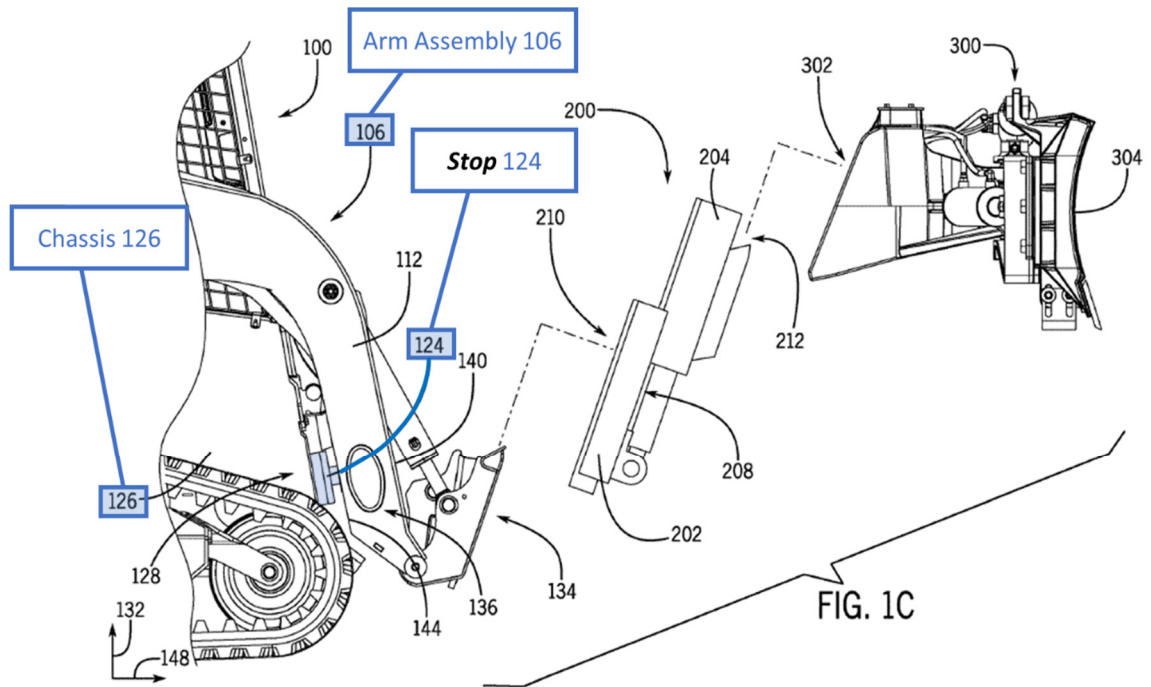
work *vehicle* 100” in the form of “*a skid steer*.” EX1006, 2:63-3:15, Figures 1A-1C; *see also* [0017], [0020]. Eckrote further discloses “a work vehicle implement 300 (e.g., *a dozer blade*) *coupled* to the work vehicle 100 by an adaptor 200.” *Id.*, 2:64-65. The adaptor 200 is part of a linkage that further includes “[an] arm assembly [featuring] a first [*main*] *arm* 112 and a second [*main*] *arm* 114,” “a tilt assembly configured to control rotation of the adaptor 200,” and “a tilt assembly 306...configured to drive rotation of the [dozer blade] work implement.” *Id.*, 3:26-40, Figure 1A. As shown below, Eckrote’s *dozer blade assembly* is *operably coupled* to a front side of the arm assembly through, e.g., the adaptor and tilt assemblies. *Id.*



EX1006, Fig. 1A (annotated)

Element [1.2] providing a stop connected to the skid steer vehicle upon which a point of the main arm rests thereby defining a lower limit of movement of the main arm; Element [1.3] positioning the point of the main arm against the stop;

The Eckrote-Lumpkins combination renders obvious Elements [1.2] and [1.3]. EX1003, ¶¶202-203. For example, Eckrote discloses that “[t]he [skid steer] work **vehicle** may include mechanical **stops** [124] to support **the [main] arms** of the arm assembly 106 while the arms are in the **lowered** position.” EX1006, 3:53-4:13; *see also* 4:14-47, 5:12-37, 10:60-11:12. These mechanical **stops** are **connected to the skid steer vehicle** chassis by an “attach[ment]...on a lower front portion of the chassis 126.” EX1006, 3:60-62. Eckrote goes on to disclose that, “[t]o support the arms of the arm assembly 106, the mechanical stops contact the arms while the arms are in the lowered position.” *Id.*, 3:58-60. In other words, and as illustrated below, **points of the main arms are positioned against the stops**, such that **the main arms rest upon the stops**. EX1003, ¶¶202-203. And because the main arms rest against the stops “while the arms are in the lowered position,” EX1006, 3:58-67, the stops **define a lower limit of movement of the main arms**. EX1003, ¶¶202-203.



EX1006, Fig. 1C (annotated)

Element [1.4] preventing the ability of the main arm from providing any lifting force by restricting the ability of a hydraulic that lifts the main arm;⁶

The Eckrote-Lumpkins combination renders obvious Element [1.4]. EX1003, ¶¶204-206. For example, Eckrote discloses that “the controller 402 does not enable the arms of the arm assembly to move when the adaptor is coupled to the work vehicle.” EX1006, 10:60-63; *see also* 2:10-33, 10:12-11:12. Specifically, “if the

⁶ Patent Owner could not reasonably contest this argument because it is consistent with Patent Owner's infringement allegations. To the extent the Board or any party argues for a narrower interpretation of this claim limitation, *see* Grounds 2B and 2D.

adaptor is attached and the arms of the arm assembly are in the fully lowered position, then the controller may block movement of the arms.” *Id.*, 10:62-65. By “block[ing]” their movement from “the fully lowered position,” Eckrote’s controller ***prevents the ability of the main arm from providing any lifting force***. *Id.*, 10:60-11:12; EX1003, ¶204. As a POSITA would have understood, if the arms cannot move upward from the lowered position, they cannot provide a lifting force. *Id.*

Additionally, it would have been apparent or obvious to the POSITA that Eckrote’s controller blocks arm movement in this way ***by restricting the ability of a hydraulic that lifts the main arm***. EX1003, ¶205. For example, the POSITA would have reached this conclusion from Eckrote’s disclosure that:

[T]he controller 402 is configured to instruct a valve assembly 408 to control hydraulic fluid flow from a hydraulic fluid source 410 to the at least one arm actuator 116, which is configured to raise and lower the [main] arms of the arm assembly.

