

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

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

Case IPR2024-00835
U.S. Patent No. 11,535,318

PATENT OWNER'S RESPONSE

[REDACTED VERSION]

TABLE OF CONTENTS

	Page(s)
I. INTRODUCTION	1
II. OVERVIEW OF THE ’318 PATENT AND PRIOR ART.....	3
A. G&Z Development Background	3
B. CIII (Ex. 1005)	8
C. Rio (Ex. 1006)	11
D. Smolders (Ex. 1021).....	18
III. LEVEL OF ORDINARY SKILL IN THE ART	18
IV. CLAIM CONSTRUCTION	19
A. “A swing leg assembly configured to be coupled to a paving machine configured to move in a paving direction . . .”	19
B. “a crawler track rotatably coupled to the jacking column” and “a slew drive coupled to the jacking column and the crawler track, wherein the slew drive is configured to cause rotation of the crawler track relative to the jacking column”	25
V. GROUND 1: THE CLAIMED INVENTION IS PATENTABLE OVER THE CIII and RIO	28
A. CIII in View of Rio Does Not Disclose a Processor That Coordinates the Movement of a Swing Leg and Crawler Track While Moving in a Paving Direction	28
B. CIII in View of Rio Does Not Render Obvious “a crawler track rotatably coupled to the jacking column” or “a slew drive coupled to the jacking column and the crawler track . . . configured to cause rotation of the crawler track relative to the jacking column”	31

1.	Neither CIII nor Rio Expressly Discloses “a crawler track rotatably coupled to the jacking column”	33
2.	Neither CIII nor Rio Expressly Discloses a Slew Drive Coupled to a Jacking Column and a Crawler Track	34
3.	Petitioner’s Proposed Combination of Rio and CIII is the Product of Impermissible Hindsight	35
a)	The “State-of-the-Art” References are Not “State-of-the-Art” and Do Not Establish That it Was Well Known to Rotatably Couple a Crawler Track to a Jacking Column	36
b)	Petitioner’s Proposed Combination Merely Retraces the Inventor’s Steps With the Benefit of Hindsight.....	39
c)	A POSITA Would Not Have Expected a Reasonable Expectation of Success in Modifying CIII with Rio.....	41
VI.	GROUND 2: THE CLAIMED INVENTION IS PATENTABLE OVER THE CIII-RIO-SMOLDERS COMBINATION	43
VII.	THE OBJECTIVE EVIDENCE CONFIRMS PATENTABILITY OVER THE CIII-RIO COMBINATIONS	43
A.	A Nexus Exists Because the Objective Indicia Evidence is the Direct Result of the Unique Characteristics of the Claimed Invention, Practiced by G&Z’s Paving Machines	43
B.	G&Z’s SmartLeg/AccuSteer Technology Resolved a Decade Long Need For Repositioning the Swing Leg/Crawler Track When Moving and Under Load.....	58
C.	The S600’s Use of A Slew Drive for Driving And Steering Under Load Overcame Industry Skepticism	62
D.	GOMACO and Other Competitors Copied G&Z’s S600 With SmartLeg/AccuSteer Technology	63

1.	Gomaco	65
2.	Wirtgen.....	76
E.	Competitors Praised G&Z’s SmartLeg/AccuSteer Technology Through Copying While the Paving Industry in General Praised the Technology Through Recognition of its Significance Industry Praise for SmartLeg / AccuSteer Technology	81
F.	G&Z’s S600’s SmartLeg/AccuSteer Technology Drove the Commercial Success.....	82
VIII.	CONCLUSION.....	84

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.</i> , 876 F.3d 1350 (Fed. Cir. 2017)	81, 82
<i>Bell Commc'ns Research, Inc. v. Vitalink Commc'ns Corp.</i> , 55 F.3d 615 (Fed. Cir. 1995)	23
<i>C.R. Bard, Inc. v. Medline Indus., Inc.</i> , No. IPR2019-00035, Paper 102 (P.T.A.B. Nov. 23, 2022)	31
<i>Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.</i> , 289 F.3d 801 (Fed. Cir. 2002)	19, 24
<i>Crocs, Inc. v. Int'l Trade Comm'n</i> , 598 F.3d 1294 (Fed. Cir. 2010)	81
<i>Dow Chem. Co. v. Am. Cyanamid Co.</i> , 816 F.2d 617 (Fed. Cir. 1987)	64
<i>Eaton Corp. v. Rockwell Int'l Corp.</i> , 323 F.3d 1332 (Fed. Cir. 2003)	24
<i>Eli Lilly & Co. v. Teva Pharm. Int'l GmbH</i> , 8 F.4th 1331 (Fed. Cir. 2021)	25
<i>In re Fought</i> , 941 F.3d 1175 (Fed. Cir. 2019)	25
<i>Fox Factory, Inc. v. SRAM, LLC</i> , 944 F.3d 1366 (Fed. Cir. 2019)	44
<i>In re Freeman</i> , 30 F.3d 1459 (Fed. Cir. 1994)	32
<i>Google LLC v. Hammond Dev. Int'l, Inc.</i> , 54 F.4th 1377 (Fed. Cir. 2022)	28, 32
<i>Graham v. John Deere Co.</i> , 383 U.S. 1 (1966)	43

<i>In re Huang</i> , 100 F.3d 135 (Fed. Cir. 1996)	44
<i>J.T. Eaton & Co. v. Atl. Paste & Glue Co.</i> , 106 F.3d 1563 (Fed. Cir. 1997)	84
<i>Leo Pharm. Prods., Ltd. v. Rea</i> , 726 F.3d 1346 (Fed. Cir. 2013)	41
<i>Metalcraft of Mayville, Inc. v. The Toro Co.</i> , 848 F.3d 1358 (Fed. Cir. 2017)	39
<i>Ohio Willow Wood Co. v. Alps S., LLC</i> , 735 F.3d 1333 (Fed. Cir. 2013)	29
<i>On Demand Mach. Corp. v. Ingram Indus., Inc.</i> , 442 F.3d 1331 (Fed. Cir. 2006)	25
<i>Otsuka Pharm. Co. v. Sandoz, Inc.</i> , 678 F.3d 1280 (Fed. Cir. 2012)	39
<i>Pacing Techs., LLC v. Garmin Int'l, Inc.</i> , 778 F.3d 1021 (Fed. Cir. 2015)	24
<i>Panduit Corp. v. Dennison Mfg. Co.</i> , 774 F.2d 1082 (Fed. Cir. 1985), <i>vacated on other grounds</i> , 475 U.S. 809 (1986), <i>on remand</i> , 810 F.2d 1561 (Fed. Cir. 1987)	64
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005)	19, 26
<i>Rambus Inc. v. Rea</i> , 731 F.3d 1248 (Fed. Cir. 2013)	44
<i>Sensonics, Inc. v. Aerosonic Corp.</i> , 81 F.3d 1566 (Fed. Cir. 1996)	40
<i>TecSec, Inc. v. Int'l Bus. Machs. Corp.</i> , 731 F. 3d 1336 (Fed. Cir. 2013)	32
<i>TQ Delta, LLC v. 2Wire, Inc.</i> , No. 13-1835-RGA, 2021 WL 2671296 (D. Del. June 29, 2021)	31

<i>Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc., 699 F.3d 1340 (Fed. Cir. 2012)</i>	43
<i>Volvo Penta of the Ams., LLC v. Brunswick Corp., 81 F.4th 1202 (Fed. Cir. 2023)</i>	44
<i>WBIP, LLC v. Kohler Co., 829 F.3d 1317 (Fed. Cir. 2016)</i>	43, 58, 62
<i>Wyers v. Master Lock Co., 616 F.3d 1231 (Fed. Cir. 2010)</i>	64, 66

PATENT OWNER'S EXHIBIT LIST

Exhibit	Description
2001	Guntert & Zimmerman Brochure, "S850 Mid-Size Slipform Paver"
2002	Guntert & Zimmerman Brochure, "S600 Multi-Purpose Slipform Paver"
2003	Guntert & Zimmerman Brochure, "S400 Multi-Purpose Slipform Paver"
2004	Gomaco Brochure, "GP4 Intelligent Slipform Paver" (2018)
2005	Patent Bots Webpage, Examiner Statistics for Gary S. Hartmann, available at https://www.patentbots.com/stats/examiner/3671-HARTMANN-GARY-S
2006	U.S. Patent No. 6,890,123
2007	Gomaco Webpage, "A Commander III Like No Other..." dated November 2016, available at https://www.gomaco.com/resources/worldstories/world44_1/piccoli.html
2008	Deposition Transcript of William Singhose, Ph.D., <i>Godbersen-Smith Construction Co. d/b/a Gomaco Corp. v. Guntert & Zimmerman Const. Div., Inc.</i> , Case No. IPR2021-00136 and IPR2020-01698, taken on July 23, 2021
2009	Decision Granting Institution of <i>Inter Partes</i> Review, <i>Godbersen-Smith Construction Co. d/b/a Gomaco Corp. v. Guntert & Zimmerman Const. Div., Inc.</i> , Case No. IPR2020-01698, Paper 24 (P.T.A.B. May 7, 2021)
2010	Excerpts of the Deposition Transcript of Kevin Klein, <i>Guntert & Zimmerman Const. Div., Inc. v. Gomaco Corp.</i> , Case No. 5:20-cv-04007-CJW-KEM (N.D. Iowa), taken on August 25, 2020, FILED UNDER SEAL

Exhibit	Description
2011	Deposition Transcript of William Singhose, Ph.D., <i>Godbersen-Smith Construction Company d/b/a Gomaco Corporation v. Guntert & Zimmerman Const. Div., Inc.</i> , Case No. IPR2024-00835, taken on February 12, 2025
2012	Deposition Transcript of William Singhose, Ph.D., <i>Godbersen-Smith Construction Company d/b/a Gomaco Corporation v. Guntert & Zimmerman Const. Div., Inc.</i> , Case No. PGR2024-00026, taken on February 13, 2025
2013	Email correspondence between J. Dahlinger and D. Pope, dated July 14, 2009, FILED UNDER SEAL
2014	Heavy Equipment Guide Webpage, “New S600 Slipform Paver The Multi-Tool Every Paving Contractor Needs,” dated November 22, 2010, available at https://www.heavyequipmentguide.ca/article/15235/new-s600-slipform-paver
2015	Declaration of Kenneth “Mark” Bryden in Support of Patent Owner’s Response, FILED UNDER SEAL
2016	Declaration of Ronald M. Guntert, Jr. in Support of Patent Owner’s Response
2017	Gomaco Brochure, “Commander III Trimmer Slipform Paver,” dated 2008
2018	Caterpillar Brochure, “PM102 Cold Planer,” dated 2007
2019	Guntert & Zimmerman Brochure, “S600 Multi-Purpose Slipform Paver”
2020	Caterpillar Sale Sheet, “PM102 Cold Planer,” dated 2011
2021	Guntert & Zimmerman Newsletter, “Construction Profiles,” dated Fall 2010

Exhibit	Description
2022	Declaration of Todd Greenwood in Support of Patent Owner's Response, <i>Godbersen-Smith Construction Company d/b/a Gomaco Corporation v. Guntert & Zimmerman Const. Div., Inc.</i> , Case No. IPR2020-01698, dated July 22, 2021
2023	Iron Planet Webpage, "2011 Cat PM-102 Tracked Cold Planer," dated February 25, 2025, available at https://www.ironplanet.com/for-sale/Cold-Planers-2011-Cat-PM-102-Tracked-Cold-Planer-Louisiana/12143308
2024	Email correspondence between J. Dahlinger and A. Moser, dated June 24, 2009, FILED UNDER SEAL
2025	Guntert & Zimmerman Newsletter, "Construction Profiles," dated Spring 2011
2026	Masonry Webpage, "CONEXPO-CON/AGG & IFPE 2011 a Huge Success," dated February 10, 2025, available at https://www.masonrymagazine.com/Default?pageID=4818
2027	CONEXPO-CON/AGG Webpage, "CONEXPO-CON/AGG 2026: International Construction Trade Show," dated February 10, 2025, available at https://www.conexpoconagg.com
2028	Gomaco Press Release, "GOMACO Introduces the GP-2400, the New Economical Slipform Paver," dated February 14, 2025, available at https://www.gomaco.com/resources/pressreleases/pressreleases_2400.html
2029	Gomaco Brochure, "New GP3 Slipform Paver" (2016)
2030	Machinery Trader Webpage, "2015 Caterpillar PM-102 for Sale in Seoul, Seoul" dated February 25, 2025, available at https://www.machinerytrader.com/listing/for-sale/237424645/2015-caterpillar-pm-102-wheel-cold-planers-asphalt-equipment

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2031	Spreadsheet – Guntert & Zimmerman Pavers and Swing Leg Sales, FILED UNDER SEAL
2032	Machinio Webpage, “2011 Caterpillar PM 102 in Malsch, Germany,” dated February 25, 2025, available at https://www.machinio.com/listings/96208521-2011-caterpillar-pm-102-in-malsch-germany
2033	Caterpillar Specification Log, “PM102 Cold Planer,” dated 2015
2034	Application No. 15/148,811 – Amendment & Response to Non-Final Office Action, dated January 17, 2017
2035	Guntert & Zimmerman / Miller Formless – Industry Analysis for Fiscal Year 2015, by Lieven Van Broekhoven, dated July 30, 2021, FILED UNDER SEAL
2036	The Global Paving Industry Report by Lieven Van Broekhoven, dated July 30, 2021, FILED UNDER SEAL
2037	Gomaco Brochure, “GT-3200 Trimmer Slipform Paver,” dated 2018
2038	Guntert & Zimmerman Webpage, “S600 Slipform Paver Gallery,” dated February 25, 2025, available at https://www.guntert.com/products/hwyair/s600gallery.html
2039	Guntert & Zimmerman Brochure, “S600 Multi-Purpose Slipform Paver”
2040	Screenshots of Guntert & Zimmerman video, “S600 Slipform Paver: 90 Degree Steering Feature,” available at https://www.youtube.com/watch?v=wEtMOGdBqbl
2041	Guntert & Zimmerman Operating & Maintenance Manual, “S600 Slipform Paver,” FILED UNDER SEAL
2042	Guntert & Zimmerman Brochure, “Construction Profiles,” dated Winter 2017

Exhibit	Description
2043	CON EXPO-CON/AGG Webpage, “5 Questions to Ask When Purchasing a Concrete Paver,” dated February 10, 2025, available at https://www.conexpoconagg.com/news/5-questions-to-ask-when-purchasing-a-concrete-pave
2044	Guntert & Zimmerman Webpage, “Patents,” dated January 22, 2024, available at https://www.guntert.com/patents.html
2045	Gomaco World Brochure, “The New GP3: The World’s Most Intelligent Paver,” Vol. 44, No. 1, dated 2016
2046	Gomaco Webpage, “GP3 Slipform Paver,” dated February 25, 2025, available at https://www.gomaco.com/resources/gp3_paver.html
2047	Intentionally Omitted
2048	Intentionally Omitted
2049	Intentionally Omitted
2050	World Highways Webpage, “Innovations in concrete paving with new technology,” dated June 22, 2016, available at https://www.globalhighways.com/wh4/feature/innovations-concrete-paving-new-technology
2051	Construction Equipment Guide Webpage, “W 250 Heads Lineup of Wirtgen Cold Mills,” dated April 6, 2011, available at https://www.constructionequipmentguide.com/w-250-heads-lineup-of-wirtgen-cold-mills/15954
2052	Construction Week Webpage, “Wirtgen to premier new paving range in Las Vegas,” dated December 19, 2016, available at https://www.constructionweekonline.com/products-services/article-42322-wirtgen-to-premier-new-paving-range-in-las-vegas
2053	Wirtgen Brochure, “Slipform Pavers SP 61i SP 62i SP 64i”

Exhibit	Description
2054	Global Highways Webpage, “Concrete paving for key Interstate link in South Carolina,” dated November 15, 2013, available at https://www.globalhighways.com/wh1/wh4/feature/concrete-paving-key-interstate-link-south-carolina
2055	World Highways Webpage, “Repairing concrete roads using new technology,” dated July 28, 2015, available at https://www.worldhighways.com/wh4/feature/repairing-concrete-roads-using-new-technology

I. INTRODUCTION

G&Z's SmartLeg and AccuSteer technologies, introduced in 2010 on its S600 slipform paver, ushered in a new paradigm in the slipform paving industry. This technology enables a slipform paver operator to reorient the swing legs of a slipform paver while the machine is in motion and its crawler tracks are under load. At the same time, the admittedly novel design simplifies the construction of the jacking columns used in the 30 years leading up to G&Z's invention, eliminating the need for complex and expensive key/keyway arrangements. G&Z's technology received copious industry praise, none more flattering than the fact that the entire industry has now copied G&Z's design. Indeed, the industry's customers have come to view the claimed technology as revolutionary and indispensable because the ability to coordinate simultaneous movements of swing legs and crawler tracks under load and on-the-fly solved a decades-long problem in the industry.

Conventional slipform pavers, such as *CIII* (see Ex. 1005), required workers to unpin, lift up, and manually swing each swing leg and crawler track assembly any time the operator desired a different swing leg position. At all other times, all swing legs would be rigidly pinned in place to prevent the swing leg from moving under load. These orchestrations were so slow and resource-intensive that it could take an entire shift for a team to reconfigure a slipform paver from its paving mode to a transport mode.

Conventional slipform pavers for concrete road construction had fixed connections between the inner tube of a jacking column and the yoke of a crawler track. When rotating a crawler track to a new orientation, the crawler track and inner tube would be rotated together by a torque arm and hydraulic cylinder connected to the inner tube. The concept was carried forward in *Rio's* (see Ex. 1006) design for an asphalt road milling machine, which uses a rotary actuator to turn the inner tube of a jacking column that is fixed to a crawler track via a complex key/keyway system. Both designs suffer from the same fundamental flaws: (1) In order to reposition a swing leg, the crawler track had to be lifted off the ground, and (2) the swing leg had to be secured in place while the machine was in motion.

In contrast, G&Z's design couples one end of a slew drive to the bottom of each jacking column inner tube and the other to the crawler track, such that no part of the jacking column rotates when rotating the crawler track. The claimed design also replaced the conventional turnbuckles, which were used to hold the swing leg stationary under motion, with a hydraulic actuator that coordinates movements of the swing leg with movements of the crawler track under load and on-the-fly. When coupled with its angular position sensors and processor, G&Z found this design capable of reconfiguring the angular orientation of the swing leg in relationship to the modular frame while at the same time keeping its crawler track moving precisely in the desired direction.

The Challenged Claims 1-8 of the '318 Patent (Ex. 1001) are patentable over *CIII* and *Rio*. *Rio*'s swing arm apparatus was unable to accomplish any reconfiguration while the machine was moving under load and relied upon a fixed connection with an anti-rotation collar between the lower tube of the jacking column and the crawler track.

II. OVERVIEW OF THE '318 PATENT AND PRIOR ART

A. G&Z Development Background

Guntert & Zimmerman (G&Z) was founded by Ronald M. Guntert, Sr., in 1942 to provide marine vessels to the US Military during WWII for the war in the Pacific. Ex. 2016 ("Guntert Decl."), ¶ 2. Today, Ronald Jr. is the company's CEO, and Ronald Sr.'s grandson, Rolf Guntert, is the company President and runs the day-to-day operations. *Id.*

In response to the contractors' changing needs (e.g., due to old highways exceeding their design life and needing reconstruction), and the demand for smoother concrete pavements, G&Z embarked on a flurry of innovations between 1996-1999. In 1996, G&Z introduced the S850, a four-track paver with a double telescopic tractor frame, telescopic bolsters, and 90-degree steering capability, which allowed the machine to drive in the transport mode and significantly reduced the time needed to alter the machine's paving width. *Id.*, ¶ 6.

These developments allowed the S850 to be self-loaded on a trailer without first removing the paving kit, which meant that the paver could be transported, unloaded and made ready to pave at another site the next day without the need for a crane. *Id.*, ¶7. And the fact that minor width changes could be implemented quickly represented a huge leap in productivity compared to what was offered on the market. The S850's 90-degree steering capability meant that pavers could be walked and steered onto a trailer and maneuvered around the job site far more quickly than earlier designs, saving time and money. *Id.*

Led by the success of the S850 G&Z to set its sights on addressing the ongoing needs of the urban paving market, which required short pours, frequent width changes and moves, and far more obstacle avoidance capabilities than the relatively straightforward highways and runways that conventional slipform pavers typically paved. *Id.*, ¶8. Early in their design of this future paver, G&Z determined that if they were to meet their new paver design goals, they needed to incorporate swing legs into this design. *Id.*, ¶12.

