

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT TRIAL AND APPEAL BOARD

SOLARIS OILFIELD SITE SERVICES OPERATING, LLC, and

SOLARIS OILFIELD SITE SERVICES PERSONNEL, LLC,

Petitioners

v.

MASABA, INC.,

Patent Owner

Case No. 2024-01179

Patent No. 11,780,689

DECLARATION OF DR. ROBERT DURHAM

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I. INTRODUCTION

1. My name is Dr. Robert A. Durham. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters contained herein.

2. I have been asked to provide technical assistance in the inter partes review of U.S. Patent No. 11,780,689, which I may abbreviate as “the '689 Patent” or refer to as the “Challenged Patent.” This declaration is a statement of my opinions on issues related to the unpatentability of claims of the '689 Patent. I am being compensated at my normal hourly rate for my analysis, plus reimbursement for expenses. My compensation does not depend on the content of my opinions or the outcome of this proceeding.

II. EXPERIENCE AND QUALIFICATIONS

3. In formulating my opinions, I have relied upon my knowledge, training, and experience in the relevant art. My qualifications are stated more fully in my curriculum vitae, which has been provided as Appendix A. My CV also lists publications on which I am a named author and identifies parties on behalf of whom I have previously provided expert testimony within the past four years. Here, I provide a brief summary of my qualifications.

4. I am a consulting engineer with experience in a number of technical areas. I have expertise in the electrification of the oil and gas industry from drilling and

completion to downstream. I have been working with oil field production companies, refining and chemical plants and equipment manufacturers and technology development companies, as a consultant, for nearly twenty years. My work relates to the subject matter of the Challenged Patent, which I describe below in Section VII (“Overview of the Challenged Patent”).

5. I received my Bachelor of Science in Electrical Engineering and Master of Engineering and Technology Management degrees, from the University of Tulsa in 1992 and 1997, respectively. After years of professional work and research I received my Ph.D. in Engineering Management from Kennedy Western University in 2004.

6. I have also served in positions of leadership in the Petroleum and Chemical Industry Committee (PCIC) of the Institute of Electrical and Electronics Engineers (IEEE) for nearly twenty years. IEEE is the world’s largest technical professional association. The PCIC is the premier forum for the exchange of electrical applications technology related to the petroleum and chemical industry. From 2005 – 2012, I served as secretary, then vice chair and then ultimately chair of the Production Subcommittee of the PCIC. The Production Subcommittee is the primary method for PCIC members to communicate technical papers related to drilling, well head and facilities operations of oil and gas wells. In 2013, I was appointed as Vice-Chair of the Standards Subcommittee of the PCIC, a role which

transitioned to Chair in 2014. I served as Chair until 2022. The Standards subcommittee of the PCIC is the Sponsor of IEEE standards relating to electrification and electrical equipment operations in the Oil and Gas Industry. The PCIC Standards Subcommittees sponsors nearly 50 electrical and oil and gas related standards. In September 2022, I was elected as an Executive Officer of the PCIC. I will serve as an Executive Officer for a total of eight years, serving two-year terms in each of the following positions: Secretary; Vice Chair; Chair; and Chair of Advisory and Awards.

7. My peers have recognized my contributions, particularly in the area of electrical equipment in the oil and gas industry. Because of this recognition, in 2019 I was elevated to the grade of Fellow of the IEEE for “contributions to submersible electrical equipment analysis and multi-point ground methods in hazardous petroleum and chemical environments.” The IEEE Fellow grade is limited to the top 0.1% of the membership of IEEE worldwide.

8. I have worked directly in the area of electrification of oil and gas fields both as an employee and as a consulting engineer. From 2000 until the end of 2002 I was employed as Manager of Electric Infrastructure for New Dominion, LLC (NDL). In that capacity I administratively owned and was responsible for all electrical equipment including overhead power lines, transformers, switchgear, drives and motors throughout NDL’s production, exploration and drilling areas.

9. After a brief stint as Vice President for EDG Power Group, responsible for Engineering and Project Management of generation and co-generation facilities across the U.S., I transitioned to the role of consulting engineer. In that role I have served as consulting engineer relating to the design, construction, and analysis of all kinds of power systems, especially those in the oil and gas industry. This has included not only design and selection of equipment but also analysis of failures of equipment in the oil and gas field from drilling / completion sites to production facilities, midstream and downstream (refinery) locations.

10. In addition, I am a principal of PEDOCS, Inc., an oil and gas production company operating over 50 oil and gas production wells in Oklahoma. As such, I am familiar with operations of oil and gas wells including well stimulation, completion, hydraulic fracturing and production.

11. I have been familiar with oil and gas drilling, fracturing (fracking) and completion operations for nearly twenty years. In addition to being responsible for interfacing with drilling and fracturing operations with regards to electrical needs as an employee of New Dominion, LLC, I have been further educated about drilling, fracturing and operations as I have consulted and investigated incidents on multiple well drilling, fracturing and completion pad sites over my engineering consulting engagements.

12. I have been familiar with power distribution, including generation, transmission, and distribution equipment. As an employee I worked as a design and construction engineer for generation facilities for Central and Southwest (now American Electric Power (AEP)). I was also responsible for design and construction of generation facilities when employed by EDG Power Group, as discussed above. While at AEP, I spent three years as a transmission planner, responsible for modeling transmission systems and developing plans for increased power distribution capacities at high voltages. While at New Dominion LLC, I owned and was responsible for design, construction and maintenance of several hundred miles of medium voltage (5 – 25 kV) distribution lines, switchgear, drives and motors used for oil and gas drilling, completion and production. Over the last ~ 20 years I have consulted with numerous clients ranging from utilities to oil and gas development and production companies on the design, upgrades and maintenance of generation and power distribution facilities.

13. I have been familiar with Occupational Safety and Health Administration (“OSHA”) and its responsibilities at oil and gas locations. I have consulted and investigated incidents on multiple oil and gas sites where OSHA has also performed investigations with regard to injuries and fatalities that have occurred at oil and gas locations, including drilling, fracturing and completion operations. As Principal Scientist of THEWAY Labs, part of my responsibilities include overseeing the

Health Safety and Environmental (HSE) program at THEWAY Labs, and establishing policies and procedures commensurate with OSHA requirements at all locations, including requirement for oil and gas sites.

14. I am the author or co-author of over fifty published papers and five books. A list of publications that I have authored over the last thirty years is included in my professional CV, which is attached as Appendix A.

15. Therefore, based on my education, professional experience of over 30 years, and scholarly books and publications, I am an expert in the relevant field of the Challenged Patent at issue here and have been an expert in this field since before the Challenged Patent was filed with the United States Patent and Trademark Office (“USPTO”). I am familiar with how a person having ordinary skill in the art would have understood and used the terminology found in the '689 Patent at the time of its filing.

III. TASK SUMMARY AND MATERIALS REVIEWED

16. I have been asked to review the Challenged Patent and its prosecution history, to provide an understanding of the technology relevant to the Challenged Patent, to review certain prior-art references, and to analyze whether or not those references disclose or teach limitations of claims from the Challenged Patent. The opinions stated in this declaration are from the perspective of a person of ordinary skill in the art (POSITA).

IV. LIST OF EXHIBITS

17. In forming my opinions, I have reviewed the Challenged Patent, its prosecution history and references cited by the Examiner, the materials cited in the List of Exhibits, and the materials cited throughout my declaration.

Ex.	Description
1001	U.S. Patent No. 11,780,689 by Jason Brenden et al. entitled “Aggregate Transferring System” (“the ‘689 Patent”)
1002	Declaration of Dr. Robert Durham
1003	[not used]
1004	U.S. Patent No. 9,663,303 by Raymond Waldner et al. entitled “Portable Conveyor System with Drive-Over Unloading Ramp and a Longitudinal Conveyor Feeding A Bucket Elevator ” (“Waldner”)
1005	<u>Belt Conveyor-based Loading Systems</u> , https://web.archive.org/web/20160819111857/http://mcschroeder.com/wp-content/uploads/2012/09/Product-Spec-Sheet-Belt-EconoLoader.pdf (August 19, 2016) (“Dynatek”)
1006	U.S. Patent No. 11,691,831 by Marlea Sleeman et. Al. entitled Portable Conveyor System Including Pivotal and Extendable Feed Conveyors for Feeding Particulate Material Into an Elevating Assembly.” (“ <i>Sleeman</i> ”)
1007	U.S. Patent No. 3,938,673 by L.F. Perry, Jr. entitled “Portable Concrete Batch Plant” (“Perry”)
1008	U.S. Patent No. 10,633,174 by Hau Nguyen - Phuc Pham, et al entitled “Mobile Oilfield Material Transfer Unit” (“Pham”)
1009	U.S. Patent No. 3,090,501by John A. Auld entitled “Cement Mixing Plant” (“Auld”)

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1010	U.S. Patent No. 10,577,198 by Henry Friesen entitled “Portable Drive-Over Conveyor for Discharging Particulate Material at a Height Suitable for Filling A Silo” (“Friesen”)
1011	U.S. Patent No. 8,926,252 by Terry McIver entitled “Fracture sand silo system and methods of deployment and retraction of same” (“McIver”)
1012	File History of ’689 Patent
1013	Claim Listing
1014	Affidavit of Nathaniel E. Frank-White regarding Dynatek
1015-1019	[not used]
1020	U.S. Patent Application Publication 2016/0258267 by Mark Payne et al. entitled “Well Fracturing Systems with Electrical Motors and Methods of Use” (“Payne”)
1021	U.S. Department of Labor, OSHA, “Worker Exposure to Silica during Hydraulic Fracturing”, available at: https://www.osha.gov/sites/default/files/publications/hydraulic_frac_hazard_alert.pdf
1022	U.S. Patent Application Publication 2019/0016536 by David Campbell et al. entitled “Proppant Conveyor Systems and Methods of Use” (“Campbell”)
1023	U.S. Patent No. 10,399,785 by Jonathan David Fike entitled “Compact Portable Conveyor” (“Fike”)
1024	U.S. Patent No. 3,998,436 by Albert Allen <i>et. al.</i> entitled “Mobile Concrete Batch Plant” (“Allen”)
1025	U.S. Patent No. 9,428,348 by Gary Teichrob <i>et. al.</i> entitled “Mobile Material Handling and Metering System” (“Teichrob”)
1026	U.S. Patent No. 10,053,308 by Corl Towes <i>et. al.</i> entitled “Portable Drive-Over Conveyor for Unloading Trucks” (“Toews”).

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1027	U.S. Patent Application Publication 2012/0241290 by Brent J. Gausman et al. entitled “Portable Low Profile Drive-Over Truck Dump Conveyor System” (“Gausman”)
1028	U.S. Patent Application Publication 2021/0354910 by Sandor Weaver Grimes et al. entitled “Proppant Supply System” (“Grimes”)
1029	<u>EconoLoader</u> <u>Air</u> <u>Slide</u> <u>Conveyor</u> <u>Design</u> , https://web.archive.org/web/20160819062313/http://mcschroeder.com/wp-content/uploads/2012/09/Product-Spec-Sheet-Air-Slide-EconoLoader.pdf
1030	EconoLoader <u>Screw</u> <u>Conveyor</u> <u>Design</u> , https://web.archive.org/web/20160819112209/http://mcschroeder.com/wp-content/uploads/2012/09/Product-Spec-Sheet-Auger-EconoLoader.pdf
1031	EconoLoader <u>Drag</u> <u>Conveyor</u> <u>Design</u> , https://web.archive.org/web/20160819173056/http://mcschroeder.com/wp-content/uploads/2012/09/Product-Spec-Sheet-Drag-EconoLoader1.pdf
1032	U.S. Patent No. 7,090,066 by Jason R. Kirsch entitled “Unloading System for Particulate Material” (“Kirsch”).
1033	Kania, L., et al. (2012). “A Catalogue Capacity of Slewing Bearings”. <i>Mechanism and Machine Theory</i> , 58, (29-45). https://doi.org/10.1016/j.mechmachtheory.2012.07.012
1034	Slewing <u>bearings</u> , https://web.archive.org/web/20200402104046/https://www.skf.com/group/products/slewing-bearings
1035	U.S. Department of Labor, OSHA, “Hydraulic Fracturing and Flowback Hazards Other than Respirable Silica” (OSHA 3763-12 2014) (“OSHA 3763”), available at: https://www.osha.gov/sites/default/files/publications/OSHA3763.pdf

All citations to exhibits reference original page numbers found in the underlying document, and all emphases are added.

V. SUMMARY OF CONCLUSIONS AND GROUNDS FOR CHALLENGE

18. After reviewing the materials identified in the List of Exhibits, I have concluded that each of the Challenged Claims of the '689 Patent would have been obvious to a person of ordinary skill in the art, based on the following grounds.

Ground	'689 Claims	Basis for Challenge
1	1-2, 4-11, 16-20, and 22-24	Obvious over <i>Waldner</i> in view of <i>Dynatek</i>
1A	1-2, 4-11, 16-20, and 22-24	Obvious over <i>Waldner</i> in view of <i>Dynatek</i> and <i>Sleeman</i>
2	6-7	Obvious over <i>Waldner</i> in view of <i>Dynatek</i> and <i>Pham</i>
2A	6-7	Obvious over <i>Waldner</i> in view of <i>Dynatek</i> , <i>Sleeman</i> , and <i>Pham</i>
3	3, 12, 21, and 25	Obvious over <i>Waldner</i> in view of <i>Dynatek</i> and <i>Auld</i>
3A	3, 12, 21, and 25	Obvious over <i>Waldner</i> in view of <i>Dynatek</i> , <i>Sleeman</i> , and <i>Auld</i>
4	13-15	Obvious over <i>Waldner</i> in view of <i>Dynatek</i> and <i>McIver</i>
4A	13-15	Obvious over <i>Waldner</i> in view of <i>Dynatek</i> , <i>Sleeman</i> , and <i>McIver</i>

VI. LEGAL STANDARDS

A. LEVEL OF ORDINARY SKILL IN THE ART

19. When interpreting a patent, I understand that it is important to identify the relevant art pertaining to the patent-in-suit as well as the level of ordinary skill in

that art at the time of the claimed invention. The “art” is the field of technology to which the patent is related.

20. I have been instructed by counsel that the person of ordinary skill in the art is a hypothetical person who is presumed to know the relevant prior art. I understand that the actual inventor’s skill is not determinative of the level of ordinary skill. I further understand that the factors that may be considered in determining the level of skill include: the types of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field. I understand that not all such factors may be present in every case, and one or more of them may predominate.

B. LEGAL STANDARD FOR CLAIM CONSTRUCTION

21. I understand that the first step in determining whether a patent claim would have been anticipated or obvious is to ascertain how a POSITA would have understood the claim terms.

22. I have been instructed by counsel on the law regarding claim construction and patent claims, and I understand that a patent may include two types of claims: independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim, or it can further depend from another dependent claim. I

understand that a dependent claim includes all the limitations that it recites, in addition to all the limitations recited in the claim(s) from which it depends.

23. It is my understanding that in proceedings before the USPTO, the claims of a patent are to be construed under what is referred to as the “Phillips standard.” I understand that this means that claim terms of a patent are given the meaning the terms would have to a POSITA, in view of the description provided in the patent itself and the patent’s file history.

24. I understand that to determine how a person of ordinary skill would understand a claim term, one should look to those sources available that show what a person of skill in the art would have understood the disputed claim language to mean. I understand that, in construing a claim term, one looks primarily to the intrinsic patent evidence, including the words of the claims themselves, the remainder of the patent, and the patent’s prosecution history. I understand that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient.

25. I understand that words or terms should be given their ordinary and accepted meaning unless it appears that the inventors were using them to mean something else. In making this determination, the claims, the remainder of the patent, and the prosecution history are of paramount importance. Additionally, the

patent and its prosecution history must be consulted to confirm whether the patentee has acted as its own lexicographer (i.e., provided its own special meaning to any disputed terms), or intentionally disclaimed, disavowed, or surrendered any claim scope.

26. In comparing the claims of the Challenged Patent to the prior art, I have considered the Challenged Patent and its file history in light of the understanding of a person of skill at the time of the alleged invention.

C. OBVIOUSNESS

27. I understand that the prior art may render a patent claim “obvious.” I understand that two or more prior art references (e.g., prior art articles, patents, or publications) that each disclose fewer than all elements of a patent claim may nevertheless be combined to render a patent claim obvious if the combination of the prior art collectively discloses all elements of the claim and one of ordinary skill in the art at the time would have been motivated to combine the prior art in such a way. I understand that this motivation to combine need not be explicit in any of the prior art but may be inferred from the knowledge of one of ordinary skill in the art at the time the patent was filed. I also understand that one of ordinary skill in the art is not an automaton but is a person having ordinary creativity. I further understand that one or more prior art references, articles, patents or publications that disclose fewer than all of the elements of a patent claim may render a patent claim obvious if including

the missing element would have been obvious to one of skill in the art (e.g., the missing element represents only an insubstantial difference over the prior art or a reconfiguration of a known system).

28. I understand that under the doctrine of obviousness, a claim may be invalid if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a POSITA to which the subject matter pertains.

29. To assess obviousness, I understand that I am to consider the scope and content of the prior art, the differences between the prior art and the claim, the level of ordinary skill in the art, and any secondary considerations to the extent they exist.

30. I understand that any evidence of secondary indicia of non-obviousness should be considered when evaluating whether a claimed invention would have been obvious to one of ordinary skill at the time of invention. These secondary indicia of non-obviousness may include, for example:

- a long felt but unmet need in the prior art that was satisfied by the claimed invention;
- commercial success of processes claimed by the patent;
- unexpected results achieved by the invention;
- praise of the invention by others skilled in the art;
- the taking of licenses under the patent by others; and

- deliberate copying of the invention.

31. I understand that there must be a nexus between any such secondary indicia and the claimed invention.

32. It is also my understanding that there are additional considerations that may be used as further guidance as to when the above factors will result in a finding that a claim is obvious, including the following:

- the claimed subject matter is simply a combination of prior art elements according to known methods to yield predictable results;
- the claimed subject matter is a simple substitution of one known element for another to obtain predictable results;
- the claimed subject matter uses known techniques to improve similar devices or methods in the same way;
- the claimed subject matter applies a known technique to a known device or method that is ready for improvement to yield predictable results;
- the claimed subject matter would have been “obvious to try” choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- there is known work in one field of endeavor that may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to a POSITA;
- there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent’s claims; and
- there is some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed subject matter.

33. Finally, I understand that a claim may be deemed invalid for obviousness in light of a single prior art reference, without the need to combine references, if the elements of the claim that are not found in the reference can be supplied by the knowledge or common sense of one of ordinary skill in the relevant art.

D. PRIORITY DATE

34. I understand that, subject to the next paragraph, the asserted “priority date” of a patent is the earlier of: (a) the date on which a patent application is filed; or (b) the date on which an earlier-filed patent application is filed if the patentee claims the benefit of priority to that earlier-filed patent application.

35. I understand that it is not enough for a patent to merely claim the benefit of an earlier-filed application, but that additional criteria must be met. In particular, the prior application itself must describe the claimed invention, and must do so in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date sought. First, I understand that a priority-date analysis is on a claim-by-claim basis. Second, I understand that, in order for a patent claim to be entitled to the filing date of an earlier patent application, a “Section 112 analysis” must be conducted. I am informed that a “Section 112” analysis encompasses looking to the earlier patent application and ascertaining whether that earlier patent application meets both the written-description and enablement requirements as of the filing date of the earlier application. I understand

that it is not enough that the claim would have been obvious from the earlier application, but that application itself must describe the claimed invention.

36. I understand that in order to satisfy the written description requirement the earlier application must reasonably convey to those skilled in the art that the inventors had possession of the subject matter of the patent as of the filing date of the earlier application. I have been informed that it is the disclosures of the earlier patent application that count, and that while the meaning of terms, phrases, or diagrams in the earlier patent application must be interpreted from the vantage point of one skilled in the art, all of the claimed limitations must appear in the specification. Further, I understand that this analysis is not a question of whether one skilled in the art might be able to construct the claimed invention from the teachings of the disclosure. The question is not whether a claimed invention is an obvious variant of that which is disclosed in the specification; rather, I understand that an earlier application must itself describe each of the claim limitations.

37. I also understand that in order to satisfy the enablement requirement, the earlier application must enable a person of ordinary skill in the art to practice the claimed invention without undue experimentation.

VII. OVERVIEW OF THE CHALLENGED PATENT

38. I have reviewed U.S. Patent No. 11,780,689 (“the '689 Patent”), which is entitled “Aggregate Transferring System.” Ex. 1001. I understand that the '689

Patent was filed on November 17, 2022, and that it was issued on October 10, 2023. The '689 Patent is a continuation of U.S. Patent App. No. 17/550,073, filed on December 14, 2021, which claims priority to a provisional application No. 63/223,124 filed on July 19, 2021. Accordingly, the '689 Patent claims priority to July 19, 2021.

A. THE SUBJECT MATTER OF THE CHALLENGED PATENT

39. The '689 Patent describes an aggregate transferring apparatus for receiving aggregate from a vehicle and elevating the aggregate to a higher level for deposit into a silo.¹ More specifically, the claims of the '689 Patent are directed to an apparatus having a base frame, a deployable frame pivotable about the base frame and having an elevating conveyor, and an extension conveyor at the top of the deployable frame with pivotable segments to discharge the aggregate.² . The '689 Patent claims various combinations of known elements for articulating between a transportable configuration and an operational configuration to reach predictable results; these elements and predictable results would have been known by a POSITA at the time of the '689 Patent's priority date.³; Examples of known elements claimed

¹ Ex. 1001, 1:14-18.

² Ex. 1001, 1:14-18, 1:25-2:6, FIG. 1A

³ see Ex. 1001, Claims 1-25

by the '689 Patent include a base frame, an unloader structure, a base conveyor, a deployable frame, an elevating conveyor, and an extension conveyor having inboard and outboard segments pivotable with respect to each other, among others.⁴

40. As demonstrated herein, all features of the Challenged Claims, including the design considerations and purported advantages described in the '689 Patent, were well known at the time the application leading to the '689 Patent was filed.

B. LEVEL OF ORDINARY SKILL IN THE ART

41. As of the earliest claimed priority date, it is my opinion that a person of ordinary skill in the art (“POSITA”) would have a degree in mechanical, electrical, petroleum, or civil engineering and with at least two years’ experience working in an industry or field that involves handling of particulate materials, which may include operations in the oil and gas industry that involve the handling of such materials. This definition is approximate, and more education may substitute for industry experience or vice versa. As of the priority date of the '689 Patent, I possessed at least the level of skill of a POSITA under this definition.

⁴ see Ex. 001, Claims 1-25

C. PROSECUTION HISTORY

42. The application that would issue as the '689 Patent, Patent Application No. 17/988,854 (the "'854 Application"), was filed on November 17, 2022.⁵ Prosecution of the '854 Application was short.⁶ In the only office action issued during prosecution that rejected claims over the prior art, the Examiner rejected claims 1-3, 8-9, 12, 15-18, 20, 21, and 24 as being unpatentable over *Waldner* in view of U.S. Patent Application Publication No. 2016/0280467 to Herman.⁷ Claim 14 was rejected as being unpatentable over *Waldner* in view of Herman and U.S. Patent Application Publication No. 2020/0140202 to Grose.⁸ In response, Applicant filed an amendment rewriting claims 4, 5, 10, 11, 19, 22, 23, and 25 in independent form (which eventually issued as claims 12, 13, 1, 16, 18, 22, 23, and 25 of the '689 Patent). In the final office action, the Examiner only maintained double-patenting rejections from the prior office action.⁹ The Examiner issued a Notice of Allowance on Aug. 21, 2023 but did not state any reasons for allowance.

⁵ Ex. 1001 cover.

⁶ Ex. 1012.

⁷ Ex. 1012, 92-94.

⁸ Ex. 1012, 94.

⁹ Ex. 1012, 64-84.

43. Based on the above, the presumed points of novelty of independent claims 1, 12, 13, 16, 18, 22, 23, and 25 of the '689 Patent over *Waldner* lie in the following features of the independent claims (or combinations thereof):

- an inboard segment of the extension conveyor of the conveyor extension assembly that is “pivotal at the inboard pivot about a substantially vertical axis with respect to the deployable frame at the inboard pivot when the extension conveyor is in the raised position,” and an outboard segment of the extension conveyor “being pivotal at the outboard pivot about a substantially vertical axis with respect to the inboard segment when the extension conveyor is in the raised position” (claim limitations 1[k] and 22[k]);
- an inboard and outboard segment of an extension conveyor that “are pivotal with respect to each other in a substantially horizontal operational plane” (claim limitation 18[j]);
- an outboard pivot of the extension conveyor that is “configured to permit transfer of aggregate from the inboard segment to the outboard segment” (claim limitation 16[k] and 23[k]);
- a trailer structure that includes a “landing leg mounted on the deployable frame to rest upon the ground surface when the deployable frame is in the storage position” and “a kingpin mounted on the

deployable frame toward the free end of the deployable frame, the kingpin being directed in a same direction as the at least one landing leg to engage a hitch of a towing vehicle when the deployable frame is in the storage position” (claim limitations 12[m] and [n] and 25[k] and [l]); and

- a frame deployment assembly that includes a “lift arm structure mounted on the base frame and the deployable frame and forming a linkage between the base frame and the deployable frame, the at least one lift arm structure being articulated between opposite first and second ends of the arm structure” and “an actuator mounted on the base frame and the at least one lift arm structure to move the at least one lift arm structure with respect to the base frame” (claim limitations 13[l] and [m]).

44. Those features, however, were well known at the time the '689 Patent was filed (along with all of the other features of all Challenged Claims). Every feature of the Challenged Claims is disclosed in the prior art.