EX1006, 10:12-16, Figure 4. In short, the controller 402 controls movement of the main arms by instructing a valve assembly 408 to regulate the flow of hydraulic fluid to the actuator 116 that raises and lowers the main arms. *Id.*, 10:12-28; EX1003, ¶¶205, 51-62. Accordingly, the POSITA would have understood that Eckrote’s controller 402 blocks upward movement of the main arms from the fully lowered position by using the valve assembly 408 to prevent hydraulic actuation (***restrict the***

ability) of the arm actuator 116 (*a hydraulic*) *that lifts the main arms*. *Id.*, 10:12-28; EX1003, ¶¶205, 51-62. It would have been axiomatic to use the hydraulic system Eckrote expressly describes to implement this movement blocking functionality. EX1003, ¶206 (citing EX1006, 2:63-3:15, 2:10-33, 10:60-11:12).

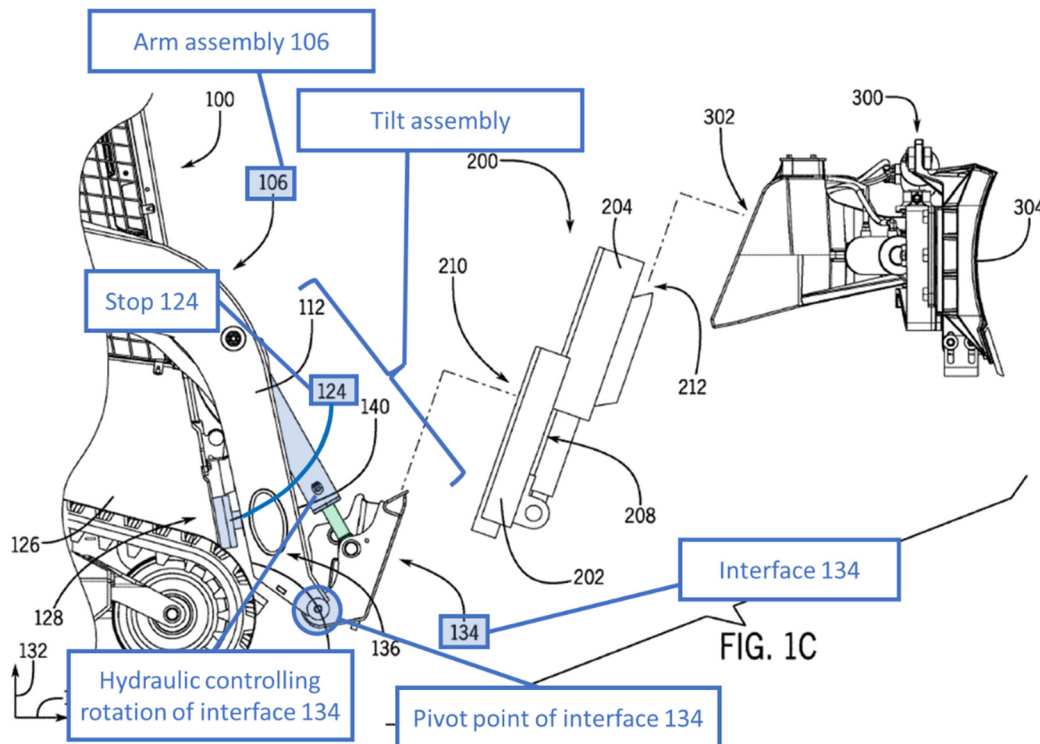
Element [1.5] operably connecting the automatic grade control system to a hydraulic that controls a pitch axis of movement of the dozer blade to affect a height of the dozer blade relative to a ground surface.

The Eckrote-Lumpkins combination renders obvious Element [1.5]. EX1003, ¶¶207-215. To start, and as discussed at [1.pre], Eckrote alone or in view of Lumpkins provides an *automatic grade control (AGC) system*. This combination also provides the additional claim feature of *operably connecting the AGC system to a hydraulic that controls a pitch axis of movement of the dozer blade to affect a height of the dozer blade relative to a ground surface*, as discussed in the two alternative mappings below. EX1003, ¶¶207, 180-181, 192-199.

Mapping #1

Mapping #1 relies on Eckrote's disclosure that "the arm assembly 106 includes a tilt assembly configured to control rotation of the adaptor 200." EX1006, 3:35-36, Figures 1A-1C. According to Eckrote, the components of the arm assembly 106—which includes the tilt assembly—are driven by "hydraulic cylinder(s)." *Id.*, 3:25-46. As shown below in Figure 1C, this tilt assembly for rotating the adaptor

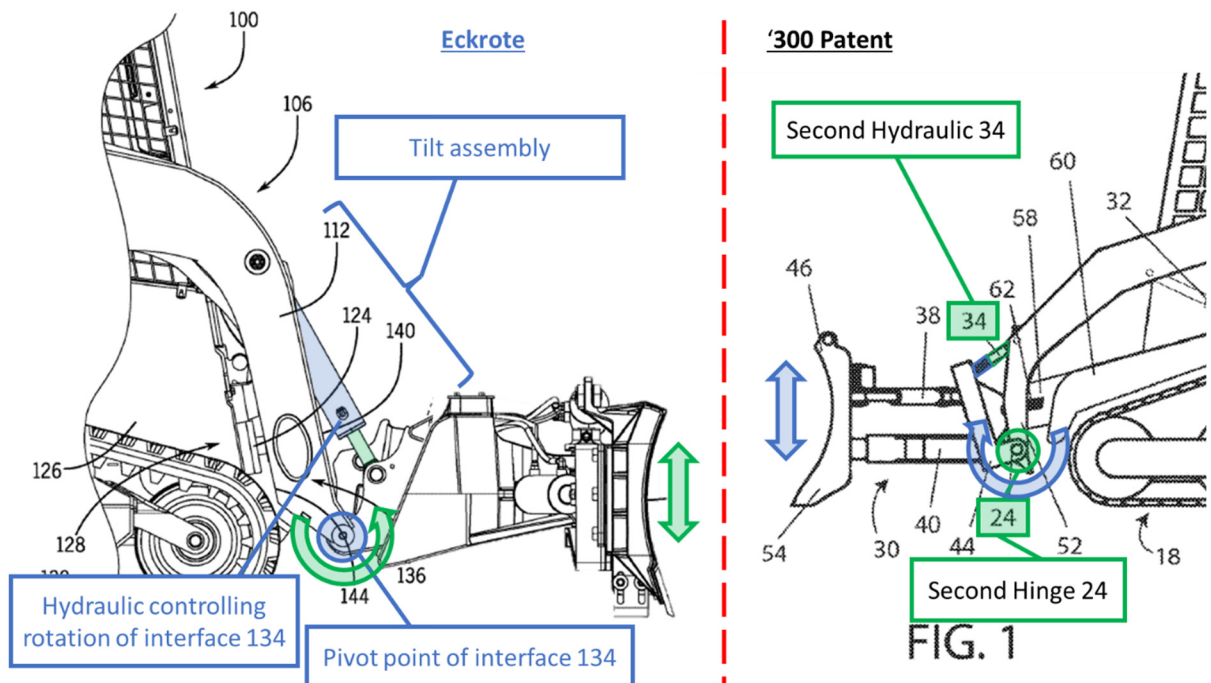
includes a hydraulic cylinder attached to the connector interface 134 that connects the main arms 112, 114 and the adaptor 200. *Id.*, 3:25-46, 4:48-5:11. Figure 1C also shows that the tilt assembly further includes a pivot joint as the connection between the arms and the connector interface. *Id.*