G&Z thus set out to design slipform paver that was narrower and even more maneuverable than the S850, with the goal of achieving coordinated steering of crawler tracks (to at least 90°) and swing legs while under load. *Id.*, ¶13. G&Z started its development process by looking at the jacking column design and performing 90-degree steering with wide steering angles from any swing leg position

using a steering cylinder and determined the steering cylinder would either run out of stroke, which would require “relocking” the steering cylinder or if they made the steering cylinder long enough, it would compromise their design goal of making the machine narrow profile. *Id.* G&Z also encountered practical limitations when using turnbuckles between the swing legs and the machine frame because they also compromised the design goal of making the machine narrow profile and required manual rebolting of the turnbuckles during machine width changes. *Id.*

G&Z considered using slew drives earlier to steer the crawler track and pivot the swing leg. *Id.*, ¶14. However, they were concerned the slew drive would not be as accurate as steering cylinders and would not be capable of developing sufficient torque to rotate the crawler track or the swing leg and hold them in position under load. *Id.* Furthermore, these slew drives were extremely expensive, and suppliers of slew drives were concerned about the application and the large overturning moments on the swing leg and skidding forces experienced by the crawler tracks. *Id.* Thus, suppliers would not warrant their slew drives if applied in G&Z's designs between the jacking column and crawler track. *Id.*

Later, G&Z spoke with a different supplier who was willing to offer G&Z slew drives for testing purposes. *Id.*, ¶ 15. G&Z mocked up a test for the slew drive on one of the S850 pavers with telescopic bolsters, introduced angular transducers to measure the positions of the jacking columns and crawler tracks, and developed

software to measure the crawler track angle in relationship to the jacking column..

Id. Through this testing, G&Z determined that with the slew drive coupled to the jacking column and crawler track, it could steer the crawler track under load and hold it in a position (despite the huge skidding forces encountered) just as well as a traditional steering cylinder with torque arm. *Id.* G&Z took the risk that the new jacking column design with slew drive would work. It prepared a test under the same loads to prove its application would work even though the slew drive supplier would not warrant the application without weeks of testing in their factory. *Id.*

Feeling more confident their new jacking column design using the slew drive had addressed the design goals of a narrow profile jacking column with wide steering angles including 90-degree steering capability from any swing leg angle, G&Z unexpectedly found a solution to eliminate the turnbuckles between the modular frame and the swing legs by replacing them with hydraulic actuator, and by using an angular transducer to measure the angle of the swing leg relative to the modular frame. *Id.*, ¶16. With these modifications, G&Z observed that it could coordinate actuation / movement of the swing leg and crawler track on-the-fly and while under load while precisely keeping the direction of the crawler track in the intended direction. *Id.* Another unexpected result was that we could use 90-degree steering and the sensed swing leg to reconfigure the machine and walk it into the transport mode. *Id.*

Thus, having designed a system that achieved its original design goals of increased maneuverability *and* the decades-long problem of slow slipform paver reconfiguration, G&Z made the decision to manufacture a slipform paver with slew drives forming the pivot point between the jacking column and crawler track, which enabled on-the-fly steering, including 90-degree steering and tight radius steering, and steering angle maintenance from and between any swing leg angle without any need to lift the crawler tracks. *Id.*

After a year of testing the S600 prototype in the factory, the USA, and Europe, G&Z perfected the control processor and software, G&Z met its design goals and dubbed its coordinated steering technology the SmartLeg / AccuSteer. *Id.*, ¶17. Introduced in the summer of 2010, the S600 was hugely successful, and G&Z's sales and market share grew exponentially. *Id.*, ¶17; Ex. 2014 at 1-2. It was so successful that G&Z added the SmartLeg / AccuSteer technology as an option for its S850 Paver. Guntert Decl., ¶17.

In March 2011, G&Z displayed its S600 with SmartLeg / AccuSteer technology at its booth on the floor of ConExpo Las Vegas, the largest construction equipment tradeshow in the North American market:

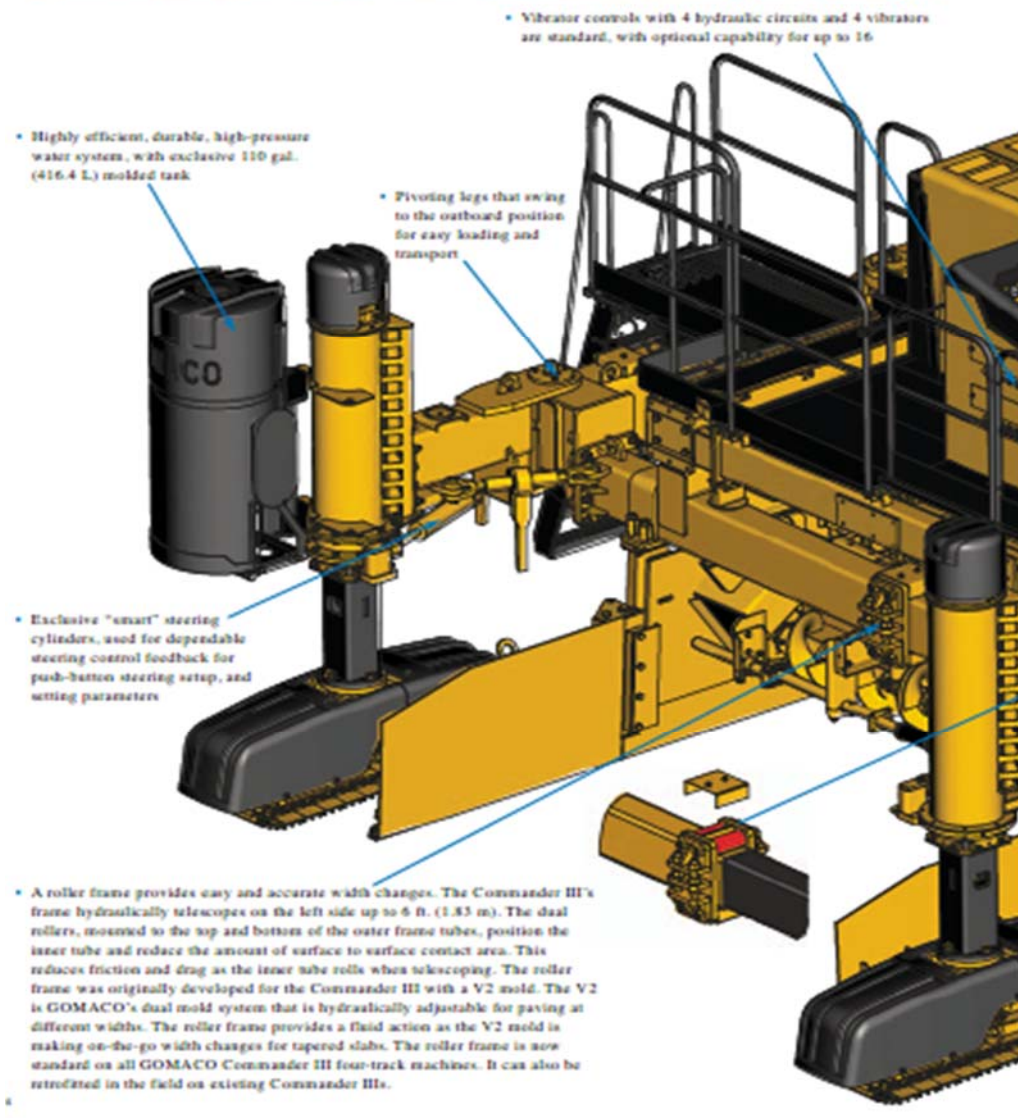


Id., ¶18 (G&Z's S600 with SmartLeg / AccuSteer technology at ConExpo 2011); Ex. 2021 at 12 (showing the S600 on display at ConExpo 2011 in "Booth # 10133"). Shortly after ConExpo in 2011, G&Z delivered its first S850SL with swing legs and slew drives in lieu of steering cylinders and telescopic bolsters used on its previous S850. Guntert Decl., ¶19. In 2015, G&Z introduced its smaller "Entry Level" S400 paver with SmartLeg / AccuSteer. *Id.*, ¶18.

B. CIII (Ex. 1005)

CIII is the operator's manual for Gomaco's CIII (Commander III) machine, which exemplified the conventional slipform paver at the time of the invention. Pet. at 10-20 (citing Ex. 1005, *CIII*).

Commander III Four-Track Paving Package



Ex. 2017 (2008 CIII brochure) at 24-27. To move a swing leg to a new position, it was necessary to “[p]lace adequate blocking or a support under” the leg and “lower the machine frame onto the support system until all weight is removed from the track.” See, e.g., CIII at 75, 80. Only with the leg suspended, its locking pins/bolts removed, and its turnbuckles either removed or manually adjusted, could the “hydraulic pivot cylinder” alter the orientation of the swing leg relative to the frame

of CIII. Petition at 14-15, 19-20; *CIII* at 79. Once the new position is achieved, the operators must reinstall the locking pin to the frame end of the cylinder mount. *CIII* at 80; Ex. 2015 (“Bryden Decl.”), ¶23.

CIII further discloses a hydraulic steering cylinder that attaches to the upper guide tube of the jacking column to rotationally control the crawler track. Petition at 13. This is the same conventional configuration described and distinguished in the '318 Patent, which was considered undesirable because it does “not allow the crawler tracks to be rotated 90° from their normal operating orientation without the time-consuming repining or repositioning of the steering.” '318 Patent, 4:20-36. *CIII*'s “jacking column includes a lower guide tube that telescopes in and out of the upper guide tube to raise or lower the track or frame.” Ex. 1036 (“'749 FWD”) at 65 (referencing *CIII* at 3-17, 5-15, 5-35). The steering cylinder rotates “the track and guide tubes relative to the outer cylinder of the jacking column.” *Id.* (referencing *CIII* at 5-7, 5-35, 8-71–72); *see also* *CIII* at 264-266, 377-378; Bryden Decl., ¶24.

The *CIII* machine's hydraulic steering cylinder is attached to the jacking column and requires manual repositioning and repining of the steering cylinder to the torque arm to approach a 90-degree steering position or maneuver around obstacles. *CIII* at 80; *see also* Ex. 2008 (deposition transcript of Petitioner's expert Dr. Singhose in IPR2020-01698, IPR2021-00136 (“Singhose 2021 Tr.”) at 18:18-19:7, 15:21-17:7 (describing the “physical limits” of the jacking column steering

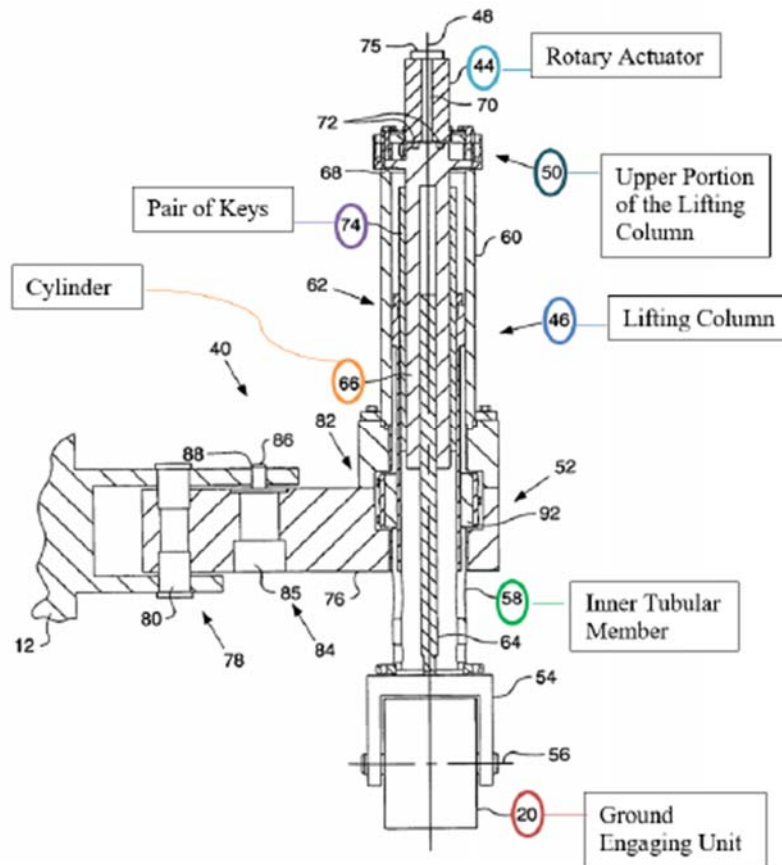
cylinder configuration); *id.* at 28:21-29:2. In other words, the *CIII* machine cannot quickly and easily reposition its crawler tracks to offset changes in the positioning of the swing leg. Instead, these tasks require that the operator stop the *CIII* machine and manually repin and reposition the swing leg and hydraulic steering cylinder for each track, individually, which can take up to a full shift. *CIII* at 80; Singhose 2021 Tr. at 12:15-13:21 (testifying that this whole process is “quite extensive” and may take as long as a day to set up); Bryden Decl., ¶25.

The '318 Patent eliminates the *CIII* machine's extensive repositioning process by describing and claiming a slipform paver that can reposition its swing legs and crawler tracks without coming to a stop and individually lifting each crawler track before repining the swing leg. These improvements over the *CIII* and other conventional slipform pavers are made possible using a crawler track rotatably coupled to the jacking column with a slew drive for causing rotation of the crawler track relative to the slew drive. '318 Patent, 6:66-7:28; *id.* at Claim 1; Bryden Decl., ¶26.

C. *Rio* (Ex. 1006)

Ex. 1006 (“*Rio*”) discloses an asphalt road-milling machine with two different actuators for moving a swing leg and crawler track. First actuator 42, is “adapted to move the one ground engaging unit 20 between the projecting position (see FIG. 4) and the retracted position (see FIG. 3) relative to the frame 12.” *Rio*, Abstract; *id.* at

4:38-44; *id.* at 5:11-24. Second actuator 44 is “connected to the lifting column 46 and is adapted to cause at least a portion of the lifting column 46 to rotate about a lifting column axis 48” *Id.* at 4:56-60.



Rio, FIG. 2 (annotated); Bryden Decl., ¶27.

In the preferred embodiment, *Rio* discloses placing a rotary actuator 44 at the upper portion 50 of the lifting column, so that it is spaced apart from other mechanical devices. *Id.* at 5:11-16 (“Such spaced apart positioning avoids problems caused by an accumulation of mechanical devices at a single location on the lifting column 46.”); *id.* at 5:54-6:6. And while *Rio* contemplates locating the rotary

actuator “along the lifting column axis,” it does not contemplate any arrangement that fails to “cause at least a portion of the lifting column 46 to rotate about a lifting column axis.” *Id.* at 4:56-60, 5:8-11. Despite the considerable differences between concrete slipform pavers and asphalt road milling machines, the similarities and shared deficiencies of *CIII* and *Rio* are striking. Bryden Decl., ¶28.

Like *CIII*, *Rio* discloses a *fixed connection* between the inner tube of the jacking column and the crawler track and does not teach or suggest any embodiments with rotary coupling between the jacking column and crawler track, let alone one implemented via a slew drive. *Id.* at 5:25-38. Also, like *CIII*, *Rio* requires the operator to stop the machine and raise the lifting column (46) to lift the ground-engaging unit from the ground before repositioning the swing leg between the retracted or projecting positions. *See, e.g., Rio* at 3:10-22, 6:43-53, 7:62-8:59. And like *CIII*, *Rio*'s design requires the swing leg to be locked in place while the machine is in motion in either the retracted or projecting positions. *Id.* at 6:27-37 (disclosing an anti-swing device that engages with a pair of receptacles 88 in the machine frame to lock the swing arm 76); Bryden Decl., ¶29.

Moreover, *Rio*'s limited retracted and projecting positions prevent its swing leg from changing orientation by up to 180 degrees relative to the module frame. *Id.* at 6:38-41 (anti-rotate device 90 includes a collar 92 connected with collar keys 94 to the inner tubular member 58, causing the collar to rotate with the inner tubular

member in response to the second actuator); *id.* at 6:43-55 (anti-rotate actuator 98 is connected to the machine frame and engageable with the collar receptacles 96 of the collar 92 to permit locking the inner tubular member and ground engaging unit when steering is not desired); Bryden Decl., ¶30. Thus, *Rio* is unable to achieve reorientation of its swing arm and ground engaging unit from the two provided retracted and projected positions unless the machine is stopped, the ground engaging unit is supported off the ground, and the keys 74, anti-swing device 84, and anti-rotate device 90 with the anti-rotate actuator 98 are all manually disengaged and then reengaged prior to resuming operation. Bryden Decl., ¶31.

Rio was filed in 2005, published in 2006, issued April 28, 2009, and is assigned to Caterpillar Paving Products, Inc. (“CAT”). *Rio*, Cover. *Rio* describes its invention as relating to an asphalt road planer or milling machine. *Id.*, 1:5-7. From at least 2007, CAT produced a series of road milling machines, including the PM102 Cold Planer (“PM102”). Ex. 2018 at 1-16 (the PM102 Cold Planer information guide, copyrighted 2007); Bryden Decl., ¶32.

The PM102 includes a machine frame supported by tracks and pivots its right rear track from a projecting position, outside of the machine frame, to a retracted position that is housed within the frame. *Rio*, 3:43-56;



Ex. 2020 at 1. PM102's processor controls the “steering angle of the **right rear track**” based upon “the position of the front tracks.” Ex. 2018 at 10 (emphasis added). The PM102 uses a “single-piece swing-arm design” to automatically pivot its lifting column and track, only while the track is lifted off of the ground:

Flush Cutting Feature

Full flush cutting operation with hydraulic control of the right rear leg allows the PM102 to be used up close to a curb, wall or guard rail.



Leg in the full-out position.



Leg in the swing-in position.



Leg in the full-in position.

Flush cutting. The right rear leg can be swung in within the machine's cutting width for full flush cutting applications. With the right rear leg swung in, the machine can cut close to a wall, barrier or other vertical obstruction.

Exclusive Caterpillar single-piece swing-arm design.

The swing-in arm mechanism ensures increased rigidity eliminating excessive wear for increased component life.

Automatic control. The rear leg swing-in system is automatic and controlled from the operator's station. The operator is not required to leave the seat while positioning the right rear leg within the machine's cutting width.

Ex. 2018 at 10. The right rear track steering uses a conventional steering cylinder connected near the lower end of the inner tube of the lifting column, not the rotary actuator:



Ex. 2018 at 7; *see also* <https://www.youtube.com/watch?v=VETLvoi9oYM> (2009 video for the PM102); Ex. 2023 (PM102 from 2011 showing same conventional features as information manual); Bryden Decl., ¶33.

A POSITA would have also discovered that the implementation of a rotary actuator atop the lifting column for PM102 was used when steering the machine while outfitted with wheels, not tracks. Ex. 2030 (PM102 from 2015 showing rotary actuator atop a lifting column connected to wheels); Ex. 2032 (PM 102 from 2011 showing rotary actuator atop a lifting column connected to wheels). Thus, a POSITA upon reviewing *Rio* and observing PM102 would conclude that its rotary actuator was not capable of steering crawler tracks. *C.f.* Ex. 2018 at 16 (2007 copyright) *with* Ex. 2033 at 16 (2015 copyright); Bryden Decl., ¶34.

D. *Smolders* (Ex. 1021)

Smolders discloses a paving machine that utilizes a traditional jacking column and steering cylinder design. *Smolders*, 6:35-41; see also *id.*, 6:15-34 (describing the steering gear mechanism 32 and how it attaches to the lifting column). This design attempts to extend the stroke of the steering cylinder to allow slightly steeper steering angles needed for tight radius curb paving, but it has no provision for 90-degree steering, and does not need a transport mode because the machine is narrow enough to fit on a standard trailer. *Smolders* also discloses that its “front truck assemblies 14 are articulated” by “pivoting device 17.” *Smolders*, 5:13-20, FIG. 1; Bryden Decl., ¶35.

III. LEVEL OF ORDINARY SKILL IN THE ART

G&Z applies Petitioner's definition of a person of ordinary skill in the art (“POSITA” or skilled artisan), as one who “would have had a four-year degree in mechanical engineering or a closely related field and at least two years of experience designing, developing, or operating heavy machinery, including their components and control systems.” Pet. at 8-9. “Additional experience could substitute for a formal degree, and an advanced degree could substitute for experience.” *Id.*

IV. CLAIM CONSTRUCTION

A. “A swing leg assembly configured to be coupled to a paving machine configured to move in a paving direction . . .”

The term “[a] swing leg assembly configured to be coupled to a paving machine configured to move in a paving direction . . .” should be construed consistent with the plain meaning of its words, which requires a paving machine with a swing leg assembly moving in a paving direction with its crawler tracks on the ground and under load, while laying and finishing concrete in a form. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (“The construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction”) (citation omitted); Bryden Decl., ¶36.