D. COMPARISON OF ASSERTED REFERENCES TO PRIOR ART DISCUSSED DURING PROSECUTION

45. I have been asked to review the examination history of the '689 Patent, and to compare the prior art grounds presented herein to those considered in

rejections by the Examiner during the examination of the '689 Patent. As I describe below, my opinion is that the Grounds of invalidity considered herein are not cumulative of the prior art considered by the Examiner during examination.

46. **Primary reference:** I have relied on *Waldner* as a base (or primary) reference. *Waldner* is listed on the face of the '689 Patent and was substantively considered by the Examiner during the prosecution of the '689 Patent.

47. **Secondary reference:** I have relied upon several additional references (secondary references) that are used in combination with the primary reference. Most of these references were not considered during prosecution of the '689 Patent, and are not cited on the cover of the '689 Patent. In particular, for each Ground of invalidity, I have relied on *Dynatek*, which was not considered during prosecution of the '689 Patent and was not cited on its cover. The claim limitations of the '689 patent, to the extent not disclosed by the primary reference, are disclosed in the secondary references, and a POSITA would have been motivated to combine the primary reference with the secondary references in the manners in which I discuss below.

E. THE CHALLENGED CLAIMS OF THE '689 PATENT

48. The Challenged Claims of the '689 Patent, which are Claims 1-25, are set forth below. Some of the claim elements have been further sub-divided for ease of reference.

Claim Element	Claim Language from '689 Patent
1[pre]	An aggregate transferring apparatus for elevating and transferring aggregate, the apparatus comprising:
1[a]	a base assembly for receiving aggregate to be conveyed by the transferring apparatus, the base assembly comprising:
1[b]	a base frame being elongated along a longitudinal axis and having a leading end and a trailing end;
1[c]	an unloader structure mounted on the base frame to receive aggregate from a vehicle at least partially positioned over the base frame; and
1[d]	a base conveyor mounted on the base frame and extending along a longitudinal portion of the base frame between the leading and trailing ends of the base frame, a portion of the base conveyor being positioned adjacent to the unloader structure to receive aggregate from the vehicle positioned over the base frame;
1[e]	an aggregate elevating assembly for elevating aggregate from the base assembly, the aggregate elevating assembly comprising:
1[f]	a deployable frame mounted on the base frame and being movable between a storage position and a deploy position, the storage position corresponding to a transport configuration of the apparatus and the deploy position corresponding to an operational configuration of the apparatus, the deployable frame being elongated with a base end and a free end; and
1[g]	an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward the free end of the deployable frame; and

1[h]	a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:
1[i]	an extension conveyor for moving aggregate from an inlet of the extension conveyor to an outlet of the extension conveyor at a location outward from the aggregate elevating assembly, the extension conveyor being movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus, the lowered position being characterized by the extension conveyor being positioned adjacent to the deployable frame of the aggregate elevating assembly, the raised position being characterized by the extension conveyor being positioned generally away from the deployable frame of the aggregate elevating assembly,
1[j]	wherein the extension conveyor is articulated between the inlet and outlet with an inboard segment and an outboard segment, the inboard segment being pivotally connected to the deployable frame of the aggregate elevating assembly by an inboard pivot, the outboard segment being pivotally connected to the inboard segment by an outboard pivot; and
1[k]	wherein the inboard segment of the extension conveyor of the conveyor extension assembly is pivotable at the inboard pivot about a substantially vertical axis with respect to the deployable frame at the inboard pivot when the extension conveyor is in the raised position, the outboard segment of the extension conveyor being pivotable at the outboard pivot about a substantially vertical axis with respect to the inboard segment when the extension conveyor is in the raised position.
2	The apparatus of claim 1 wherein the base assembly has at least one axle and a pair of wheels mounted on the at least one axle such that the base assembly is transportable across the ground surface.
3	The apparatus of claim 2 wherein the aggregate elevating assembly includes trailer structure configured to permit the apparatus to be

	towed across a ground surface, the trailer structure being positioned adjacent to the ground surface when the deployable frame is in the storage position.
4	The apparatus of claim 1 wherein the lowered position of the extension conveyor of the conveyor extension assembly is characterized by the extension conveyor being oriented substantially parallel to the deployable frame of the aggregate elevating assembly, the raised position of the extension conveyor being characterized by the extension conveyor being oriented substantially perpendicular to the deployable frame of the aggregate elevating assembly.
5	The apparatus of claim 1 wherein the raised position of the extension conveyor of the conveyor extension assembly is characterized by the extension conveyor being cantilevered outwardly from the deployable frame of the aggregate elevating assembly.
6[pre]	The apparatus of claim 1 wherein the conveyor extension assembly additionally comprises:
6[a]	a conveyor support frame supporting the segments of the extension conveyor on the aggregate elevating assembly, the conveyor support frame being movable with respect to the deployable frame of the aggregate elevating assembly when the extension conveyor moves between the lowered position and the raised position; and
6[b]	an extension conveyor lift structure acting on the conveyor support frame for moving the extension conveyor between the lowered position and the raised position.
7	The apparatus of claim 1 wherein the extension conveyor lift structure comprises at least one extension actuator extendable to pivot the conveyor support frame away from the deployable frame and move the extension conveyor to the raised position, the at least one extension actuator being retractable to pivot the conveyor support frame toward the deployable frame and move the extension conveyor to the lowered position.

8	The apparatus of claim 1 wherein the conveyor extension assembly includes a chute mounted on the extension conveyor to extend downward from the extension conveyor and receive aggregate from the outlet of the extension conveyor.
9	The apparatus of claim 1 wherein the base assembly includes an outrigger structure mounted on the base frame, the outrigger structure being movable with respect to the base frame between a stabilizing condition corresponding to an operational configuration of the apparatus and a non-stabilizing condition corresponding to a transport configuration of the apparatus.
10	The apparatus of claim 1 wherein the unloader structure includes a pair of ramps and a grate mounted on the base frame, the grate being positioned between the pair of ramps, at least a portion of the grate being reticulated to permit aggregate to pass through the grate and fall onto the base conveyor.
11	The apparatus of claim 10 wherein each of the ramps of the unloader structure is pivotable with respect to the base frame, the ramps extending laterally in substantially horizontal and opposite directions from the base frame in the operational condition of the apparatus, the ramps extending substantially vertical and parallel to each other in the transport condition of the apparatus.
12[pre]	An aggregate transferring apparatus for elevating and transferring aggregate, the apparatus comprising:
12[a]	a base assembly for receiving aggregate to be conveyed by the transferring apparatus, the base assembly comprising:
12[b]	a base frame being elongated along a longitudinal axis and having a leading end and a trailing end;
12[c]	an unloader structure mounted on the base frame to receive aggregate from a vehicle at least partially positioned over the base frame; and

12[d]	a base conveyor mounted on the base frame and extending along a longitudinal portion of the base frame between the leading and trailing ends of the base frame, a portion of the base conveyor being positioned adjacent to the unloader structure to receive aggregate from the vehicle positioned over the base frame;
12[e]	an aggregate elevating assembly for elevating aggregate from the base assembly, the aggregate elevating assembly comprising:
12[f]	a deployable frame mounted on the base frame and being movable between a storage position and a deploy position, the storage position corresponding to a transport configuration of the apparatus and the deploy position corresponding to an operational configuration of the apparatus, the deployable frame being elongated with a base end and a free end; and
12[g]	an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward the free end of the deployable frame; and
12[h]	a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:
12[i]	an extension conveyor for moving aggregate from an inlet of the extension conveyor to an outlet of the extension conveyor at a location outward from the aggregate elevating assembly, the extension conveyor being movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus, the lowered position being characterized by the extension conveyor being positioned adjacent to the deployable frame of the aggregate elevating assembly, the raised position being characterized by the extension conveyor being positioned generally away from the deployable frame of the aggregate elevating assembly; and
12[j]	wherein the extension conveyor is articulated between the inlet and outlet with an inboard segment and an outboard segment, the

	inboard segment being pivotally connected to the deployable frame of the aggregate elevating assembly by an inboard pivot, the outboard segment being pivotally connected to the inboard segment by an outboard pivot;
12[k]	wherein the base assembly has at least one axle and a pair of wheels mounted on the at least one axle such that the base assembly is transportable across the ground surface;
12[l]	wherein the aggregate elevating assembly includes trailer structure configured to permit the apparatus to be towed across a ground surface, the trailer structure being positioned adjacent to the ground surface when the deployable frame is in the storage position;
12[m]	wherein the trailer structure comprises: at least one landing leg mounted on the deployable frame to rest upon the ground surface when the deployable frame is in the storage position; and
12[n]	a kingpin mounted on the deployable frame toward the free end of the deployable frame, the kingpin being directed in a same direction as the at least one landing leg to engage a hitch of a towing vehicle when the deployable frame is in the storage position.
13[pre]	An aggregate transferring apparatus for elevating and transferring aggregate, the apparatus comprising:
13[a]	a base assembly for receiving aggregate to be conveyed by the transferring apparatus, the base assembly comprising:
13[b]	a base frame being elongated along a longitudinal axis and having a leading end and a trailing end;
13[c]	an unloader structure mounted on the base frame to receive aggregate from a vehicle at least partially positioned over the base frame; and
13[d]	a base conveyor mounted on the base frame and extending along a longitudinal portion of the base frame between the leading and

	trailing ends of the base frame, a portion of the base conveyor being positioned adjacent to the unloader structure to receive aggregate from the vehicle positioned over the base frame;
13[e]	an aggregate elevating assembly for elevating aggregate from the base assembly, the aggregate elevating assembly comprising:
13[f]	a deployable frame mounted on the base frame and being movable between a storage position and a deploy position, the storage position corresponding to a transport configuration of the apparatus and the deploy position corresponding to an operational configuration of the apparatus, the deployable frame being elongated with a base end and a free end; and
13[g]	an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward the free end of the deployable frame; and
13[h]	a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:
13[i]	an extension conveyor for moving aggregate from an inlet of the extension conveyor to an outlet of the extension conveyor at a location outward from the aggregate elevating assembly, the extension conveyor being movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus, the lowered position being characterized by the extension conveyor being positioned adjacent to the deployable frame of the aggregate elevating assembly, the raised position being characterized by the extension conveyor being positioned generally away from the deployable frame of the aggregate elevating assembly,
13[j]	wherein the extension conveyor is articulated between the inlet and outlet with an inboard segment and an outboard segment, the inboard segment being pivotally connected to the deployable frame of the aggregate elevating assembly by an inboard pivot, the

	outboard segment being pivotally connected to the inboard segment by an outboard pivot; and
13[k]	wherein the aggregate elevating assembly includes a frame deployment assembly configured to move the deployable frame with respect to the base frame between the storage and deploy positions, the frame deployment structure comprising:
13[l]	at least one lift arm structure mounted on the base frame and the deployable frame and forming a linkage between the base frame and the deployable frame, the at least one lift arm structure being articulated between opposite first and second ends of the arm structure; and
13[m]	an actuator mounted on the base frame and the at least one lift arm structure to move the at least one lift arm structure with respect to the base frame.
14	The apparatus of claim 13 wherein the at least one lift arm structure comprising a pair of the lift arm structures mounted on the base frame and the deployable frame, the pair of lift arm structures being located on opposite lateral sides of the deployable frame.
15[a]	The apparatus of claim 13 wherein the at least one lift arm structure comprises a first link member and a second link member pivotally mounted together; and
15[b]	wherein the actuator of the frame deployment assembly is mounted on a base mount point on the base frame and a medial mount point on the second link member.
16[pre]	An aggregate transferring apparatus for elevating and transferring aggregate, the apparatus comprising:
16[a]	a base assembly for receiving aggregate to be conveyed by the transferring apparatus, the base assembly comprising:
16[b]	a base frame being elongated along a longitudinal axis and having a leading end and a trailing end;

16[c]	an unloader structure mounted on the base frame to receive aggregate from a vehicle at least partially positioned over the base frame; and
16[d]	a base conveyor mounted on the base frame and extending along a longitudinal portion of the base frame between the leading and trailing ends of the base frame, a portion of the base conveyor being positioned adjacent to the unloader structure to receive aggregate from the vehicle positioned over the base frame;
16[e]	an aggregate elevating assembly for elevating aggregate from the base assembly, the aggregate elevating assembly comprising:
16[f]	a deployable frame mounted on the base frame and being movable between a storage position and a deploy position, the storage position corresponding to a transport configuration of the apparatus and the deploy position corresponding to an operational configuration of the apparatus, the deployable frame being elongated with a base end and a free end; and
16[g]	an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward the free end of the deployable frame; and
16[h]	a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:
16[i]	an extension conveyor for moving aggregate from an inlet of the extension conveyor to an outlet of the extension conveyor at a location outward from the aggregate elevating assembly, the extension conveyor being movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus, the lowered position being characterized by the extension conveyor being positioned adjacent to the deployable frame of the aggregate elevating assembly, the raised position being characterized by the

	extension conveyor being positioned generally away from the deployable frame of the aggregate elevating assembly;
16[j]	wherein the extension conveyor is articulated between the inlet and outlet with an inboard segment and an outboard segment, the inboard segment being pivotally connected to the deployable frame of the aggregate elevating assembly by an inboard pivot, the outboard segment being pivotally connected to the inboard segment by an outboard pivot; and
16[k]	wherein the outboard pivot of the extension conveyor of the conveyor extension assembly is configured to permit transfer of aggregate from the inboard segment to the outboard segment.
17	The apparatus of claim 16 wherein the inboard segment of the extension conveyor of the conveyor extension assembly is pivotable at the inboard pivot about a substantially vertical axis with respect to the deployable frame at the inboard pivot when the extension conveyor is in the raised position, the outboard segment of the extension conveyor being pivotable at the outboard pivot about a substantially vertical axis with respect to the inboard segment when the extension conveyor is in the raised position.
18[pre]	An aggregate transferring apparatus for elevating and transferring aggregate to elevated locations above a ground surface, the apparatus comprising:
18[a]	a base assembly configured to receive aggregate to be conveyed by the transferring apparatus, the base assembly including:
18[b]	an elongated base frame; and
18[c]	a base conveyor extending longitudinally of the base frame;
18[d]	an aggregate elevating assembly configured to elevate aggregate from the base conveyor of the base assembly, the aggregate elevating assembly including:

18[e]	a deployable frame mounted on the base frame and being movable between a storage position and a deploy position; and
18[f]	an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward a free end of the deployable frame; and
18[g]	a conveyor extension assembly configured to convey aggregate to locations elevated from the ground surface and horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:
18[h]	an extension conveyor for moving aggregate from an inlet of the extension conveyor at the aggregate elevating assembly to an outlet of the extension conveyor at a location outward from the elevating assembly;
18[i]	wherein the extension conveyor includes an inboard segment and an outboard segment, the inboard and outboard segments being articulated between the inlet and outlet such that the inboard and outboard segments are pivotable with respect to each other and with respect to the aggregate elevating assembly about substantially vertical axes to permit adjustment of a position of the outlet with respect to the aggregate elevating assembly; and
18[j]	wherein the inboard and outboard segments of the extension conveyor are pivotable with respect to each other in a substantially horizontal operational plane.
19	The apparatus of claim 18 wherein the extension conveyor is movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus for movement of the inboard and outboard segments in a substantially horizontal operational plane.
20	The apparatus of claim 18 wherein the inboard segment of the extension conveyor is pivotable with respect to the aggregate elevating assembly at an inboard pivot, the outboard segment of the

	extension conveyor being pivotable with respect to the inboard segment at an outboard pivot spaced from the elevating assembly by the inboard segment.
21	The apparatus of claim 18 wherein the aggregate elevating assembly includes trailer structure configured to permit the apparatus to be towed across a ground surface, the trailer structure being positioned adjacent to the ground surface when the deployable frame is in the storage position.
22[pre]	An aggregate transferring apparatus for elevating and transferring aggregate to elevated locations above a ground surface, the apparatus comprising:
22[a]	a base assembly configured to receive aggregate to be conveyed by the transferring apparatus, the base assembly including:
22[b]	an elongated base frame; and
22[c]	a base conveyor extending longitudinally of the base frame;
22[d]	an aggregate elevating assembly configured to elevate aggregate from the base conveyor of the base assembly, the aggregate elevating assembly including:
22[e]	a deployable frame mounted on the base frame and being movable between a storage position and a deploy position; and
22[f]	an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward a free end of the deployable frame; and
22[g]	a conveyor extension assembly configured to convey aggregate to locations elevated from the ground surface and horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:
22[h]	an extension conveyor for moving aggregate from an inlet of the extension conveyor at the aggregate elevating assembly to an outlet

	of the extension conveyor at a location outward from the elevating assembly;
22[i]	wherein the extension conveyor includes an inboard segment and an outboard segment, the inboard and outboard segments being articulated between the inlet and outlet such that the inboard and outboard segments are pivotable with respect to each other and with respect to the aggregate elevating assembly about substantially vertical axes to permit adjustment of a position of the outlet with respect to the aggregate elevating assembly;
22[j]	wherein the inboard segment of the extension conveyor is pivotable with respect to the aggregate elevating assembly at an inboard pivot, the outboard segment of the extension conveyor being pivotable with respect to the inboard segment at an outboard pivot spaced from the elevating assembly by the inboard segment; and
22[k]	wherein the inboard segment of the extension conveyor of the conveyor extension assembly is pivotable at the inboard pivot about a substantially vertical axis with respect to the deployable frame at the inboard pivot when the extension conveyor is in the raised position, the outboard segment of the extension conveyor being pivotable at the outboard pivot about a substantially vertical axis with respect to the inboard segment when the extension conveyor is in the raised position.
23[pre]	An aggregate transferring apparatus for elevating and transferring aggregate to elevated locations above a ground surface, the apparatus comprising:
23[a]	a base assembly configured to receive aggregate to be conveyed by the transferring apparatus, the base assembly including:
23[b]	an elongated base frame; and
23[c]	a base conveyor extending longitudinally of the base frame;

23[d]	an aggregate elevating assembly configured to elevate aggregate from the base conveyor of the base assembly, the aggregate elevating assembly including:
23[e]	a deployable frame mounted on the base frame and being movable between a storage position and a deploy position; and
23[f]	an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward a free end of the deployable frame; and
23[g]	a conveyor extension assembly configured to convey aggregate to locations elevated from the ground surface and horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:
23[h]	an extension conveyor for moving aggregate from an inlet of the extension conveyor at the aggregate elevating assembly to an outlet of the extension conveyor at a location outward from the elevating assembly;
23[i]	wherein the extension conveyor includes an inboard segment and an outboard segment, the inboard and outboard segments being articulated between the inlet and outlet such that the inboard and outboard segments are pivotable with respect to each other and with respect to the aggregate elevating assembly about substantially vertical axes to permit adjustment of a position of the outlet with respect to the aggregate elevating assembly;
23[j]	wherein the inboard segment of the extension conveyor is pivotable with respect to the aggregate elevating assembly at an inboard pivot, the outboard segment of the extension conveyor being pivotable with respect to the inboard segment at an outboard pivot spaced from the elevating assembly by the inboard segment; and
23[k]	wherein the outboard pivot of the extension conveyor of the conveyor extension assembly is configured to permit transfer of aggregate from the inboard segment to the outboard segment.

24	The apparatus of claim 23 wherein the inboard and outboard segments of the extension conveyor are pivotable with respect to each other in a substantially horizontal operational plane.
25[pre]	An aggregate transferring apparatus for elevating and transferring aggregate to elevated locations above a ground surface, the apparatus comprising:
25[a]	a base assembly configured to receive aggregate to be conveyed by the transferring apparatus, the base assembly including:
25[b]	an elongated base frame; and
25[c]	a base conveyor extending longitudinally of the base frame;
25[d]	an aggregate elevating assembly configured to elevate aggregate from the base conveyor of the base assembly, the aggregate elevating assembly including:
25[e]	a deployable frame mounted on the base frame and being movable between a storage position and a deploy position; and
25[f]	an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward a free end of the deployable frame; and
25[g]	a conveyor extension assembly configured to convey aggregate to locations elevated from the ground surface and horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:
25[h]	an extension conveyor for moving aggregate from an inlet of the extension conveyor at the aggregate elevating assembly to an outlet of the extension conveyor at a location outward from the elevating assembly;
25[i]	wherein the extension conveyor includes an inboard segment and an outboard segment, the inboard and outboard segments being articulated between the inlet and outlet such that the inboard and

	outboard segments are pivotable with respect to each other and with respect to the aggregate elevating assembly about substantially vertical axes to permit adjustment of a position of the outlet with respect to the aggregate elevating assembly;
25[j]	wherein the aggregate elevating assembly includes trailer structure configured to permit the apparatus to be towed across a ground surface, the trailer structure being positioned adjacent to the ground surface when the deployable frame is in the storage position; and
25[k]	wherein the trailer structure comprises: at least one landing leg mounted on the deployable frame to rest upon the ground surface when the deployable frame is in the storage position; and
25[l]	a kingpin mounted on the deployable frame toward a free end of the deployable frame, the kingpin being directed in a same direction as the at least one landing leg to engage a hitch of a towing vehicle when the deployable frame is in the storage position.

F. CLAIM CONSTRUCTION OF THE '689 PATENT

49. For purposes of my analysis of the '689 Patent claims, I have applied the ordinary and accepted meaning of the claim language as a POSITA. However, I understand that certain terms in those claims that may require construction under the applicable law.

50. To the extent that Patent Owner asserts or the Board finds that the “unloader structure ... to receive aggregate from a vehicle at least partially positioned over the base frame” of claims 1, 12-13, and 16 must be construed under 35 U.S.C. 112(f), I understand that that term may be construed consistent with the

specification and file history of the '689 Patent to require the following function and structure(s):

51. Function: “receiving aggregate”

52. Corresponding structure: (i) a pair of ramps mounted across a base frame, and (ii) an opening positioned between the pair of ramps; or equivalent structures.

53. To the extent that Patent Owner asserts or the Board finds that the “trailer structure configured to permit the apparatus to be towed across a ground surface” of claims 3 and 21 must be construed under 35 U.S.C. 112(f), I understand that that term may be construed consistent with the specification and file history of the '689 Patent to require the following function and structure(s):

54. Function: “permit the apparatus to be towed across a ground surface”

55. Corresponding structure: a kingpin mounted on the deployable frame toward its free end; or equivalent structures.

56. My analysis also applies the alternative constructions for the terms set forth above. In the event these constructions are applicable to the claim terms noted above, my opinions set forth in this declaration would not change. However, I reserve the right to supplement my testimony to the extent that other constructions of those or other terms are proposed or adopted.

VIII. TECHNOLOGY BACKGROUND AND STATE OF THE ART

57. In the subsections below, I describe some of the basic principles of engineering that would be used, or at least considered for use, in the field of handling aggregate or particulate materials, *e.g.*, transporting and handling such materials in oilfield operations such as fracturing operations. The principles discussed in the subsections below would have been well-known to a POSITA in the 2021 timeframe, and long before.

A. SAND AND GRAVEL TRANSPORTATION / STORAGE

58. Operations in many industries involve the transportation and storage of large amounts of particulate or aggregate materials, such as sand or gravel, at a site where those materials will be used. For example, in the oil and gas industry, hydraulic fracturing operations are employed at oil and gas wells to stimulate the production of fluids from subterranean formations penetrated by those wells. Hydraulic fracturing operations often involve pumping large amounts of particulates – such as sand, gravel, or other aggregate materials – into the well in order to hold open fractures created in the subterranean formation and allow the flow of fluids through those fractures. For example, *Payne* describe hydraulic fracturing as “high-pressure injection of “fracking fluid” (primarily water, containing sand or other proppants suspended with the aid of thickening agents) into a wellbore to create cracks in the deep-rock formations through which natural gas, petroleum, and brine

will flow more freely. When the hydraulic pressure is removed from the well, small grains of hydraulic fracturing proppants (such as sand or aluminum oxide) hold the fractures open.”¹⁰ As OSHA describes “Large quantities of silica sand are used during hydraulic fracturing. Sand is delivered via truck and then loaded into sand movers, where it is subsequently transferred via conveyer belt and blended with other hydraulic fracturing fluids prior to high pressure injection into the drilling hole.”¹¹ *Campbell* describes proppants as “a solid bulk material, for example sand, treated sand, man-made ceramic materials, glass, sintered bauxite, or combinations of these.”¹²

59. Other industries, such as construction, use aggregates such as sand and gravel delivered to and stored on site, then subsequently used in the construction process. As described by *Fike* “Construction projects often use fluent materials, which are materials that flow, such as gravel, concrete, soil, mulch, and other bulk material, and the delivery of the same.”¹³ *Fike* further describes storage of the materials at the site: “Urban construction sites, for example have limited space, and

¹⁰ Ex. 1020 [0005].

¹¹ Ex. 1021 at 2; see generally Ex. 1035.

¹² Ex. 1022 [0016].

¹³ Ex 1023 1:44-46.

private property may overlap with public property. Any such circumstances may result in unexpected or undesired costs, such as rent to the municipality or private property owners for use of public or private space for delivery and/or storage of materials”¹⁴

60. Further still, manufacture of concrete requires delivery, storage and handling of aggregate materials such as sand and gravel. *Perry* describes “A concrete batch plant designed and constructed for transport to the site wherein the concrete is to be used.”¹⁵ Allen is directed to a “mobile concrete batch plants for mixing cement and aggregate (including sand) in proper proportions at a job site and for depositing the mix into mix trucks.”¹⁶ Allen’s concrete batch plant is meant to be used on-site at a job location, to wit “An improved mobile concrete batch plant in accordance with the present invention comprises a wheeled supporting framework adapted for towing while in the horizontal road transport position and further adapted to have one end raised to a working position at the job site to accommodate mix trucks there

¹⁴ Ex. 1022 1:38-44.