EX1006, Fig. 1C (annotated)

As would have been clear to a POSITA, extension and retraction of the cylinder causes the interface connector 134, and thus the adaptor 200 supporting the dozer blade, to rotate about a *pitch axis* of the pivot point relative to the main arms 112, 114. EX1003, ¶¶210-211. In other words, the linear position of the hydraulic cylinder dictates the angular position of the interface connector 134, which raises/lowers the distal end of the adaptor 200 where the dozer blade is attached.

EX1003, ¶210. Accordingly, the *hydraulic* cylinder *controls a pitch axis of movement of the dozer blade to affect a height of the dozer blade relative to a ground surface*. EX1003, ¶211. The '300 Patent describes and illustrates a similar arrangement for using pitch axis rotation to affect blade height. *E.g.*, EX1001, 4:20-38, 6:25-36, 6:39-42, 6:55-67, 8:12-26, Figs. 3-4, Figure 2.



Left: EX1006, Fig. 1C (annotated)

Right: EX1001, Fig. 2 (annotated)

Additionally, it would have been apparent or obvious to a POSITA exercising common sense and ordinary creativity that the *hydraulic* cylinder of Eckrote's above-discussed tilt assembly is *operably connected to the AGC system* (as taught by Eckrote alone or in view of Lumpkins, per Element [1.pre]). EX1003, ¶212. First, Eckrote indicates that the components of the “arm assembly”—which includes

the “tilt assembly”—can be controlled by “an input device (e.g., one or more hand controllers, levers, etc.).” EX1006, 3:25-46. In addition to “hand controllers,” Eckrote also describes an automatic control (AGC) system for controlling hydraulically driven assemblies. EX1006, 9:65-10:59, 3:16-46; *see also supra*, Element [1.pre]. Given that the ***control (AGC) system*** is one of two options Eckrote discloses for controlling the position of the dozer blade using the ***hydraulic*** cylinder of the tilt assembly, the notion of ***operably connecting*** these components would have been exceptionally apparent or exceedingly obvious to the POSITA. EX1003, ¶212. Second, operably connecting the ***control (AGC) system*** with the tilt assembly’s ***hydraulic*** cylinder also would have been obvious in view of Eckrote’s express disclosure to control (and operably connect) the control system with other hydraulically-driven components in the same linkage, e.g., the main arms and adaptor. EX1003, ¶¶212, 51-62; *see also supra*, Element [1.4].

Mapping #2

Mapping #2 relies on Eckrote’s disclosure discussed at Element [1.4] that the ***hydraulic*** actuator for the main arms 112, 114 is controlled by, and thus ***operably connected to, the control (AGC) system*** (as taught by Eckrote alone or in view of Lumpkins, per Element [1.pre]). EX1006, 3:25-46, 10:12-28.

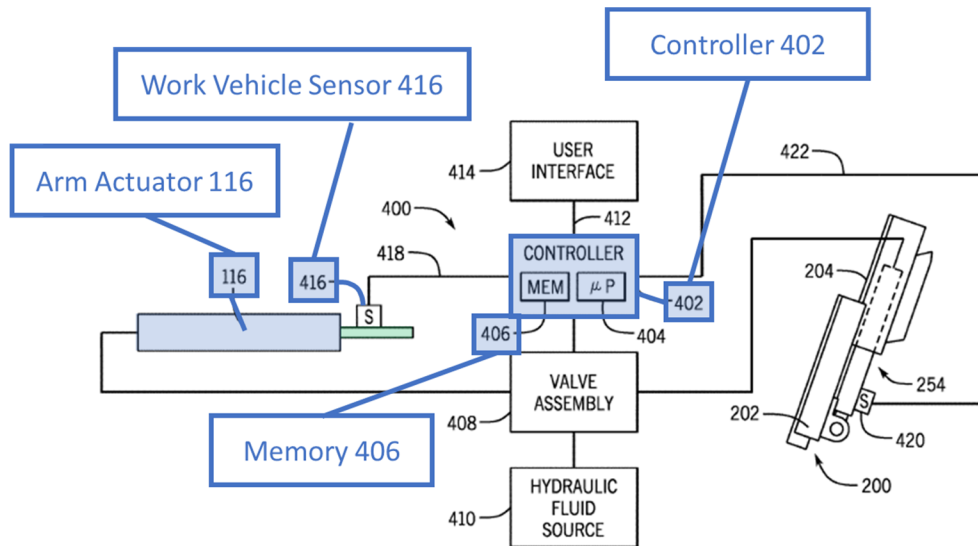
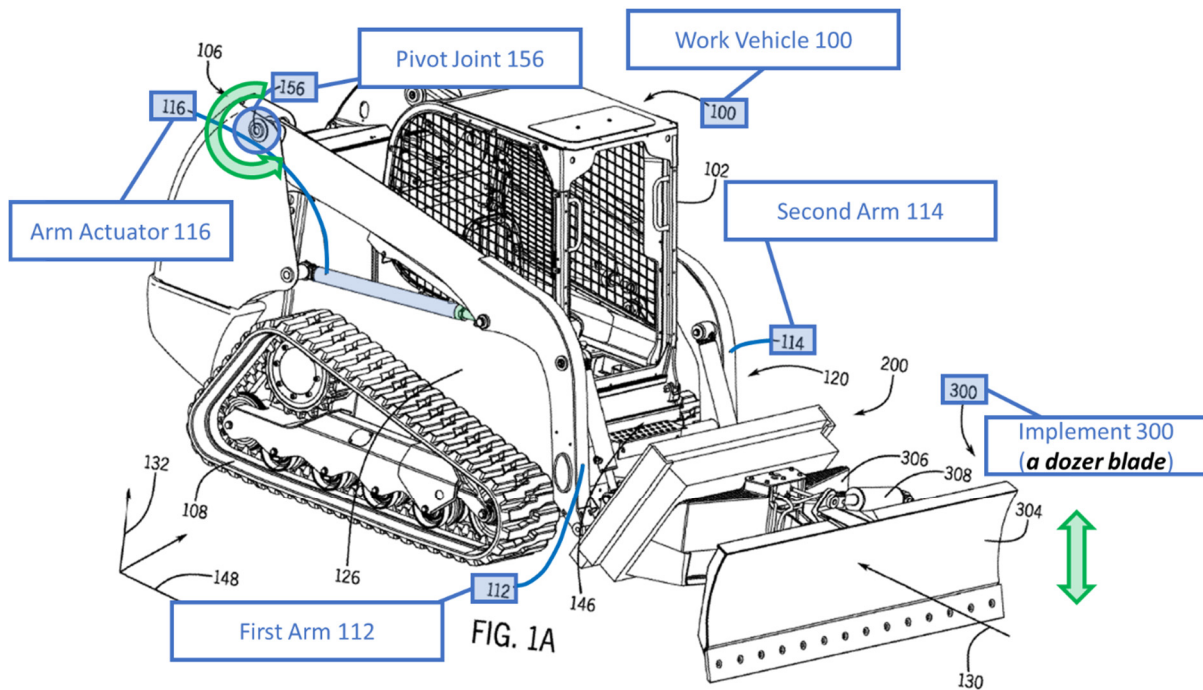