In the context of the ’318 Patent, the preamble is limiting because it “is necessary to give life, meaning, and vitality to the claim,” and limits the claimed invention to the on-the-fly embodiment. *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (internal quotations and citation omitted); Ex. 1036 at 38-40 (the Board recognized that the “on-the-fly” embodiment is where the crawler track is rotated when in contact with the ground).

The phrase “configured to move in a paving direction...” is essential to breathe life into the limitations in the claim body because it clarifies that the limitations are conducted while the machine is moving in the paving direction.

Accordingly, for example, the processor recited in Claim 1 must be read to receive and send the claimed signals to coordinate movements of the swing leg and crawler track when moving and under load. This interpretation of the claims is fully consistent with the corresponding disclosure of this embodiment in the specification:

Onboard computer or processor 82 and the associated transducers 70, 78 form a feedback loop in which the computer receives the angular position signal from swing leg transducer 78.

* * *

The onboard computer then signals by how much worm gear drive 60 must rotationally adjust the orientation of yoke 62 and crawler tracks 16 to again align the crawler tracks with the paving direction. This process is repeated each time the angular position of the swing leg is changed, or when for other reasons the angular orientation of the crawler tracks becomes misaligned from the desired **paving direction** of the machine.

Thus, the above-described **feedback loop automatically adjusts the angular orientation of the crawler tracks so that the tracks remain oriented in the travel direction without any need to stop operation of the machine** or manually adjust the orientation of the tracks and/or the swing legs.

'318 Patent, 12:43-13:2 (emphasis added), Claim 1; *see also id.* at 11:54-57 ("Providing the slew gear with two oppositely arranged worm drives increases the

power available to rotate the crawler track while a portion of the total machine load is carried by it.”); Bryden Decl., ¶37.

In using the closed feedback loop in conjunction with the slew drive, the paving machine is allowed to remain underload and moving while simultaneously changing the angular orientation of the swing leg and crawler track on-the-fly. Bryden Decl., ¶38; ’318 Patent, 15:63-16:14;

An onboard computer or other processor receives the outputs from the transducers and generates a signal to pivot the crawler track relative to the associated jacking column to keep the crawler tracks oriented in the paving direction when the angular orientation of the swing leg changes, and also keeps all the crawler tracks’ orientations synchronized. ***Thus, no matter what the swing leg angle is, the crawler track stays straight ahead in the paving direction and position.***

Id. at 6:23-31 (emphasis added);

A closed loop feedback system that connects the hydraulic actuator for the swing leg, the rotary power drive for the crawler, and the onboard computer always maintains the swing leg angle at a fixed, preset angle. If the swing leg migrates away from a preset angle, the swing leg hydraulic cylinder is actuated to maintain the preset angle and at the same time the necessary adjustments to the crawler track orientation are made with the hydraulic rotary power drive or steering cylinder.

Id. at 6:41-49 (emphasis added);

Thus, the *crawler track positions can be relocated when the machine is walked forward or backward while the crawler tracks at all times stay in their straight-ahead normal operating orientation* and position without requiring any manual mechanical or electronic adjustments.

Id. at 6:53-57 (emphasis added); Ex. 1036 at 38-40 (recognizing the “on-the-fly” embodiment is where the crawler track is rotated when in contact with the ground). In the context of the intrinsic evidence, “on-the-fly” machine operation requires steering of the swing leg and/or crawler track when moving and under load.

The term “paving direction” also breathes life into the meaning of Claim 4’s “transport position,” which is different than the paving configuration and which is reached via on-the-fly coordinated steering of the crawler tracks and swing legs under load:

Working in conjunction with the swing leg position transducer, and after unpinning the swing leg hydraulic cylinder from the swing leg, the rotary actuators allow the machine to be preprogrammed to first turn the crawler tracks relative to the jacking columns normal to the paving direction, and then walk the crawler tracks on the ground in an arc around the pivot shaft of the swing legs into their outboard transport position (in which the crawlers are oriented 90°, i.e. substantially transverse to the paving direction) so that the paving machine can be sufficiently narrowed for moving it over ordinary highways to a new paving site with a legal or otherwise approved transport width dimension, or, for maneuvering the paving machine around a paving site which is tightly confined.

'318 Patent, 7:9-22; *id.* at 13:22-14:7 (describing the process for placing the machine into transport position “[w]ith the crawlers resting on the ground” and “walking [them] in an arc around the pivot shaft of the swing leg”); *id.* at FIGS. 8A-E; Bryden Decl., ¶39.

It is “well-settled . . . that a claim preamble has the import that the claim as a whole suggests . . . when the claim drafter chooses to use *both* the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects.” *Bell Commc’ns Research, Inc. v. Vitalink Commc’ns Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995) (citations omitted). Thus, by claiming a paving machine configured to move in a paving direction, and then claiming the components, orientations, and processing of signals required to steer the swing legs and crawler tracks under load, it is clear that the drafter chose to claim the on-the-fly embodiment.

G&Z successfully made the same argument when distinguishing the claims of a related application from the prior art. In its Response to Non-Final Office Action for Application No. 15/148,811 (“’811 App.”), G&Z distinguished a similarly claimed invention from the prior art, which disclosed a steering collar that needed to be rebolted every time a change was made stating, “[s]uch immovable-during use bolted/pinned structures . . . required to reposition jacking columns of such a paving machine is in part what the presently-claimed invention specifically overcomes.”

Ex. 2034, Response to Non-Final Office Action at 8-9 (October 17, 2016); *Catalina Mktg.*, 289 F.3d at 808 (“[C]lear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention.”) (citation omitted).

Notably, the preamble in '811 App. tracks the preamble in the '318 Patent:

'811 App.	'318 Patent
A paving machine configured to move in a paving direction for spreading, leveling and finishing concrete into a form having a generally upwardly exposed, finished concrete surface and terminating in lateral concrete sides, the paving machine comprising:	A swing leg assembly configured to be coupled to a paving machine configured to move in a paving direction for spreading, leveling, and finishing concrete into a form having a generally upwardly exposed, finished concrete surface and terminating in lateral concrete sides, the swing arm assembly comprising:

'318 Patent at Claim 1; Ex. 2034, '811 App, Amendments to the Claims at 2. Thus, G&Z's reliance upon the claimed invention's maneuverability during use to distinguish prior art shows that “a paving machine configured to move in a paving direction” limits the invention to instances when the machine is in use.

Finally, the preamble is limiting because several limitations in Claim 1's body “rely upon and derive antecedent basis from the preamble.” *Pacing Techs., LLC v. Garmin Int'l, Inc.*, 778 F.3d 1021, 1024 (Fed. Cir. 2015) (quoting *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003)). Claim 1's preamble

recites “a paving machine,” which provides antecedent basis for the same element in the body of the claim. *See, e.g.,* ’318 Patent, Claim 1. That the paving machine is required to be configured in such a way that it moves in a paving direction provides the frame work for which the claim is understood. *Eli Lilly & Co. v. Teva Pharm. Int’l GmbH*, 8 F.4th 1331, 1341 (Fed. Cir. 2021) (a term stating an intended use in a preamble can be limiting where it provides antecedent basis for that term); *On Demand Mach. Corp. v. Ingram Indus., Inc.*, 442 F.3d 1331, 1343 (Fed. Cir. 2006) (“[T]he preamble in this case necessarily limits the claims, in that it states the framework of the invention.”); *In re Fought*, 941 F.3d 1175, 1178 (Fed. Cir. 2019) (“We have repeatedly held a preamble limiting when it serves as antecedent basis for a term appearing in the body of a claim.”) (citations omitted). Indeed, this is necessary when determining the change in the swing leg assembly orientation when positioned in transport orientation in Claim 4.

B. “a crawler track rotatably coupled to the jacking column” and “a slew drive coupled to the jacking column and the crawler track, wherein the slew drive is configured to cause rotation of the crawler track relative to the jacking column”

The term “a crawler track rotatably coupled to the jacking column, wherein the crawler track is configured to rotate about a second axis to a second angular orientation relative to the jacking column” should be construed to mean that one side of the slew drive is coupled to the jacking column, one side of the slew drive is

coupled to the crawler track, and neither cylinder of the jacking column rotates along with the crawler track. *Phillips*, 415 F.3d at 1316; Bryden Decl., ¶40.

Unlike the '749 Patent, the '318 Patent's express claim language requires a slew drive that rotatably couples the crawler track to the jacking column and rotates the crawler track relative to the entire jacking column:

1. A swing leg assembly . . . comprising:

* * *

a crawler track rotatably coupled to the jacking column, wherein the crawler track is configured to rotate about a second axis to a second angular orientation *relative to the jacking column*;

a slew drive coupled to the jacking column and the crawler track, wherein the slew drive is configured to cause rotation of the crawler track *relative to the jacking column*

'318 Patent, Claim 1 (emphasis added). This language does not recite causing the crawler track to rotate relative to *a portion* of the jacking column. Bryden Decl., ¶41.

This plain language reading of the claims is entirely consistent with every embodiment of the invention disclosed in the '318 Patent, which describes coupling a slew drive to the bottom of a rotationally-fixed jacking column, such that the crawler track rotates relative to the entire jacking column. *Id.*, Abstract (“A slew drive coupled to the jacking column and crawler track rotates the crawler track relative to the jacking column between multiple angular orientations.”), 8:65-9:1

(“The crawlers are mounted to the lower ends of the jacking columns, and they are rotatable relative to the jacking columns about vertical axes . . .”), 11:65-67 (“Supports 74 extend across opening 69 and secure the can with transducer 70 at the rotational center between the jacking column and the yoke.”), 12:6-9 (“a signal that indicates the angular position of yoke 62 relative to jacking column 14 and any changes in the angular position due to rotational movements of the yoke”), 12:56-60 (“The onboard computer then signals by how much worm gear drive 60 must rotationally adjust the orientation of yoke 62 and crawler tracks 16 to again align the crawler tracks with the paving direction.”); 13:25-30 (“With the crawlers resting on the ground and initially facing in the paving direction 18, they are rotated 90° about the vertical jacking column axis with worm gear drive 60 into a position in which they are substantially transverse to the paving direction.”); Bryden Decl., ¶42.

Thus, a person of ordinary skill in the art applying the plain and ordinary meaning for these limitations would construe it to exclude arrangements where a rotary actuator turns either cylinder of the jacking column along with the crawler track. Bryden Decl., ¶43.

V. GROUND 1: THE CLAIMED INVENTION IS PATENTABLE OVER THE *CIII* and *RIO*

A. *CIII* in View of *Rio* Does Not Disclose a Processor That Coordinates the Movement of a Swing Leg and Crawler Track While Moving in a Paving Direction

The Challenged Claims are patentable because the combination of *CIII* and *Rio* does not disclose—and is not alleged to disclose—a processor that performs the claimed operations while the paver is moving in a paving direction. See Section V.A, *supra*; Pet. at 52-59 (describing operations that occur only when the crawler track is lifted off of the ground); Bryden Decl., ¶44.

Petitioner's obviousness arguments expressly depend on the premise that the '318 Patent's claims are not limited to the "on-the-fly" steering embodiment. See Pet. at 9-10. But rather than construe the claims of *this* patent, Petitioner suggests that the Board's '749 FWD resolves this issue. See *id.* at 10 ("Should Patent Owner again attempt to limit the claims to require on-the-fly steering, the Board should reject this argument for the same reasons as before—the claims lack any such requirement."). Petitioner is wrong because unlike in the '749 Patent, the Challenged Claims *do* recite "such [a] requirement." *Id.*; see also Section IV.A, *supra*.

There is, therefore, no basis for the Board to apply collateral estoppel from the '749 FWD in its efforts to correctly construe the Challenged Claims in this case because the issues presented are not identical. See *Google LLC v. Hammond Dev.*

Int'l, Inc., 54 F.4th 1377, 1381 (Fed. Cir. 2022) (collateral estoppel requires identical issues of patentability) (citing *Ohio Willow Wood Co. v. Alps S., LLC*, 735 F.3d 1333, 1342 (Fed. Cir. 2013)). Unlike the '318 Patent, Claim 1 of the '749 Patent contained no requirement that the processor emit a control signal to move the crawler track in response to changes in the swing leg orientation while *moving in a paving direction*. Accordingly, not only does collateral estoppel *not* apply, the Claims of the '318 Patent *are* limited to the “embodiment where the crawler track is rotated when the track is in contact with the ground.” Pet. at 9; Ex. 1036 ('749 FWD) at 35-40; Bryden Decl., ¶45.

Indeed, the claims are further limited to an embodiment where the crawler track is rotated *responsive to changes in the orientation of the swing leg* while the paver is moving in a paving direction:

a processor configured to . . .

in response to determining the change of the first angular orientation,¹
determine a target second angular orientation² based on the

¹ The first angular orientation is the orientation of the swing leg “relative to the paving machine.” Ex. 1001 at Claim 1.

² The second angular orientation is the orientation of the crawler track “relative to the jacking column.” Ex. 1001 at Claim 1.

determined change of the first angular orientation and the second angular orientation based on the second signal; and

send a control signal to the slew drive in order to ***cause the second angular orientation of the crawler track to rotate to the target second angular orientation.***

See '318 Patent at Claim 1 (emphasis added); Bryden Decl., ¶46.

CIII and *Rio* both expressly prohibit moving their swing legs under load or while in motion and include locking mechanisms to ensure that such movement cannot occur. See *CIII* at 80 (“To swing the assembly to the left from any position, remove the locking pin from the frame end of the mount and move the swing control switch to extend the swing cylinder, swinging the leg to the left, until the locking pin can be inserted in the desired position.”); see also *Rio*, 6:27-37 (disclosing an anti-swing device that engages with a pair of receptacles 88 in the machine frame to lock the swing arm 76 when the asphalt milling machine is in motion); Bryden Decl., ¶47.

For at least the foregoing reasons, Patent Owner respectfully requests that the Board confirm the patentability of the Challenged Claims over *CIII* in view of *Rio*. Bryden Decl., ¶48.

B. *CIII* in View of *Rio* Does Not Render Obvious “a crawler track rotatably coupled to the jacking column” or “a slew drive coupled to the jacking column and the crawler track . . . configured to cause rotation of the crawler track relative to the jacking column”

The Challenged Claims are also patentable because neither *CIII* nor *Rio* discloses a crawler track rotatably coupled to a jacking column, and Petitioner's argument for combining *CIII* and *Rio* such that *CIII*'s crawler track would rotate with respect to the entirety of its jacking column is the product of impermissible hindsight. Bryden Decl., ¶49.

Collateral estoppel from the '749 FWD does not bar any of the following arguments for several reasons. First, the language of the '318 Patent is materially different from that of the '749 Patent, so the issues presented are not identical. *C.R. Bard, Inc. v. Medline Indus., Inc.*, No. IPR2019-00035, Paper 102 at 54 (P.T.A.B. Nov. 23, 2022) (“The material differences in the claims, alone, and thus the issues previously decided, precludes a finding of collateral estoppel.”); *see also TQ Delta, LLC v. 2Wire, Inc.*, No. 13-1835-RGA, 2021 WL 2671296, at *5-6 (D. Del. June 29, 2021) (finding explanation of how the additional limitations alter the invalidity analysis overcomes collateral estoppel). For example, whereas the '318 Patent requires coupling a slew drive to a jacking column and crawler track to implement the claimed rotatable coupling, the '749 Patent merely required a rotary actuator physically between the jacking column and crawler track, without any requirement

that it be coupled to, or provide a rotatable connection between those elements. Ex. 1036 ('749 FWD) at 68-79; Bryden Decl., ¶50.

Moreover, Patent Owner's arguments depend at least in part on a claim construction argument that the Board declined to decide in the '749 FWD. *See id.* at 36-37 (declining to consider whether the claims of the '749 Patent required the crawler track to rotate with respect to the entire jacking column). Collateral estoppel does not attach to any issues that were not decided in the earlier action. *Google*, 54 F.4th at 1381 (stating the factors necessary for collateral estoppel to apply) (citing *In re Freeman*, 30 F.3d 1459, 1465 (Fed. Cir. 1994)).

Still further, many of the Board's earlier determinations regarding how and why a POSITA would have combined *CIII* and *Rio* depended on construing the claims to encompass embodiments where the swing leg and crawler track were moved with the track off the ground. That reasoning would not apply in this case because the Challenged Claims *are* limited to the on-the-fly steering embodiments, meaning again that the issues presented in this case are not identical, and collateral estoppel cannot resolve them. "[C]ollateral estoppel requires that the issues of patentability be identical." *Google*, 54 F.4th at 1381 (citation omitted).

Further, while the Federal Circuit affirmed the '749 FWD, it did so in a Rule 36 Judgment, which means that collateral estoppel *only* attaches to those determinations that were "implicitly or explicitly decided on appeal." *TecSec, Inc.*

v. Int'l Bus. Machs. Corp., 731 F. 3d 1336, 1341-42 (Fed. Cir. 2013). Because the '749 FWD applied a broad construction of the purportedly similar limitations (requiring only that the actuator be located physically between the jacking column and crawler track), the disclosure of Ex. 1008 ("*Miller*")—which discloses a rotary actuator physically between a jacking column and crawler track, but which is not coupled to the jacking column—was relevant to the claims of the '749 Patent in a way that it is not relevant to the claims of the '318 Patent.

1. Neither *CIII* nor *Rio* Expressly Discloses “a crawler track rotatably coupled to the jacking column”

Neither *CIII* nor *Rio* discloses a swing leg assembly with a crawler track rotatably coupled to an entire jacking column. Instead, *CIII* and *Rio* both disclose assemblies where the inner tube of the jacking column rotates along with the crawler track. *CIII* at 378 (“On 4-track capable machines, the track yoke is bolted to the base plate of the inner guide tube.”); *Rio* at 5:32-6:6 (discussing the rotation of the inner tubular member 58 using a key and keyway arrangement to permit sliding between it and the outer cylinder 66); *see also* Ex. 1036 ('749 FWD) at 11-12, 77 (determining that *Rio* discloses a complex jacking column with an internal “key and keyway arrangement” controlling the rotation of the “inner tubular member” of its lifting column that “is connected to the bracket 54” which “may be a simple axial wheel support . . . or may support a track section.”); Bryden Decl., ¶51.

The jacking column of the '318 Patent similarly includes inner and outer tubes. '318 Patent at 11:20-39. However, unlike the fixed connections between the inner cylinders and crawler tracks disclosed in *CIII* and *Rio*, the claimed crawler track is rotatably coupled to the jacking column in its entirety. Construing the claims to encompass rotation of the inner tube along with the crawler track would be inconsistent with the claim's requirement that only the crawler track must rotate relative to the jacking column. See Section IV.B, *supra*. Accordingly, as Dr. Singhose acknowledged on cross-examination, *Rio* does not expressly disclose a crawler track rotatably coupled to a jacking column. Ex. 2012 ("Singhose Tr. Day II") 18:3-18; 30:12-25; Bryden Decl., ¶52.

2. Neither *CIII* nor *Rio* Expressly Discloses a Slew Drive Coupled to a Jacking Column and a Crawler Track

Nor do *CIII* and *Rio* disclose coupling a slew drive to ***a jacking column and a crawler track***, such that that crawler track rotates with respect to the entire jacking column. *CIII* admittedly does not disclose a slew drive. Pet. at 13-14. And *Rio* is clear that its second rotary actuator turns the milling machine's crawler track by rotating the portion of the jacking column that is fixedly coupled to the crawler track:

The second actuator 44 is connected to the lifting column 46 and is ***adapted to cause at least a portion of the lifting column 46 to rotate about a lifting column axis 48*** that is oriented generally vertically relative to the work machine 12.

Rio, 4:56-60 (emphasis added); *id.* at 5:32-61 (The rotary actuator “causes the cylinder 66 to rotate as the cylinder flange 68 slides on the outer tubular member 60” of the lifting column). “The cylinder 66 is engaged with the inner tubular member 58 by a pair of keys 74” and the corresponding key and keyway prevents relative rotational movement between the crawler track, inner tubular member 58, and cylinder 66. *Id.* at 5:63-6:6; Bryden Decl., ¶53.

Rio does not describe *any* embodiments in which its second rotary actuator does not “cause at least a portion of the lifting column 46 to rotate about a lifting column axis 48.” Therefore, *Rio* fails to reasonably suggest coupling a slew drive to a jacking column and a crawler track such that the crawler track rotates with respect to both cylinders of the jacking column. Bryden Decl., ¶54.