¹⁵ Ex. 1007 Abstract

¹⁶ Ex 1024 1:6-9.

beneath.”¹⁷ Allen’s plant contains “a multi-compartment aggregate storage bin”¹⁸ and a “belt type aggerate conveyor.”¹⁹

61. Job-site aggregate handling systems were not only portable but were designed to be convertible to be transported from job-site to job-site as a normal trailer, and then erected at the job site for use. Allen’s system was designed with “a wheeled supporting framework adapted for towing while in the horizontal road transport position and further adapted to have one end raised to a working position at the job site to accommodate mix trucks therebeneath.”²⁰ Fike’s conveyor system “may be a trailer or vehicle bed. [] In a transport mode the feed conveyor is substantially parallel to, and supported by, the base, and the primary conveyor is substantially parallel to, and directly above, the feed conveyor. In operation mode, the feed conveyor is angled relative to the base's upper surface and its lower end and the hopper are disposed lower than the base's upper surface.”²¹ *Teichrob* describes “a method and system for handling granular material, such as proppant used in

¹⁷ Ex 1024 2:13-18.

¹⁸ Ex 1024 2:25-26.

¹⁹ Ex. 1024 3:67.

²⁰ Ex. 1024 2:13-18.

²¹ Ex. 1023 Abstract

hydraulic fracturing.”²² *Teichrob*’s system comprises “a delivery module configured to receive said granular material at a reception area thereof and to convey said granular material to a predetermined delivery location.”²³ As another example, *Perry* teaches a portable concrete batch plant that is oriented substantially horizontally during transport and substantially vertically during operation.²⁴ *Perry* discloses “[a] concrete batch plant designed and constructed for transport to the site wherein the concrete is to be used, said plant being disposed in a substantially horizontal position during transport thereof and in a substantially vertical position during operation thereof for producing concrete batches.”²⁵

62. In order to make them towable, these systems included hitches and/or kingpins for attachment to a towing vehicle. As an example, *Perry* teaches “[K]ing pin 157 is engaged and locked in the fifth wheel” of a standard type highway tractor trailer vehicle, such that “the tractor may be moved forwardly in the usual manner for pulling the plant 140 along the highway.”²⁶

²² Ex. 1025 Abstract

²³ Ex. 1025 3:59-62

²⁴ See, e.g., Ex. 1007 Abstract

²⁵ Ex. 1007 Abstract

²⁶ Ex. 1007, 4:23-37

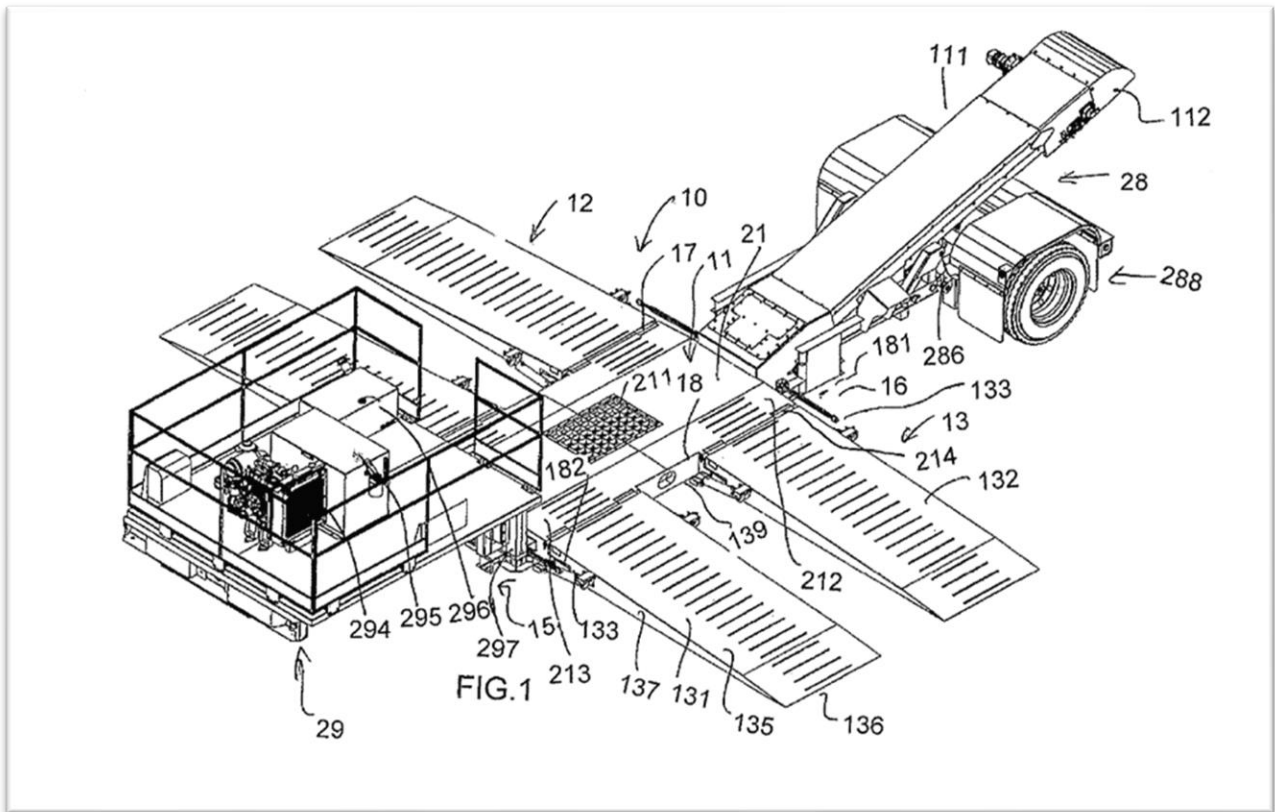
63. Particulate materials are often delivered via specially designed transport vehicles (trucks, train cars) that have a “belly discharge opening which is relatively close to the ground”²⁷ In the case of trucks, unloading was accomplished often by the use of drive over conveyors. According to *Toews*, “Material transport vehicle unloading conveyor systems are commonly used whenever there is a need to transport and store materials at a variety of locations.”²⁸ These systems, when used with belly discharge openings often included “drive-over” type systems, where the trucks are elevated over a conveyor system and the materials drop onto the conveyor trough the belly discharge opening. Further, according to *Toews*, these “drive over” systems were common in agricultural use.²⁹ However, by at least 2014 these systems were also known for use to unload proppant (e.g. sand) for trucks to be stored in silos and used for hydraulic fracturing operations. *Toews* discusses “[a] drive-over conveyor for unloading fracking sand is designed to be towed as a highway semi-

²⁷ Ex. 1026 3:18 – 19.

²⁸ Ex. 1026 1:9-11.

²⁹ Ex. 1026 1:21 – 23.

trailer.”³⁰ Further, *Toews* describes “an arrangement [] designed for unloading sand from highway trucks for movement to a storage silo for use in fracking.”³¹



Ex. 1026 Fig. 1

64. As another example, *Gausman* describes a “portable truck dump comprises a conveyor system mounted on an elongate frame to transport material from a first end of the frame to a second, opposite end of the frame.”³² This system

³⁰ Ex. 1026 Abstract.

³¹ Ex. 1026 1:14-16.

³² Ex. 1027 Abstract.

is “suitable for unloading a belly dump material transport vehicle having belly-dump gates”³³ The system of *Gausman* comprises a frame, a grate and ramps, each of which is suitable to support an aggregate transport truck.³⁴ The grate is “positioned over the conveyor system.”³⁵ When a truck is positioned on the grate and the belly-gate is opened, the material discharges through the belly-dump, through the grate and onto “a conventional endless conveyor belt assembly”³⁶ that carries the material out from under the grate, up an incline and “to a hopper 25 for delivery to subsequent conveyor systems.”³⁷ Like the system of *Toews, Perry* and others discussed above, *Gausman*’s system is “portable”.

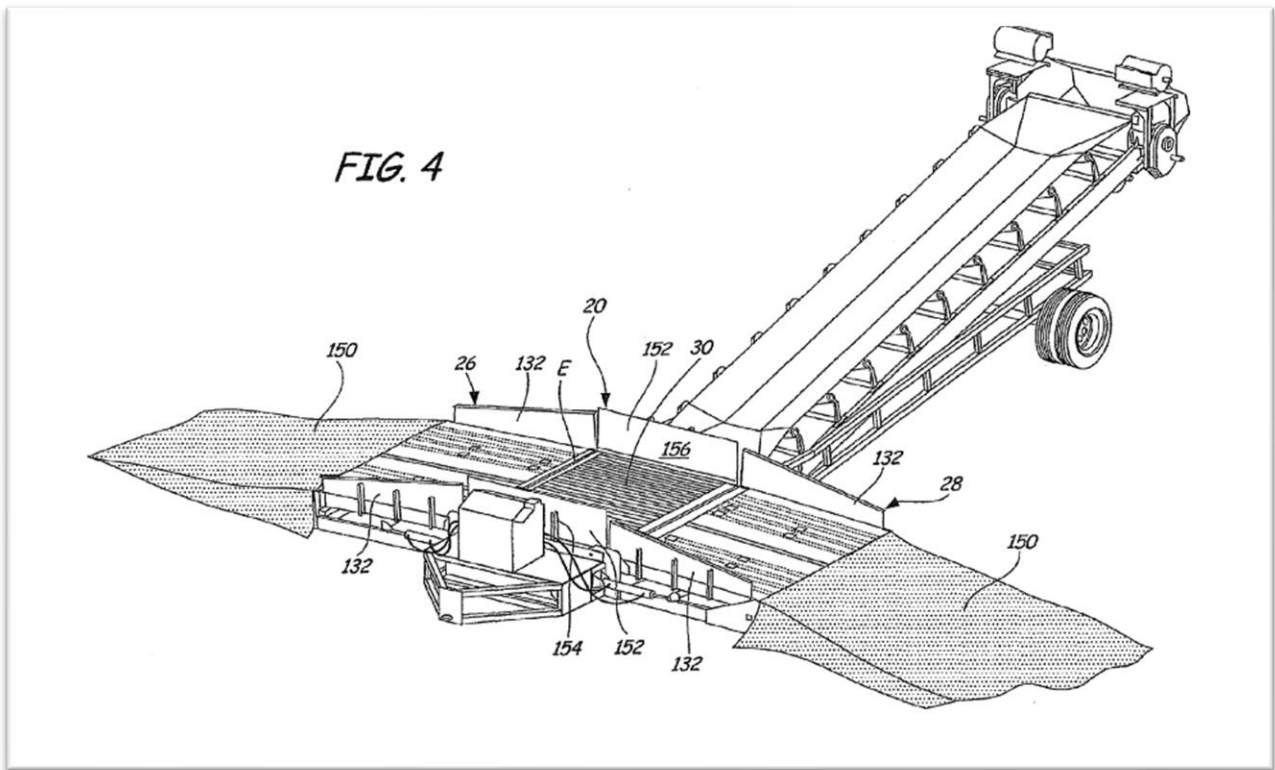
³³ Ex. 1027 [0004].

³⁴ Ex. 1027 [0004].

³⁵ Ex. 1027 Abstract.

³⁶ Ex. 1027 [0014]

³⁷ Ex. 1027 [0014]



Ex. 1027 Fig. 4

65. As yet another example, *Friesen* teaches “portable drive-over conveyors for transferring particulate material transported by a truck off the truck to a desired location.”³⁸

B. CONVEYORS FOR PARTICULATE MATERIALS

66. As discussed briefly in the section above, conveyor systems were well-known to move aggregate around at a job site. Some of these systems include “chutes” or “ramps” used to direct aggregate from an elevated location to a lower

³⁸ Ex. 1010 1:12 – 15.

location. For example, *Friesen* discloses “a chute at the discharge of the conveyor system for guiding the particulate material by gravity away therefrom to a desired outside location.”³⁹ *Campbell* describes “[a] discharge chute depends from the telescopic conveyor boom to define the discharge point.”⁴⁰

67. Many systems, however, used belt type conveyors, as discussed above regarding *Friesen*, *Gausman*, and *Toews*. Often times these conveyor systems used multiple levels of belts to elevate the material to its desired location. *Friesen* describes a conveyor system comprised of a “first stage of the conveyor system [that] transfers the material in one direction from an inlet of the conveyor system to a transfer discharge, whereas the unloaded material is transferred to the second stage transferring the material in an opposite direction to a discharge of the overall conveyor system which is located at a higher elevation than the transfer discharge.”⁴¹ *Campbell* describes a drive over conveyor system comprising “a drive over ramp proppant receiver 95 connected to conveyor 36.”⁴² Conveyor 36 is used “to convey

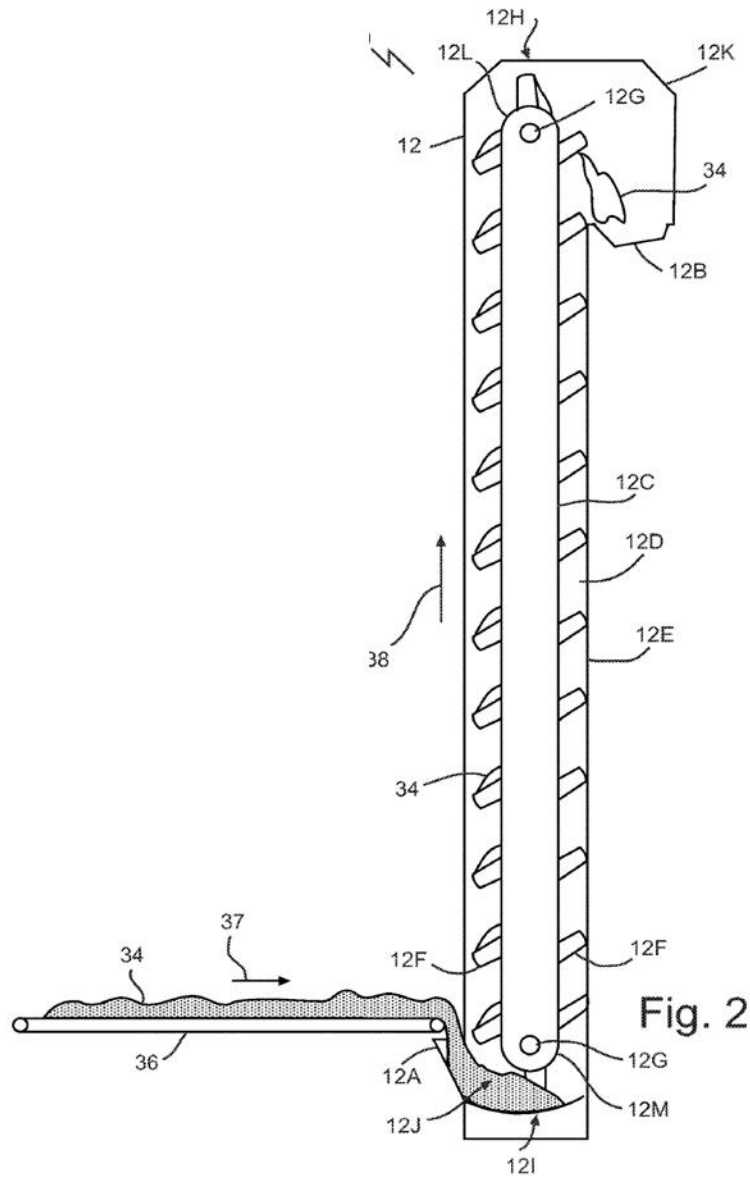
³⁹ Ex. 1010 4:55 – 67.

⁴⁰ Ex. 1022 [0005].

⁴¹ Ex. 1010 Abstract

⁴² Ex. 1022 [0034]

the proppant 34 to the inlet hopper 12A of the bucket elevator 12⁴³ which raises the proppant (sand) “to the relatively elevated position of the outlet chute 12B.”⁴⁴



⁴³ Ex. 1022 [0033].

⁴⁴ Ex. 1022 [0025].

68. *Teichrob* teaches “main conveyors” which deliver material to ‘discharge conveyors 130, which convey the material to a height appropriate to allow the material to feed one or more blender modules.’⁴⁵ *Teichrob* further teaches the conveyors “may be expanded in length, for example by adding one or more additional conveyors arranged end-to-end.”⁴⁶

69. As discussed above regarding *Campbell*, some systems use bucket or paddle type conveyors to carry the particulate material more or less vertically to an elevated height. However, this was not limited to *Campbell* as *Grimes* also teaches use of a “bucket elevator [that] may include a plurality of buckets, paddles, or bins arranged on a belt or chain and designed to scoop proppant from a receiving area 116 at or near the bottom of the silo and carry the proppant to the top of the silo.”⁴⁷

C. TRANSPORTABLE EQUIPMENT SET UP AND OPERATION

70. Systems, such as those of *Friesen*, *Fikes*, *Toews*, and *Gausman* are designed to be portable, set up on site, and then collapsed and transported off site. In order to enable the setup and collapse of these systems, various types of joints are used. These joints allow the various components (ramps, conveyors, chutes, etc.) not

⁴⁵ Ex. 1025 5:7 – 11.

⁴⁶ Ex. 1025 5:1 – 2.

⁴⁷ Ex. 1028 [0124].

only to move during setup but, if desired, be adjusted during operations. For example, *Friesen* teaches a main conveyor comprised of folding sections, with sections attached together with ‘pivot joints’ which define a particular pivot axis.⁴⁸ *Friesen* also teaches the use of a “ball and socket joint” used to support, and allow positioning of, the discharge chute during operation.

71. Another type of pivot joint that was known in the art before the ‘689 Patent was a slewing ring bearing joint. Slewing bearings are made up of an inner ring and an outer ring, either of which usually incorporates a gear. This type of pivot joint would allow rotational movement around a ring-shaped housing. Such slewing bearings can support substantial axial, radial, and moment loads, with low friction. Further, materials could be passed through the interior of the housing. Slewing bearings were known to be used in material handling applications before the ‘689 Patent.⁴⁹

72. *Fikes* teaches that conveyors are “pivotably mounted” so that they can be pivoted “upwardly and downwardly about a substantially horizontal axis, as well as rotated about a substantially vertical axis between 270 and 360 degrees from one

⁴⁸ See Ex. 1010 6:29 – 45. See also 11:45 – 63, 12:7-22

⁴⁹ See, e.g. Ex. 1033 and Ex. 1034.

extreme to the 25 opposite extreme.”⁵⁰ *Toews* further teaches pivoting attachment of both the conveyors and the ramps, for example using “pivot pins”.⁵¹ *Gausman* teaches similarly pivotable joints or connections, used to support at least ramps.⁵²

73. In addition to the joints discussed above, it was known to use hydraulic actuators or rams to move the various components of the conveyor systems into place, and to assist in “collapsing” the system for transportation. For example, *Gausman* teaches “dual actuated hydraulic cylinders which allow ramp system 20 to be raised and lowered relative to the ground.”⁵³ *Toews* teaches ramps “raised and lowered by cylinders 133 at the sides of the ramps.”⁵⁴ Further, in *Toews*, the conveyor is deployed between the storage (transport) and the operating position by a “drive cylinder 286”.⁵⁵ *Fike* teaches deployment of “support legs” by the use of “hydraulic rams, and a hand crank with worms and gears.”⁵⁶ Further, *Fike* also the

⁵⁰ Ex. 1023 6 :14 – 31.

⁵¹ See Ex. 1026 5:40 – 59. See also claims 1, 7.

⁵² See, e.g. Ex. 1027 [0025], [0026], [0030]

⁵³ Ex. 1027 [0018]. See also

⁵⁴ Ex. 1026 2:43 – 45.

⁵⁵ Ex. 1026 5:41 – 60.

⁵⁶ Ex. 1023 6:1-2.

conveyor is mounted by the use of a “turret mechanism” to allow for rotation. The turret mechanism uses “hydraulic rams 44 and 46” to position the conveyor.⁵⁷

IX. OVERVIEW OF THE PRIOR ART

A. WALDNER (EX. 1004)

a. Status of Waldner

74. *Waldner* is U.S. Patent No. 9,663,303. *Waldner* is titled “Portable conveyor system with drive-over unloading ramp and a longitudinal conveyor feeding a bucket elevator.” *Waldner* was filed on Oct. 16, 2014 and issued on May 30, 2017. Ex. 1004. The filing and issuance of *Waldner* thus predate the claimed priority date of the '689 Patent.

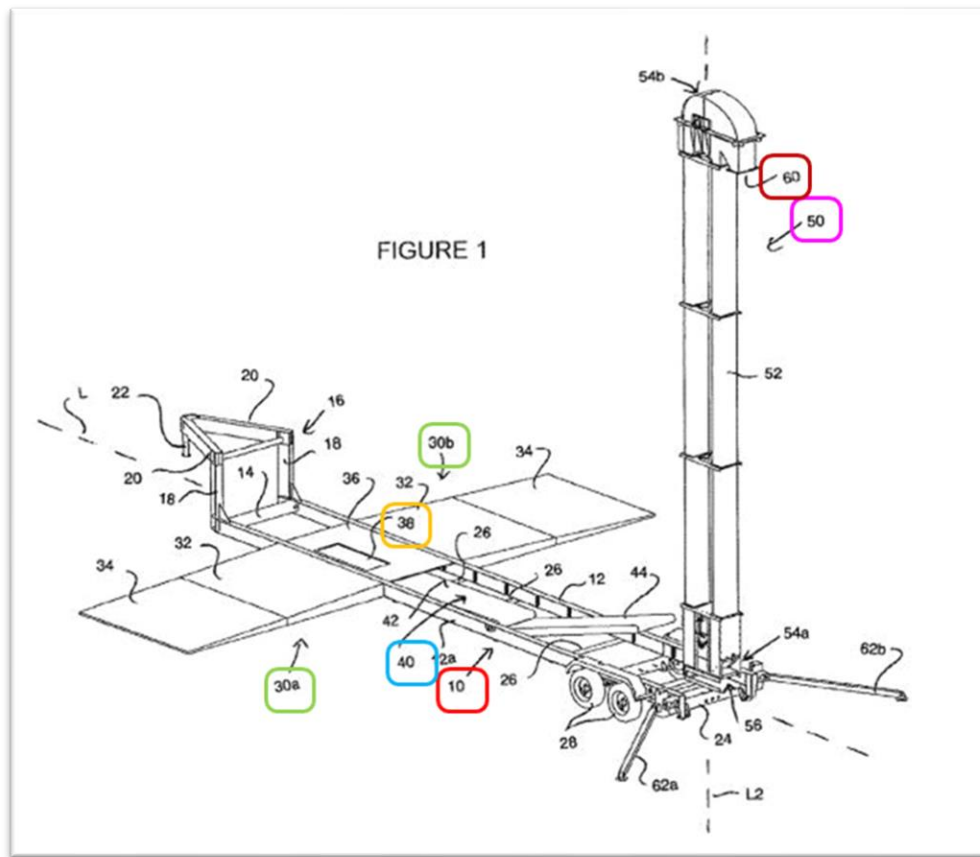
b. Overview of the Disclosure of Waldner

75. Like the '689 Patent, *Waldner* relates to a portable system for conveying particulate material (*e.g.*, proppant used in fracturing of oil and gas wells) from a vehicle to an elevated inlet of a storage container.⁵⁸ *Waldner*’s system is actuable between an operational configuration and a transport configuration, and “provides an all-in-one solution for emptying of particulate or granular material from a bottom-unload vehicle. . . and for vertically conveying the material up to an elevated location

⁵⁷ See Ex. 1023 6:32 – 59. See also 7:52 – 56; 8:50 – 67; 9:20 – 31.

⁵⁸ See, *e.g.*, Ex. 1004, 1:14-20 & 12:4-12

using an on-board bucket conveyor, which is fed by a built in intermediate conveyor that automatically moves the material from beneath the transport vehicle to the bucket conveyor,” embodiments of which are depicted in Figures 1, 12, and 15.⁵⁹



Ex. 1004, Fig. 1.

76. In the above portable conveyor system, the trailer includes a frame 10 (annotated in red) having a belt conveyor 42 (annotated in blue) running

⁵⁹ Ex. 1004, 1:14-20; 12:4-12; 11:61-12:1.

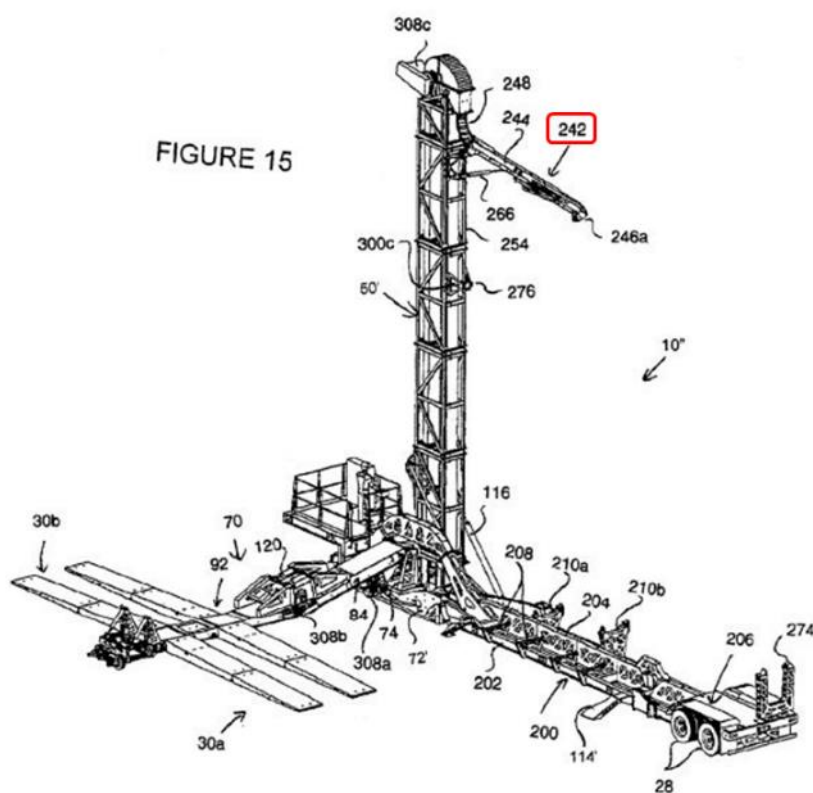
therethrough.⁶⁰ The ramp assemblies 30a, 30b [annotated in green] provide an opening 38 [annotated in orange] for aggregate to be deposited into and on the conveyor belt 42. *Id.* A bucket elevator 50 [annotated in magenta] is pivotable about an end of the frame 10 and is raised relative to the frame 10 when in an operational configuration.⁶¹ The bucket conveyor in the bucket elevator receives aggregate from the conveyor belt 42 and transports it upwards towards the outlet port 60 [annotated in dark red].