FIG. 4

EX1006, Fig. 4 (annotated)

As illustrated below, the main arms 112, 114 are part of a linkage that further includes the adaptor 200, two tilt assemblies, and the dozer blade implement. EX1006, 3:25-3:52. As Eckrote explains, the main arms 112, 114 “are movable between a lowered position 120 and a raised position” via rotational movement about the *pitch axis* of “a respective pivot joint 156” that is controlled by the “at least one arm [*hydraulic*] actuator 116.” *Id.*; see also 3:53-4:13, 10:12-28, 10:60-11:12, Figures 1A-1C, Figure 4. Because the *dozer blade* and main arms are part of the same mechanical linkage, any *pitch axis* movement of the main arms is transmitted to the *dozer blade* and *affects the height of the dozer blade relative to a ground surface*. EX1003, ¶¶213-214.



EX1006, Fig. 1A (annotated)

Notably, Mapping #2 points to the same “hydraulic” for both of Elements [1.4] and [1.5]—the hydraulic actuator that drives the main arms. The breadth of the Challenged Claims permit this mapping. For one, each of Elements [1.4] and [1.5] generically references a hydraulic. The indefinite article “a” in each instance makes clear that no particular hydraulic is required, insofar as the surrounding claim limitations are met. Additionally, the fact that Element [1.4] requires *restricting the ability of a hydraulic* does not constrain the scope of Element [1.5], which separately requires *operably connecting the automatic grade control system to a hydraulic*. Because the surrounding claim limitations do not require otherwise, Element [1.4]’s hydraulic and Element [1.5]’s hydraulic can be the same or different.

(b) **Claim 2**

Element [2.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [2.1] locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.⁷

The Eckrote-Lumpkins combination renders obvious Elements [2.pre] and [2.1], including for similar reasons discussed above at Elements [1.2], [1.3] and [1.4]. EX1003, ¶¶216-217. As discussed, Eckrote's controller blocks movement of ***(locks) the main arms at a lower limit of movement that is against the stops*** by preventing actuation of the hydraulic actuator that lifts the main arms. *Supra*, Elements [1.2], [1.3], [1.4]; EX1003, ¶217.

(c) **Claim 3**

Element [3.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [3.1] operating a valve to hydraulically isolate the hydraulic lift that lifts the main arm to further prevent any movement of the main arm.

The Eckrote-Lumpkins combination renders obvious Elements [3.pre] and [3.1], including for similar reasons discussed above at Elements [1.2], [1.3], and [1.4]. EX1003, ¶¶218-219. As discussed, Eckrote's controller blocks arm

⁷ To the extent the Board or the parties assert that a mechanical lock of some form is required to meet this claim limitation, *see* Grounds 2B-2D.

movement away from the stops by *operating a valve* assembly. *Supra*, Elements [1.2], [1.3], [1.4]; EX1003, ¶¶218-219, 202-206. From a POSITA's perspective, it would have been apparent or obvious to operate the valve assembly to achieve this result by *hydraulically isolating*, and therefore preventing actuation of, the *hydraulic* actuator that *lifts the main arms*. EX1003, ¶219.

(d) **Claim 4**

Element [4.pre] The method for controlling a dozer blade as in claim 3 further including:

*Element [4.1] locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.*⁸

The Eckrote-Lumpkins combination renders obvious Element [4.pre] and [4.1] for the reasons discussed above at Elements [3.1] and [2.1]. EX1003, ¶220.

F. GROUND 2B—Obviousness Over Eckrote, Lumpkins, Stratienko

Ground 2B incorporates the analysis of Ground 2A for several claim elements. Stratienko's supplementary teachings provide an additional/alternative basis for finding Element [1.4] of Claim 1 and Claims 2-4 obvious.

⁸ To the extent the Board or the parties assert that a mechanical lock of some form is required to meet this claim limitation, *see* Grounds 2B-2D.

1. The Combination, Reasons to Combine, & Expectation of Success

The Eckrote-Lumpkins-Stratienko combination represents the predictable result of applying Stratienko’s supplemental teachings about an infinite position mechanical locking device for preventing motion of a hydraulic actuator in the context of the Eckrote-Lumpkins system of a skid-steer vehicle with an automatic grading system for positioning the height/pitch of the dozer blade. EX1003, ¶¶221-233. In effect, Stratienko’s device provides a mechanism for locking the hydraulic cylinder that controls movement of the skid-steer’s main arms in the Eckrote-Lumpkins combination. EX1003, ¶222. From a POSITA’s perspective in 2018, applying Stratienko’s supplemental teachings in this way would have involved nothing more than applying a known solution to the known problem of preventing “undesirable movements of the rod,” (EX1008, 1:22-27)—a problem acknowledged in Eckrote’s teaching to “block movement of the arms” to ensure they remain in the lowered position. EX1006, 10:60-11:12; EX1003, ¶222. The fundamental aspects of Eckrote’s disclosure would remain intact, bolstered by the well-known and beneficial teachings of Lumpkins to utilize an automatic grading system and Stratienko to prevent movement of a hydraulic cylinder. EX1003, ¶¶222-232.