3. Petitioner's Proposed Combination of *Rio* and *CIII* is the Product of Impermissible Hindsight

Petitioner's proposal to “modify each of *CIII*'s swing-leg assemblies by positioning *Rio*'s rotary actuator 44 between the jacking column and crawler track, and using that rotary actuator to rotate *CIII*'s crawler track relative to the entire jacking column, rather than just its outer cylinder,” is the product of impermissible hindsight. Pet. at 45.

a) *The “State-of-the-Art” References are Not “State-of-the-Art” and Do Not Establish That it Was Well Known to Rotatably Couple a Crawler Track to a Jacking Column*

Because neither *CIII* nor *Rio* teaches or suggests modifying their fixed crawler track/jacking column couplings with rotatable couplings, Petitioner cites several “state-of-the-art” references for the proposition that “this design was well known.” Pet. at 45. However, **none** of the many “state-of-the-art” references cited in the Petition—most of which are many decades old—disclose or even fairly suggest rotatably coupling a crawler track to a jacking column. Certainly, none establishes that such couplings were “well known” or would have provided the many benefits that customers in the slipform paving industry can no longer live without. See Section VIII; Bryden Decl., ¶56.

Miller does nothing to cure *CIII* and *Rio*’s deficiencies because its steering housing 122 is not a slew drive and is not coupled to the jacking column and crawler track, as claimed. *Miller*’s steering housing 122 is connected to the walking beam of the machine’s frame, not the jacking column. See *Miller* at 5:21-26 (describing that the “extendable support member” attaches to bogey-mount 66, 68 not “steering housing 122”), 6:8-13 (“A steering spindle is provided at the ends of each walking beam. Thus, as previously described, the walking beam 64 has the steering spindles or housings 122 at its ends”); Bryden Decl., ¶57.

Littman's prime mover is far afield from the concrete slipform paver disclosed in the '318 Patent and fails to disclose a slew drive between a jacking column and a crawler track. See Ex. 1007 ("*Littman*"), 1:11-27; Ex. 2011 (Singhose Tr. Day I) at 152:1-153:12 (stating that *Littman*'s use in road construction would be similar to a forklift). Rather than being coupled to a jacking column and crawler track, *Littman*'s rotary actuator is located fully within the telescoping second section 70 that Petitioner likens to a jacking column. *Littman*, FIGS. 4, 5. Indeed, rather than disclose the type of upright jacking columns found in the '318 Patent, *Littman*'s elongated legs articulate at angles during operation and, as such, its wheels are subject to an entirely different set of forces than those seen in the claimed slipform paver in the '318 Patent. *Littman*, FIG. 2; Bryden Decl., ¶58.

Whitaker's supporting means 26 (which Petitioner likens to the claimed jacking column) has rectangular upper telescopic sections and a round lower end 28 that is fixedly coupled to the crawler track and ring gear 31. Ex. 1011 at ("*Whitaker*") FIG. 3. Motor 32 is mounted on the lower end of the support shaft 26 and rotates lower section 28 in conjunction with its crawler track. *Id.* Accordingly, like *CIII* and *Rio*, *Whitaker* discloses rotating the crawler track along with a portion of the jacking column. Thus, *Whitaker* also does not establish that it "was well known" to rotate a crawler track relative to an entire jacking column, let alone doing so with a slew drive coupled to the jacking column and crawler track such that the

crawler track rotates relative to the entire jacking column. Pet. at 45; Bryden Decl., ¶59.

Ex. 1009 (“*Johns*”) also fails to establish that it was “well known” to place a slew drive physically between a jacking column and crawler track because *Johns*’ “mobile work platform” lacks a swing leg assembly and jacking column. It is also not comparable in size or weight to a conventional large concrete slipform paver. *Johns*, FIG. 2; Ex. 2012 (Singhose Tr. Day II) at 25:12-21. It also turns wheels, which are much easier to turn than crawler tracks. Bryden Decl., ¶60.

Finally, Ex. 1021 (“*Smolders*”) is directed to a paving machine that discloses a steering design that relies upon the fixed connection between its lifting column and crawler track to rotate the lower portion of the lifting column when steering. *Smolders*, 6:35-41 (“two diametrically opposite groove-guided blocks 67 arranged in a groove on the inner periphery of Steering ring 66 while projecting radially inwardly and engaging corresponding longitudinal grooves 65 of the lower portion 9 of lifting column 10”); *see also id.* at 6:15-34 (describing the steering gear mechanism 32 and how it attaches to the lifting column); Bryden Decl., ¶61.

Neither *CIII* nor *Rio* teaches or suggests rotatably coupling a crawler track to a jacking column with a slew drive, and far from confirming that the claimed design was well known, the “state-of-the-art” reference disclose several ways to turn a wheel or a crawler track with a rotary actuator that ***do not*** involve (1) rotating the

crawler track with respect to an entire jacking column or (2) coupling a slew drive to a crawler track and jacking column to cause such rotational movement. Bryden Decl., ¶62. “Without any explanation as to how or why the references would be combined to arrive at the claimed invention, we are left with only hindsight bias that *KSR* warns against.” *Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1367 (Fed. Cir. 2017) (citation omitted).

b) Petitioner's Proposed Combination Merely Retraces the Inventor's Steps With the Benefit of Hindsight

Lacking evidence that the claimed arrangement was known, let alone “well known” in the art, Petitioner’s proposal to rotatably couple *CIII*’s crawler track to its jacking column with Rio’s rotary actuator simply retraces the path the inventor took to achieve the claimed invention. *See Otsuka Pharm. Co. v. Sandoz, Inc.*, 678 F.3d 1280, 1296 (Fed. Cir. 2012) (“The inventor’s own path itself never leads to a conclusion of obviousness; that is hindsight. What matters is the path that the person of ordinary skill in the art would have followed, as evidenced by the pertinent prior art.”) (citations omitted); Bryden Decl., ¶63. Dr. Singhose tells a just-so story about all of the modifications a POSITA would have found *obvious* at the time of the invention without showing that the claimed arrangement of components was known or even likely to produce the considerable benefits that caused the entire industry to copy the design. Ex. 1002 (“Singhose Decl.”), ¶¶ 56-81, 87-92.

Petitioner perversely asserts that the benefits of G&Z's invention, including the relative simplicity G&Z's jacking column design compared to prior art designs, provided *a priori* motivation for the modification. See Pet. at 27-35. The opposite is true. *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570 (Fed. Cir. 1996) (“[S]implicity does not establish obviousness; indeed, simplicity may represent a significant and unobvious advance over the complexity of prior devices.”). Petitioner's recognition that the simplicity of G&Z's design is an “advance over the complexity of prior devices” like *CIII* and *Rio* is evidence that the claims are *patentable*, not evidence that they are obvious. *Id.*

As in *Sensonics*, “the references discussed . . . do not . . . lead one of ordinary skill in the art to the invention in suit.” *Id.* *CIII*, *Rio*, *Miller*, *Littman*, *Whittaker*, and *Johns* **all** fail to disclose a crawler track that rotates with respect to a jacking column or a slew drive coupled to a jacking column and crawler track that causes such rotation. “To draw on hindsight knowledge of the patented invention, when the prior art does not contain or suggest that knowledge, is to use the invention as a template for its own reconstruction—an illogical and inappropriate process by which to determine patentability.” *Id.* (citation omitted).

In fact, Petitioner would have the Board believe that the proposed combination was *obvious* at the time of the invention even in view of the “considerable elapsed time” between when the *Miller* reference first contemplated

using rotary actuators to turn a track (albeit *without* providing a rotary connection between a jacking column and crawler track) and the time of the claimed invention. *See Leo Pharm. Prods., Ltd. v. Rea*, 726 F.3d 1346, 1356-57 (Fed. Cir. 2013) (finding that decades of elapsed time between the alleged prior art and the claimed invention evince that the claimed invention was not obvious and that the analysis was tainted by hindsight); *Littman*, Cover (patent issued in 1985); *Miller*, Cover (patent issued in 1977). Thus, while rotary actuators may have been used on construction machines as early as 1977, none were arranged as part of the claimed swing leg assemblies in the '318 Patent until 2010, when G&Z released its S600 with SmartLeg / AccuSteer technology.

That no one attempted to implement a rotary connection with a slew drive coupled to a jacking column and a crawler track in the 34 years between *Miller* and the date of the invention “suggests instead that [Petitioner] only traverses the obstacles to this inventive enterprise with a resort to hindsight.” *Leo Pharm.*, 726 F.3d at 1356.

c) *A POSITA Would Not Have Expected a Reasonable Expectation of Success in Modifying CIII with Rio*

When considering whether it would have been obvious to apply *Rio*'s teachings to *CIII*, a POSITA would look to evidence of how well the design operated in the real world as part of the routine engineering process. *Bryden Decl.*, ¶64. In doing so, they would have discovered that the machines implementing one or more

aspects of *Rio*'s teachings only had one swing leg, and it had to be lifted off the ground when relocating the track. *Supra* at §III.B.1; *see also e.g.*, Ex. 2018 at 1-2; Ex. 2011 (Singhose Tr. Day I) at 81:16-83:3.

Furthermore, a POSITA would have noticed that in asphalt milling machines that included crawler tracks, those machines used conventional steering cylinders, not rotary actuators. *Supra* at §II.C; Bryden Decl., ¶65. Because of the similarities in weight and the forces required to rotate the crawler tracks in *CIII* and *Rio*, a POSITA would not have expected success in a design where the rotation of the crawler track was not performed by rotating at least the lower portion of the jacking column as well. Bryden Decl., ¶65. Dr. Singhose acknowledged that due to the weight of the machines and the extra friction, crawler tracks require more torque to rotate than wheels, especially on unprepared, uneven, or loose ground. Ex. 2011 (Singhose Tr. Day I) at 70:8-73:17; 114:10-24; 144:18-145:11.

The only physical machine the Petition and Dr. Singhose attempt to extract knowledge from is Gomaco's own GT-3200, which was a fraction of the size of *CIII* and *Rio*. Ex. 1010 at 8 (weight is 13,000-16,000 lbs.); Ex. 2010 (Klein Tr.) at 36:16-18 ([REDACTED] Ex. 2037 (GT-3200 Brochure) at 4. Thus, a POSITA around the time of filing, would have been aware of the physical implementation of *Rio* and understood the limitations of its rotary actuator design in smaller paving machines, such that they would not have

been motivated to implement the modifications proposed in the Petition on the larger CIII, absent hindsight. Bryden Decl., ¶66.

VI. GROUND 2: THE CLAIMED INVENTION IS PATENTABLE OVER THE CIII-RIO-SMOLDERS COMBINATION

Petitioner does not allege that *Smolders* cures any of the deficiencies noted above with respect to Independent Claim 1. Accordingly, Claims 2-7 are patentable for at least the same reasons as Independent Claim 1. Bryden Decl., ¶67.

VII. THE OBJECTIVE EVIDENCE CONFIRMS PATENTABILITY OVER THE CIII-RIO COMBINATIONS

The objective indicia evidence demonstrates that the Challenged Claims are not obvious in view of *CIII* and *Rio*. Objective evidence “is often be the most probative and cogent evidence in the record.” *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012) (internal quotations and citation omitted). Objective indicia “guard against slipping into use of hindsight.” *Graham v. John Deere Co.*, 383 U.S. 1, 36 (1966) (citation omitted).

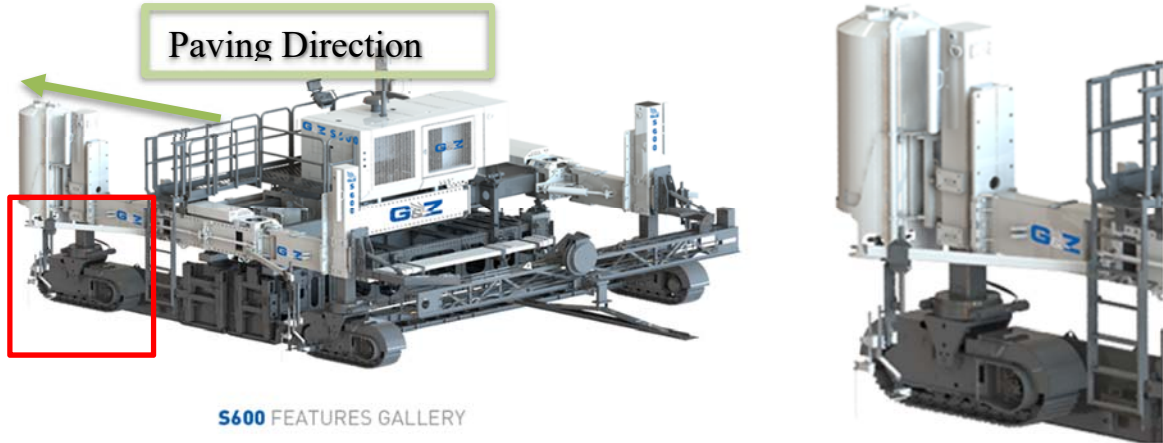
A. A Nexus Exists Because the Objective Indicia Evidence is the Direct Result of the Unique Characteristics of the Claimed Invention, Practiced by G&Z's Paving Machines

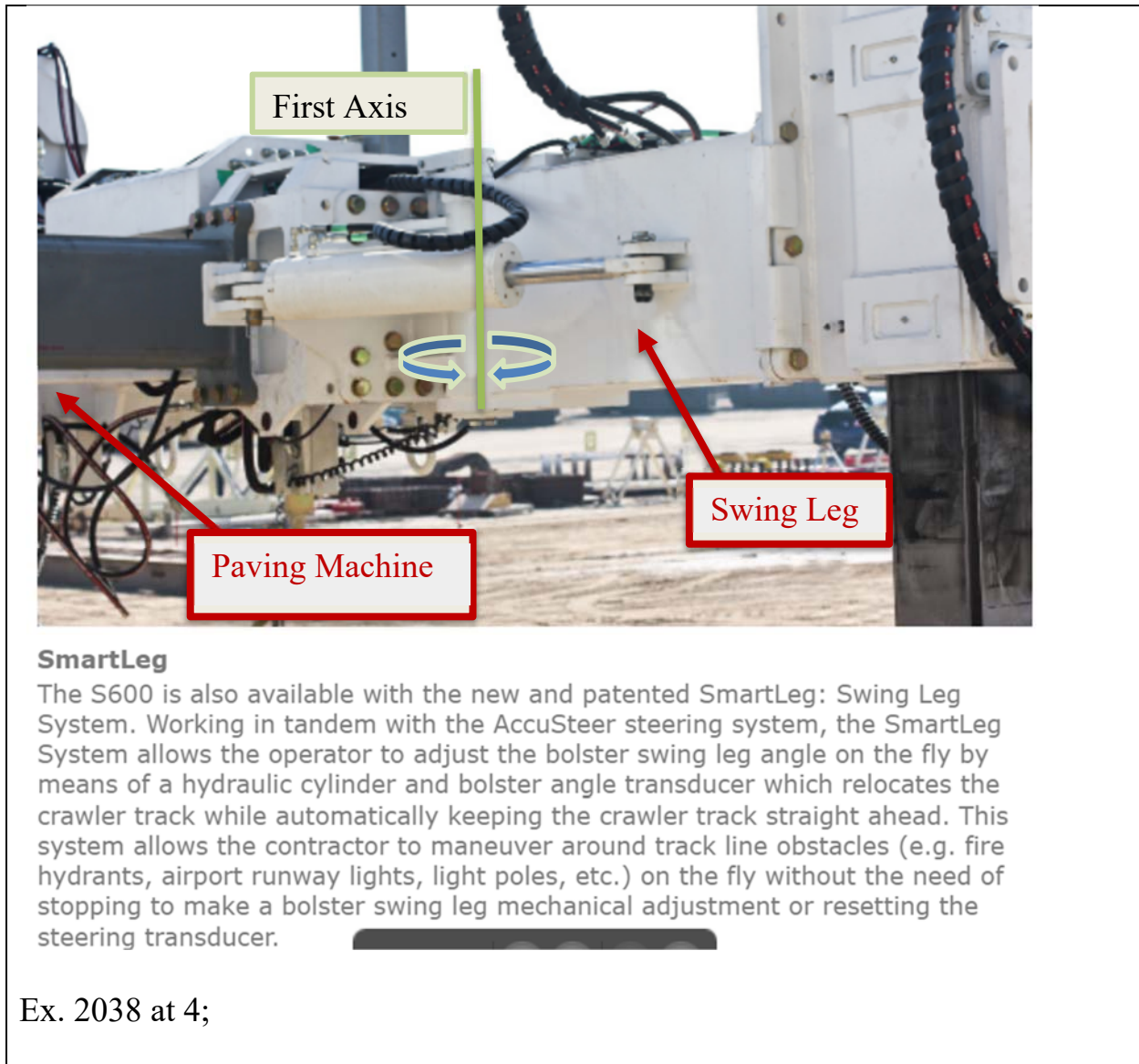
A nexus must exist between the objective factor and “the merits of the claimed invention.” *Transocean Offshore Deepwater Drilling*, 699 F.3d at 1350 (citation omitted). Nexus is not drawn to a unique claim element; it relates to the claimed invention as a whole. *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1331-32 (Fed. Cir.

2016) (quoting *Rambus Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013) (further citations omitted)).

“The patent owner is . . . afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the ‘direct result of the unique characteristics of the claimed invention.’” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373-74 (Fed. Cir. 2019) (quoting *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996)); see also *Volvo Penta of the Ams., LLC v. Brunswick Corp.*, 81 F.4th 1202, 1211 (Fed. Cir. 2023) (a nexus, independent of the presumption, was demonstrated between the claims and objective indicia of nonobviousness through evidence of commercial success and copying due to the unique features of the claimed invention).

Here G&Z is nexus is shown, at the very least, through the S600's implementation of unique characteristics of the claimed invention's swing leg, slew drive, sensors, and processor features enabling its SmartLeg / AccuSteer Technology, as shown below. Bryden Decl., ¶69.

'318 Patent, Claim [1Pre]	
	
Ex. 2038 at 1 (https://www.guntert.com/products/hwyair/s600gallery.html)	
'318 Patent, Claim [1A]	a swing leg configured to be coupled to the paving machine, and configured to pivot about a first axis to a first angular orientation relative to the paving machine;



SMARTLEG SWING LEG SYSTEM



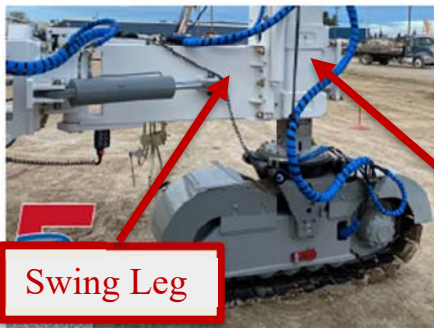
▲
The SmartLeg system in tandem with AccuSteer allows the swing leg angle to be adjusted on-the-fly to maneuver around an obstacle while automatically keeping the crawler track straight ahead.

Ex. 2019 at 4; Ex. 2039 at 5.

'318 Patent, Claim [1B]

a jacking column coupled to the swing leg;

SMARTLEG SWING LEG SYSTEM



Swing Leg

Jacking Column

▲
The SmartLeg system in tandem with AccuSteer allows the swing leg angle to be adjusted on-the-fly to maneuver around an obstacle while automatically keeping the crawler track straight ahead.

Ex. 2019 at 4.

'318 Patent, Claim [1C]

a crawler track rotatably coupled to the jacking column, wherein the crawler track is configured to rotate about a second axis to a second angular orientation relative to the jacking column;



AccuSteer

As an option, the S600 can be equipped with the patented AccuSteer: Slew Drive Track Control System. The AccuSteer system uses slew drives which are mounted on top of the crawler track yokes to steer the tracks in lieu of conventional steering cylinders. They eliminate the need to repin steering cylinders and reset the steering transducer when changing the swing leg/crawler track position. The AccuSteer slew drives are powered with dual hydraulic motor driven hourglass worm gears giving enormous power and gear life to the gearbox. The AccuSteer system allows the operator to independently rotate each crawler track 320 degrees providing unparalleled paver maneuverability on site, rapid swing leg relocation for paving and transport, and speeds width change. This option includes the required heavier duty jacking columns and reinforced track yokes. These jacking columns have 42" (1.1m) of hydraulic lift and 36" (915mm) of mechanical bolting adjustment.