77. *Waldner* notes that “[F]rom the outlet port 60, the granular material is fed into the storage bin or tank that is to be filled with the granular material, for example via a discharge chute if provided.”⁶² Further description of the discharge chute member 242 [annotated in red] is depicted in more detail in Figures 15 & 22A-22D:

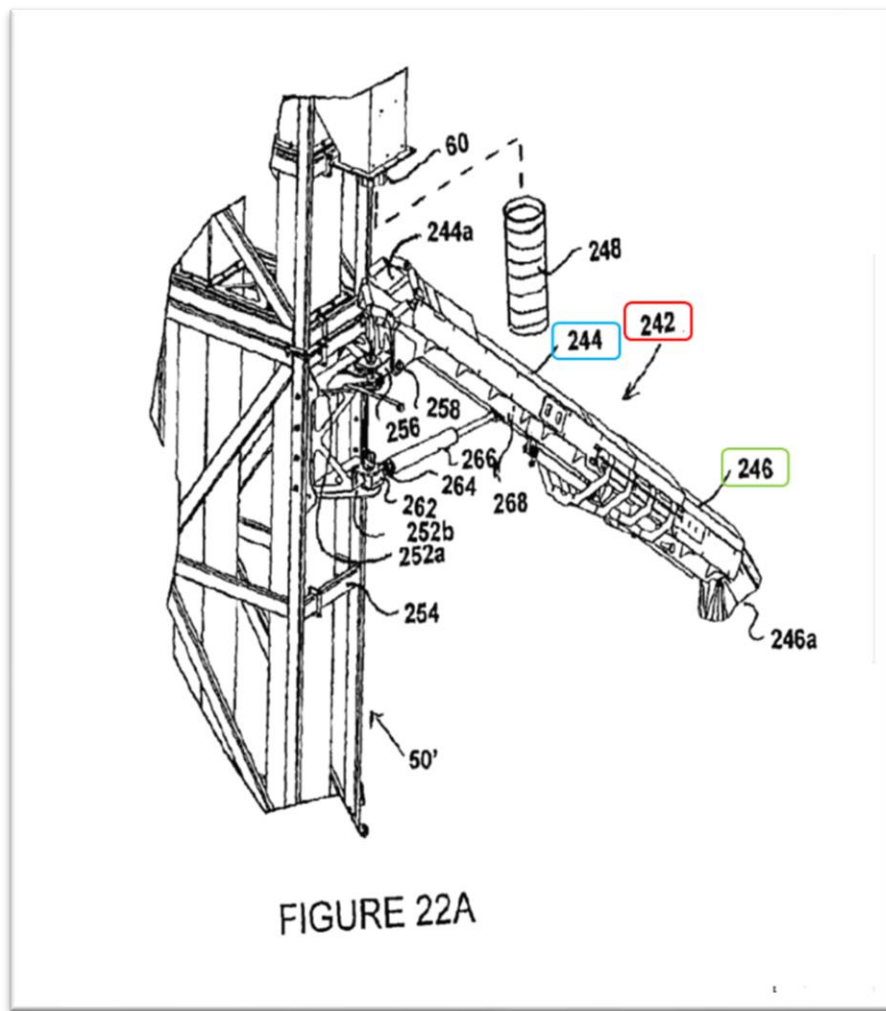
⁶⁰ Ex. 1004, 1:14-20; 12:4-12; 11:61-12:1; Fig. 1

⁶¹ Ex. 1004, 1:14-20; 12:4-12; 11:61-12:1; Fig. 1

⁶² Ex. 1004 16:47-50



Ex. 1004, Fig. 15 (annotated).



Ex. 1004, Fig. 22A (annotated).

78. As depicted above, the discharge chute member 242 (annotated in red) includes a proximal section 244 (annotated in blue) and a distal section 246 (annotated in green) slidably coupled together.⁶³ The discharge chute member 242

⁶³ Ex. 1004 Fig. 22A; 25:7-13

can be raised, lowered, and swung horizontally relative to the bucket elevator 50.⁶⁴

79. Thus, in my opinion, a POSITA would have understood that *Waldner* discloses an entire aggregate transferring system, similar to the system described in the '689 Patent, that includes a base assembly for receiving aggregate, an aggregate elevating assembly, and a conveyor extension assembly. Indeed, the Patent Office originally rejected the '689 Patent claims over *Waldner*, citing *Waldner* for those elements, and the applicant did not dispute that *Waldner* disclosed those elements.

B. DYNATEK (EX. 1005)

a. Status of Dynatek

80. *Dynatek* refers to a Product Specification Sheet relating to the belt-based EconoLoader system manufactured by DYNATEK Articulated Loading Systems, a Division of D & D Products, Inc.⁶⁵ Dynatek advertises “For DYNATEK, developing that experience and knowledge began over 100 years ago, when its founder, George Manierre began designing and manufacturing articulated conveying systems to load coal and other bulk solids into boxcars. Today, DYNATEK still uses some of those original concepts along with 3-D CAD design, FEA analysis, better materials, state-

⁶⁴ Ex. 1004 26:20-63.

⁶⁵ See Ex. 1005.

of-the-art power transmission technology and modern control platforms to create the EconoLoader™ Articulated Loading Conveyors in use throughout the world.”⁶⁶

81. When a POSITA would access the Dynatek website to obtain information about its articulated loading systems, one would have found *Dynatek*. As evidenced by the Declaration of the custodian from Internet Archive, *Dynatek* was publicly accessible from the McShroeder website by at least Aug. 19, 2016, corresponding to the date it was archived by the WayBack Machine of Internet Archive.⁶⁷

82. In looking to find information regarding Dynatek Loading systems, a POSITA would have navigated to the Dynatek Website.⁶⁸ A POSITA then would have navigated to information regarding Local Representatives by clicking on the “Rep Locator” tab.

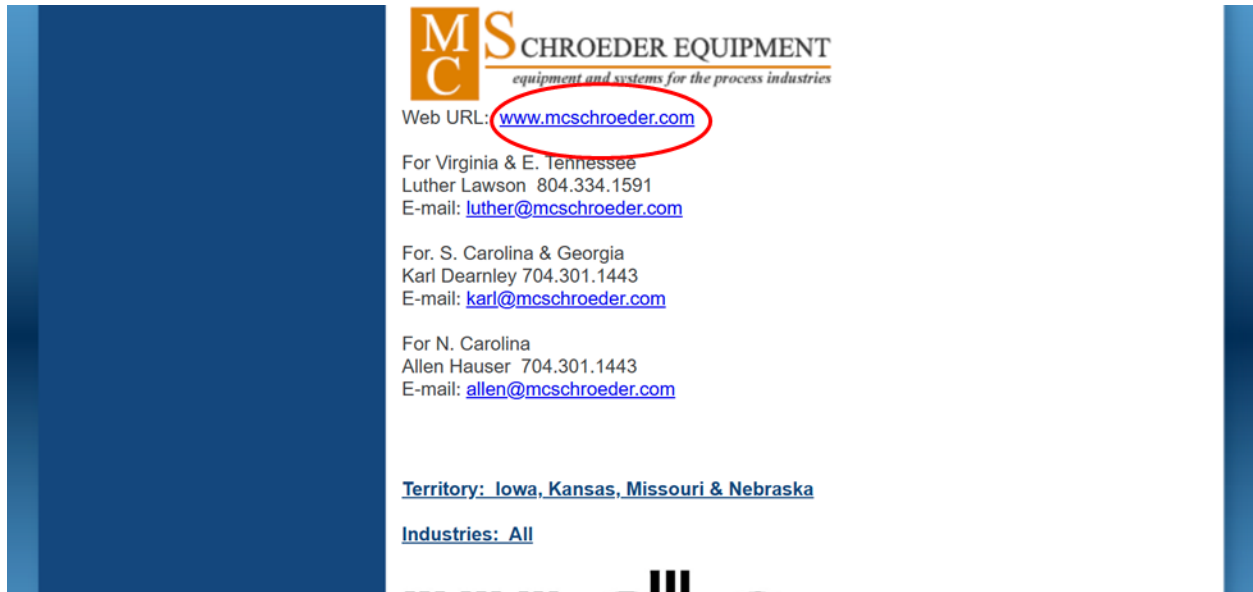


⁶⁶ <https://dynatekloadingsystems.com/about-us/>

⁶⁷ Ex. 1014 at 1, 25 (describing Ex. 1005, Dynatek).

⁶⁸ web.archive.org/web/20160823115122/http://www.dynatekloadingsystems.com/

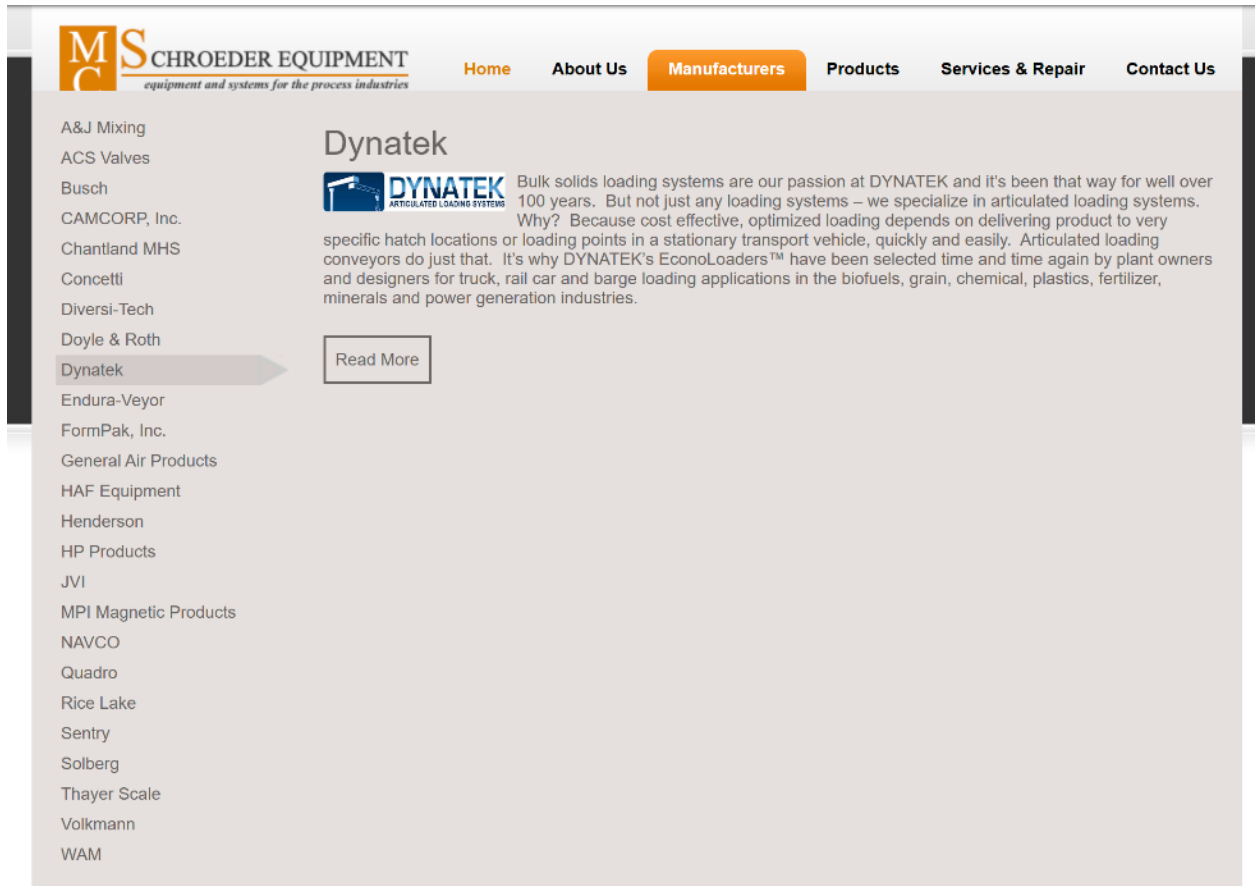
83. From the Rep Locator page,⁶⁹ a POSITA would have scrolled down and found “MC Schroeder Equipment” which is the first rep identified to serve “all” industries. A POSITA would then have clicked on the hyperlink for “mcschroeder.com” to find information regarding the *Dynatek* system.



84. This would have taken them to the M.C. Schroeder website. From the landing page, a POSITA would then have clicked on “Manufactures,” which would have brought up a drop-down of various manufacturers that M.C. Schroeder repped, which included Dynatek. A POSITA would then have clicked on “Read More” to gain additional information about the Dynatek systems that M.C. Schroeder repped.

⁶⁹<https://web.archive.org/web/20160912083231/http://www.dynatekloadingsystems.com/replocator>

Declaration of Dr. Robert A. Durham
IPR of USP 11,780,689



85. Once on the M.C. Schroeder Dynatek page⁷⁰ a POSITA would have clicked on “Sales Brochure” and “Belt Econoloader”, which, took a POSITA to two different PDF documents: “Belt Econoloader” (“*Dynatek*”) and a “Sales Brochure” that has additional photographs and descriptions of the Econoloader.

70

<https://web.archive.org/web/20160822044326/http://mcschroeder.com/prods/dynatek>

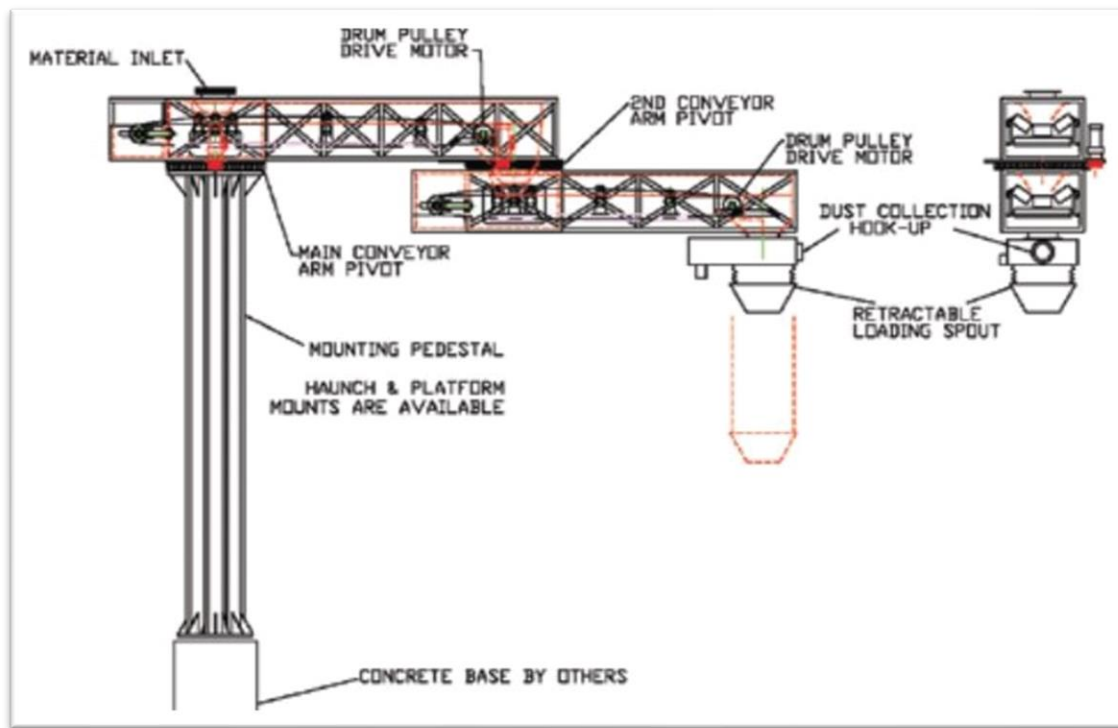


b. Overview of the Disclosure of Dynatek and related materials

86. *Dynatek* describes the belt-based EconoLoader™, which is an articulated belt-based conveyor system for loading bulk granular material (*e.g.*, sand, gravel, and minerals) into vehicles or containers.⁷¹ *Dynatek* shows that the articulated loader is capable of controlling a discharge position for loading applications by using two conveying arms.⁷² The slewing bearing-based pivot connections between the two conveying arms and the mounting pedestal are depicted in more detail below:

⁷¹ Ex. 1005 at 2.

⁷² Ex. 1005 at 2.



Ex. 1005, Fig. 2.

87. As depicted above, there is a pivot connection between a first arm and the mounting pedestal, and another pivot connection between the first arm and the second arm.⁷³ Each conveying arm has its own conveyor belt and is capable of moving horizontally with respect to the other.⁷⁴ *Dynatek* was not listed in items examined by the examiner during prosecution of the '689 Patent.

⁷³ Ex. 1005 at 2 Fig. 2.

⁷⁴ Ex. 1005 at 2.

C. SLEEMAN (EX. 1006)

a. Status of Sleeman

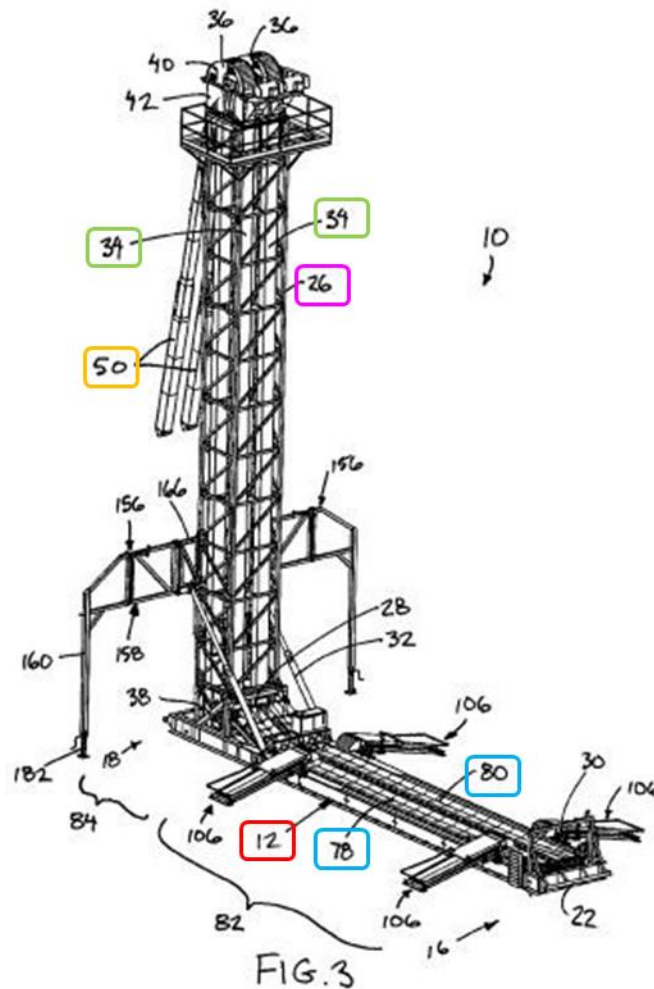
88. *Sleeman* is U.S. Patent No. 11,691,831. *Sleeman* is titled “Portable Conveyor System Including Pivotal and Extendable Feed Conveyors for Feeding Particulate Material into an Elevating Assembly.” *Sleeman* was filed on Jul. 6, 2021, and issued on Jul. 4, 2023. *Sleeman* was originally filed as an international (PCT) application on November 19, 2019, which was published on July 30, 2020.⁷⁵ The filing of *Sleeman*, as well as the filing and publication of its PCT application, thus predate the claimed priority date of the '689 Patent.

b. Overview of the Disclosure of Sleeman

89. *Sleeman* relates to a portable conveyor system 10 as shown in Figure 3 below “for receiving particulate material discharged from the bottom discharge gate of a transport vehicle and for conveying the particulate material to downstream equipment such as an upright silo or other suitable storage container, typically at an elevated location such as the intake opening of the upright silo or storage container.”⁷⁶

⁷⁵ Ex. 1006 Cover

⁷⁶ Ex. 1006, 16:28-36.

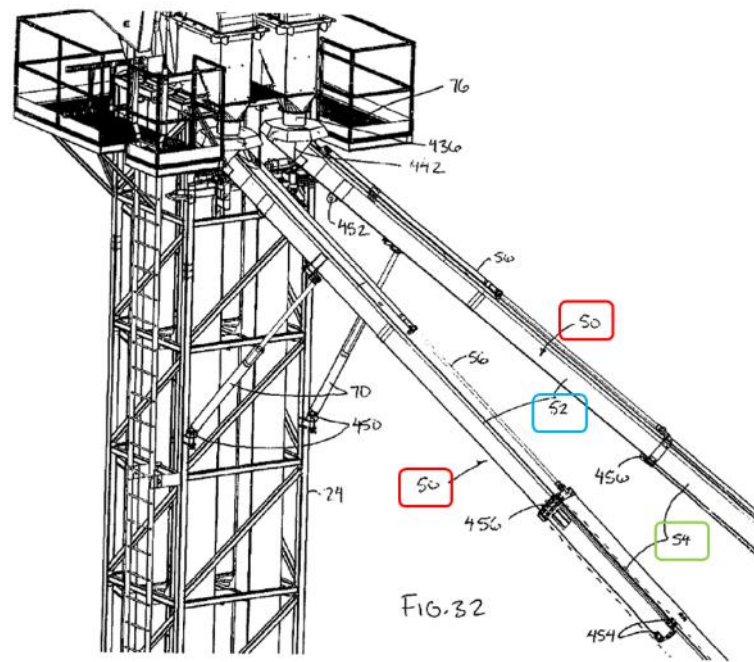


Ex. 1006, Fig. 3.

90. In the above portable conveyor system 10, the base frame 12 [annotated in red] has two main conveyors 78, 80 [annotated in blue] that transport material to the bucket elevators 34 [annotated in green] housed in the main frame 26 [annotated in magenta].⁷⁷ The transported material is transported vertically and discharged out

⁷⁷ Ex. 1006, Fig. 3, 1:9-13

through spouts 50. [annotated in orange] As shown in Figure 32, “each discharge spout 50 [annotated in red] includes a first duct 52 [annotated in blue] and a second duct 54 [annotated in green] which are coupled to one another in a telescoping configuration.”⁷⁸ *Sleeman* also discloses a series of actuators, shafts, and gears that are used to pivot the discharge spouts relative to the main frame 26 and move them to desired positions.⁷⁹ *Sleeman* was not used during prosecution of the ’689 Patent.



Ex. 1006 Fig. 32.

⁷⁸ Ex. 1006 19:11-13

⁷⁹ Ex. 1006 19:25-20:13

D. PHAM (EX. 1008)

a. Status of Pham

91. *Pham* is U.S. Patent No. 10,633,174. *Pham* is titled “Mobile oilfield material transfer unit.” *Pham* was filed on Aug. 1, 2014 and issued on Apr. 28, 2020.⁸⁰ The filing and issuance of *Pham* thus predate the claimed priority date of the '689 Patent.