A POSITA would have been motivated to pursue the Eckrote-Lumpkins-Stratienko combination and possessed a reasonable expectation of its success in arriving at the claimed invention for at least the following independent reasons.

First, Eckrote’s teaching to block movement of the arm with a controller that controls hydraulic fluid flow to the arm actuator would have prompted a POSITA to look to references, such as Stratienko, that disclose solutions to the problem of preventing “undesirable movements” of a hydraulic cylinder rod used to move a lift arm. EX1008, 1:22-27; EX1006, 10:60-11:12, 10:12-28; EX1003, ¶224. A POSITA would have understood that locking a cylinder rod with a mechanical lock is a known technique for solving the problem that Lewis’s teaching introduces—to prevent movement of the main lift arm. EX1003, ¶224; *see also* EX1008, 1:21-34. A POSITA would have understood that Stratienko’s mechanical cylinder lock presents a suitable solution to the problem—either in place of or in conjunction with Eckrote’s suggestion to control the hydraulic fluid flow to the arm actuator—because Stratienko’s cylinder lock is specifically designed to work with high-power hydraulic cylinders, such as those on a skid-steer. EX1003, ¶¶225-226; EX1008, 2:67-3:9, 3:28-49, 2:33-39; EX1006, 2:63-3:15, 3:25-46, 4:48-5:11, 10:12-28, 10:45-11:12, Fig. 4. Stratienko’s lock can be engaged when the cylinder is contracted and the lift arm (and dozer blade) is in the lowered position. EX1003, ¶¶227-228, 127-130 A POSITA would have been motivated to use Stratienko’s lock

for this purpose as a suitable addition to the Eckrote-Lumpkins design to prevent the main lift arm from moving. EX1003, ¶¶223-228.

Second, even setting aside Eckrote's express instruction, a POSITA would have appreciated that there are particular advantages to using Stratienko's lock in the Eckrote-Lumpkins combination. EX1003, ¶¶229-233. For example, while Eckrote describes the idea of blocking movement of the arm by a controller controlling the hydraulic fluid flow to the actuator (EX1006, 10:60-11:12), Stratienko recognizes that fluid leak across the seals in the cylinder could still cause unwanted movements of the arm. EX1008, 1:22-27; EX1003, ¶229. A POSITA would have known that fluid leakage in a hydraulic cylinder can lead to creep and unintended movement of the hydraulic cylinder and therefore allow the arm to lift. EX1003, ¶¶229-230, 63-69. A POSITA would have understood that inadvertent movement of the vehicle arm during grading caused by fluid leak in the cylinder would be inefficient because graded areas may be out of specification and therefore need to be re-graded. EX1003, ¶230; EX1007, [0003], [0010], [0034]. A mechanical lock—such as the cylinder lock Stratienko teaches—solves this problem as well as others that would arise due to inadvertent lift arm movements. EX1003, ¶231. Additionally, Stratienko describes that mechanical locks are durable, and that its specific design is compact, simple, and inexpensive. EX1008, 1:29-31; 2:3-6; 2:67-3:1. Further still, Stratienko describes that the cylinder lock “is used in

conventional hydraulic actuators” (*id.*, 2:34-35) and “is universally adaptable to standard hydraulic actuators and can be easily adapted to fit different size rods for a particular hydraulic actuator.” *Id.*, 3:3-6; EX1003, ¶232. A POSITA would have been motivated by such advantages to use Stratienko’s lock with the Eckrote-Lumpkins design to prevent inadvertent movement of the lift arm. EX1003, ¶233.

2. Claim Element Analysis

(a) Claim 1

Elements [1.pre], [1.1], [1.2], and [1.3]

The Eckrote-Lumpkins-Stratienko combination renders obvious Elements [1.pre], [1.1], [1.2] and [1.3] for the reasons discussed above at §V.E.4 Elements [1.pre], [1.1], [1.2], [1.3]. EX1003, ¶¶234, 192-203.

Element [1.4] preventing the ability of the main arm from providing any lifting force by restricting the ability of a hydraulic that lifts the main arm;

The Eckrote-Lumpkins-Stratienko combination renders obvious Element [1.4]. EX1003, ¶¶235-236. As discussed, this combination incorporates Stratienko’s disclosure of an automatically operated “infinite position type” mechanical hydraulic cylinder rod lock as a supplemental means of immobilizing the main arm of the Eckrote-Lumpkins skid-steer vehicle in a lowered position against a stop. EX1008, 1:62-63; *see also id.*, 2:33-3:9, 3:50-4:36, 5:14-60, Figs. 3-4; *supra*, §V.B.1 (summary of Stratienko), §V.F.1 (motivation-to-combine). As a

POSITA would have understood, in the Eckrote-Lumpkins-Stratienko combination, when Stratienko's mechanical lock grips the rod of the hydraulic cylinder actuator controlling the main arm, the *main arm is prevented from providing any lifting force* because the *hydraulic that lifts the main arm is restricted* from moving. EX1003, ¶¶235-236; §V.F.1 (combination).

Element [1.5] operably connecting the automatic grade control system to a hydraulic that controls a pitch axis of movement of the dozer blade to affect a height of the dozer blade relative to a ground surface.

The Eckrote-Lumpkins-Stratienko combination renders obvious Element [1.5] for the reasons discussed above at §V.E.4 (Element [1.5]). EX1003, ¶¶237, 207-215.

(b) **Claim 2**

Element [2.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [2.1] locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.