Ex. 2038 at 3;

ACCUSTEER SLEW DRIVE TRACK CONTROL

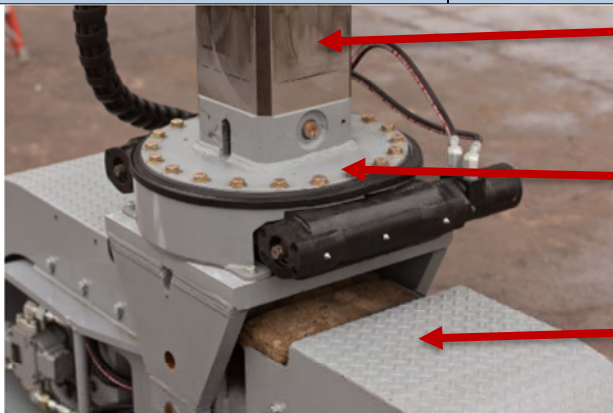


▲
The AccuSteer system offers unparalleled maneuverability and accuracy allowing synchronized steering in 90 degree mode in every swing leg position.

Ex. 2019 at 4; Ex. 2039 at 4.

'318 Patent, Claim 1: [1D]

a slew drive coupled to the jacking column and the crawler track, wherein the slew drive is configured to cause rotation of the crawler track relative to the jacking column;



Jacking Column

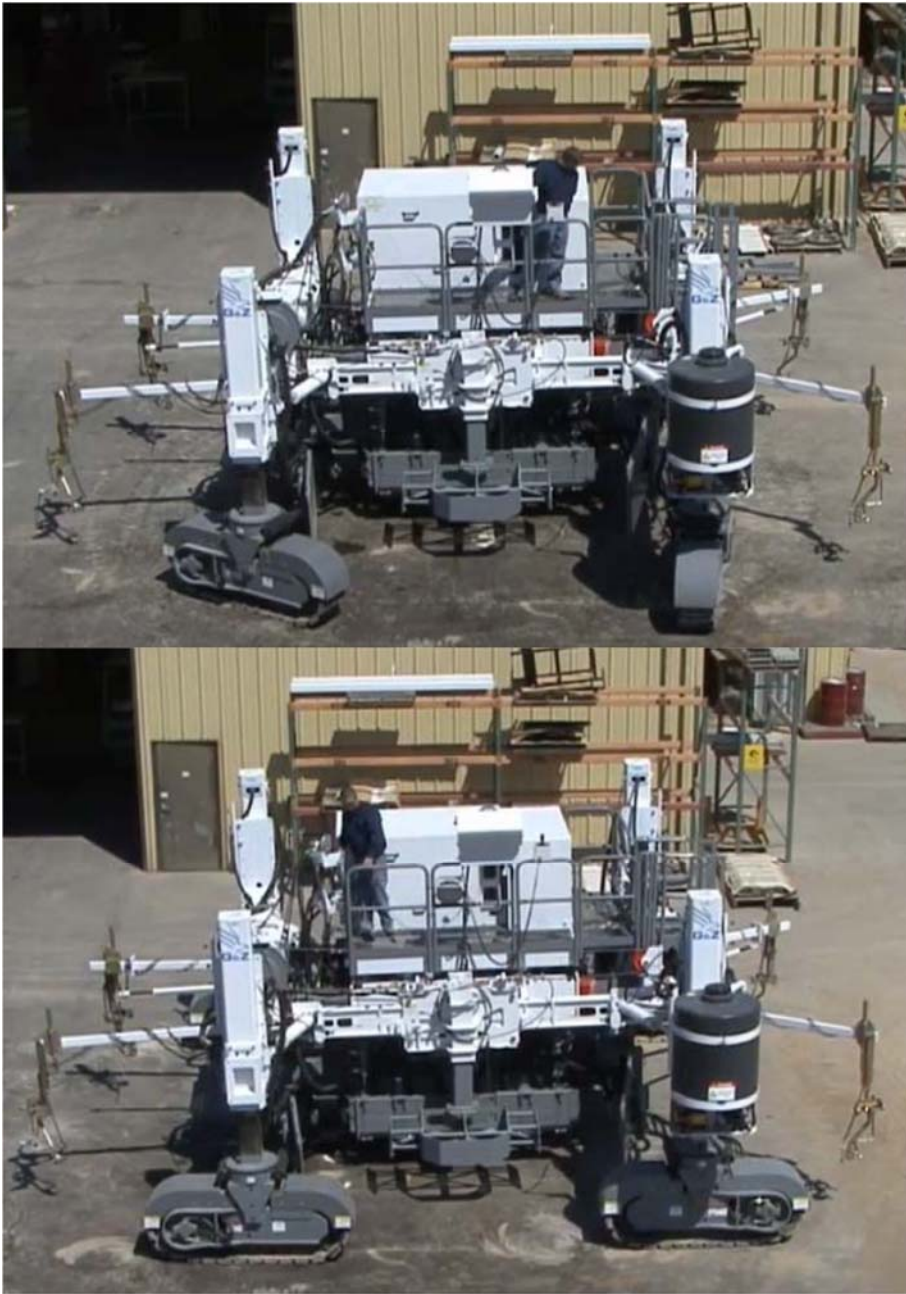
Slew Drive

Crawler Track

AccuSteer

As an option, the S600 can be equipped with the patented AccuSteer: Slew Drive Track Control System. The AccuSteer system uses slew drives which are mounted on top of the crawler track yokes to steer the tracks in lieu of conventional steering cylinders. They eliminate the need to repin steering cylinders and reset the steering transducer when changing the swing leg/crawler track position. The AccuSteer slew drives are powered with dual hydraulic motor driven hourglass worm gears giving enormous power and gear life to the gearbox. The AccuSteer system allows the operator to independently rotate each crawler track 320 degrees providing unparalleled paver maneuverability on site, rapid swing leg relocation for paving and transport, and speeds width change. This option includes the required heavier duty jacking columns and reinforced track yokes. These jacking columns have 42" (1.1m) of hydraulic lift and 36" (915mm) of mechanical bolting adjustment.

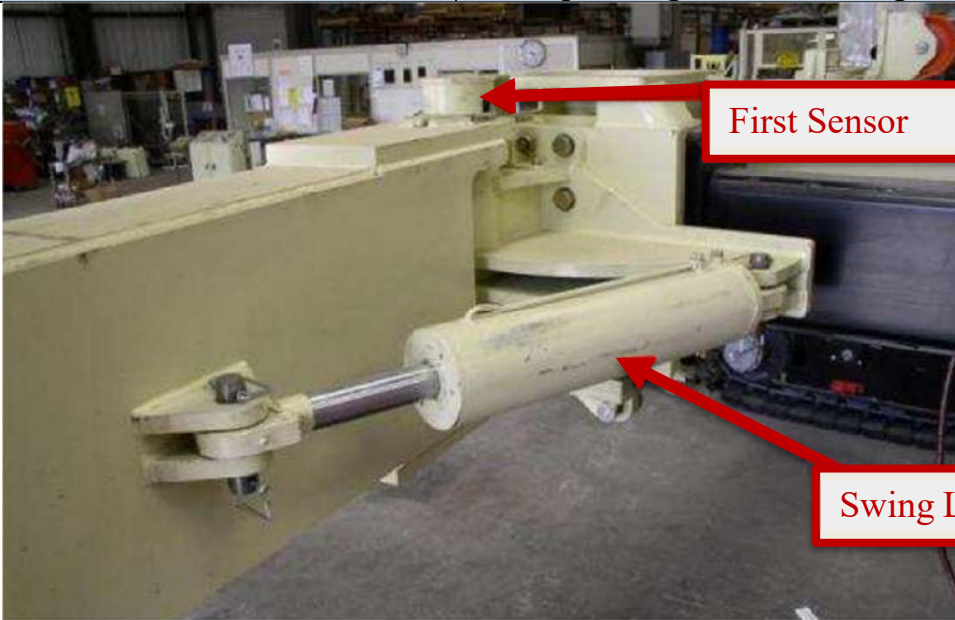
Ex. 2038 at 3; *id.* at 7 (showing 90-degree steering of crawler tracks using the slew drive); Ex. 2019 - G&Z S600 at 4; Ex. 2039 at 4;



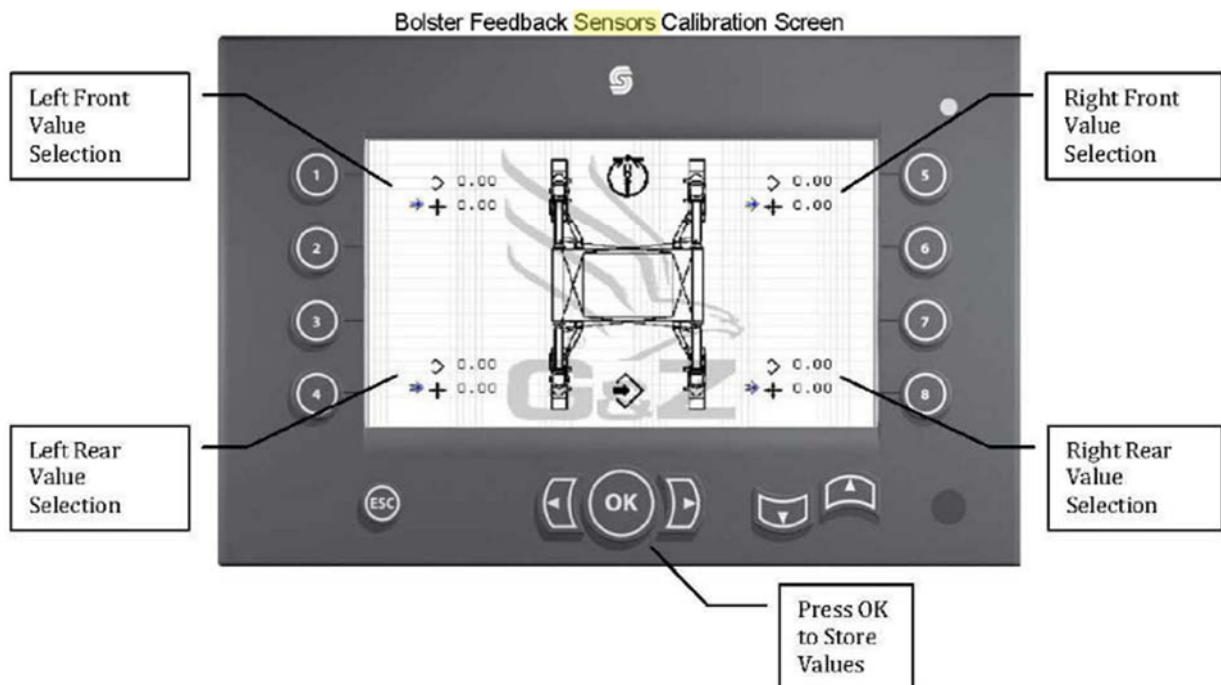
Ex. 2040 – S600 Slipform Paver (showing the S600's slew drive causing rotation of the crawler tracks relative to the jacking column).

'318 Patent, Claim 1: [1E]

a first sensor configured to emit a first signal corresponding to the first angular orientation;

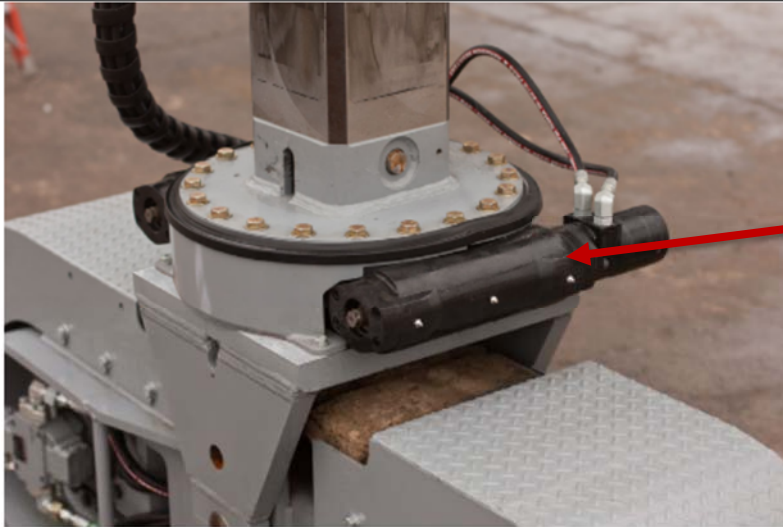


See above image of S600 SmartLeg sensor and cylinder;



Ex. 2041 (S600 operating manual) at 34 (showing S600's processor receiving signals from its SmartLeg sensor;

'318 Patent, Claim 1: [1F]	a second sensor configured to emit a second signal corresponding to the second angular orientation; and
-----------------------------------	---



Slew Drive with
Steering Sensor

AccuSteer

As an option, the S600 can be equipped with the patented AccuSteer: Slew Drive Track Control System. The AccuSteer system uses slew drives which are mounted on top of the crawler track yokes to steer the tracks in lieu of conventional steering cylinders. They eliminate the need to repin steering cylinders and reset the steering transducer when changing the swing leg/crawler track position. The AccuSteer slew drives are powered with dual hydraulic motor driven hourglass worm gears giving enormous power and gear life to the gearbox. The AccuSteer system allows the operator to independently rotate each crawler track 320 degrees providing unparalleled paver maneuverability on site, rapid swing leg relocation for paving and transport, and speeds width change. This option includes the required heavier duty jacking columns and reinforced track yokes. These jacking columns have 42" (1.1m) of hydraulic lift and 36" (915mm) of mechanical bolting adjustment.

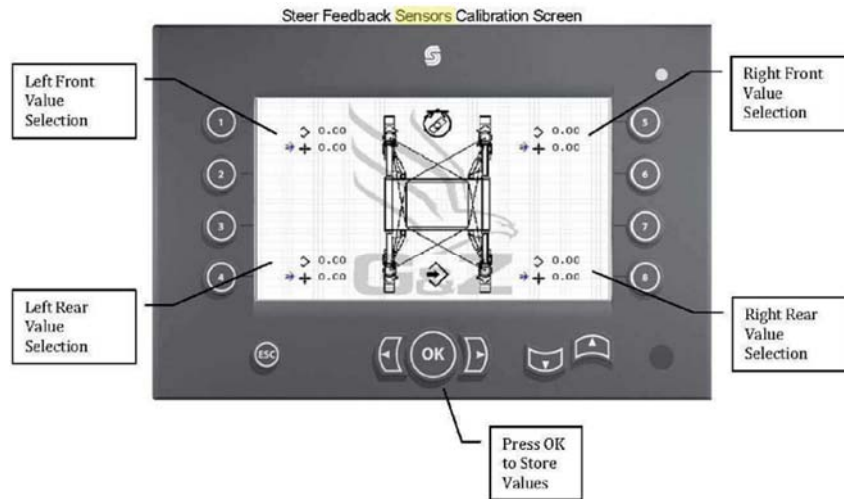
Ex. 2038 at 3;

ACCUSTEER SLEW DRIVE TRACK CONTROL



▲
The AccuSteer system offers unparalleled maneuverability and accuracy allowing synchronized steering in 90 degree mode in every swing leg position.

Ex. 2019 at 4; Ex. 2039 at 4;



Ex. 2041 at 33 (showing S600's processor receiving signals from its steering sensor).

'318 Patent, Claim [1G]

a processor configured to:
receive the first signal from the first sensor, and
the second signal from the second sensor;

determine a change of the first angular orientation
based on the first signal;

in response to determining the change of the first
angular orientation, determine a target second
angular
orientation based on the determined change of the
first angular orientation and the second angular
orientation based on the second signal; and

send a control signal to the slew drive in order to
cause the second angular orientation of the
crawler track to rotate to the target second
angular orientation.



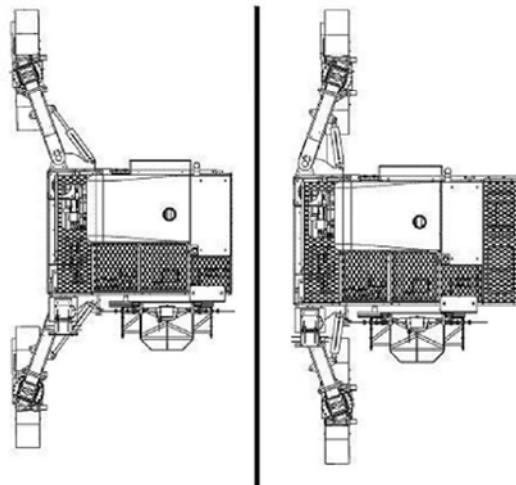
Operator Controls

G&Z Next Generation Plus 1 Operator Control System incorporates user friendly operator features and state of the art networked controllers allowing extensive monitoring and diagnostic capability including remote diagnostics. The Operator Console features intuitively organized switches which are labeled with standard ISO symbols making this a durable, easy to use, multi-lingual user interface.

Ex. 2038 at 5; Ex. 2019 – G&Z S600 at 4 (showing reconfiguration of the crawler track based upon changes in the angular orientation of the swing leg while moving underload); Ex. 2021 at 7 (describing how the S600 uses its AccuSteer and SmartLeg systems in tandem to “adjust the swing leg angle on the fly while automatically keeping the track straight ahead.”);