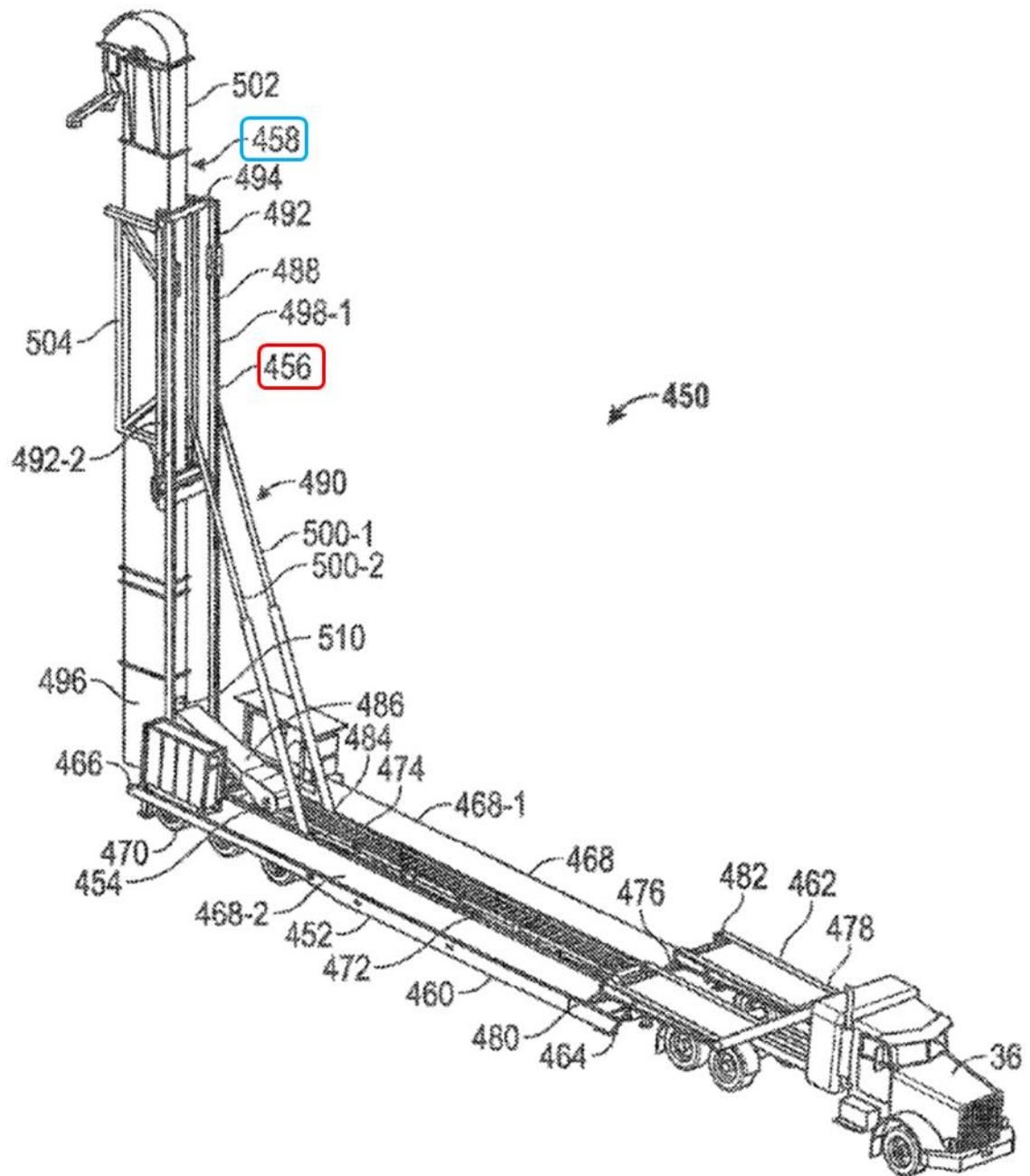
b. Overview of the Disclosure of Pham

92. *Pham* relates to a mobile oilfield material transfer unit that can transition between a transportable position and a vertical, operational position.⁸¹ Once the mast assembly 456 (annotated in red) is raised, material may be transported vertically up through the first conveyor assembly 458 (annotated in blue) to be discharged to one or more silos.⁸²

⁸⁰ Ex. 1007 Cover

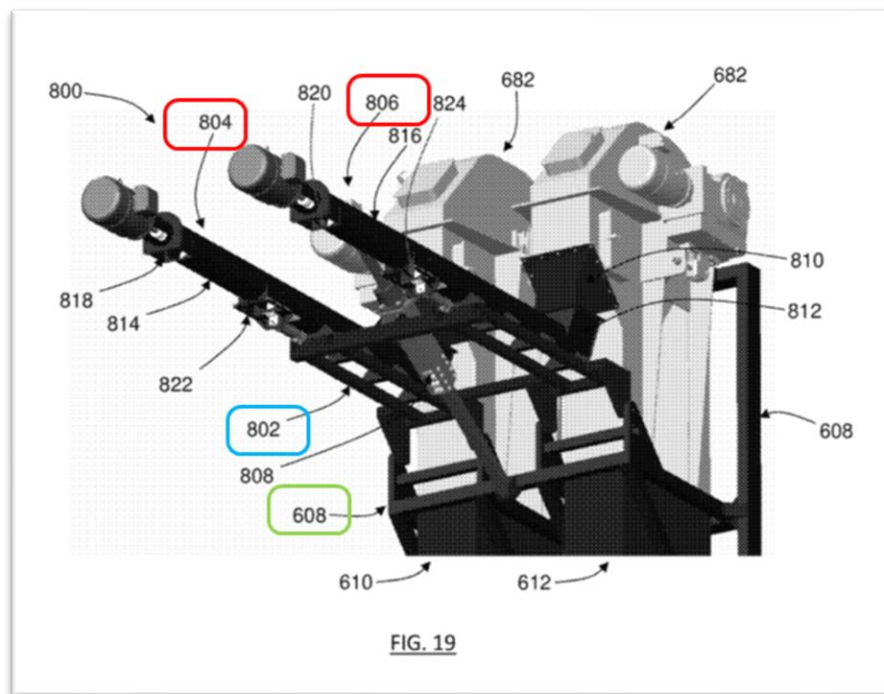
⁸¹ See Ex. 1008, 5:46-47; 5:54-6:4.

⁸² See Ex. 1008 9:30-62.



93. As shown below in Figure 19, *Pham* further teaches “Auger conveyors 804, 806 [annotated in red, discharge assembly] (also shown in FIG. 9) are disposed onto, and supported by, an articulated support frame 802.[annotated in blue] Support

frame 802 may be supported by and movably connected with mast assembly 608 [annotated in green] thus enabling support frame 802 to move to/from an operational and stowed orientation.”⁸³



Ex. 1008 Fig. 19

E. AULD (EX. 1009)

a. Status of Auld

94. *Auld* is an issued United States patent, U.S. Patent No. 3,090,501. *Auld* is titled “Cement Mixing Plant.” *Auld* was filed on Mar. 23, 1959 and issued on May

⁸³ Ex. 1008 14:13-18.

21, 1963.⁸⁴ The filing and issuance of *Auld* thus predate the claimed priority date of the '689 Patent.

b. Overview of the Disclosure of Auld

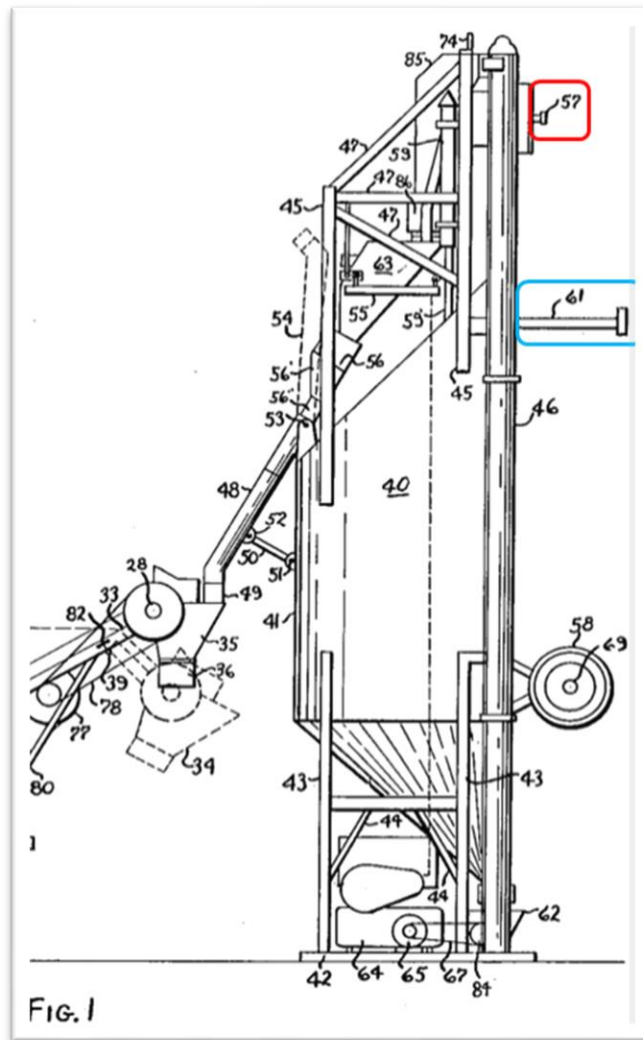
95. *Auld* relates to a portable cement batching plant 40 configurable in a horizontal position, in which the cement batching plant 40 is towable via a truck, and a vertical position, in which a silo 41 of the cement batching plant 40 is operational.⁸⁵ To facilitate towing, a king pin 57 [annotated in red] is attached to the cement batching plant 40.⁸⁶ Further *Auld* provides that “[a] pivoted parking stand 61 [annotated in blue] is swingably attached to the silo 41 ... to hold the silo 41 temporarily in [a] stored position when the truck is moved away from under the king pin 57.”⁸⁷ A relevant portion of Fig. 1 of *Auld* is depicted below, illustrating the cement batching plant 40 in the vertical position.

⁸⁴ Ex. 1009, cover.

⁸⁵ Ex. 1009, Fig. 1; Fig. 2; 3:2-9; 1:69-72; 2:1-2

⁸⁶ Ex. 1009, 4:63-67

⁸⁷ Ex. 1009, 4:74-5:3.



Ex. 1009, Fig. 1 (cropped, annotated).

96. As depicted above, in the vertical position of the cement batching plant 40, the kingpin 57 and the parking stand 61 are at an elevated location along silo 41.⁸⁸ *Auld* was not examined during the prosecution of the '689 Patent.

⁸⁸ Ex. 1009 Fig. 1

F. FRIESEN (EX. 1010)

a. Status of Friesen

97. *Friesen* is U.S. Patent No. 10,577,198. *Friesen* is titled “Portable drive-over conveyor for discharging particulate material at a height suitable for filling a silo.” *Friesen* was filed on Nov. 3, 2017, and issued on Mar. 3, 2020.⁸⁹ The filing and issuance of *Friesen* thus predate the claimed priority date of the '689 Patent.

b. Overview of the Disclosure of Friesen

98. *Friesen* relates to “apparatuses for transferring particulate material, and more specifically to portable drive-over conveyors for transferring particulate material transported by a truck off the truck to a desired location using multiple conveyors to progressively elevate the material from an initial intake to the desired discharge height,” *e.g.* for filling a silo.⁹⁰ *Friesen* teaches a system that includes a “portable drive-over conveyor which is suited for transferring particulate material, such as aggregate, salt, grain, and fertilizer, that is unloaded from a dump truck (not shown) (or, generally speaking, a transport vehicle) and moved from the truck to another location in proximity to the portable drive-over conveyor.”⁹¹ *Friesen*

⁸⁹ Ex. 1010 Cover

⁹⁰ Ex. 1010, 1:12-17, 3:17-21

⁹¹ Ex. 1010 7:50-63

discloses its apparatus is particularly “suited for transferring the particulate material into tall containment structures for which the material needs to be discharged at a sufficient height,” including a “bin [or] silo”.⁹² *Friesen* teaches use for handling proppant at fracturing sites. *Friesen* teaches “a conventional configuration of silos storing fracking proppants is referred to as a six-pack configuration, in which the silos are arranged in two rows each comprising three silos and separated from the other by a conveyor oriented to deliver the proppants from the silos to a container for blending. The illustrated arrangement of portable drive-over conveyor is able to fill each silo of the six-pack from a single parked location.”⁹³

99. *Friesen* further teaches that its discharge chute 106 “is rotatable about the upstanding axis U in swiveling pivoting movement.”⁹⁴ Further, “[t]he chute's body 108 is formed by a plurality of elongated cylindrical sections 120 with ends of the sections held 20 in an overlapped arrangement. [] As such, the chute comprises a telescopic configuration allowing for a length of the chute to be adjusted.”⁹⁵ The combination of the rotatable and extendable chute “allows for the portable drive over

⁹² Ex. 1010 7:58-63.

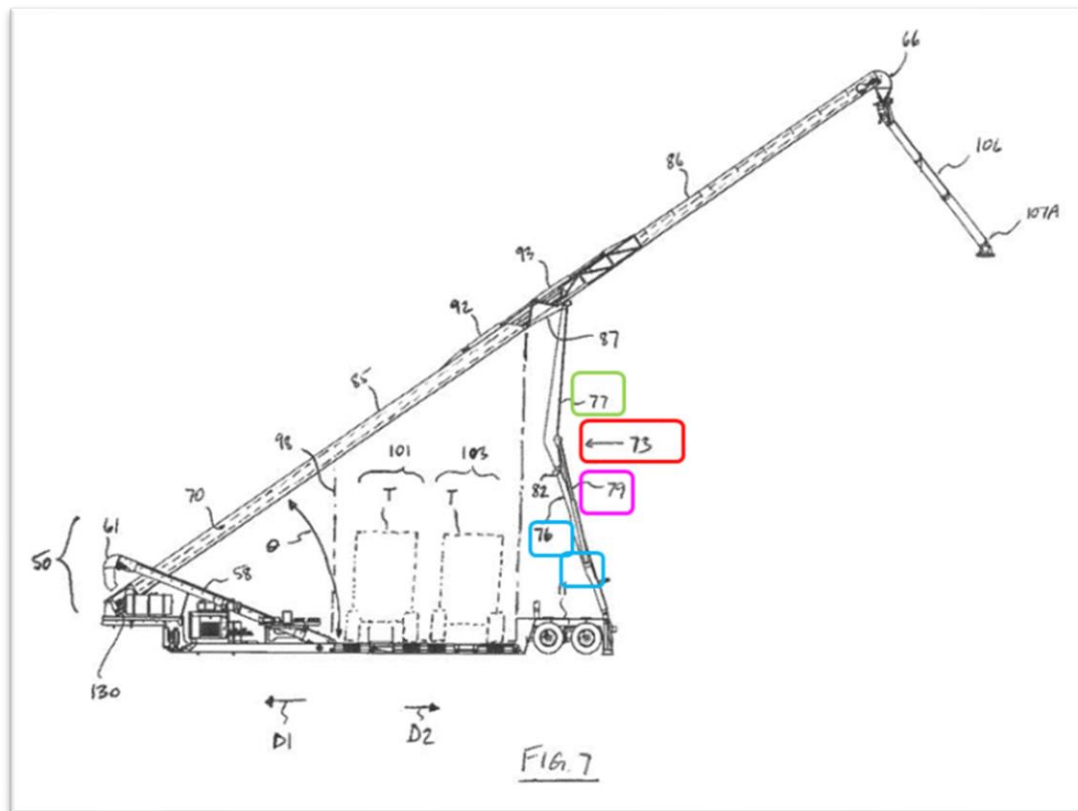
⁹³ Ex. 1010 14:34-42.

⁹⁴ Ex. 1010 14:1 - 14

⁹⁵ Ex. 1010 18-28.

conveyor to remain parked and from this single parked location be capable of filling multiple silos which have fill openings spaced from one another.”⁹⁶

100. *Friesen* discloses a conveyor deployment system that has many similarities to the system of *McIver* (discussed below) and to the elements of the ‘689 Patent claims. For example, *Friesen* discloses a frame deployment system configured to raise a folding conveyor, depicted below:



Ex. 1010, Fig. 7.

⁹⁶ Ex. 1010 31-34.

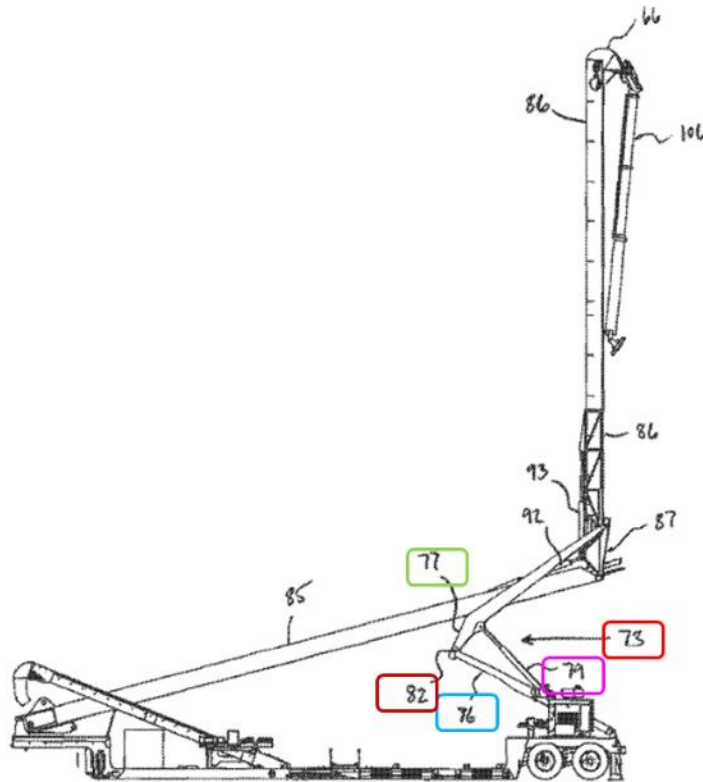


FIG. 6

Ex. 1010 Fig. 6

101. As depicted above, the scissor linkage 73 (annotated in red) includes pivotally connected arms 76, 77 (annotated in blue, green) that are actuated by the hydraulic cylinder 79 (annotated in magenta) to raise the folding conveyor from the base trailer.⁹⁷ *Friesen's* apparatus uses “a hydraulically actuated scissor-style linkage 73 [annotated in red] located at the rear end of the trailer is arranged and

⁹⁷ Ex. 1010 Fig. 7; 10:66-11:13.

operable to effect raising and lowering of the second conveyor 65 assembly between the stored and operating positions.”⁹⁸ As shown, the sectioned folding conveyor is moved, via the scissor linkage 73, with respect to a rear frame section 11 of the trailer.

102. *Friesen* discloses “The scissor linkage 73 [annotated in red] is generally of a conventional arrangement comprising a pair of pivotally connected arms 76, 77, [annotated in blue, green] each on either side of the conveyor, between which a hydraulic cylinder 79 actuator [annotated in magenta] is connected inwardly of their pivotal interconnection at 82 [annotated in dark red] so that the arms can move from a folded position in which one effectively overlies the other to an extended position in which the arms are effectively vertically stacked one on top of the other.”⁹⁹ *Friesen* further discloses “The scissor linkage 73 is pivotally coupled to a framework of the second conveyor assembly at the intermediary section 87 at a pivot joint 94 [not shown]”¹⁰⁰ while the other end of the arm “is pivotally supported at the rear frame section of the trailer.”¹⁰¹ A POSITA would have understood that the arms 76,

⁹⁸ Ex. 1010 10:62-65.

⁹⁹ Ex. 1010, 10:66-11:6.

¹⁰⁰ Ex. 1010 12:7-9.

¹⁰¹ Ex. 1010 11:8-9

77 form a linkage between the trailer and the sectioned folding conveyor, as shown in Fig. 7.

103. *Friesen* further discloses using a hydraulic cylinder 79 to move the arms 76, 77 from a “folded position in which one effectively overlies the other to an extended position in which the arms are effectively vertically stacked one on top of the other.”¹⁰² Fig. 6 of *Friesen* shows the conveyor, and arms, in the partially retracted position. A POSITA would have understood that the hydraulic cylinder 79 articulates the arms 76, 77 so that the end of arm 77 connected at pivot joint 94 extends away from the end of arm 76 connected to the rear frame section of the trailer in order to raise the conveyor to the operational position.

104. *Friesen* discloses “[t]he scissor linkage 73 is pivotally coupled to a framework of the second conveyor assembly at the intermediary section 87 at a pivot joint 94 [not shown]”¹⁰³ while the other end of the arm “is pivotally supported at the rear frame section of the trailer.”¹⁰⁴

105. *Friesen* further discloses using a hydraulic cylinder 79 to move the arms 76, 77 from a “folded position in which one effectively overlies the other to an

¹⁰² Ex. 1010 11:1-6.

¹⁰³ Ex. 1010 12:7-9.

¹⁰⁴ Ex. 1010 11:8-9

extended position in which the arms are effectively vertically stacked one on top of the other.”¹⁰⁵ A POSITA would have understood that the hydraulic cylinder is used to move the lift arm structure relative to the base frame of the trailer 4, and that cylinder 79 is mounted to the base frame of the trailer 4.

106. *Friesen* was not examined during the prosecution of the '689 Patent.

G. McIVER (EX. 1011)

a. Status of McIver

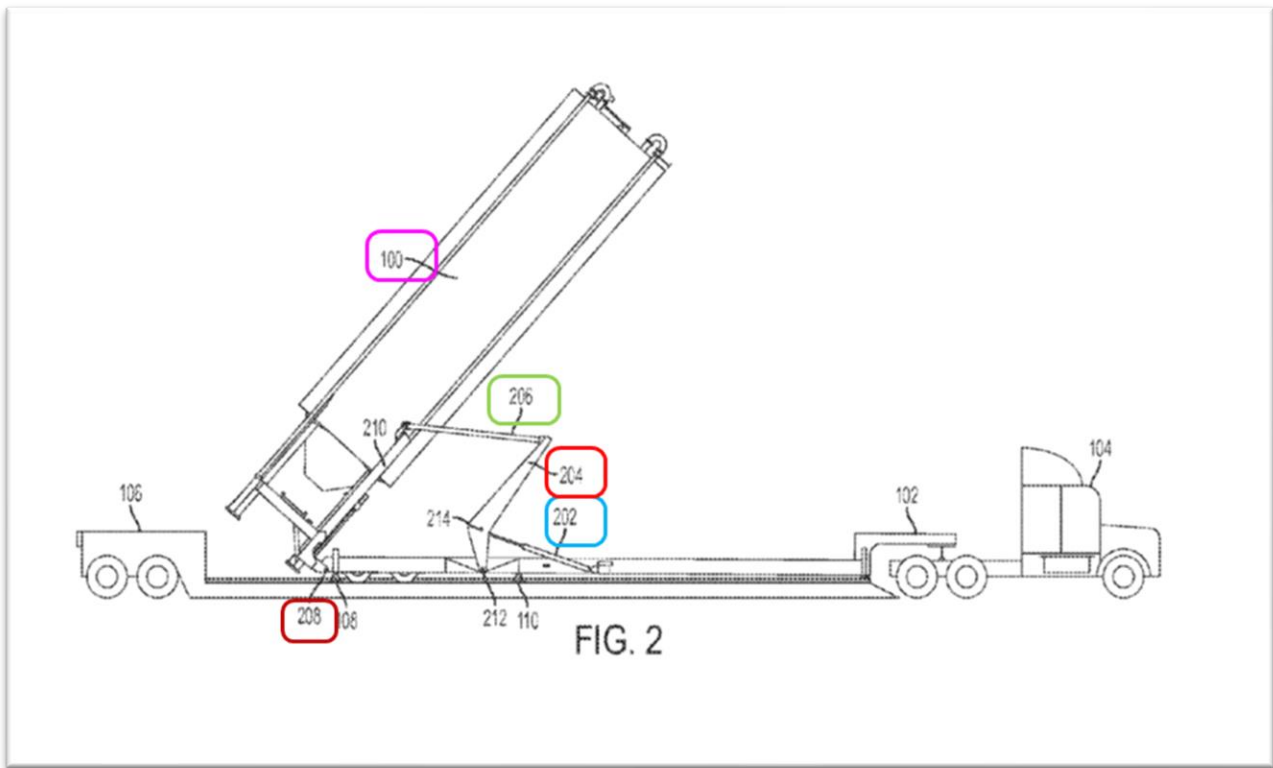
107. *McIver* is U.S. Patent No. 8,926,252. *McIver* is titled “Fracture sand silo system and methods of deployment and retraction of same.” *McIver* was filed on Oct. 23, 2012, and issued on Jan. 6, 2015.¹⁰⁶ Ex. 1011, 1. The filing and issuance of *McIver* thus predate the claimed priority date of the '689 Patent.

b. Overview of the Disclosure of McIver

108. *McIver* relates to “self-erecting silo storage systems for use in the oil and natural gas mining and drilling industries.” *McIver* discloses an actuation system used for erecting a silo from a trailer once transported to a designated location, as depicted below:

¹⁰⁵ Ex. 1010 11:1-6.

¹⁰⁶ Ex. 1011 Cover



Ex. 1011, Fig. 2.

109. As shown, the actuator 202 (annotated in blue) moves the rocker arm 204 (annotated in red), which causes the silo 100 (annotated in magenta) to rotate about the pin 208 (annotated in orange). *McIver* further discloses a set of linkages disposed on each side of trailer 102, where each set of linkages includes a rocker arm.¹⁰⁷ *McIver* was cited in an Information Disclosure Statement and considered

¹⁰⁷ Ex. 1011 Fig. 7, 9:37-44.

during the prosecution of the '689 Patent,¹⁰⁸ but was not discussed by the Examiner and not examined as part of the combinations discussed below.

X. GROUND 1: CLAIMS 1-2, 4-11, 16-20, AND 22-24 ARE RENDERED OBVIOUS BY WALDNER IN VIEW OF DYNATEK

110. It is my opinion that Waldner, in view of Dynatek, discloses and/or suggests all limitations of Claims 1-2, 4-11, 16-20, and 22-24, and thus renders those claims obvious.

A. REASONS TO COMBINE WALDNER AND DYNATEK

111. A POSITA would have been motivated to combine the teachings of Waldner and Dynatek. Initially, both Waldner and Dynatek are analogous art to each other, and to the '689 Patent. The '689 Patent relates to the field of handling aggregate material such as sand, including for use in operations at oil and gas wells.¹⁰⁹ Both Waldner and Dynatek are directed to conveying aggregate material, such as sand, through a system of conveyors. Alternatively, the '689 Patent is concerned with the problem of designing a conveyor system to transfer aggregate material to an elevated location such as the inlet of a storage silo.¹¹⁰ Waldner teaches “[a] portable conveyor system for receiving particulate material from a transport

¹⁰⁸ Ex. 1012, 53.

¹⁰⁹ Ex. 1001, 4:13 – 17.