The Eckrote-Lumpkins-Stratienko combination renders obvious Elements [2.pre] and [2.1]. EX1003, ¶238. As discussed, this combination incorporates Stratienko's disclosure of an "infinite position type" mechanical hydraulic cylinder rod lock for immobilizing the main arm of the Eckrote-Lumpkins skid-steer vehicle in a lowered position against a mechanical stop. EX1008, 1:62-63; *see also id.*, 2:33-

3:9, 3:50-4:36, 5:14-60, Figs. 3-4; *supra*, §V.B.1 (summary of Stratienko), §V.F.1 (motivation-to-combine). As a POSITA would have understood, in the Eckrote-Lumpkins-Stratienko combination, Stratienko's infinite position lock prevents the rod of the arm assembly hydraulic cylinder from axial movement, and thus locks the main arm in place by preventing the main arm from moving. EX1008, 5:40-62; EX1003, ¶238. Accordingly, a POSITA would have understood that in the Eckrote-Lumpkins-Stratienko combination, engaging Stratienko's mechanical hydraulic cylinder rod lock with the arm actuator ***locks the main arm against the stop*** at the ***lower limit of movement of the main arm***. EX1003, ¶238; §V.F.1 (combination).

(c) **Claim 3**

Element [3.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [3.1] operating a valve to hydraulically isolate the hydraulic lift that lifts the main arm to further prevent any movement of the main arm.

The Eckrote-Lumpkins-Stratienko combination renders obvious Elements [2.pre] and [2.1], including for similar reasons discussed above at §V.E.4 (Elements [1.2], [1.3], and [1.4]). EX1003, ¶¶239-246, 204-236. As discussed above, this combination incorporates Stratienko's disclosure of an automatically operated "infinite position type" mechanical hydraulic cylinder rod lock as a supplemental means of immobilizing the main arm of the Eckrote-Lumpkins skid-steer vehicle in a lowered position against a mechanical stop. EX1008, 1:62-63; *see also id.*, 2:33-

3:9, 3:50-4:36, 5:14-60, Figs. 3-4; *supra*, §V.B.1 (summary of Stratienko), §V.F.1 (motivation-to-combine).

In the Eckrote-Lumpkins-Stratienko combination, a POSITA would have been motivated to apply Stratienko's cylinder lock *in addition to* Eckrote's controller controlling the hydraulic fluid flow to the arm actuator to block movement of the arm. EX1006, 10:60-11:12; *supra* §V.E.1 (summary of Eckrote), §V.F.1 (motivation-to-combine); EX1003, ¶¶239-242. A POSITA would have understood that redundant mechanisms are applied to important systems as a matter of routine practice. EX1003, ¶¶243-245, 71-72. Additionally, a POSITA would have understood that controlling hydraulic fluid flow to and from the arm actuator hydraulic cylinder to block arm movement might still lead to unintentional movements when fluid leaks across seals in the system and would have thus been motivated to employ both hydraulic and mechanical locks. EX1008, 1:22-27; EX1003, ¶¶241, 63-69. A POSITA would have understood that there is little, if any, downside to using Stratienko's lock as a redundant locking mechanism in the Eckrote-Lumpkins-Stratienko combination because Stratienko's lock can be used with any standard cylinder and is both cheap and easy to install. EX1008, 1:29-31; 2:3-6; 2:67-3:1; EX1003, ¶242.

Accordingly, a POSITA would have understood that in the Eckrote-Lumpkins-Stratienko combination, Eckrote's controller *blocks movement of the*

arm using *a valve* assembly to block the flow of hydraulic fluid to the arm actuator, thereby *hydraulically isolat[ing] the hydraulic lift that lifts the main arm*. *Supra*, §V.E.4 Elements [1.2], [1.3], [1.4], [3.1]; EX1003, ¶¶239-246; EX1006, 10:12-28, 10:60-11:12, Fig. 4.

(d) **Claim 4**

Elements [4.pre] and [4.1]

The Eckrote-Lumpkins-Stratienko combination renders obvious Elements [4.pre] and [4.1] for the reasons discussed above at §V.F.2 Elements [3.1] and [2.1]. EX1003, ¶¶247, 238-246

G. GROUNDS 2C—Obviousness Over Eckrote, Lumpkins, Orser

Ground 2C incorporates the analysis of Ground 2A for several claim elements. Orser's supplementary teachings provide an additional/alternative basis for finding Elements [2.1] and [4.1] obvious.

1. The Combination, Reasons to Combine, & Expectations of Success

The Eckrote-Lumpkins-Orser combination represents the predictable result of applying Orser's supplemental teachings about a mechanical lift arm lock to the Eckrote-Lumpkins combination, which provides for blocking movement of the main arm of a skid-steer from a lowered position on the stops during automatic grading. EX1003, ¶¶248-260. In effect, Orser's lock provides a mechanism for mechanically

locking the main lift arm of the skid-steer to the stops in the lowered position in the Eckrote-Lumpkins combination. EX1003, ¶¶249-250; EX1009, 2:9-14. From a POSITA's perspective in 2018, applying the supplemental teachings of Orser in this way would have involved nothing more than applying a known solution to the known problem of preventing movement of the main arm—a problem acknowledged by Eckrote's teaching to "block movement of the arms" to ensure they remain in the lowered position. EX1006, 10:60-11:12; EX1003, ¶251. The fundamental aspects of Eckrote's disclosure would remain intact, bolstered by the well-known and beneficial teachings of Lumpkins to use an AGC and of Orser to mechanically lock the main arm to the stop. EX1003, ¶252.

A POSITA would have been motivated to pursue the Eckrote-Lumpkins-Orser combination and possessed a reasonable expectation of the combination's success in arriving at the claimed invention for at least the following independent reasons.

First, Eckrote's teaching to block movement of the arm with a controller that controls hydraulic fluid flow to the arm actuator would have prompted a POSITA to look to references, such as Orser, that disclose solutions to the problem of "[b]lock[ing] upward movement of the arm." EX1006, 10:60-11:12, 10:12-28; EX1009, 2:9-14; EX1003, ¶¶253-254. A POSITA would have understood that mechanically locking a main arm to the chassis of the skid-steer is a known

technique for solving the problem that Eckrote's teaching introduces—to block movement of the main arm. EX1003, ¶¶254-255. A POSITA would have understood that Orser's mechanical arm lock presents a suitable solution to the problem—either in place of or in conjunction with Eckrote's suggestion to control hydraulic fluid flow to the arm actuator—because Orser's arm lock is specifically designed to work with an arm of a skid-steer. EX1003, ¶256; EX1009, 3:32-44, Figs. 1-2; EX1006, 2:63-3:15, 10:60-11:12; *see also id.*, 3:25-4:47, 10:12-28, Figs. 1A, 4. Orser's lock is “adapted to secure lift arm 12 to body 16 in a lowered position.” EX1009, 3:37-38; EX1003, ¶256. A POSITA would have been motivated to use Orser's lock for this purpose as a suitable mechanical addition to the Eckrote-Lumpkins design to prevent the main arm from moving. EX1003, ¶256.