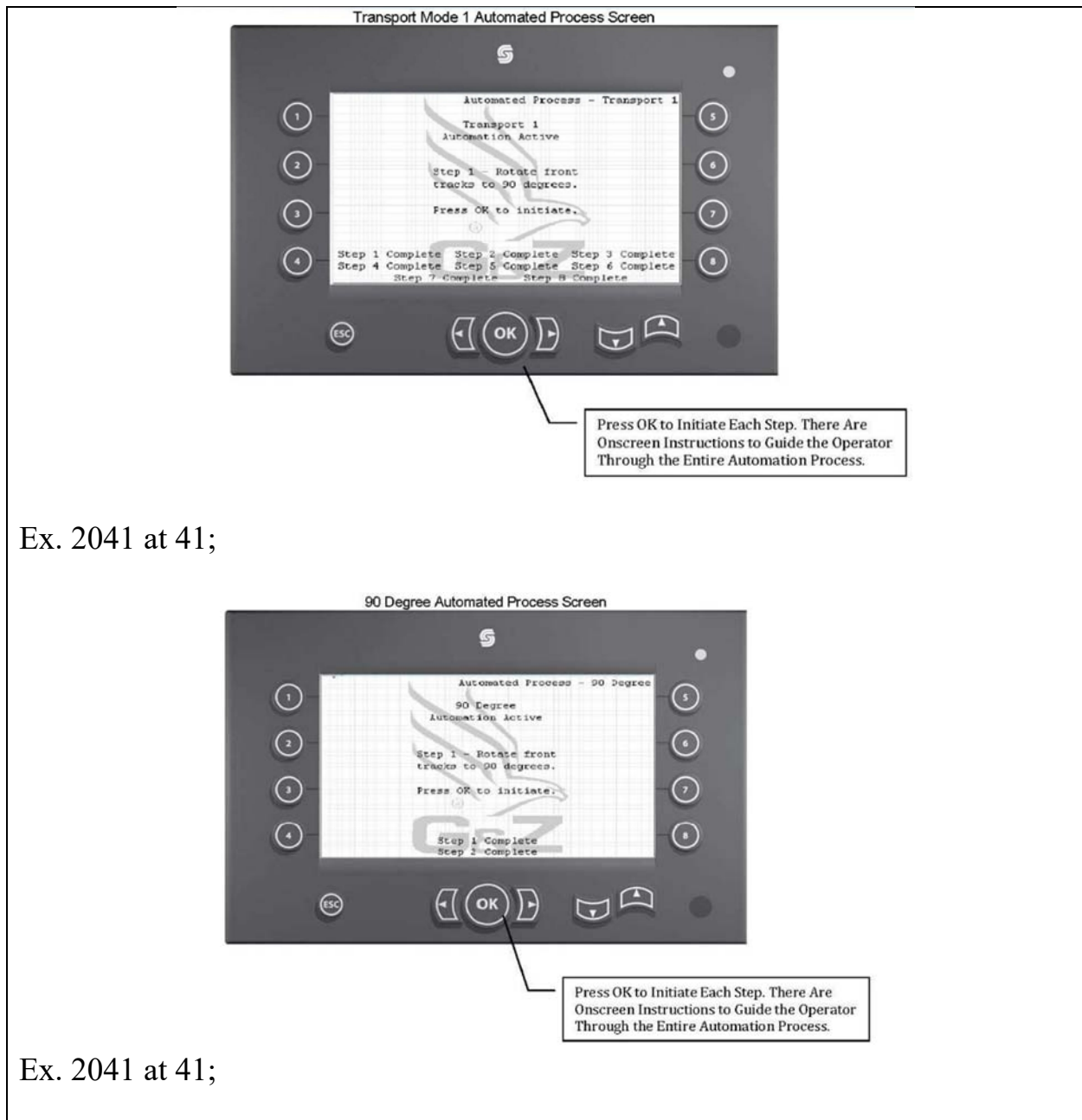
HYDRAULIC SWINGLEG SYSTEM

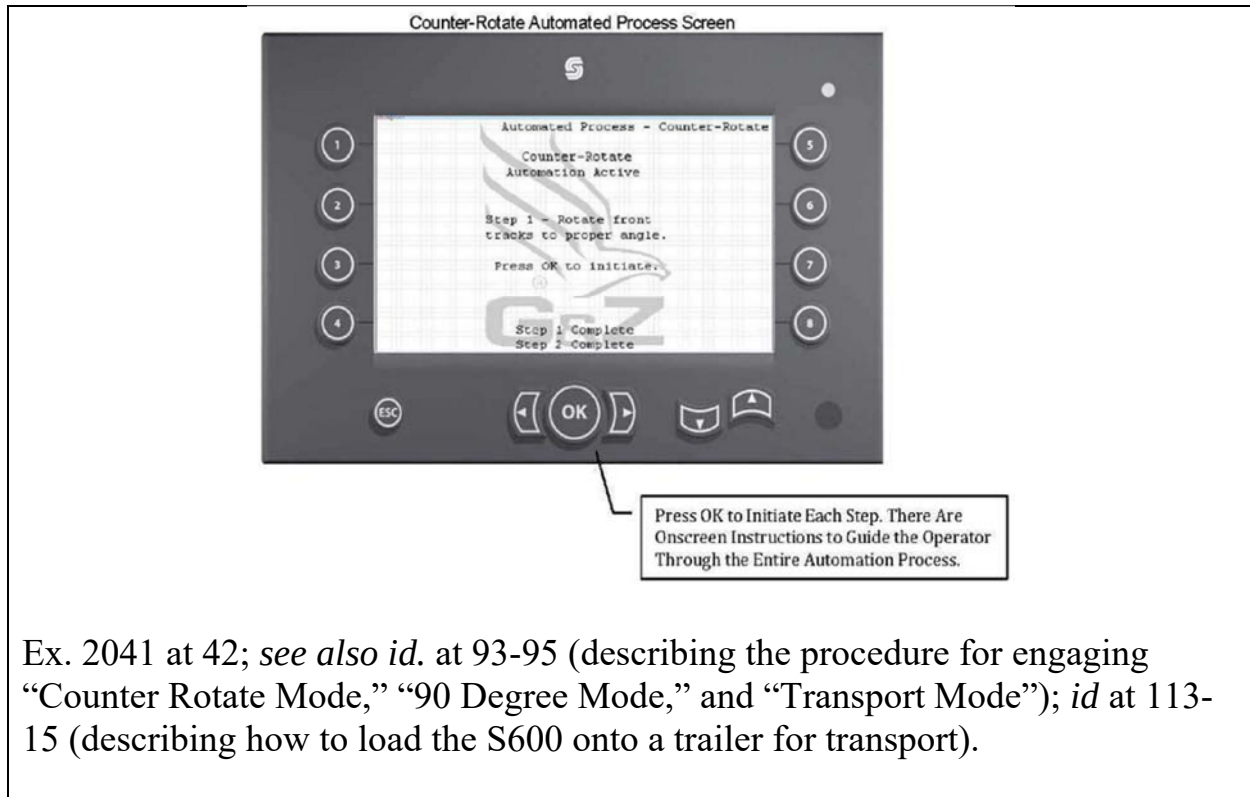
As an option, the Hydraulic SwingLeg system is used in lieu of the standard adjustable turnbuckles. Working in tandem with the crawler track slew drives, the SmartLeg system allows the operator to adjust the bolster swing leg angle on the fly by means of a hydraulic cylinder and a bolster angle transducer, which relocates the crawler track while keeping the crawler track pointing straight ahead. This allows contractors to maneuver around track line obstacles on the fly without need of stopping to make a mechanical adjustment and re-calibrating the **sensor** transducer.



Inboard/Outboard Positions

Ex. 2041 at 77;





Ex. 2041 at 42; *see also id.* at 93-95 (describing the procedure for engaging “Counter Rotate Mode,” “90 Degree Mode,” and “Transport Mode”); *id* at 113-15 (describing how to load the S600 onto a trailer for transport).

B. G&Z’s SmartLeg/AccuSteer Technology Resolved a Decade Long Need For Repositioning the Swing Leg/Crawler Track When Moving and Under Load

G&Z’s claimed swing leg assembly solution, as embodied on S600, solved the long-felt industry need for a slipform paver with greater maneuverability as the limited mobility of conventional slipform pavers was also manually intensive, costly, and prohibitive. Bryden Decl., ¶70. Such “[e]vidence of a long felt but unresolved need tends to show non-obviousness because it is reasonable to infer that the need would have not persisted had the solution been obvious.” *WBIP*, 829 F.3d at 1332 (citation omitted).

In the early 2000s, contractors began requesting a slipform paver that could maneuver in the tight confines of urban and airport worksites, as the industry began moving towards more jobs centered on repairing roads rather than originally laying them down on undeveloped ground where space was not limited and maintaining traffic was not an issue. Bryden Decl., ¶71; Ex. 2022 (“Greenwood Decl.”) at ¶¶ 3, 5.

Conventional slipform pavers did not have the maneuverability to accomplish the jobs on these sites demanded in either a cost or time-efficient manner. Bryden Decl., ¶72; Guntert Decl., ¶¶ 4-5; Greenwood Decl., ¶¶ 3-4. This was because an operator had to stop the slipform paver and raise the crawler track off the ground, manually unpin the turnbuckles on each swing leg, reposition each leg, then repin and attach the turnbuckles to the swing leg, unpin and detach the jacking column hydraulic steering cylinder, then reattach the hydraulic steering cylinder, reposition each crawler track, and recalibrate the steering sensors, before finally lowering the crawler track to the ground so the machine can begin working again in the paving direction. Guntert Decl., ¶5; Bryden Decl., ¶72. These manual adjustments were due to the conventional design, as each swing leg had a turnbuckle(s) or locking pins, and an upright jacking column with a steering cylinder located on it. *Id.*

The swing leg's turnbuckle(s) or locking pins locked the jacking column and crawler track into position and any necessary change in configuration that was needed to move around the job site, avoid obstacles, or pave in a narrow profile required a time-consuming manual process that could take up to half a day. Guntert Decl., ¶¶4-5; Greenwood Decl., ¶¶ 3-4. Further, the hydraulic steering cylinder had to be manually repined to relocate the crawler track, and it offered only limited crawler track steering angles, making quick adjustments nearly impossible. Greenwood Decl., ¶¶ 3-4; Bryden Decl., ¶73.

Given these drawbacks for the conventional slipform paver design at the time, the paving industry felt the need for a slipform paver that was able to: (1) reposition each swing leg and crawler track simultaneously while under load and continuing to move in a paving direction; (2) quickly transform the machine from a paving mode to 90 degree steering position for maneuvering on site, width change or configuring the machine into the transport mode; and (3) enable a wide range of steering angles regardless of the angular orientation of the swing leg. Guntert Decl. at ¶13; Greenwood Decl. at ¶ 4; Bryden Decl., ¶74.

Upon its release in 2010, G&Z's S600 solved these issues using its SmartLeg / AccuSteer technology. Bryden Decl., ¶75; Ex. 2021 at 6-8 (G&Z Fall 2010 Newsletter announcing the "New S600 Multi-Purpose Slipform Paver"); Ex. 2014 at 1-2 (describing the S600 with SmartLeg / AccuSteer as "providing

exceptional maneuverability on site” and offering “a high level of flexibility for the contractor to maneuver around track line obstacles (e.g. fire hydrants, airport runway lights, etc.) on the fly and without stopping”).

As Mr. Greenwood, a seasoned veteran within the paving industry, articulates that “ a slipform company that could respond to the industry demands by introducing a slipform paver that can on-the-fly reposition its swing legs and crawler tracks and relocate the crawler tracks to a 90 degree steering position for maneuvering and to walk the slipform paver out from a paving mode and into the transport mode **would have a license [to] print money.**” Greenwood Decl., ¶ 4. Further, AccuSteer also works to enable “quick telescopic tractor width changes” with VariWidth by “walk[ing] the machine in or out using 90-degree steering mode.” Ex. 2014 at 2 (describing VariWidth working together with AccuSteer as a “huge time saver”); see also e.g., Ex. 2042 at 21 (describing AccuSteer and SmartLeg systems); Bryden Decl., ¶77.

The S600 with SmartLeg / AccuSteer technology dramatically improved productivity because it made possible, for the first time ever, to maneuver the swing leg with jacking column and crawler track position simultaneously, on-the-fly, under load, to avoid obstacles in the paving path. Bryden Decl., ¶78; Greenwood Decl., ¶¶6-7. It also quickly and easily changed the slipform paver

from the paving mode to the transport mode, vice versa, using 90-degree steering.

Guntert Decl., ¶¶16-19; Greenwood Decl., ¶¶4, 6-7.

With these improvements over conventional pavers, the S600 with SmartLeg / AccuSteer technology became the gold standard in the paving community.

Bryden Decl., ¶79. The S600's maneuverability and versatile paving applications, provide contractors with a machine capable of center-line paving, side-mounted paving and barrier paving, easy transport, and easy to set-up, change width and breakdown. In fact, these functionalities are among the primary considerations of contractors, even today, purchase a paving machine. Ex. 2043 at 1-2 (2022 article discussing purchasing considerations with representatives from Gomaco, Wirtgen, and Power Curbers Companies).

C. The S600's Use of A Slew Drive for Driving And Steering Under Load Overcame Industry Skepticism

“Doubt or disbelief by skilled artisans regarding the likely success of a combination or solution weighs against the notion that one would combine elements in references to achieve the claimed invention.” *WBIP*, 829 F.3d at 1335 (citations omitted). Here, due to the weight of the paving machines at issue and the forces required to rotate the tracks under load and maintain the crawler track in a desired position despite the huge frictional / skidding forces between the crawler track and the ground, there was skepticism about the S600 design expressed from slew drive manufacturers and from engineers within G&Z. Bryden Decl., ¶¶80-81.

Kinematics is a motion control company that manufactures, among other things, slew drives. Guntert Decl. at ¶_. During development of the S600, G&Z approached Kinematics about using their slew drives for steering. Guntert Decl. at ¶15. In response, Kinematics would not guarantee their product without Kinematic factory testing of the loads the S600 would place on the slew drive and noted that G&Z's [REDACTED]

[REDACTED] Ex. 2013 at 1 (July 14, 2009 email from David Pope, President of Kinematics Manufacturing Inc.). Even G&Z's VP of Engineering, Jerry Dahlinger, expressed his doubt about the steering design stating that he does not [REDACTED]

[REDACTED] Ex. 2024 at 4 (June 19, 2009 e-mail from Jerry Dahlinger to Ron Guntert updating him on the S600 project).

After extensive development, testing and evaluation, G&Z's S600 proved the skeptics wrong, and its unique slew drive design eventually became the new standard for paving machines.

D. GOMACO and Other Competitors Copied G&Z's S600 With SmartLeg/AccuSteer Technology

The Federal Circuit indicated that copying “requires evidence of efforts to replicate a specific product, which may be demonstrated through internal company documents, direct evidence such as disassembling a patented prototype, photographing its features, and using the photograph as a blueprint to build a

replica, or access to the patented product combined with substantial similarity to the patented product.” *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010) (citations omitted). Evidence of copying is persuasive of nonobviousness when an alleged infringer tries for a substantial length of time to design a similar product to the claimed invention, but failed and then copied the claimed invention instead. *Dow Chem. Co. v. Am. Cyanamid Co.*, 816 F.2d 617, 622-23 (Fed. Cir. 1987); *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 1085, 1099 (Fed. Cir. 1985), *vacated on other grounds*, 475 U.S. 809 (1986), *on remand*, 810 F.2d 1561 (Fed. Cir. 1987) (evidence of copying found persuasive of nonobviousness where admitted infringer failed to satisfactorily produce a solution after 10 years of effort and expense).

The evidence shows that G&Z released its S600 with SmartLeg / AccuSteer technology in 2010 and displayed and demonstrated the paver for large crowds at ConExpo in March, 2011. Bryden Decl., ¶¶83-84; Ex. 2025 at 5 (describing the incredible attention G&Z received at ConExpo 2011 regarding its display of “two S600s” and a live demonstration of its automated ability of navigating around obstacles while keeping the tracks in a forward paving direction and automatically convert itself from paving mode to transport mode using 90-degree steering);



Guntert Decl., ¶ 18 (image of the 2011 G&Z ConExpo booth and its S600 with SmartLeg / AccuSteer).

ConExpo bills itself as “the largest construction show in North America,” and in 2011 it lived up to the hype. Ex. 2027 at 1. The 2011 ConExpo attracted nearly 120,000 attendees from all over the globe, 2,400 exhibitors, and held hundreds of industry meeting and educational seminars. Ex. 2026 at 1-2; Ex. 2027 at 1-2. All of G&Z’s competitors were present for the S600 display and demonstrations. A G&Z S600 Paver was also at Intermat Paris 2012, BAUMA Munich 2013 and at World of Concrete every one of these years. Guntert Decl. at ¶20.

1. Gomaco

Copying requires “evidence of efforts to replicate a specific product, which may be demonstrated through . . . access to the patented product combined with

substantial similarity to the patented product.” *Wyers*, 616 F.3d at 1246 (citations omitted). Here, Gomaco had access to the S600 starting at least as early as ConExpo 2011, and the S600 is marked with the '318 Patent and every other patent in its family. Ex. 2044 at 1 (showing the S600 marked by US Patent Nos. 8,459,898; 9,359,727; 10,589,807; 11,535,318; 11,772,723); Bryden Decl., ¶85.

Gomaco was at ConExpo 2011, in “Booth #5111,” where it displayed its new line of products. Ex. 2028 at 2. There Gomaco had up-close access to the design and functionality of G&Z’s S600 with SmartLeg / AccuSteer technology. Gomaco was also at Intermat Paris 2012, BAUM Munich 2013 and at World of Concrete every one of these years. Guntert Decl. at ¶. [REDACTED]

[REDACTED]

[REDACTED]

Ex. 2010 (Klein Tr.) at 18:17-20:24; *id.* at 16:20-18:3 [REDACTED]

[REDACTED]

[REDACTED] Bryden Decl., ¶86. In March 2011, G&Z delivered a S600 Paver to Hawkins Construction in Omaha NE which is a short 1 hr and 45 min. car drive from Gomaco’s factory in Ida Grove IA. Guntert Decl., ¶19.

Gomaco did not release its GP3 with its smart leg and smart steering until at least 2015, and in the previous action for the '749 Patent, the earliest Petitioner has evidenced as having started developing the design [REDACTED]

[REDACTED]. Bryden Decl., ¶87; Ex. 1036 at 55, 60, 84, 88-91 (citing to Exs. 1165, 2002, 2003, 2011, 2054, and 2055 which are all from [REDACTED]); Ex. 2010 (Klein Tr.) at 11:10-14:2 ([REDACTED]); Ex. 2045 at 3-4 (Gomaco introduced its “new GP3 slipform paver” at World of Concrete in Las Vegas).

This evidence shows that when developing the GP3, Gomaco investigated different kinds of rotary actuators to solve the maneuverability problem before deciding to copy G&Z's design. Bryden Decl., ¶88; Ex. 1036 at 60, 90 (finding Petitioner changed its design as part of the “typical engineering processes”). Any claim that Gomaco was unaware of G&Z's S600 and its SmartLeg / AccuSteer slew drive technology when developing the GP3 in [REDACTED], does not hold water. Ex. 1036 at 90; Ex. 2010 (Klein Tr.) at 16:3-11. The facts clearly show that Gomaco was aware of G&Z's use of a slew drive to allow for 90-degree steering and its ability to coordinate the movements of its swing legs and crawler tracks while under load.

G&Z and Gomaco compete in a niche market and for the same customers. Bryden Decl., ¶89; Ex. 2010 (Klein Tr.) at 42:4-13, 43:14-45:12. Thus, given the narrow competition between the limited players in the concrete slipform paver field, each company would naturally keep close tabs on its competitors' technological developments. *Id.* 17:17-18:3. In this case, Gomaco would have had at least 3 years

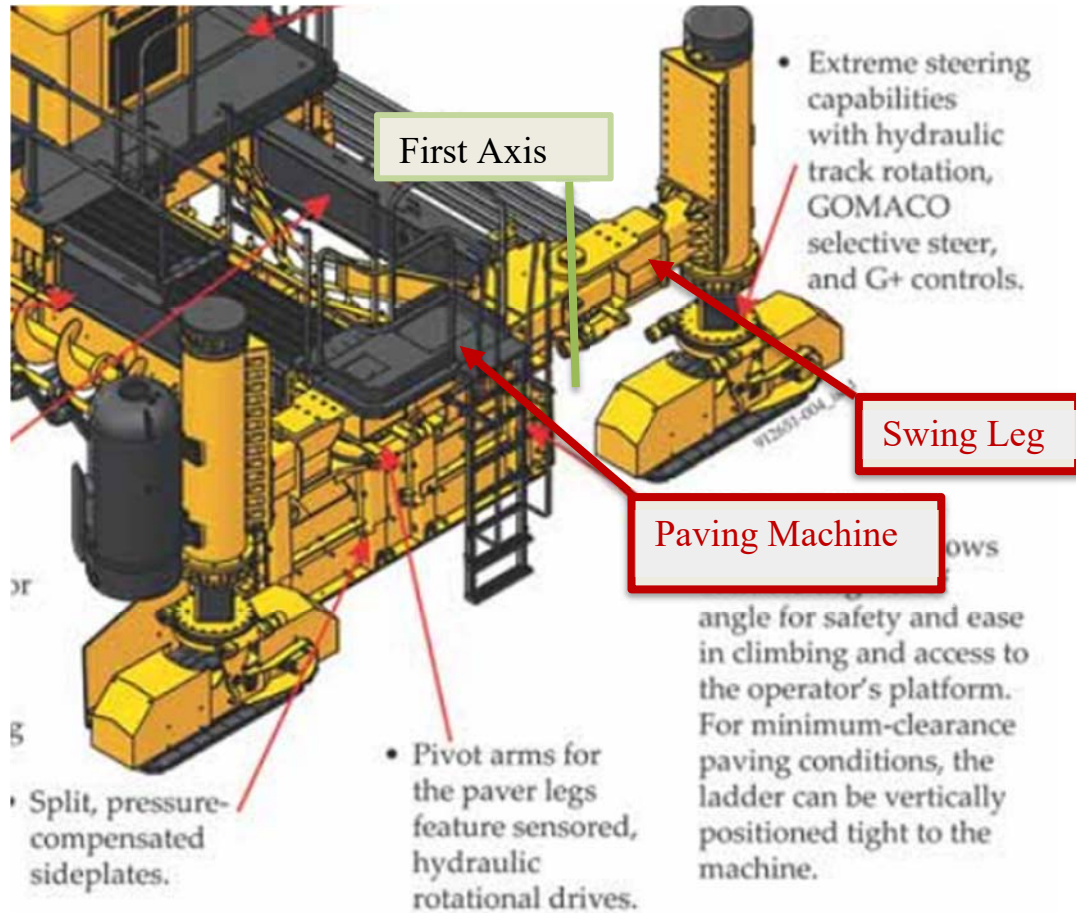
of observational information and feedback on the performance and utility of the S600. Bryden Decl., ¶89.