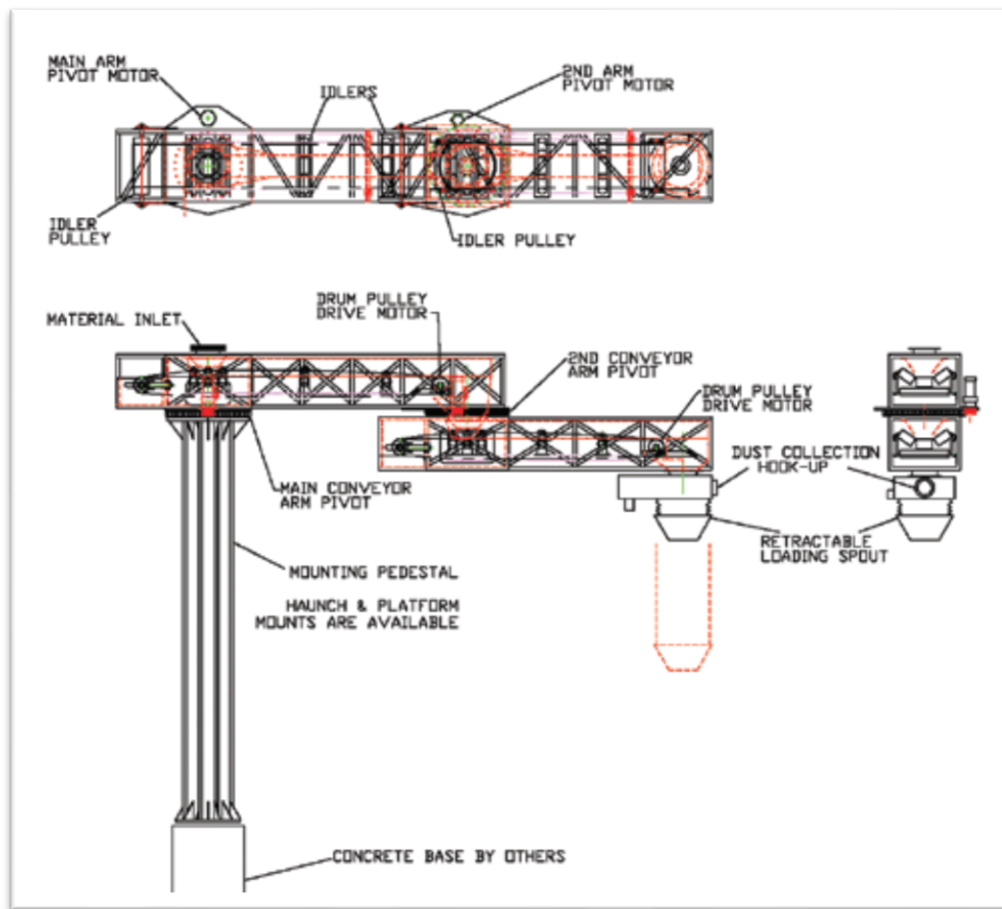
¹¹⁰ Ex. 1001, 3:54 - 58.

vehicle and conveying the particulate material to an elevated location.”¹¹¹ Dynatek teaches its “Econoloader” is “the right choice for loading applications involving granular, irregular, abrasive, sticky, even wet materials like coal, compost, sand, gravel, minerals, and fertilizer.” Dynatek further discloses, “[b]elt conveyor-based EconoLoaders™ consist of (2) open or enclosed conveying arms, each containing its own belt conveyor.”¹¹² Further, both Waldner and Dynatek teach elevated systems for conveying the aggregate material. *Waldner* teaches “portable conveyor solutions for receiving particulate matter from a transport vehicle and conveying said particulate material to an elevated location.”¹¹³ Dynatek’s system is an elevated conveyor system, as shown in the figures.

¹¹¹ Ex. 1004 Abstract.

¹¹² Ex. 1005 at 2.

¹¹³ Ex 1004 2:36 – 41.



112. A POSITA would have been motivated to look to the teachings of *Waldner* when finding solutions to handle particulate matter (e.g. proppant) at an oil and gas site because *Waldner* teaches use for handling proppant at fracturing sites. *Waldner* teaches its conveyer system “can be used to fill hydraulic fracturing proppant tanks at hydrocarbon well sites with sand or other granular proppant material.”¹¹⁴ A POSITA would have been motivated to look to the teachings of

¹¹⁴Ex. 1004 12:4-7.

Dynatek as it was known long before the ‘689 Patent to use conveyor belts, like the belts of *Dynatek* for discharge of aggregate material.¹¹⁵ Accordingly, both *Waldner* and *Dynatek* were relevant to a problem allegedly solved by the ‘689 Patent, using conveyor belt systems to transfer and discharge material from an elevated location.

113. Further, a POSITA would have recognized that *Dynatek* and *Waldner* were closely related technologies as both references discuss handling not only sand but other aggregate type materials. *Waldner* teaches its system or related technologies not only for handling proppant at a hydraulic fracturing site but also “to fill grain bins in the agricultural industry,”¹¹⁶ as well as concrete / bulk cement systems.¹¹⁷ A POSITA would therefore be motivated to look to other technologies for handling various types of aggregate materials. *Dynatek* teaches that its system is directed to the same type systems as *Waldner*. *Dynatek* discloses use of its system for handling “granular, irregular, abrasive, sticky, even wet materials like coal,

¹¹⁵ See tech background.

¹¹⁶ Ex. 1004 12:4-12.

¹¹⁷ Ex. 1004 2:12-18.

compost, sand, gravel, minerals, and fertilizer”¹¹⁸ as well as “DDGS,¹¹⁹ calcium carbonate, salt, soy meal, coffee and a host of other materials”.¹²⁰

114. *Waldner* teaches a “discharge chute member 242 [] is of a telescopically adjustable length”¹²¹ and that is rotatable relative to the elevator to which it is mounted; “the discharge member 242 is movable relative to the elevator frame 254 about the vertical axis shared by the pivot pins of the two mounting brackets, and also about the horizontal axis of the pivot pin 258 between the upper link 256 and the discharge member 242.”¹²² The combination of adjustable length and rotatable discharge chute allow the chute to discharge “to various positions in 3D space.”¹²³

115. *Waldner* states that the movement of its discharge chute 242 allows the operator to “adjust the point of final discharge of granular or particulate material from the system ***without having to move the trailer***” and the chute to discharge “to

¹¹⁸ Ex. 1005 at 2.

¹¹⁹ DDGS is Dried Distillers Grains with Solubles, a type of animal feed

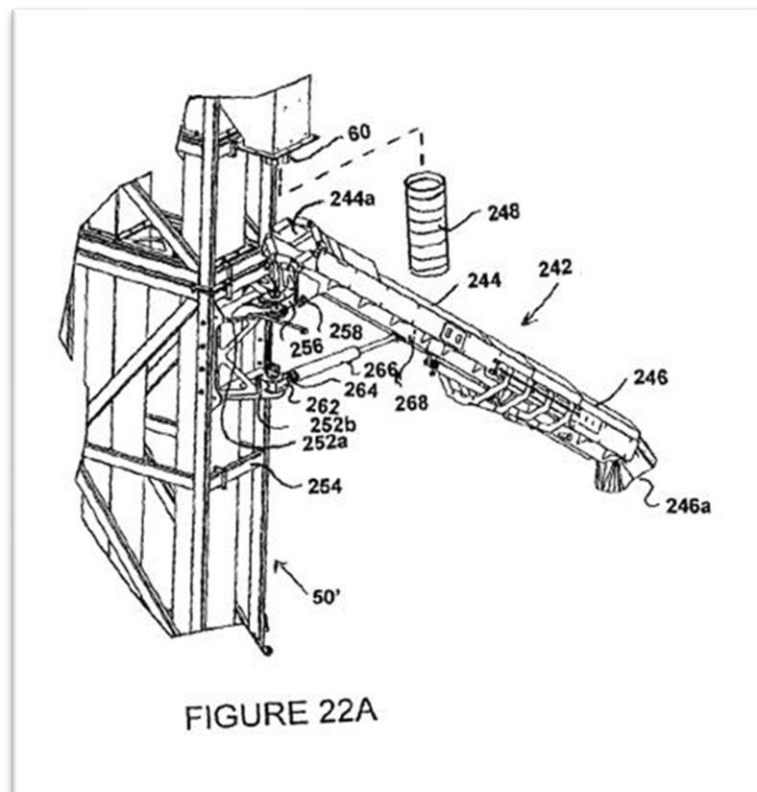
¹²⁰ Ex. 1005 at 2.

¹²¹ Ex. 1004 25:7-8

¹²² Ex. 1004 25:59-63.

¹²³ Ex. 1004 25:66.

various positions in 3D space.”¹²⁴. However, in Waldner, movement of particles through the discharge chute is controlled only by gravity and the angle of the chute. Waldner’s mechanism for adjusting the discharge chute’s position may be limited its precision and range of motion. A POSITA building the Waldner system would have looked to other known conveyor systems, such as Dynatek, that achieve similar objectives, *e.g.*, to optimize its design and/or to potentially incorporate commercially-available components to enhance control and/or particle movement rates.



¹²⁴ Ex. 1004, 15:19-21, 25:66

Waldner Fig. 22A

116. Similarly, Dynatek teaches “belt conveyor-based models are designed for articulated motion. Two slewing bearing-based pivots, enable both conveyor arms to pivot separately resulting in nearly 330 degrees of rotation and loader reach of up to 27 feet.”¹²⁵ Dynatek also teaches that EconoLoader’s articulated motion result in a wide range of rotation and reach. *Dynatek* further teaches “[r]etractable loading spouts with 3 to 60 feet of vertical travel and dust recovery,” where the spouts provide increased vertical travel and enhance dust recovery.¹²⁶ A POSITA would have recognized that the combination of “nearly 330 degrees of rotation” and vertical discharge from “3 to 60 feet” means discharge to various positions in 3D space, similar to *Waldner*.

117. As discussed above regarding how a POSITA would have found *Dynatek*, the *Dynatek* landing page on the M.C Schroeder Website showed several styles of *Econoloader*, including Air Slide, Auger, Belt and Drag versions. A POSITA would have been motivated to look at the “Belt Econoloader” first when looking for improvements to *Waldner*’s apparatus, as *Waldner* already teaches the use of belt conveyors. Further, a belt conveyor would be more advantageous in its

¹²⁵ Ex. 1005 at 2.

¹²⁶ Ex. 1005at 2.

ability to control speed of discharge¹²⁷ as opposed to gravity based systems such as an “Air Slide” system, which are designed primarily for use with fine powders that have been “fluidized”, rather than larger particles such as sand.¹²⁸ Other systems such as “auger” or “drag conveyer” would be useful for handling proppant type aggregate and a belt conveyor would at least be obvious to try, as only three operations were available to choose from.¹²⁹

118. A POSITA would have been motivated to combine the teachings of *Waldner* and *Dynatek* not only because of their similarities, but other reasoning as well. Based on these teachings, a POSITA would have been motivated to substitute the EconoLoader of Dynatek for the discharge chute of Waldner, *e.g.*, to maximize the rotation and reach of the system, optimize dust control, enhance mechanical control, and/or increase discharge rates. The combination involves substitution of one known component (*Dynatek’s* Econoloader) for another (the discharge chute member of Waldner) to obtain predictable results the discharge of aggregate material from an elevated location. This would involve modifying the “discharge chute member” of Waldner with the conveyor belts and outboard pivot of *Dynatek* to

¹²⁷ *Dynatek* at 2

¹²⁸ See Ex. 1029

¹²⁹ See Ex. 1030, Ex. 1031.

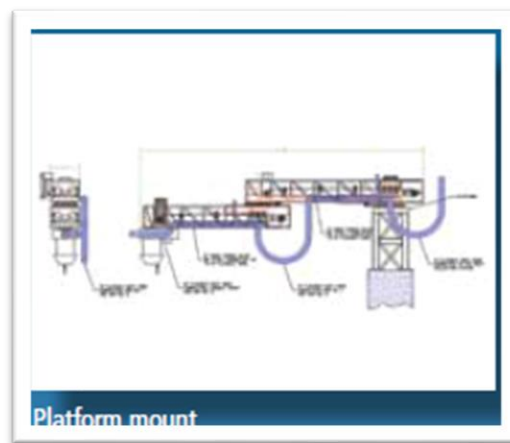
obtain predictable results, the discharge of material to various points in 3D space. Further, the combination uses a known technique of 2 pivotal sections from *Dynatek* instead of *Waldner's* telescoping sections to increase range of motion of the discharge point, and using controllable conveyor belts of *Dynatek* instead of the discharge chute of *Waldner* to improve control of delivery and discharge of the particulate matter. In *Waldner*, movement of particles through the discharge chute is controlled only by gravity and the angle of the chute. In *Dynatek*, the additional control of the speed of the conveyor allows for better control and discharge rates.

BELT WIDTH (INCHES)	TROUGH DEGREES	CROSS- SECTION AREA (Sq. Ft.)	CONVEYING RATES in Short Tons Per Hour Density of 100 Pounds Per Cubic Foot Assumed							
			BELT SPEED in Feet Per Minute							
			50	100	150	200	250	300	350	400
18	20	0.161	24	48	72	96	120	145	169	193
18	35	0.205	31	61	92	123	154	185	215	246
18	45	0.226	34	68	102	135	169	203	237	271
24	20	0.321	48	96	144	193	241	289	337	385
24	35	0.406	61	122	183	244	305	365	426	487
24	45	0.440	66	132	198	264	330	396	462	528

119. A POSITA would have had a reasonable expectation of success in the combination. Both *Dynatek* and *Waldner* teach mechanical devices used to discharge or dispense the same type of solid materials, including sand, used for hydraulic fracturing proppant in *Waldner*. Further, the combination involves substitution of one known component (*Dynatek's* Econoloader) for another (the discharge chute member of *Waldner*) to obtain predictable results in moving aggregate material

horizontally at an elevated location. Additionally, both Dynatek and Waldner use known mechanical devices for similar purposes, and Dynatek specifically teaches ease of installation using various mounting techniques, including a “platform mount” similar to the elevated structure that supports Waldner’s discharge chute.

120. There is no indication that the *Dynatek* Econoloader would be difficult to use or mount to the system of Waldner without undue experimentation. *Waldner’s* discharge system is sold as a component (i.e. discharge conveyor) to be used with other types of systems to deliver the particulate material to the conveyors of *Dynatek*. *Waldner* teaches a system for delivering the particulate material to an elevated location for discharge. *Dynatek* specifically teaches various mounting techniques. One “standard” mounting option of the *Dynatek* system is “platform mount”, where the discharge chute is mounted to a derrick-like structure, similar to the elevated structure of *Waldner* which supports *Waldner’s* discharge chute.



121. *Dynatek* further teaches “Every DYNATEK EconoLoader™ is custom-engineered for the application so filling special customer requests is no issue.”¹³⁰ *Dynatek* advertises “Structural design, method of conveying, conveying capacities, wind load, and site parameters are all carefully considered when designing a bulk loading installation.”¹³¹ Further, *Dynatek* advertises “We can work with your existing structure, propose a standard solution or adapt the mounting to your individual specifications,”¹³² indicating to a POSITA that mounting a Dynatek Econoloader to the existing structure of *Waldner* would be simply an engineering problem, one which *Dynatek* was able to solve.

B. DISCLOSURE OF WALDNER IN VIEW OF DYNATEK

a. Independent Claim 1

122. It is my opinion that the combination of *Waldner* and *Dynatek* discloses and/or suggests each and every limitation of Claim 1, and a POSITA would have found Claim 1 to be obvious based on the combined teachings of *Waldner* and *Dynatek*.

¹³⁰ Ex. 1005 at 3.

¹³¹ Ex. 1014, Exhibit B at 41.

¹³² Ex. 1014, Exhibit B at 41.

i. *Limitation 1[p]: “An aggregate transferring apparatus for elevating and transferring aggregate, the apparatus comprising:”*

123. To the extent the preamble is limiting, *Waldner* discloses a “portable conveyor system for receiving particulate material [i.e. aggregate] from a transport vehicle and conveying the particulate material to an elevated location.”¹³³ *Waldner* discloses the elements of its mobile conveyor system in multiple embodiments¹³⁴

124. Accordingly, *Waldner* discloses the preamble.

ii. *Limitation 1[a]: “a base assembly for receiving aggregate to be conveyed by the transferring apparatus, the base assembly comprising:”*

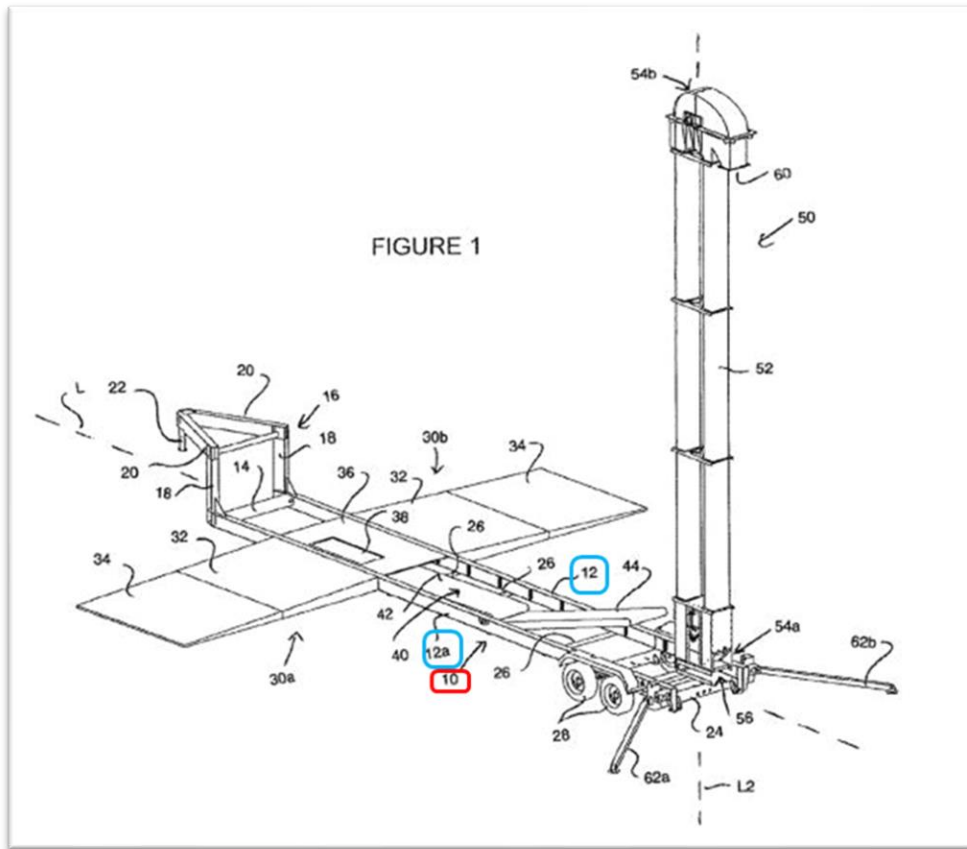
125. *Waldner* discloses “an all-in-one solution for emptying of particulate or granular material from a bottom-unload vehicle . . . and for vertically conveying the material up to an elevated location using an on-board bucket conveyor, which is fed by a built in intermediate conveyor that automatically moves the material from beneath the transport vehicle to the bucket conveyor.”¹³⁵ *Waldner* further discloses “a frame 10[annotated in red] including two longitudinal side beams 12a, 12b

¹³³ Ex. 1004, Abstract, 1:17-20, 11:60-12:1

¹³⁴ Ex. 1004, 10:49-11:55

¹³⁵ Ex. 1004 11:60-12:1.

[annotated in blue] that lie parallel to one another on opposite sides of a central longitudinal axis L of the trailer.”¹³⁶



Ex. 1004 Fig. 1 (annotated)

¹³⁶ Ex. 1004 12:15-18.

126. Further, *Waldner* teaches this frame supports: a gooseneck structure with hitch coupler 22,¹³⁷ ground wheels 26,¹³⁸ deployable ramp sections,¹³⁹ a bridging platform 36 with an opening 38,¹⁴⁰ a longitudinal conveyor 42 and a second ramped conveyor 44,¹⁴¹ a bucket elevator 50 which itself supports an outlet port 60,¹⁴² hydraulic cylinders for elevation and deployment of the assembly (not shown),¹⁴³ and a pair of outrigger arms 62a and 62b.¹⁴⁴ A POSITA would have understood that at least the disclosed trailer frame 10, first horizontal belt conveyor 42, ramp assemblies 30a, 30b, bridging platform 36, and opening 38, or “feeder conveyor framework 70”¹⁴⁵ (not shown) provides the function of a “base assembly”

¹³⁷ Ex. 1004 12:22 – 34.

¹³⁸ Ex. 1004 12:35 – 51.

¹³⁹ Ex. 1004 12:52 – 13:31.

¹⁴⁰ Ex. 1004 13:32 – 50.

¹⁴¹ Ex. 1004 13:51 – 14:3.

¹⁴² Ex. 1004 14:4 – 15:21.

¹⁴³ Ex. 1004 15:22 – 35.

¹⁴⁴ Ex. 1004 22 – 35.

¹⁴⁵ Ex. 1004 17:9 – 23.

to receive material from a vehicle to be conveyed by the bucket conveyor.¹⁴⁶ Further, a POSITA would have understood that a deployable structure, such as the trailer mounted and deployable structure described in *Waldner* would have had a “base assembly” for support of the structure. Thus, *Waldner*, either alone or in view of the knowledge of a POSITA, teaches or discloses Limitation 1[a].

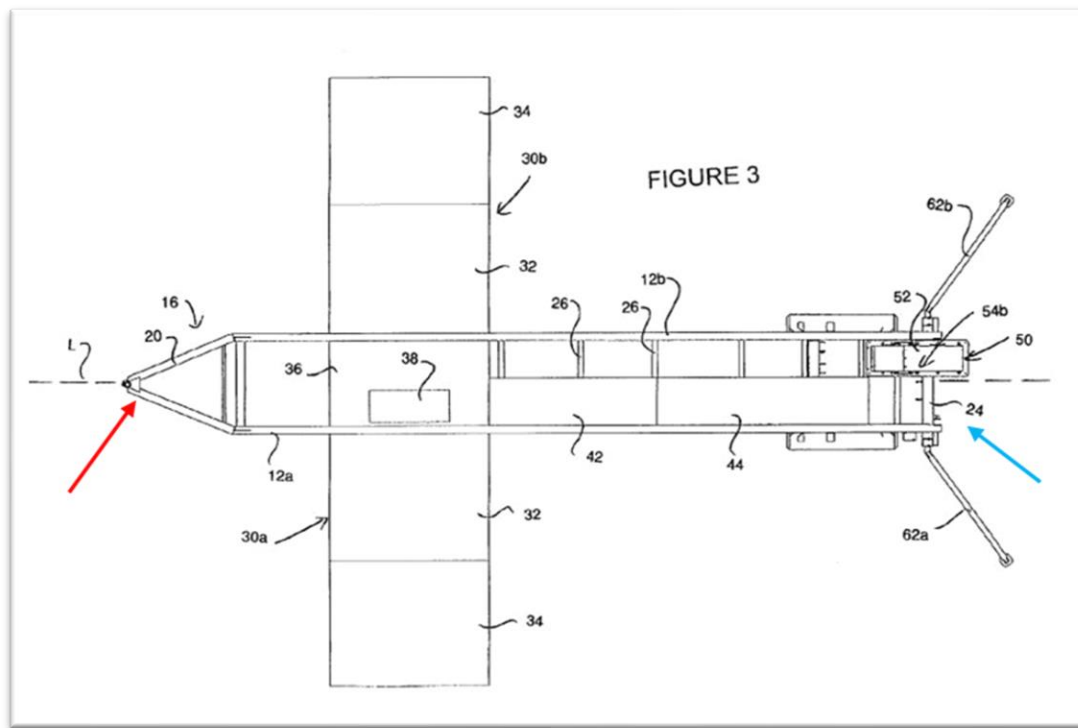
iii. *Limitation 1[b]: “a base frame being elongated along a longitudinal axis and having a leading end and a trailing end;”*

127. As discussed above regarding 1[a], *Waldner* discloses “a frame 10 including two longitudinal side beams 12a, 12b that lie parallel to one another on opposite sides of a central longitudinal axis L of the trailer.”¹⁴⁷ The frame 10 includes a first end (annotated in red) and “a second end [annotated in blue] of the trailer that opposes the hitch-equipped first end thereof.”¹⁴⁸

¹⁴⁶ Ex. 1004, Figs. 1, 3 & 15, 12:52-59, 13:32-55, 21:15-27, 26:64-66, 27:7-18

¹⁴⁷ Ex. 1004, 12:15-18, 12:52-59, Figure 1.

¹⁴⁸ Ex. 1004, 12:22-36, Figs. 1, 3, 15.



Ex. 1004, Fig. 3 (annotated)

128. Further, *Waldner* teaches a hitch coupler carried on the frame at the first end thereof and support wheels on the frame at a distance spaced from the first end thereof in the longitudinal direction for rolling support of the frame on a ground Surface during transport of the trailer assembly;”¹⁴⁹ and that “the hitch coupler is carried on a gooseneck structure at the first end of the frame.”¹⁵⁰ A POSITA would have understood that the “hitch coupler” connects to the towing vehicle, and the first

¹⁴⁹ Ex. 1004 9:59 – 63.

¹⁵⁰ Ex. 1004 10:43-44.