Second, as discussed above in §V.C.2 (Ground 1C combination), a POSITA would have appreciated that the Orser arm lock has particular advantages when used in combination with a hydraulic control mechanism. EX1003, ¶¶257, 159-165. A POSITA would have recognized that the advantage of having Orser's arm lock as an additional mechanism to secure the main arm in the lowered position that can be used independently from the hydraulic cylinders applies to its use in the Eckrote-Lumpkins combination. EX1009, 2:19-26; EX1003, ¶258. A POSITA would have understood that the use of Orser's mechanical arm lock eliminates the detrimental effects of fluid leakage in the hydraulic lift cylinder, and also eliminates undesirable

movement of the lift arm (and therefore the dozer blade) due to mechanical play in the pivot joints of the lift arms and hydraulic cylinders. EX1003, ¶258. A POSITA would have also understood that for similar reasons as discussed above, Orser's arm lock provides a redundancy to Eckrote's control of hydraulic fluid flow to the arm actuator that provides additional measures that allow operators of Eckrote's skid-steer to prevent inadvertent movements of the main arm. EX1009, 1:13-37, 2:1-9; *see also* EX1008, 1:22-27, 5:68-6:14; EX1003, ¶¶259-260.

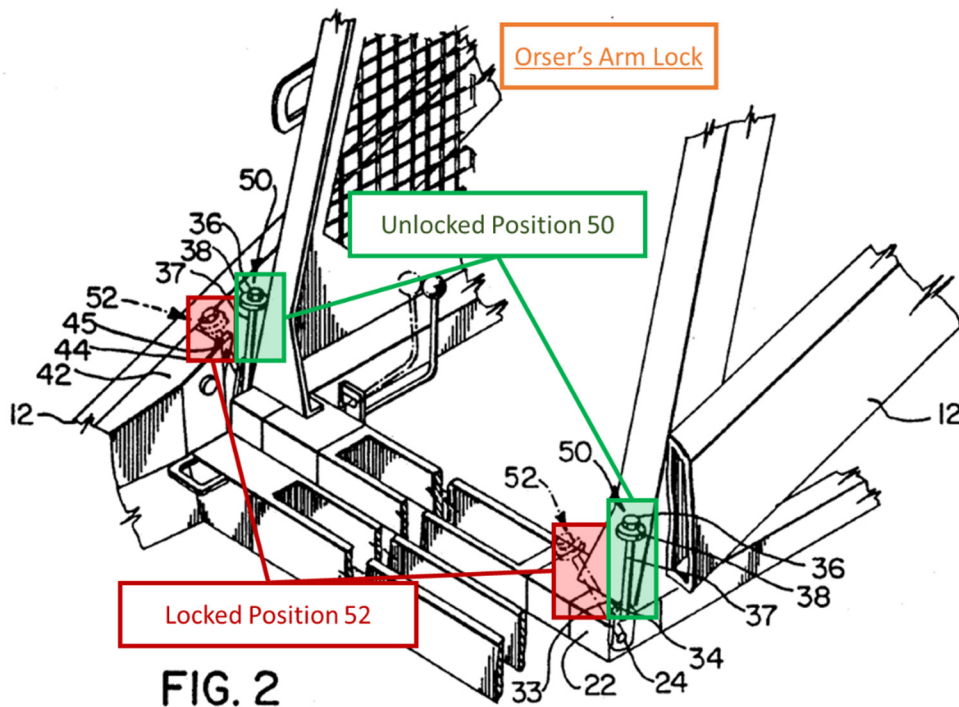
2. Claim Element Analysis

(a) Claim 2

Element [2.pre] The method for controlling a dozer blade as in claim 1 further including:

Element [2.1] locking the main arm against the stop when the main arm is at the lower limit of movement of the main arm.

The Eckrote-Lumpkins-Orser combination renders obvious Elements [2.pre] and [2.1]. EX1003, ¶¶261-263. As discussed, this combination incorporates Orser's disclosure of an arm lock as a supplemental means of securing the main arm of the Eckrote-Lumpkins skid-steer in the lowered position against the mechanical stop. EX1009, 2:1-14; *see also id.*, 3:32-44, 1:13-37, Figs. 1-2; *supra*, §V.C.1 (summary of Orser), §V.G.1 (motivation-to-combine).



EX1009, Fig. 2 (annotated)

As a POSITA would have understood, in the Eckrote-Lumpkins-Orser combination, when Orser's arm lock is engaged, the main arm is secured against the stop, "***locking the lift arm*** to the vehicle body in the ***lowered position***." EX1009, Abstract, 1:6-11, 4:19-27; EX1003, ¶¶262-263; §V.G.1 (motivation-to-combine).

(b) Claim 4

Elements [4.pre] and [4.1]

The Eckrote-Lumpkins-Orser combination renders obvious Elements [4.pre] and [4.1] for the reasons discussed above at §V.E.4 Elements [3.1] and §V.G.2 Element [2.1]. EX1003, ¶¶261-264, 218-219.

H. GROUND 2D—Obviousness Over Eckrote, Lumpkins, Stratienko, Orser

Ground 2D incorporates the analysis of Ground 2B for several claim elements. As discussed at Ground 2C, Orser's supplementary teachings provide an additional/alternative basis for finding Elements [2.1] and [4.1] obvious.

A POSITA would have been motivated to apply Orser's supplemental teachings about a mechanical arm lock for securing the main arm to a skid-steer body to the Eckrote-Lumpkins-Stratienko combination, which provides for immobilizing the main arm of a skid-steer in a lowered position during automatic grading by control of hydraulic fluid flow to the arm actuator and an infinite position cylinder lock. EX1003, ¶¶265-270; §V.F.1. A POSITA would have understood that the additional mechanical arm lock taught by Orser provides an additional and advantageous redundancy to the mechanisms for securing the arm in the Eckrote-Lumpkins-Stratienko combination (i.e., controlling hydraulic fluid flow to prevent flow to the cylinder and mechanically locking the cylinder rod). EX1003, ¶266. For example, because Orser's mechanical lock operates independently from the hydraulics of the system, the lock provides additional confidence that the arm will not unexpectedly move. *Id.* Orser's mechanical lock prevents undesirable movements of the lift arm resulting not only from leakage of hydraulic fluid at the cylinder, but also prevents movements of the lift arm that are unrelated to

compression or leakage of hydraulic fluid. EX1003, ¶¶267-268. A POSITA would have understood that Orser's mechanical lift arm lock also prevents unintended and undesirable movements resulting from mechanical play at the joints of the arms. EX1003, ¶¶267, 70. A POSITA would have understood that redundancy in securing the arm in a lowered position would provide backup mechanisms for preventing inadvertent movement of the main arm. EX1009, 1:13-37, 2:1-9, 5:68-6:14; EX1003, ¶¶268, 71-72.