The GP3 was the first machine to debut for Gomaco using its slew drive smart leg and steering design in 2015 and is copied its design from G&Z's S600. Bryden Decl., ¶¶82, 90;

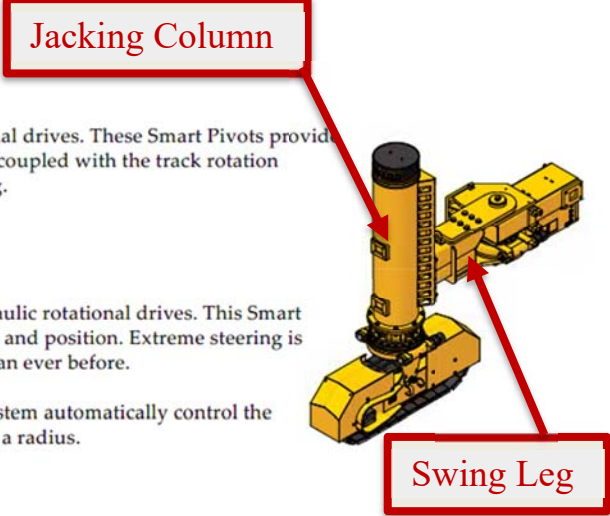
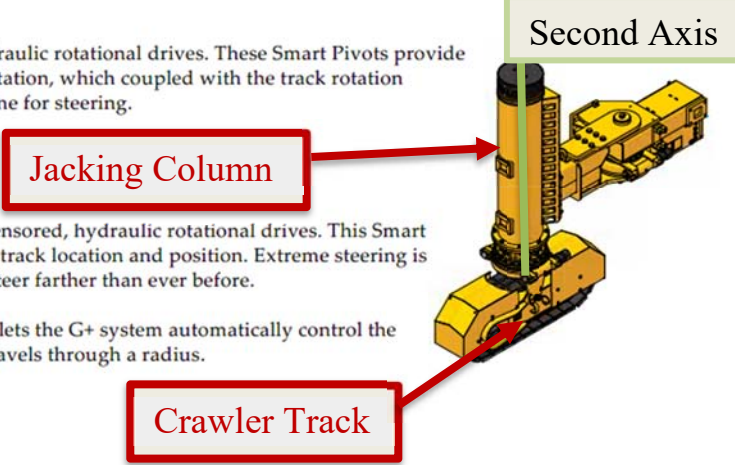
'318 Patent, Claim [1Pre]	A swing leg assembly configured to be coupled to a paving machine configured to move in a paving direction for spreading, leveling, and finishing concrete into a form having a generally upwardly exposed, finished concrete surface and terminating in lateral concrete sides, the swing arm assembly comprising:
 Ex. 2029 at 2.	

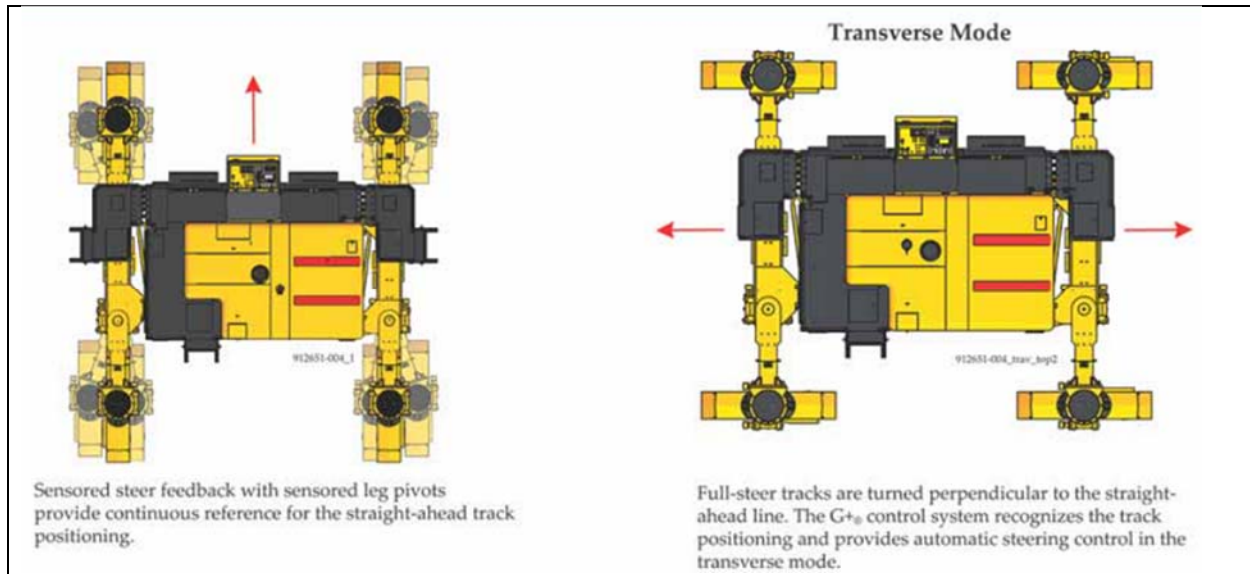
**'318 Patent, Claim
[1A]**

a swing leg configured to be coupled to the paving machine, and configured to pivot about a first axis to a first angular orientation relative to the paving machine;



Ex. 2029 at 5.

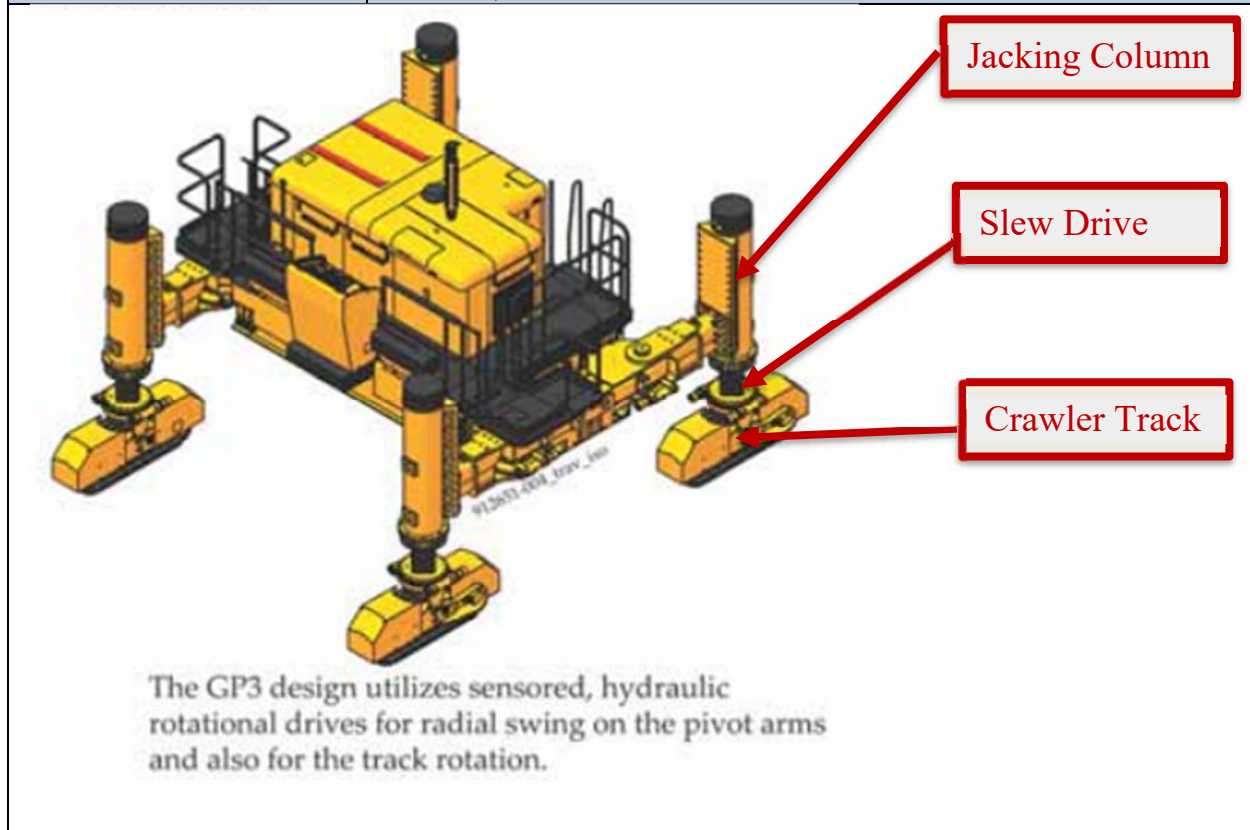
'318 Patent, Claim [1B]	a jacking column coupled to the swing leg;
Smart Leg Positioning Pivot arms for the paver legs feature sensed, hydraulic rotational drives. These Smart Pivots provide the G+ controls with information on the angle of rotation, which coupled with the track rotation sensors, maintain the tracks in the straight-ahead line for steering. Smart Track Steering Track steering and rotation is accomplished with sensed, hydraulic rotational drives. This Smart Track Rotation provides the G+ controls with exact track location and position. Extreme steering is now possible with the tracks having the ability to steer farther than ever before. Smart Leg Pivoting and Smart Track Rotation now lets the G+ system automatically control the direction and speed of each individual track as it travels through a radius. Ex. 2029 at 3.	 The diagram shows a 3D perspective view of a paver leg assembly. A red box labeled 'Jacking Column' points to a vertical hydraulic cylinder. Another red box labeled 'Swing Leg' points to the horizontal arm that connects the jacking column to the track system. The tracks are shown as a series of yellow links.
'318 Patent, Claim [1C]	a crawler track rotatably coupled to the jacking column, wherein the crawler track is configured to rotate about a second axis to a second angular orientation relative to the jacking column;
Smart Leg Positioning Pivot arms for the paver legs feature sensed, hydraulic rotational drives. These Smart Pivots provide the G+ controls with information on the angle of rotation, which coupled with the track rotation sensors, maintain the tracks in the straight-ahead line for steering. Smart Track Steering Track steering and rotation is accomplished with sensed, hydraulic rotational drives. This Smart Track Rotation provides the G+ controls with exact track location and position. Extreme steering is now possible with the tracks having the ability to steer farther than ever before. Smart Leg Pivoting and Smart Track Rotation now lets the G+ system automatically control the direction and speed of each individual track as it travels through a radius. Ex. 2029 at 3;	 This diagram is similar to the one in the first row but includes an additional label. A green box labeled 'Second Axis' points to a vertical line passing through the center of the jacking column, indicating the axis of rotation for the crawler track. A red box labeled 'Crawler Track' points to the track links. The 'Jacking Column' and 'Swing Leg' labels are also present.



Ex. 2029 at 4.

'318 Patent, Claim 1: [1D]

a slew drive coupled to the jacking column and the crawler track, wherein the slew drive is configured to cause rotation of the crawler track relative to the jacking column;

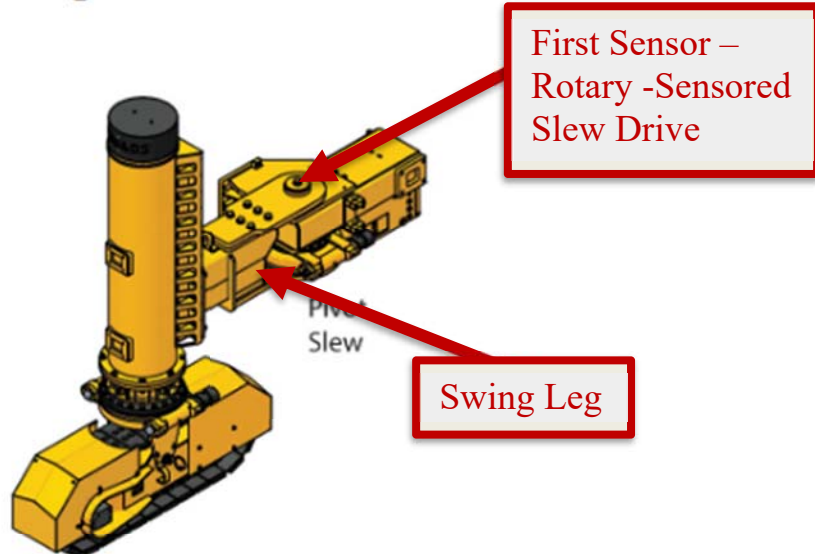


Ex. 2029 at 4; Ex. 2046 at 1 (“Rotary-sensored slew drives are also located on all four tracks for the ultimate in smart steering technology and extreme steering with the tracks having the ability to steer farther than ever before.”).

'318 Patent, Claim 1: [1E]

a first sensor configured to emit a first signal corresponding to the first angular orientation;

Smart Leg Positioning on Four-Track Pavers



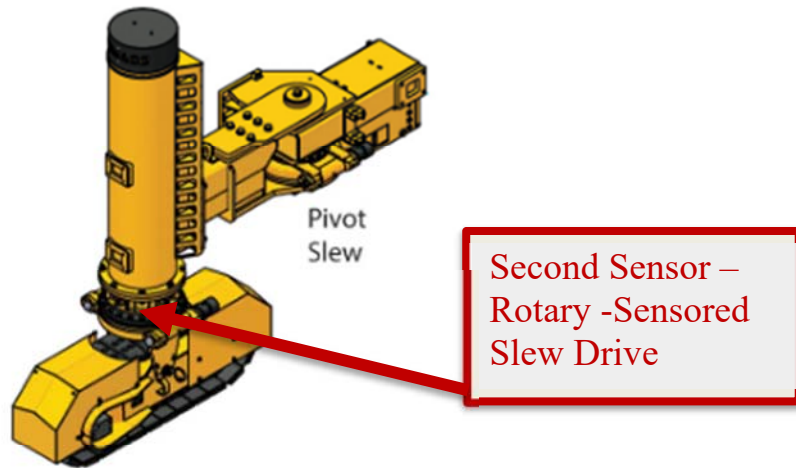
Pivot arms for the paver legs feature rotary-sensored slew drives. These smart pivots provide the G+ controls with information on the pivot arm angle, which coupled with the track rotation sensors, maintain the tracks in the straight-ahead line for steering, even when the leg pivot is at an angle.

Ex. 2046 at 24 [https://www.gomaco.com/resources/gp3_paver.html]

'318 Patent, Claim 1: [1F]

a second sensor configured to emit a second signal corresponding to the second angular orientation; and

Smart Leg Positioning on Four-Track Pavers



Pivot arms for the paver legs feature rotary-sensored slew drives. These smart pivots provide the G+ controls with information on the pivot arm angle, which coupled with the track rotation sensors, maintain the tracks in the straight-ahead line for steering, even when the leg pivot is at an angle.

Ex. 2046 at 24 [https://www.gomaco.com/resources/gp3_paver.html]

**'318 Patent, Claim
[1G]**

a processor configured to:
receive the first signal from the first sensor, and the
second signal from the second sensor;

determine a change of the first angular orientation based
on the first signal;

in response to determining the change of the first angular
orientation, determine a target second angular
orientation based on the determined change of the
first angular orientation and the second angular
orientation based on the second signal; and

send a control signal to the slew drive in order to cause
the second angular orientation of the crawler track to
rotate to the target second angular orientation.



Ex. 2046 at 12-13 (G+ control system “includes leg position, paving speed and percentage of drive, steering, travel information, grade information, deviation meters, and more.”); *id.* at 1 (“The smart pivots on the legs provide the exclusive G+ control system with information on the pivot arm angle and works together with the track rotation sensors to maintain the tracks in the straight-ahead steering line.”);

Transport Mode

The GP3 slipform paver is designed for easy transport. A retractable, sliding console reduces the shipping width of the machine. The paver can be switched to the transport mode by simply driving the legs around to the transport position. After the legs are in the transport position, G+ travel is switched to "transport" for complete control. The operator can take this paver to the transport mode in minutes without assistance.



Ex. 2029 at 3;

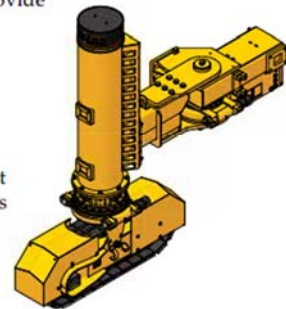
Smart Leg Positioning

Pivot arms for the paver legs feature sensed, hydraulic rotational drives. These Smart Pivots provide the G+ controls with information on the angle of rotation, which coupled with the track rotation sensors, maintain the tracks in the straight-ahead line for steering.

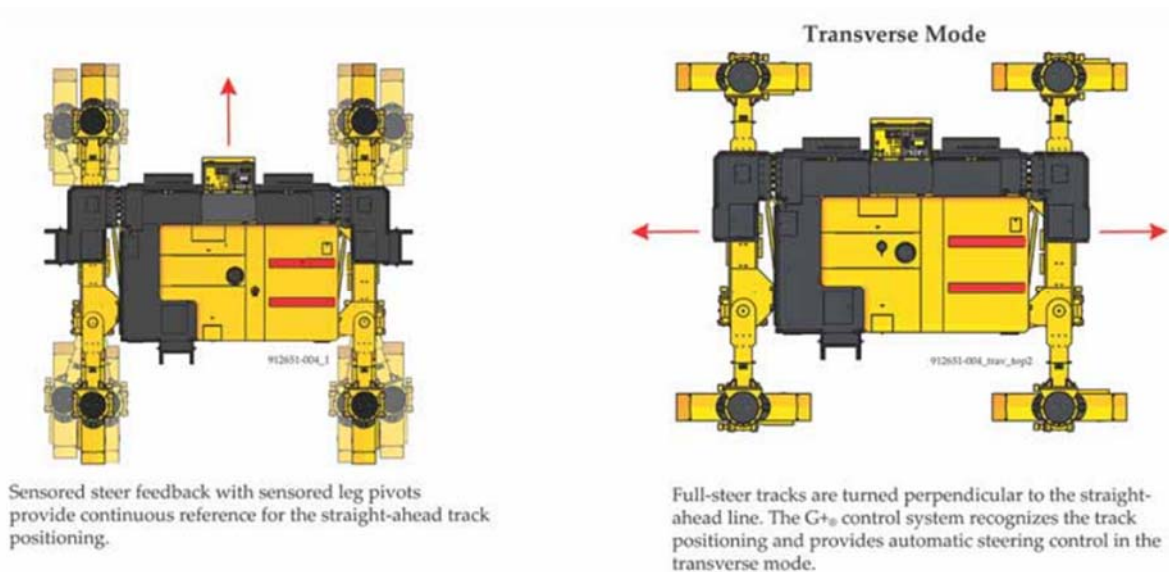
Smart Track Steering

Track steering and rotation is accomplished with sensed, hydraulic rotational drives. This Smart Track Rotation provides the G+ controls with exact track location and position. Extreme steering is now possible with the tracks having the ability to steer farther than ever before.

Smart Leg Pivoting and Smart Track Rotation now lets the G+ system automatically control the direction and speed of each individual track as it travels through a radius.



Ex. 2029 at 3;



Ex. 2029 at 4;

Significantly, Gomaco went so far as to copy G&Z's marketing term, "SmartLeg," in promoting its "Smart Leg" steering capabilities of its slipform paver machines. Ex. 2050 at 1-3; *see also* Ex. 2046 (discussing "Smart Leg Positioning" and "Smart Track Steering" using slew drives on GP3). In addition to these features, the GP3 also has the same frame widening features as S600 and paving kit Telescoping / Telescopic End Sections. *C.f.* Ex. 2029 at 3 (Smart Width provides easy, accurate width change setup and also a reference for G+ to control proper steering and track speeds) *with* changes Ex. 2019 at 5-6 (paving kit Telescopic / Telescoping End Sections "TeleEnd" and VariWidth systems provide fast and easy width changes to the machine frame). GP3 also had a paver mounted front tie bar inserter and dowel bar inserter attachment and the ability utilize multiple paving kit configurations for both inset and offset paving, same as the S600. Bryden Decl., ¶91; Ex. 2029 at 5-7; Ex. 2019 at 5-7, 10-11.

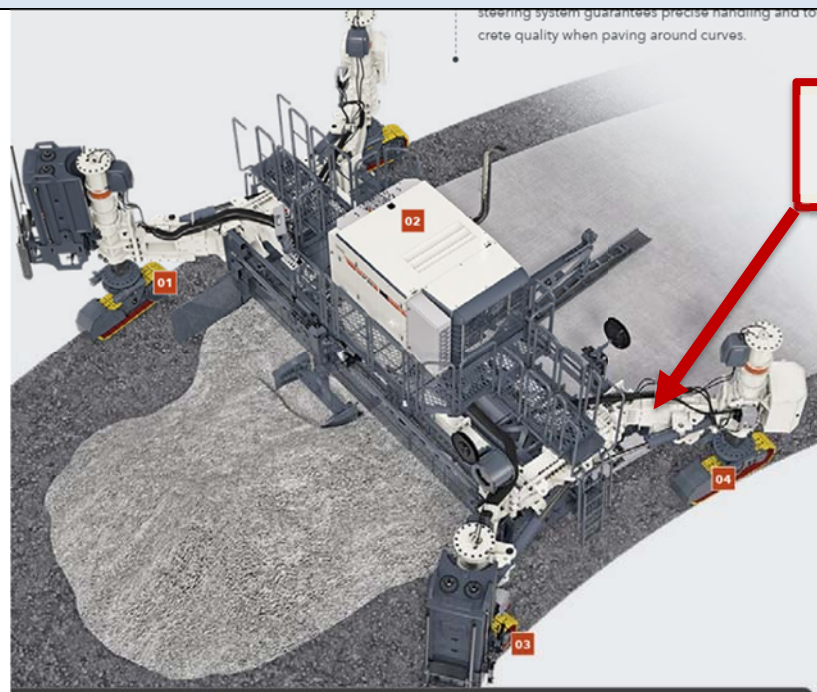
Thus, Gomaco's access to the S600 with SmartLeg / AccuSteer technology, coupled with the circumstantial evidence regarding Gomaco's delay in altering their product design to be at least substantially similar to the S600, if not identical, supports copying. Bryden Decl., ¶92.