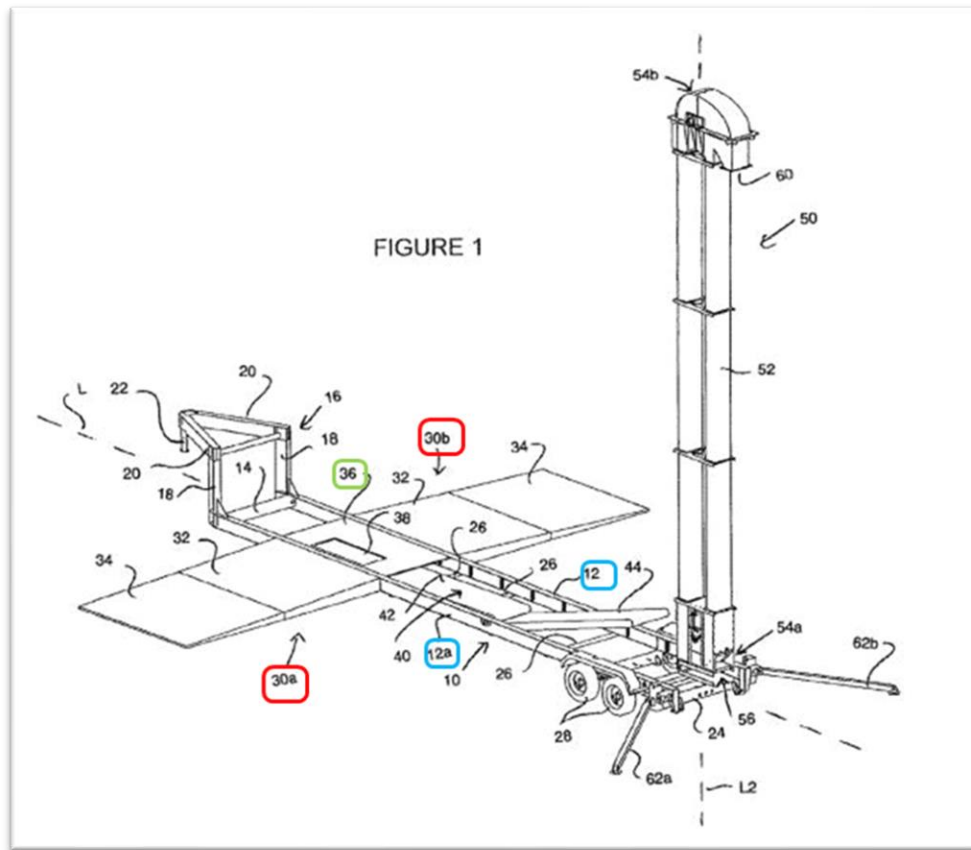
end would thus be the “leading end”. Further, a POSITA would have understood that the wheels would be near the “second end” and would be trailing behind the hitch coupler, i.e. the second end would be a “trailing end”. Accordingly, *Waldner* discloses limitation 1[b].

iv. *Limitation 1[c]: “an unloader structure mounted on the base frame to receive aggregate from a vehicle at least partially positioned over the base frame; and”*

129. *Waldner* discloses a first ramp assembly 30a and a second ramp assembly 30b [annotated in red] connected to the longitudinal side beam 12a and side beam 12b, respectively [annotated in blue], of the frame 10.¹⁵¹ *Waldner* further describes that a bridging platform 36 [annotated in green] is placed between the ramp assemblies 30a, 30b to connect them together.¹⁵²

¹⁵¹ Ex. 1004 12:52 – 13:3.

¹⁵² Ex. 1004 13:32 – 50.



Ex. 1004 Fig. 1

130. *Waldner* further teaches the bridging platform “is mounted atop the atop the longitudinal beams 12a, 12b of the trailer frame 10.”¹⁵³ Accordingly, the bridging platform (part of the unloader structure discussed below) is positioned at least partially over the base frame (trailer 10).

131. As discussed by *Waldner*, a “transport vehicle is driven up one of the ramps, and over the bridging platform onto the other ramp into an unloading position

¹⁵³ Ex. 1004 13:32 – 33.

placing the outlet of the transport vehicle over the opening 38 of the bridging platform 36.”¹⁵⁴ Further, *Waldner* describes the function of the bridging platform: “[w]ith the transport vehicle parked in the unloading position, the bottom outlet of the transport vehicle is opened in order to allow granular material to fall from the vehicle through this outlet, and onward through the opening 38 in the bridging platform 36 and onto the horizontal belt conveyor 42 below.”¹⁵⁵ Accordingly, a POSITA would have understood the ramps 30a, 30b and bridging platform 36, along with opening 38, to comprise the “unloader structure” claimed, as the structure is used to elevate the transport vehicle above the trailer and conveyor and to allow the trucks to unload aggregate to the conveyor assembly; and that that a portion of conveyor 42 is positioned adjacent to the “unloader structure” to receive aggregate from the vehicle positioned over the base frame.

132. To the extent that claim 1[c] requires a grate (though not specifically claimed), a POSITA would have considered opening 38 to be a grate or equivalent structure thereof. Thus, *Waldner*, teaches or discloses Limitation 1[c].

133. Alternatively, a POSITA would have deemed it obvious to add a grate to opening 38. Grates to cover openings such as opening 38 were widely known and

¹⁵⁴ Ex. 1004. 16:18-22.

¹⁵⁵ Ex. 1004, 16:37-42.

used in the field of material unloading,¹⁵⁶ and a POSITA would have known how to install such a grate on opening 38. In using *Waldner's* system, a grate may have been required over opening 38 to comply with worker safety regulations.¹⁵⁷ Moreover, a POSITA would have been motivated to include a grate, *e.g.*, to prevent materials other than the particulate material conveyed using *Waldner's* systems (*e.g.*, debris, loose parts, etc.) from falling onto the conveyor below.

- v. ***Limitation 1[d]: “a base conveyor mounted on the base frame and extending along a longitudinal portion of the base frame between the leading and trailing ends of the base frame, a portion of the base conveyor being positioned adjacent to the unloader structure to receive aggregate from the vehicle positioned over the base frame;”***

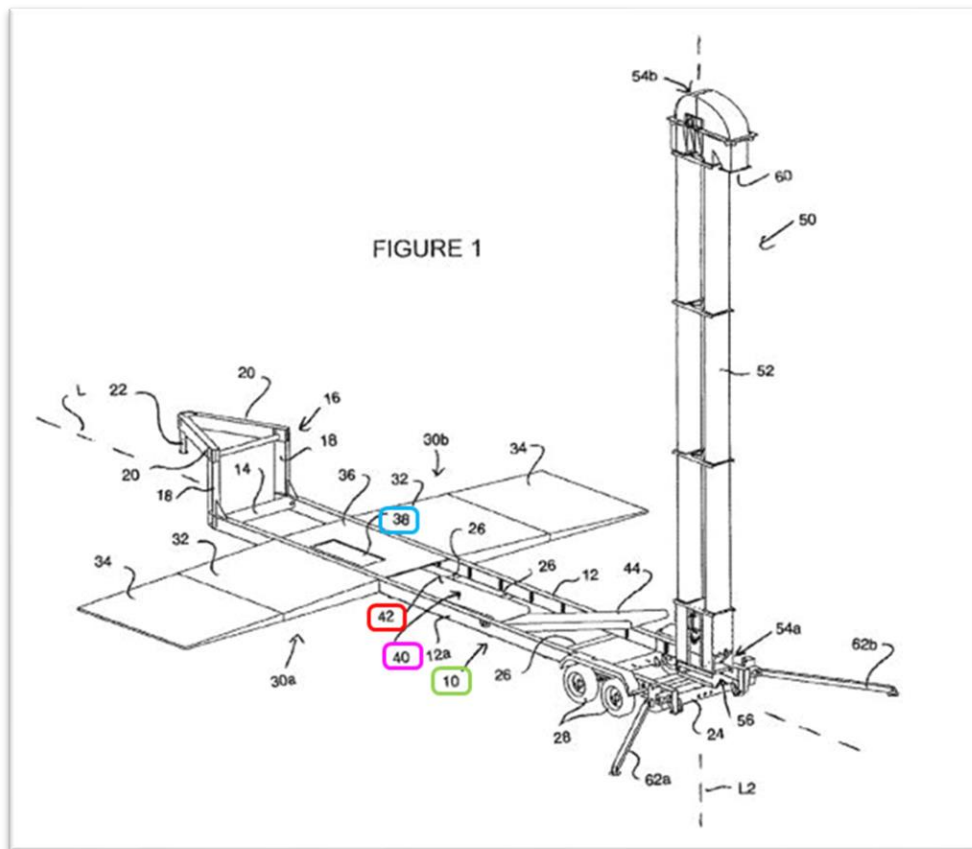
134. *Waldner* discloses a longitudinal conveyor system 40 that includes a first horizontal belt conveyor 42 (annotated in red) that runs in the longitudinal direction of the trailer frame from an area beneath the bridging platform 38 (annotated in blue) and a second inclined belt conveyor starting below one end of conveyor 42 and extending toward the second end of the trailer frame.¹⁵⁸ As shown

¹⁵⁶ See, *e.g.*, Ex. 1032 (discharge opening 19).

¹⁵⁷ See, *e.g.*, OSHA Regulations, 29 CFR 1910.29(e) (available at <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.29>).

¹⁵⁸ Ex. 1004 13:51-60

in Fig. 1 of *Waldner*, the conveyor system 40 (annotated in magenta) extends between the first end and second end of the frame 10 (annotated in green):



Ex. 1004, Fig. 1 (annotated)

135. In view of Fig. 1, and the description of the location of the conveyor assembly 40 and belt conveyor 42 and 44 in the specification, a POSITA would have understood that the first horizontal belt conveyor 42 and inclined conveyor 44

are mounted to frame 10.¹⁵⁹ Further, as described above in Section X.B.a.iv, the combination of ramp assemblies 30a, 30b and bridging platform 36 are disposed over trailer 10 and at least a portion of the first horizontal belt conveyor 42, at least suggesting the conveyor is attached to the trailer frame (i.e. base assembly). The combination of belt conveyor 42 and incline conveyor 44 comprise the “base conveyor” claimed. Accordingly, *Waldner*, discloses or at least suggests Limitation 1[d].

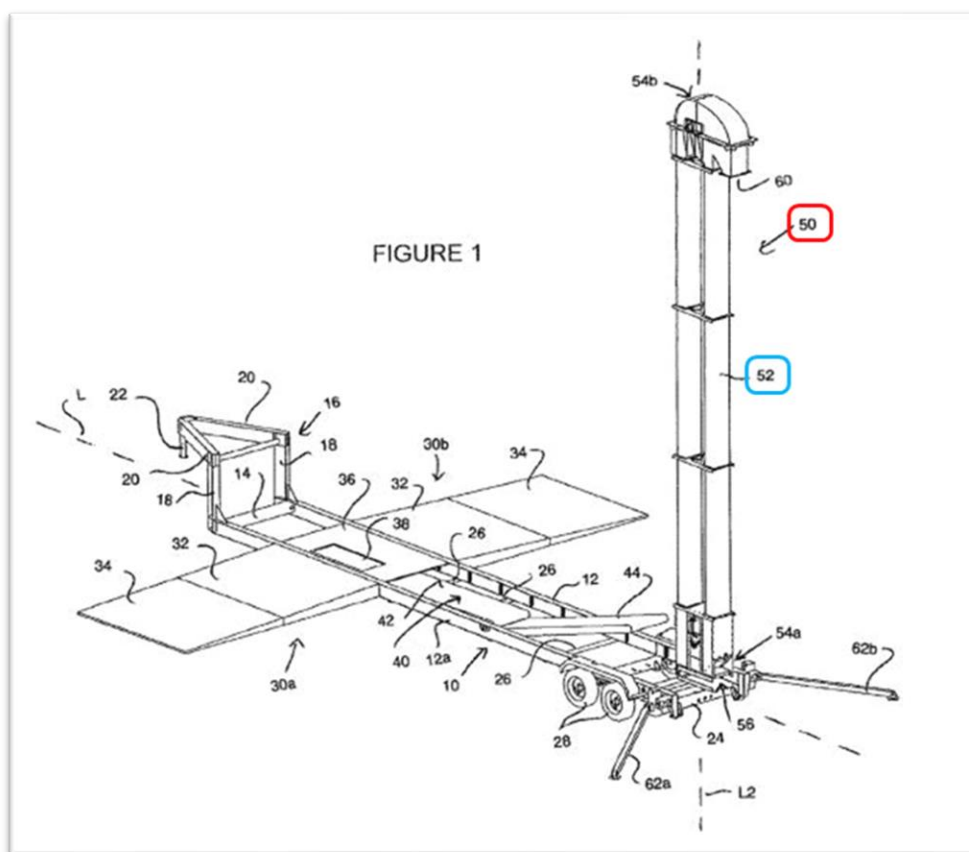
vi. *Limitation 1[e]: “an aggregate elevating assembly for elevating aggregate from the base assembly, the aggregate elevating assembly comprising:”*

136. *Waldner* discloses a bucket elevator 50 ([annotated in red] for “vertically conveying the material up to an elevated location using an on-board bucket conveyor, which is fed by a built in intermediate conveyor that automatically moves the material from beneath the transport vehicle to the bucket conveyor.”¹⁶⁰ *Waldner* teaches “[t]he bucket elevator features an elongated housing structure 52 [annotated in blue] having first and second ends 54a, 54b spaced apart along a longitudinal axis L2 of the bucket elevator.”¹⁶¹

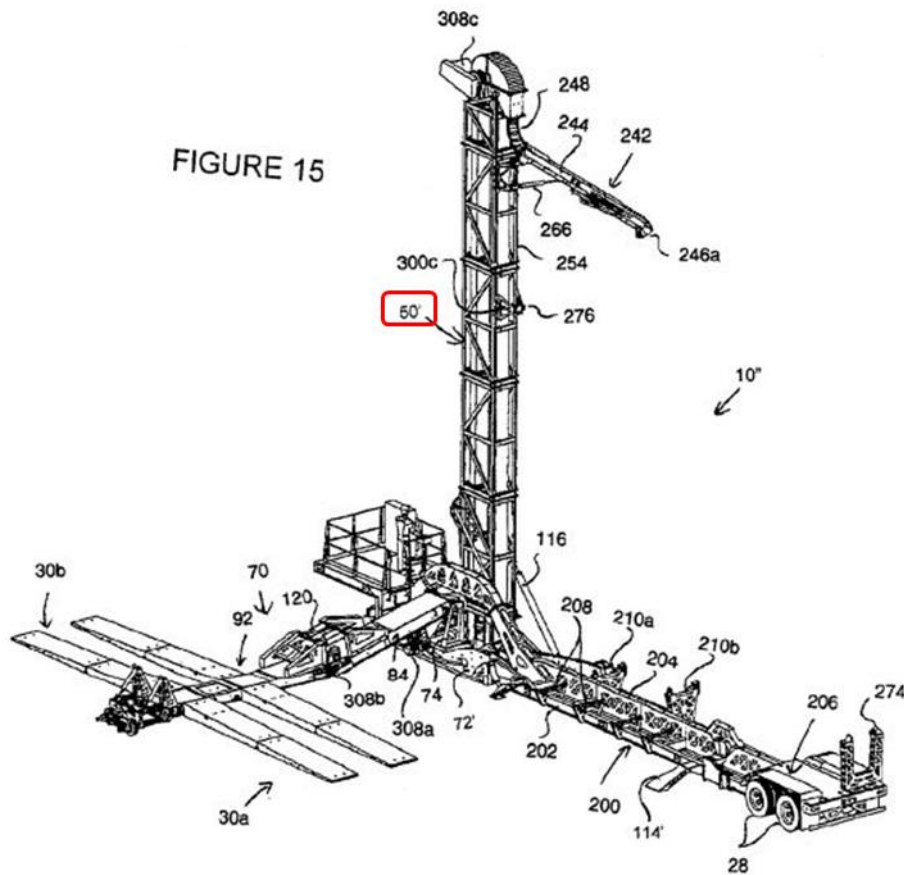
¹⁵⁹ Ex. 1004, 13:51- 14:3.

¹⁶⁰ Ex. 1004, 11:64-12:1; see also 14: 4 – 22.

¹⁶¹ Ex. 1004, 14:9-11



Ex. 1004, Fig. 1 (annotated).



Ex. 1004, Fig. 15 (annotated: bucket elevator 50' annotated in red).

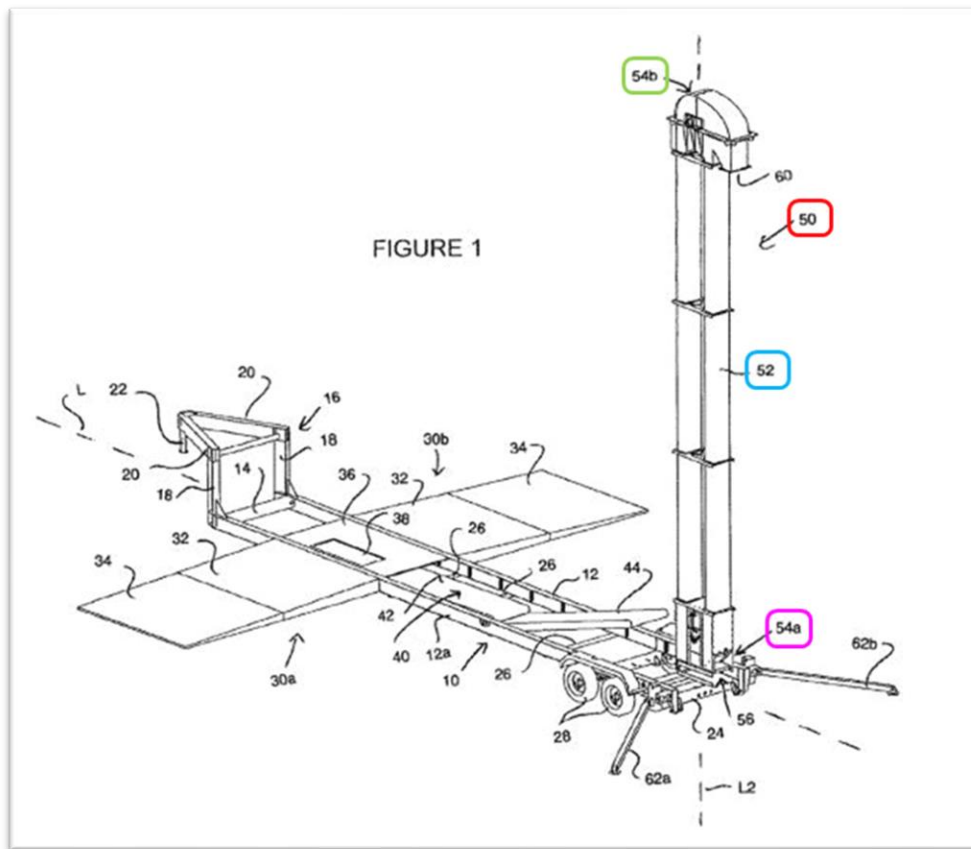
137. A POSITA would have understood a bucket elevator 50 (50' in some embodiments) to comprise an “aggregate elevating assembly”. Further, *Waldner* teaches the “bucket elevator 50 is mounted to the trailer frame [i.e. base assembly] at or near the second end thereof.”¹⁶² Accordingly, *Waldner* discloses or at least suggests Limitation 1[e].

(a) **Limitation 1[f]: “a deployable frame mounted on the base frame and being movable between a**

¹⁶² Ex. 1004 14:4-5.

storage position and a deploy position, the storage position corresponding to a transport configuration of the apparatus and the deploy position corresponding to an operational configuration of the apparatus, the deployable frame being elongated with a base end and a free end; and”

138. *Waldner* discloses the bucket elevator 50 [annotated in red] including “an elongated housing structure 52 [i.e. frame] having first and second ends 54a, 54b spaced apart along a longitudinal axis L2 of the bucket elevator.”¹⁶³



¹⁶³ Ex. 1004. 14:8-11

Ex. 1004 Fig. 1 (annotated)

139. *Waldner* further teaches the bucket elevator is contained in “bucket elevator frame 254.”¹⁶⁴

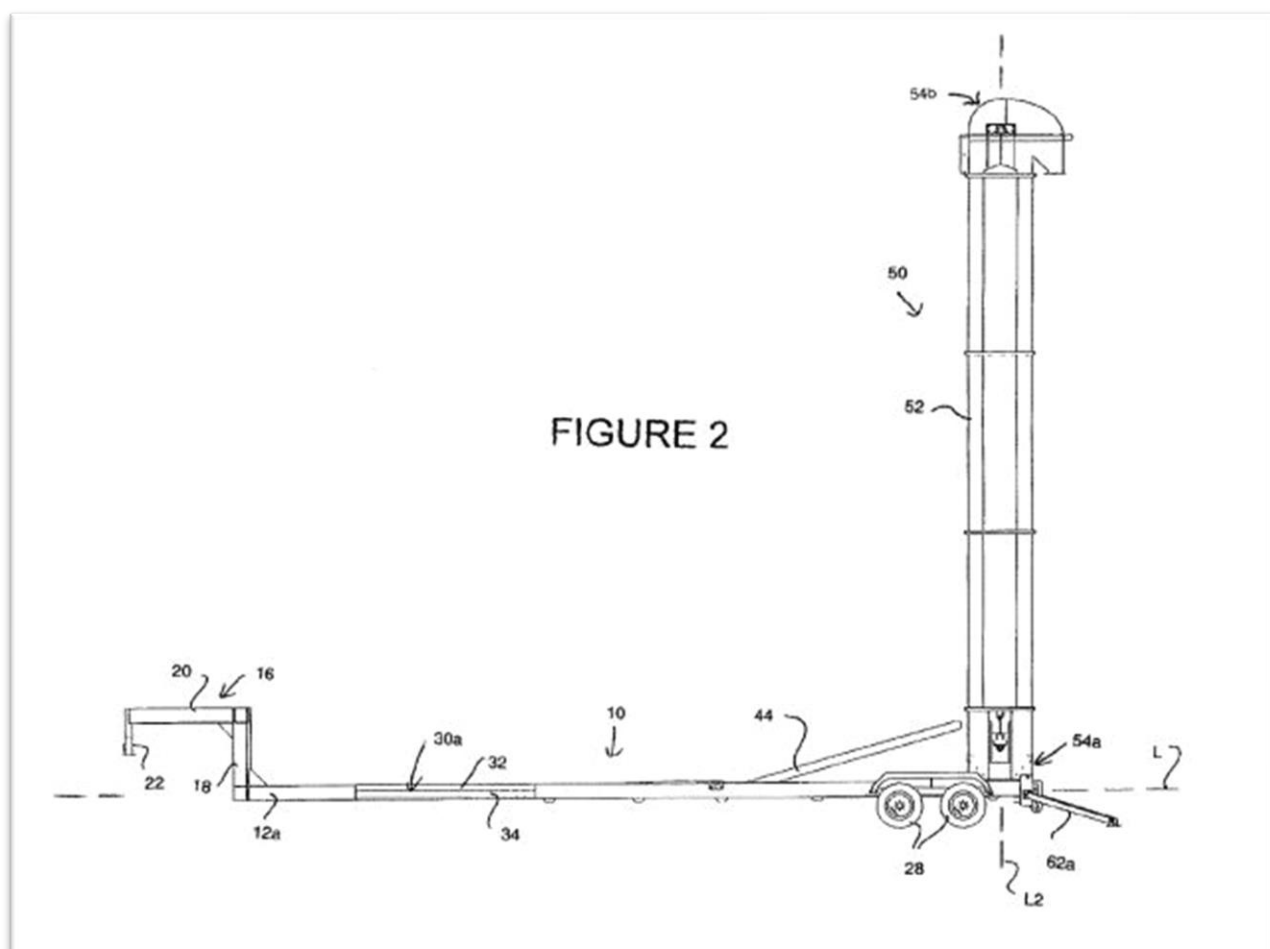
140. *Waldner* further describes the first end 54a [annotated in green]being connected to the trailer frame through the pivotal connection 56 and material being conveyed up to the top of bucket elevator housing 52 to second end 54b [annotated in magenta] then discharged.¹⁶⁵ A POSITA would have understood this to mean the housing (i.e. frame) to have a base end (first end 54a) and a free end (second end 54b)

141. *Waldner* discloses that “the bucket elevator housing can be pivoted about the axis of its pivotal connection 56 to the frame into a lowered storage position in which the longitudinal dimension of the bucket conveyor lies generally horizontally along the longitudinal axis L of the trailer, [shown in Fig. 5]” and for operations, it can be pivoted to “an upright operational position in which the longitudinal axis L2 of the bucket elevator lies perpendicular to the longitudinal trailer axis L [shown in Fig. 2]”¹⁶⁶

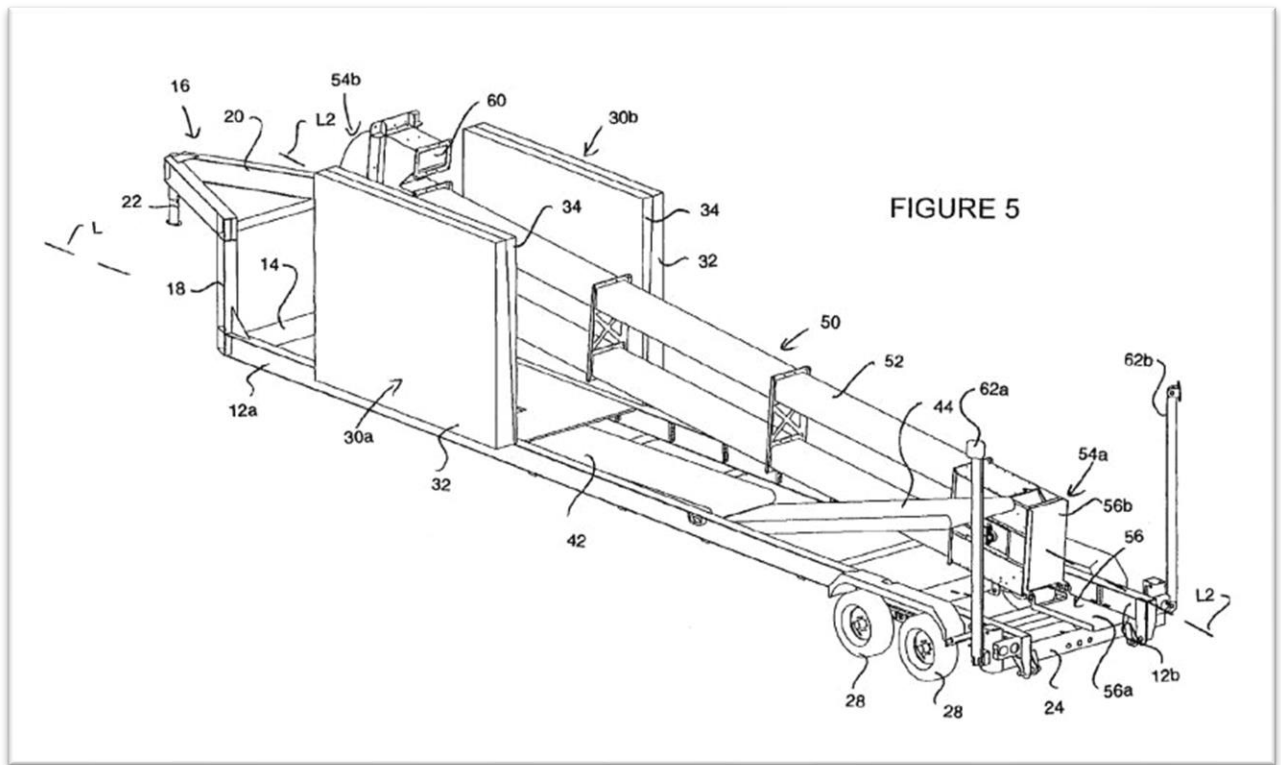
¹⁶⁴ See, e.g. Ex. 1004 25:20 – 26:45.