Additionally, a POSITA would have understood that the cost associated with delays for equipment repair during a grading operation with labor on site is expensive. EX1003, ¶269. A POSITA would have been motivated to implement Orser's lock in addition to Stratienko's cylinder lock and Eckrote's hydraulic control system as a low-cost redundancy that provides a mechanical option separate from the hydraulic system so that in the case of failure of one of the other mechanisms for preventing movement of the arms, delay and cost would be minimized. EX1003, ¶¶269-270.

1. Claim Element Analysis

(a) Claim 2

Elements [2.pre] and [2.1]

The Eckrote-Lumpkins-Stratienko-Orser combination renders obvious Elements [2.pre] and [2.1] for the reasons discussed above at §V.G.2. EX1003, ¶¶271, 238.

(b) Claim 4

Elements [4.pre] and [4.1]

The Eckrote-Lumpkins-Stratienko-Orser combination renders obvious Elements [4.pre] and [4.1] for the reasons discussed above at §V.F.2 Element [3.1] and above at §V.H.1 Element [2.1] (which cross-references §V.G.2). EX1003, ¶¶271-272, 238-247.

VI. ANALYSIS ON DISCRETION

A. 35 U.S.C. §325(d)—*Advanced Bionics*

The asserted combinations in this Petition are materially different from the art references addressed during prosecution of the '300 Patent. The presently cited references—i.e., Funk, Lewis, Stratienko, Orser, Eckrote, and Lumpkins—were never considered, or even cited. These references offer new and distinct teachings that provide the features erroneously deemed missing from the prior art by the Examiner. Neither part of the *Advanced Bionics* two-part framework is met, and denying institution under §325(d) would be inconsistent with the Board's precedent.

B. 35 U.S.C. §314(a)—*Fintiv*

Institution should not be discretionarily denied under §314(a) because no *Fintiv* factor favors that result.

Factor 1 weighs against denial. The parallel district court litigation was transferred to the Northern District of Iowa on June 28, 2024. The litigation was then stayed pending resolution of Patent Owner’s Writ of Mandamus contesting the venue transfer. EX1043. The Federal Circuit denied the Writ on September 11, 2024. Petitioner intends to file a motion to further stay the litigation pending resolution of this IPR.

Factor 2 weighs against denial because the District Court for the Northern District of Iowa has not set a trial date.

Factor 3 weighs against denial because Petitioner diligently filed this Petition while the co-pending litigation remains in its infancy.

Factor 4 weighs against denial. As noted above, no trial date has been scheduled. No *Fintiv* stipulation has been offered given the lack of a trial date, and it otherwise remains too early to assess the suitability of a stipulation.

Factor 5 is neutral. Although the parties in the parallel litigation are the same, there is no indication that the parallel litigation will reach a jury trial before the conclusion of this IPR.

Factor 6 weighs against denial in view of this Petition’s compelling merits.

VII. FEES—37 C.F.R. §42.103

Petitioner authorizes the Patent and Trademark Office to charge any fees to Deposit Account No. 06-1050.

VIII. MANDATORY NOTICES—37 C.F.R §42.8(a)(1)

A. Real Party-In-Interest—37 C.F.R. §42.8(b)(1)

Deere & Company is the petitioner and the real party-in-interest. Petitioner also identifies John Deere Construction & Forestry Company, Dobbs Equipment, LLC, and EFE, Inc., solely because Patent Owner named these entities in its second amended complaint filed on March 29, 2024 and without admitting that they are in fact real parties-in-interest.

B. Related Matters—37 C.F.R. §42.8(b)(2)

Petitioner is not aware of any disclaimers, reexamination certificates or petitions for *inter partes* review for the '300 Patent. The '300 Patent is the subject of the following civil action: *David's Dozer V-Loc System, Inc., v. Deere & Company*, 2:24-cv-1023 (ND Iowa) filed June 28, 2024.

C. Lead And Back-Up Counsel—37 C.F.R. § 42.8(b)(3)

Petitioner provides the following designation of counsel.

Lead Counsel	Backup Counsel
Kenneth Darby, Reg. No. 65,068 Fish & Richardson P.C. 60 South Sixth Street Suite 3200	Thomas Rozylowicz, Reg. No. 50,620 Kiersten Batzli, Reg. No. 75,476 Benjamin Elacqua, <i>Pro Hac Vice</i> Fish & Richardson P.C.

Minneapolis, MN 55402 Tel: 202-783-5070 Fax: 877-769-7945 Email: IPR57677-0001IP1@fr.com	60 South Sixth Street Suite 3200 Minneapolis, MN 55402 Tel: 202-783-5070 Fax: 877-769-7945 Email: IPR57677-0001IP1@fr.com
--	---

D. Service Information

Please address all correspondence and service to the address listed above.

Petitioner consents to electronic service by email at IPR57677-0001IP1@fr.com
(referencing no. 57677-0001IP1).

Respectfully submitted,

Dated September 19, 2024

/Kenneth Wayne Darby Jr./

Kenneth Darby, Reg. No. 65,068
Thomas Rozylowicz, Reg. No. 50,620
Kiersten Batzli, Reg. No. 75,476
Benjamin Elacqua, *Pro Hac Vice*
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

(Control No. IPR2024-01442)

Attorneys for Petitioner

CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 14,000 words, which equals the 14,000 allowed under 37 CFR § 42.24.

Dated September 19, 2024

/Kenneth Wayne Darby Jr./
Kenneth Darby, Reg. No. 65,068
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
T: 202-783-5070
F: 877-769-7945

(Control No. IPR2024-01442)

Attorneys for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on September 19, 2024, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided via Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

CHRISTOPHER J. VANDAM, P.A.
19600 NE 21 Ct.
MIAMI, FL 33179
UNITED STATES

/Hoi Cheung/
Hoi Cheung
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
hcheung@fr.com