2. Wirtgen

Wirtgen Gmbh / Wirtgen America, Inc. ("Wirtgen"), is another company that is in the concrete slipform paver industry and released a slipform paver which copied

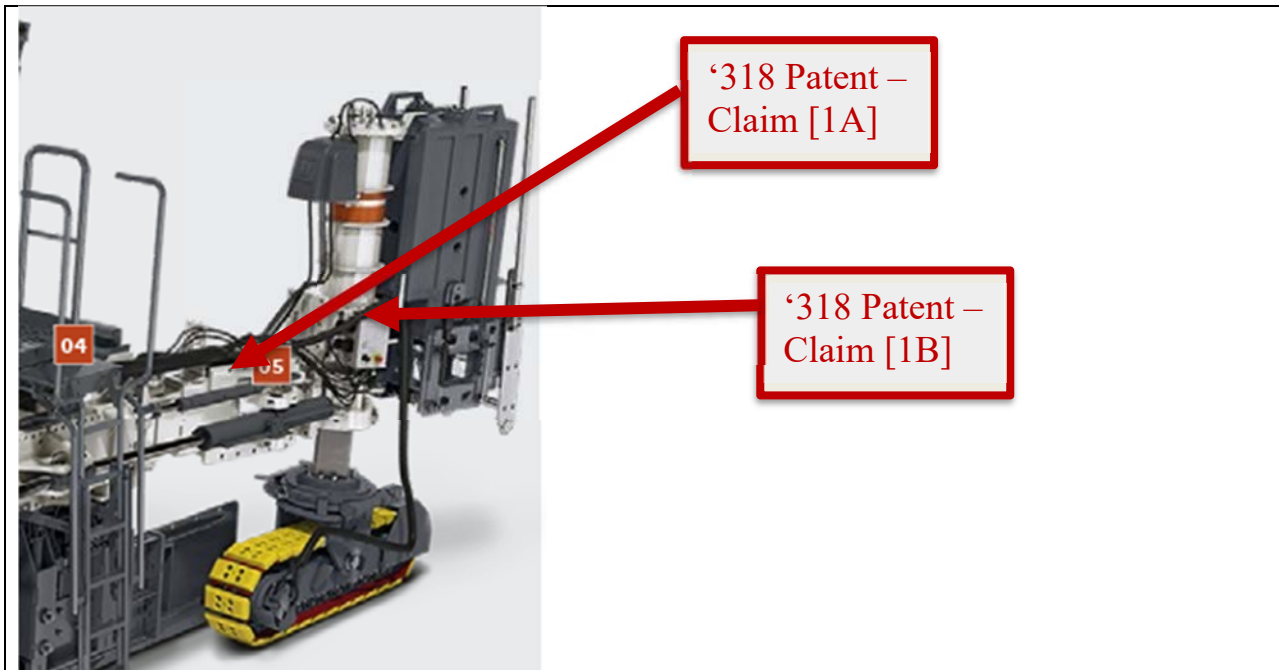
G&Z's S600 design with its SmartLeg / AccuSteer features. Wirtgen was at ConExpo Las Vegas 2011 and had access to the G&Z S600 on display and its demonstrations. Ex. 2051. Wirtgen was also present at Intermat Paris in 2012 and BAUMA Munich in 2013. Guntert Decl., ¶¶20. The similarities between G&Z's SmartLeg/AccuSteer features in its S600 Slipform Paver Machine and Wirtgen's SP64i slipform paver machine are illustrated below. Notably, the SP64i was not debuted by Wirtgen until 2017. Bryden Decl., ¶¶93; Ex. 2052 (Wirtgen to premier new paving range in Las Vegas) at 2.

Wirtgen SP64i

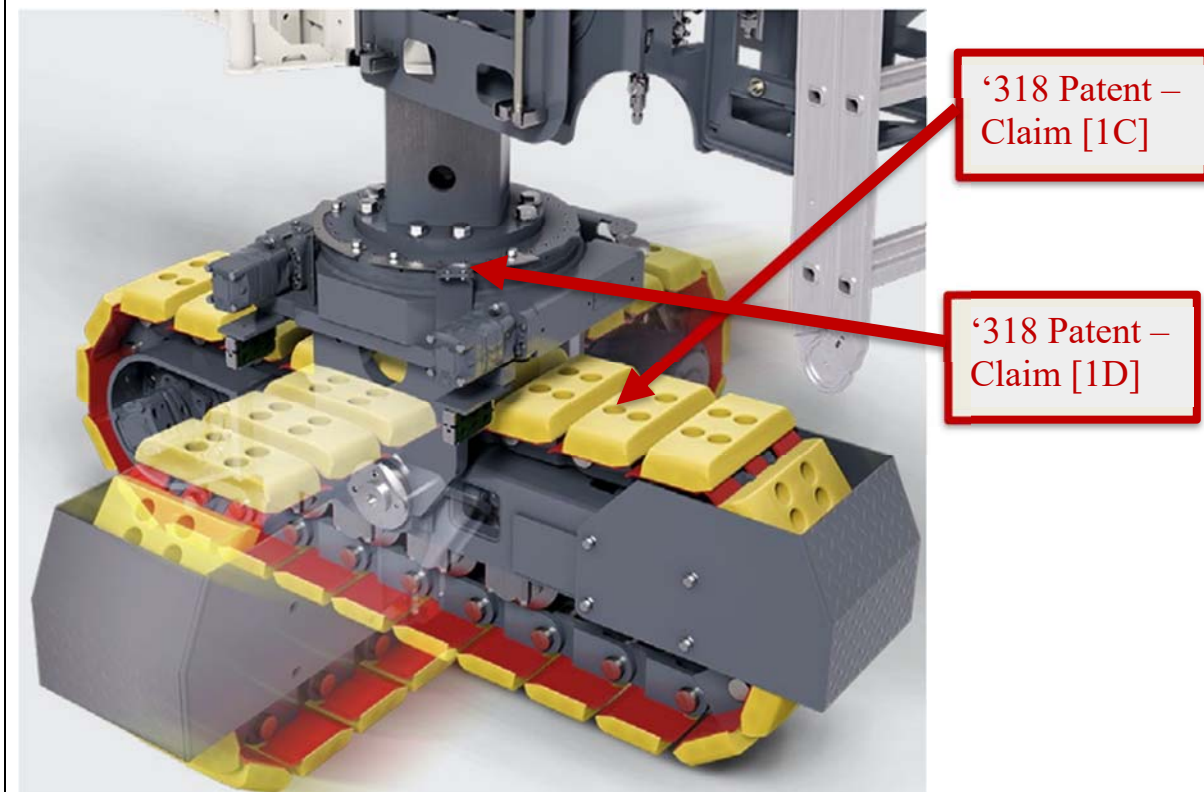


'318 Patent –
Claim [1pre]

Ex. 2053 [SP61SP64i World Brochure Datasheet] at 21;



Ex. 2053 at 13 (“Crawler units with a wide slewing angle guarantee maximum flexibility on the job site”);



id. at 20-25 (showing the use of the slew drive to rotate the crawler track in unison with the swivel arm for steering and altering the machine configuration, i.e. paving mode or transport mode);

Innovative Worm Gear Steering

The crawler units' steering angles of up to 100° to the left and 160° to the right increase flexibility, such as the ability to easily approach obstacles, particularly on tight job sites.

Crab mode with track units at a steering angle of 90° to the side

Transmission steering allows the machine move sideways with the crawler units rotated by 90°. At the same time, this reduces time-consuming manual paving at the end of the lane, which is often necessary on cramped sites, to a minimum.

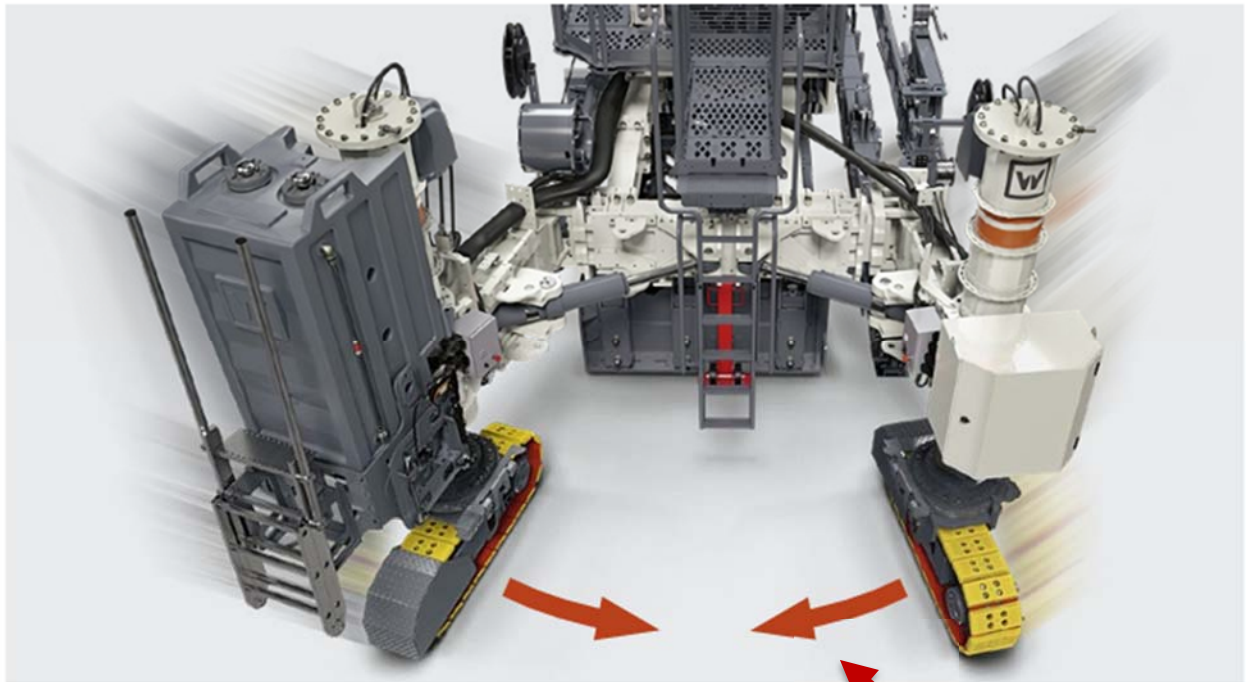
Rotating around Its Own Axis

Rotating the machine around its own axis by means of widely slewable crawler units eliminates the need for time-consuming turning maneuvers in confined construction site conditions.

Paving Plus Package

The additional sensors that can be integrated into the swivel arms optimize machine control.

Id. at 23;



Id. at 25;

**04 Steering Angle Sensor Adjustment /
Field-Proven Track Steering**

On the SP 64i, the fully automatic adjustment of the steering angle of all of the crawler units optimizes the machine's driving performance, making high-precision concrete paving possible. Alternatively, the SP 62i's sensitive track steering system guarantees precise handling and top concrete quality when paving around curves.

'318 Patent –
Claim [1E-
G]

Id. at 21; *id.* at 23 (Innovative Worm Gear Steering – The crawler units' steering angles of up to 100 degrees to the left and 160 degrees to the right increase flexibility, such as the ability to easily approach obstacles, particularly on tight job sites).

E. Competitors Praised G&Z's SmartLeg/AccuSteer Technology Through Copying While the Paving Industry in General Praised the Technology Through Recognition of its Significance Industry Praise for SmartLeg / AccuSteer Technology

As established above, GOMACO and other competitors copied the S600 with SmartLeg/AccuSteer technology, which is a “form of flattering praise for inventive features.” Bryden Decl., ¶94; *Crocs, Inc. v. Int’l Trade Comm’n*, 598 F.3d 1294, 1311 (Fed. Cir. 2010); § VIII.D, *supra*. The paving industry also praised G&Z’s S600 with SmartLeg/AccuSteer technology through appreciation of its significance to the industry. *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1364-65 (Fed. Cir. 2017) (holding that praise from non-competitor industry participants who have evaluated the invention and recognized its “significance and value . . . weighs in favor of nonobviousness.”).

The industry requested options that increased steering maneuverability while also reducing the time it takes to transform a slipform paver from one mode to another mode without having to repin the hydraulic steering cylinder to achieve 90 degree steering. The S600 with its SmartLeg / AccuSteer technology responded to this demand and was praised by the industry for redefining what mobility means in the paving community. Bryden Decl., ¶95. Today, the S600 design with its SmartLeg / AccuSteer technology represents the industry standard performance that contractors require in a paving machine. For example, Heavy Equipment Guide stated that:

Guntert & Zimmerman (G&Z) has announced the release of the S600 Multi-Purpose Slipform Paver. The G&Z S600 Slipform Paver is designed around a multi-purpose tractor frame that makes it ideal for city street, secondary roads, highway and airport paving as well as a wide range of other applications such as barrier walls, off-set paving and zero or minimum clearance paving. The S600's design has redefined what mobility means for a small paver without sacrificing the same performance advantages contractors have come to expect from G&Z's large and mid-size paver. Utilizing G&Z's time tested and rugged paving kit design, the S600 is capable of achieving excellent ride numbers on the toughest IRI and zero blanking band projects.

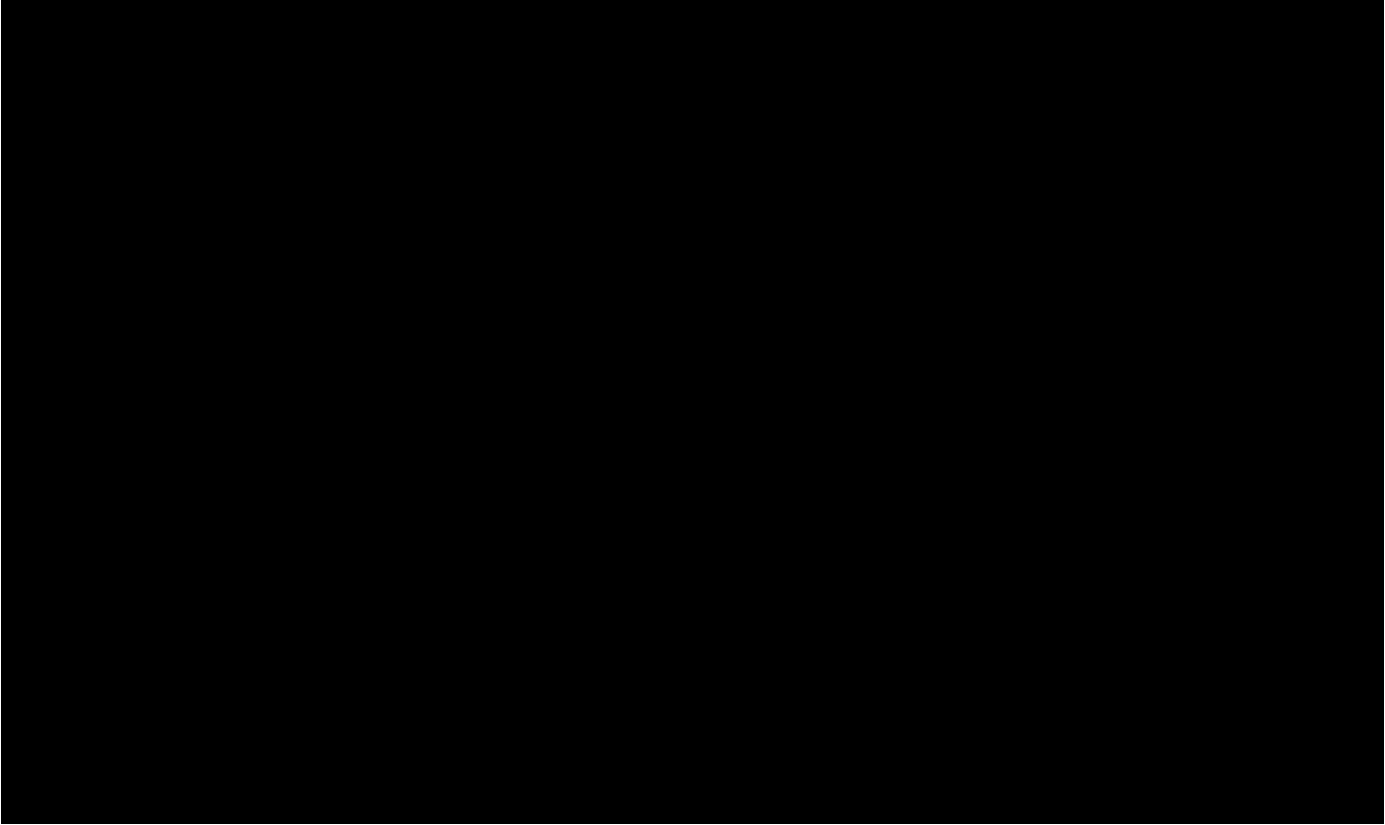
Ex. 2014 at 1; *id.* (“The versatility of the S600 tractor allows the contractor to quickly switch between applications and paving widths.”); *Arctic Cat*, 876 F.3d at 1364-65 (holding that praise from non-competitor industry participants who have evaluated the invention and recognized its “significance and value . . . weighs in favor of nonobviousness.”).

In fact, the industry was so impressed with the S600's versatility that G&Z sold four prior S600s before ever formally introducing it to the market. Bryden Decl., ¶96; Ex. 2025 at 5. Contractors were purchasing G&Z's slipform pavers with the SmartLeg / AccuSteer technology for urban paving and rehabbing highway road construction projects. Ex. 2054 at 1-4 (describing the use of a S850SL with swing legs on a key section of interstate, close to Columbia, S.C.); Ex. 2055 at 1-4 (describing the use of an S600 for use in a rehabilitation project for road where two interstates meet and receive high traffic).

F. G&Z's S600's SmartLeg/AccuSteer Technology Drove the Commercial Success

Upon hitting the market, G&Z's innovative S600 with its SmartLeg / AccuSteer technology immediately began paying dividends, with the introduction

of these features translating directly into commercial success in the form of significantly increased paver sales, driven by those designs equipped with the SmartLeg / AccuSteer technology.



Bryden Decl., ¶97 (citing Ex. 2031)

Once GOMACO entered the market with its copycat version of G&Z's SmartLeg / AccuSteer equipped slipform pavers, the GP3, G&Z's market share quickly eroded and eroded further with Gomaco's introduction of the GP4 in 2017, with G&Z [REDACTED] of its market share between 2014 and 2019 while GOMACO's market share [REDACTED] Bryden Decl., ¶98 (citing Ex. 2035 at 13;

Ex. 2036 at 10). GOMACO introduced its GP3 slipform paver in 2014/2015. *See supra* § VIII(D)(1).

Accordingly, because G&Z demonstrated significant sales of its S600 and its S400 and S850 slipform pavers that utilize SmartLeg / AccuSteer, and these “successful product[s are] the invention disclosed and claimed in the patent, it is presumed that the commercial success is due to the patented invention.” *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997) (citation omitted). Consequently, the evidence set forth herein establishes that the ‘318 Patent was not obvious at the time.

VIII. CONCLUSION

Petitioner has not established a reasonable likelihood that it will prevail in establishing that Claims 1-8 of the ‘318 Patent are invalid. Patent Owner accordingly requests that the Board deny institution of *inter partes* review of the ‘318 Patent.

Respectfully submitted,

Dated: February 26, 2025

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(Case No. IPR2024-00835)

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CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. § 42.24

The undersigned hereby certifies that the portions of the above-captioned **PATENT OWNER'S RESPONSE** specified in 37 C.F.R. § 42.24 has 13,872 words in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24(b)(2). This word count was prepared using the Microsoft Word word-processing system used to prepare this paper.

Dated: February 26, 2025

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CERTIFICATE OF SERVICE

The undersigned certifies, in accordance with 37 C.F.R. § 42.6(e), and pursuant to agreement by the parties that filing with the Board through the Patent Trial and Appeal Case Tracking System (P-TACTS) constitutes electronic service, that service was made on the Petitioner as detailed below.

<i>Date of service</i>	February 26, 2025
<i>Manner of service</i>	Electronic Filing with the Board
<i>Documents served</i>	PATENT OWNER'S RESPONSE
<i>Persons Served</i>	Finnegan, Henderson, Farabow, Garrett & Dunner, LLP: Jason E. Stach Luke J. McCammon David K. Mroz Sonja W. Sahlsten Robert K. High

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