¹⁶⁵ Ex. 1004 14:12-13; 16:45-46

¹⁶⁶ Ex. 1004 14:39-43; 14:30-34.



Ex. 1004, Fig. 2.



Ex. 1004, Fig. 5.

142. A POSITA would have understood, based on the teachings of *Waldner*, that the system in the “lowered storage position” is transportable and that deploying the bucket elevator housing upright places the system in the operational configuration.¹⁶⁷

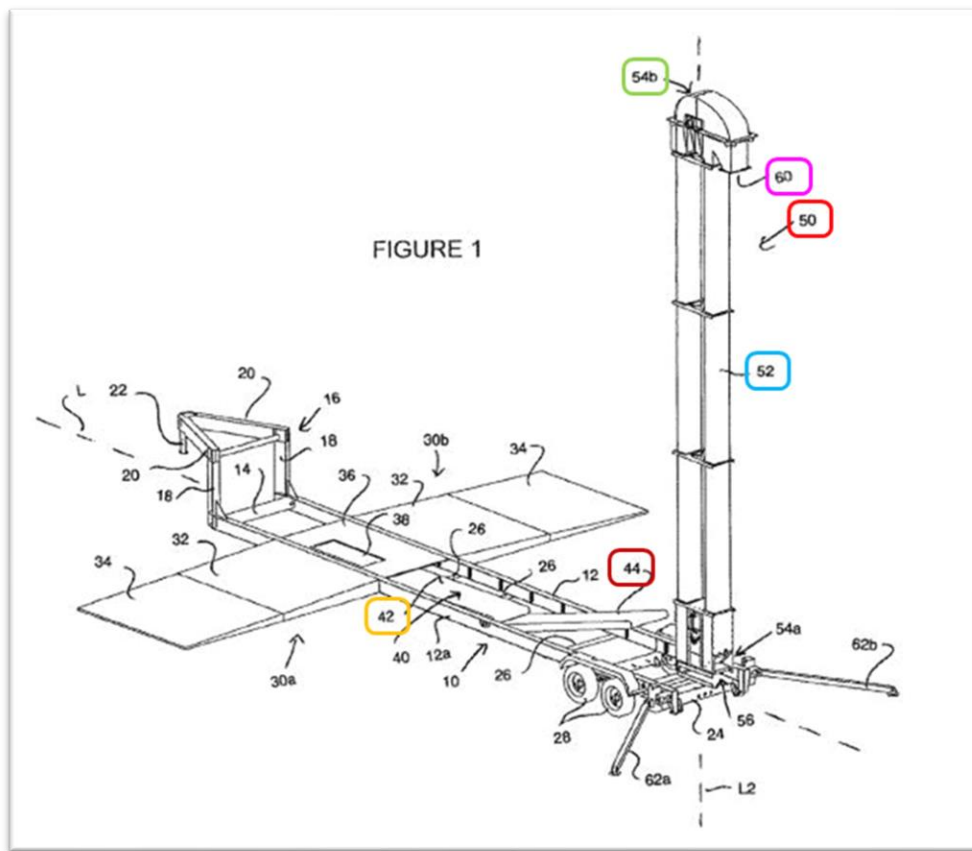
143. Accordingly, *Waldner*, either alone or in view of the knowledge of a POSITA, teaches or discloses Limitation 1[f].

(b) Limitation 1[g]: “an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly

¹⁶⁷See Ex. 1004 generally.

from the base assembly toward the free end of the deployable frame; and”

144. *Waldner* discloses the bucket elevator housing 52 (annotated in blue) including a bucket conveyor 50 (annotated in red) using buckets to carry material from the inclined belt conveyor 44 (annotated in dark red) on the trailer frame 10 up to an outlet port 60 (annotated in magenta) at the second end 54b (annotated in green, “free end”).¹⁶⁸



¹⁶⁸ Ex. 1004, 14:47-15:21.

145. *Waldner* further describes “The granular material falling from the vehicle is conveyed by the horizontal belt 42 to the inclined belt 44, and onward via the inclined belt into the inlet of the bucket elevator 50, where the material is then lifted up to the top end 54b of the bucket elevator and discharged therefrom through the outlet port 60 thereof.”¹⁶⁹ A POSITA would understand that *Waldner*’s teaching of bucket conveyor 50 discloses a elevating conveyor used to convey the aggregate upwardly from the base assembly toward the free end of the deployable frame 52. A POSITA would further understand that bucket conveyor 50 is configured to receive aggregate from belt conveyor 42, which is part of the base conveyor, by way of inclined belt conveyor 44.

146. Accordingly, *Waldner*, discloses or at least teaches Limitation 1[g].

(c) **Limitation 1[h]: “a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:”**

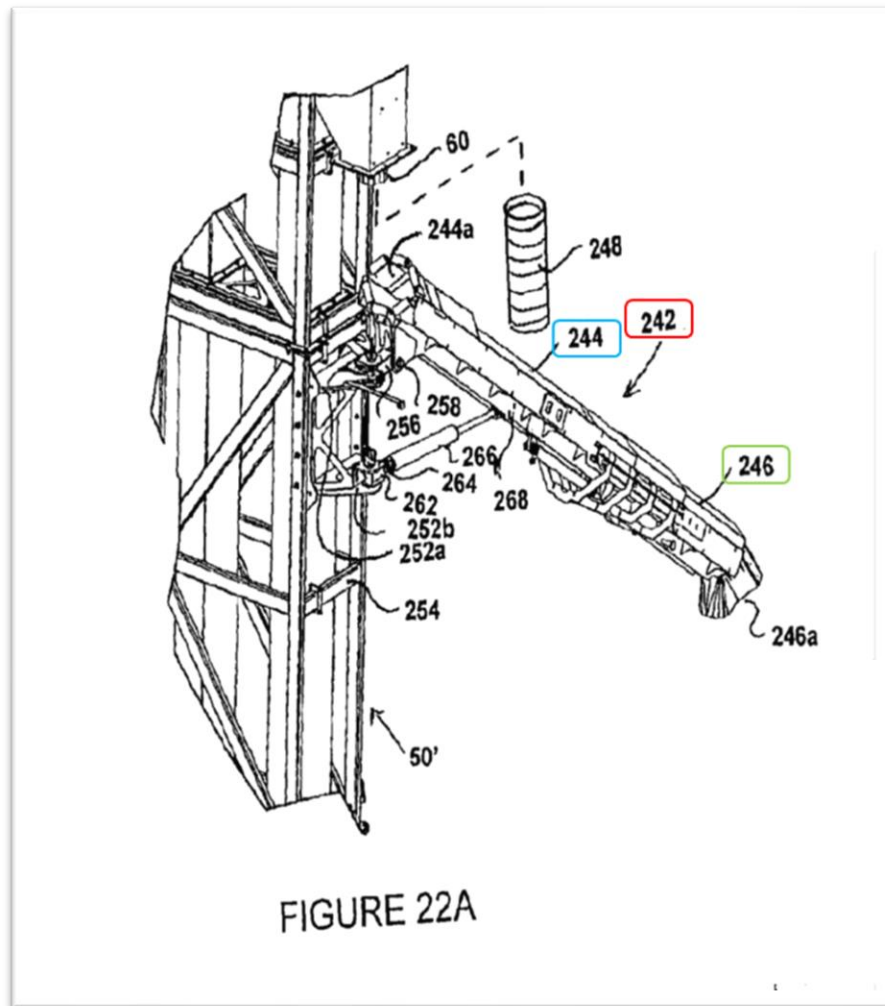
147. *Waldner* discloses “From the outlet port 60, the granular material is fed into the storage bin or tank that is to be filled with the granular material, for example via a discharge chute if provided.”¹⁷⁰ Further details of the discharge chute are

¹⁶⁹ Ex. 1004 16:42 – 47.

¹⁷⁰ Ex. 1004 16:47 – 50.

provided by *Waldner*: “Referring to FIG. 22, a discharge chute member 242 [annotated in red] of the bucket elevator 50' is of a telescopically adjustable length, having a proximal section 244 [annotated in blue] and a distal section 246 [annotated in green] that are slidably coupled together and collectively form an enclosed tubular passage from an inlet end 244a of the proximal section to an opposing discharge end 246a of the distal section.”¹⁷¹

¹⁷¹ Ex. 1004 25:7 – 14.



Ex. 1004 Fig. 22A (annotated)

148. *Waldner* further discloses swinging the discharge chute member 242 “horizontally to a desired angle radiating outwardly away from the bucket elevator.”¹⁷² *Waldner* further describes “an operator can thus carefully aim the

¹⁷² Ex. 1004 26:59 – 60.

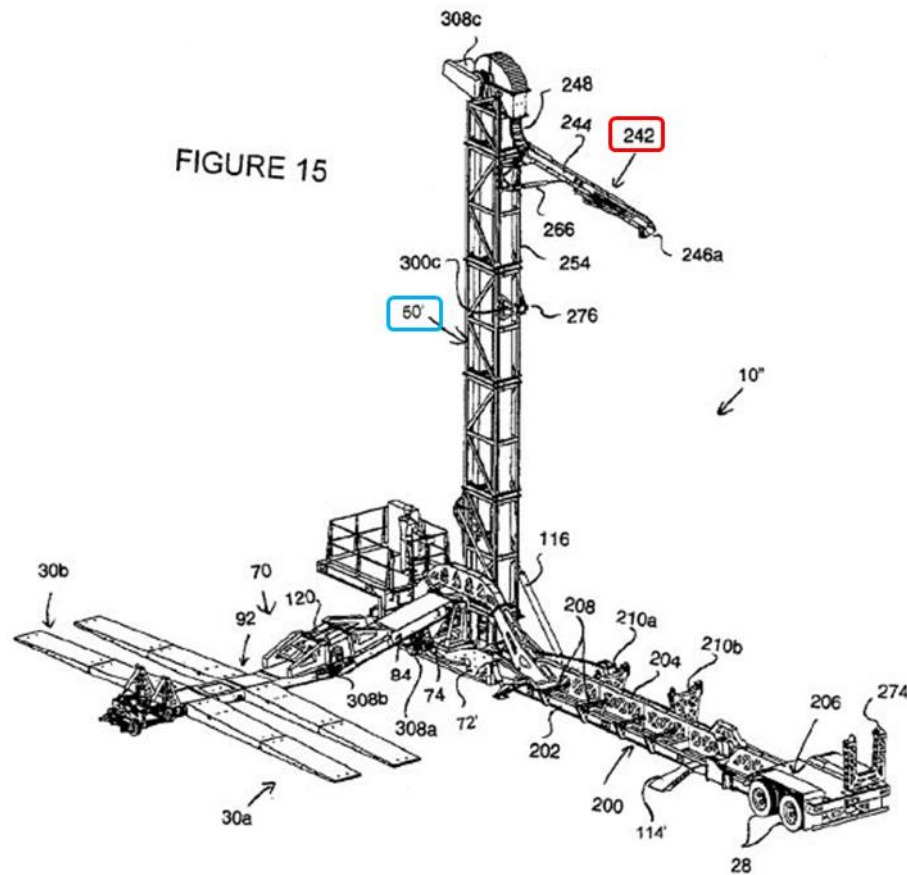
discharge opening 246a at the target destination, such as the fill port of a storage bin.”¹⁷³

149. *Waldner* describes that “although not shown for the first embodiment, a discharge chute may be coupled to the outlet port 60 of the bucket elevator and have an actuator, such as a hydraulic cylinder, that is operable to move a discharge end of the chute relative to the outlet port 60 of the bucket elevator.”¹⁷⁴ *Waldner* further discloses the “discharge chute member 242” (annotated in red) so mounted at the top of the bucket elevator 50’ [annotated in blue] using a combination of brackets, links, and pivot pins that receives the material discharged from the outlet port 60 and directs the material away from the bucket elevator 50’.¹⁷⁵

¹⁷³ Ex. 1004 26:61 – 63

¹⁷⁴ Ex. 1004, 15:14-19

¹⁷⁵ Ex. 1004, 25:7-57, 25:66-26:19, & Figs. 22A-22D



Ex. 1004, Fig. 15 (annotated);¹⁷⁶

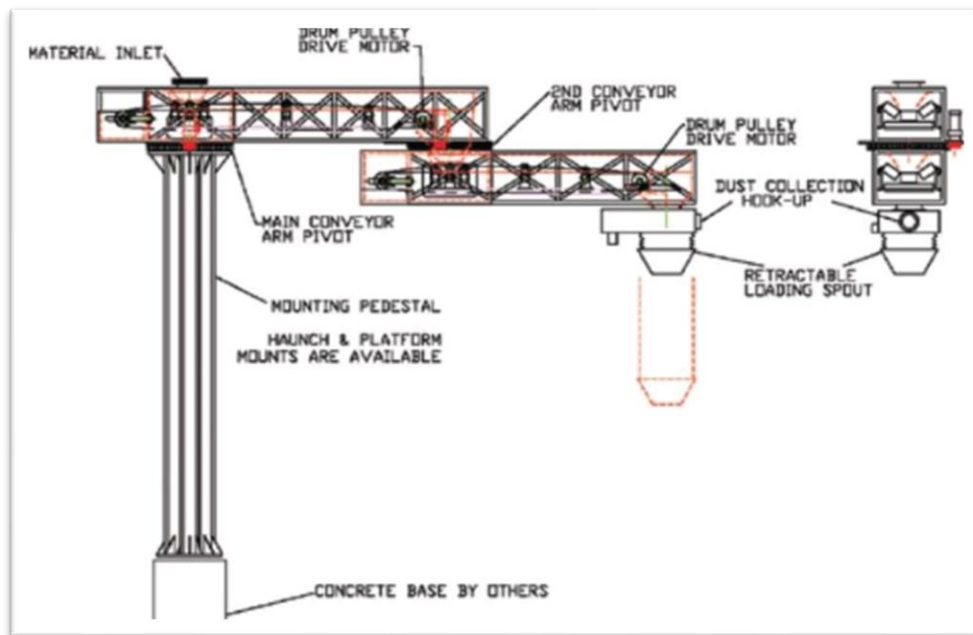
150. An operator can use actuators 266 and 270 to aim the discharge opening 246a of discharge chute 242 at a target destination, such as the fill port of a storage bin.¹⁷⁷

¹⁷⁶ see also Figs. 22A-22D (see also Figures 10-12 (showing discharge chute member attached vertically to bucket elevator 50 with brackets 276 shown in Fig.15 and discussed at 26:46-54)).

¹⁷⁷ Ex. 1004, 26:55-63

151. To the extent Figure 15 illustrates a different embodiment of a mobile conveyor system, it would have been obvious for a POSITA to use a combination of components from the different embodiments presented by *Waldner* (i.e, the discharge chute member 242).¹⁷⁸

152. In combination with *Dynatek*, the EconoLoader of *Dynatek* replaces discharge chute member 242, or Discharge chute member 242 is modified per the teachings of *Dynatek* to have “(2) open or enclosed conveying arms, each containing its own belt conveyer.”¹⁷⁹ As shown, *Dynatek’s* conveyor also includes a frame around the belt conveyors.



¹⁷⁸ Ex. 1004, 33:22-39

¹⁷⁹ Ex. 1005 at 2.

Ex. 1005 at 2.

153. Accordingly, the combination of *Waldner* and *Dynatek* renders Limitation 1[h] obvious.

- (d) **Limitation 1[i]: “an extension conveyor for moving aggregate from an inlet of the extension conveyor to an outlet of the extension conveyor at a location outward from the aggregate elevating assembly, the extension conveyor being movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus, the lowered position being characterized by the extension conveyor being positioned adjacent to the deployable frame of the aggregate elevating assembly, the raised position being characterized by the extension conveyor being positioned generally away from the deployable frame of the aggregate elevating assembly,”**

154. As discussed above regarding 1[h], *Waldner* discloses the discharge chute member 242 having an inlet end 244a receiving material from the outlet port 60 and a discharge end 246a opposite therefrom.¹⁸⁰ A POSITA would have understood that the discharge chute member 242, modified or replaced with the belt-conveyor based discharge member of *Dynatek*, is an extension conveyor that

¹⁸⁰ Ex. 1004 25:7 – 13.

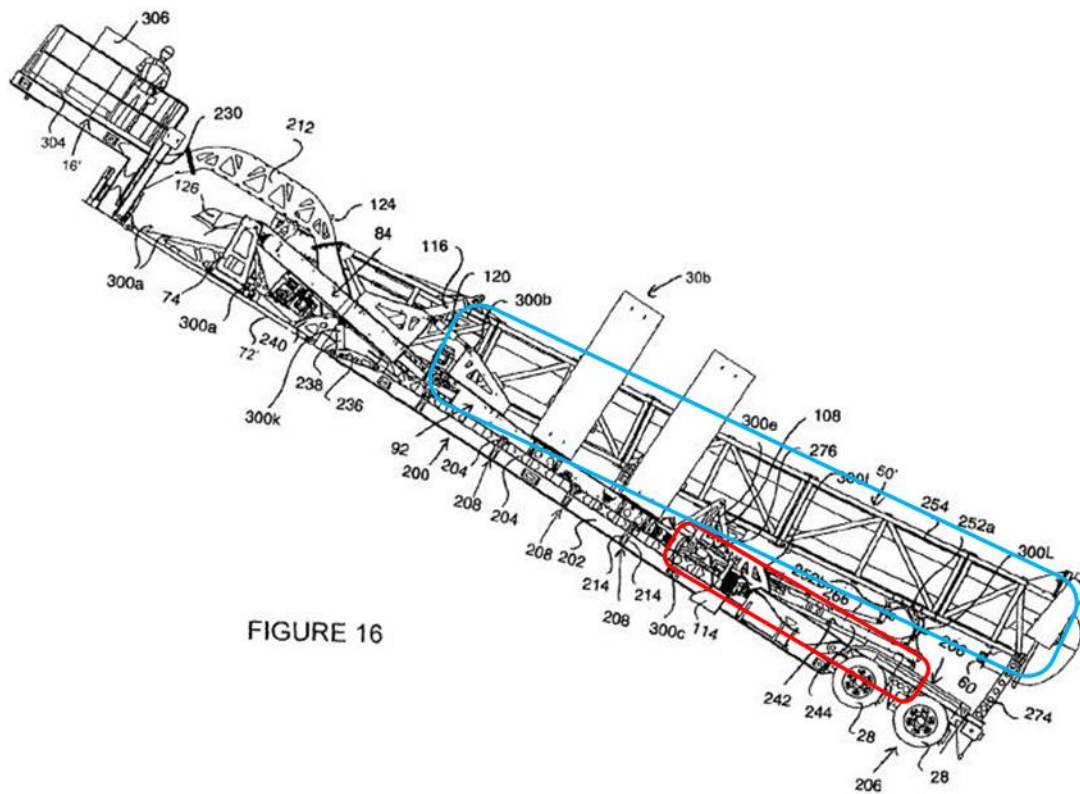
discharges material from the inlet end 244a to the discharge end 246a and away from the bucket elevator 50. *Waldner* further discloses that “the discharge member 242 is movable about two perpendicular axes to allow relocation thereof to various positions in 3D space” in relation to the bucket elevator 50.¹⁸¹ *Waldner* further discloses using an assembly that includes brackets 252a, 252b and actuators 266, 270 to move the discharge chute member 242 relative to the bucket elevator 50.¹⁸²

155. *Waldner* teaches that “when the bucket elevator is lowered into the storage position, the collapsed discharge member 242 [annotated in red] resides in a space between the bucket elevator 50' [annotated in blue] and the trailer so as to overlie the rear end of the open trailer framework 200 and the wheeled rear truck 206 connected thereto.”¹⁸³ Accordingly, when in the storage position, the discharge assembly is adjacent to the elevator assembly (50'). Fig. 16 of *Waldner* shows the discharge member in this position.

¹⁸¹ Ex. 1004 25:64 – 66.

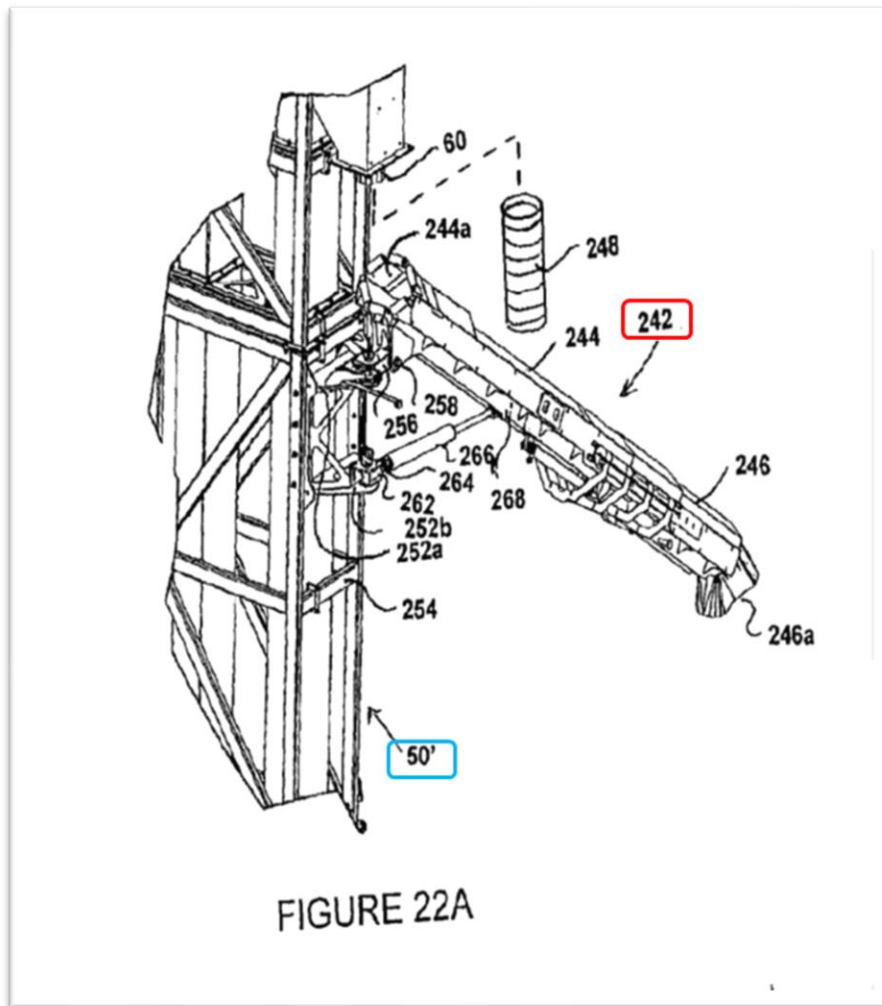
¹⁸² Ex. 1004 26:46 – 63; see also 25:7 – 65.

¹⁸³ Ex. 1004 20 – 25.



Ex. 1004 Fig. 16 (annotated)

156. As discussed above regarding Limitation 1[h], Fig. 22 shows the discharge chute assembly in the “raised” position, which shows the extension conveyor 242 (annotated in red) positioned away from the deployable frame of the elevating assembly 50’ (annotated in blue).



Ex. 1004 Fig. 22A (annotated)

157. As discussed above regarding limitation 1[h], to the extent that the discharge chute member 242 of *Waldner* is not an “extension conveyor,” *Dynatek* discloses such an arrangement. *Dynatek* discloses an articulated loader having two conveying arms that each comprise their own belt conveyor.¹⁸⁴ As discussed above,

¹⁸⁴ Ex 1005 at 2.

it would have been obvious to a POSITA to substitute *Dynatek*'s EconoLoader for discharge chute member 242, or to modify discharge chute member 242 to include one or more conveyor belts. Thus, the combination of *Waldner* and *Dynatek* renders Limitation 1[i] obvious.

- (e) **Limitation 1[j]: “wherein the extension conveyor is articulated between the inlet and outlet with an inboard segment and an outboard segment, the inboard segment being pivotally connected to the deployable frame of the aggregate elevating assembly by an inboard pivot, the outboard segment being pivotally connected to the inboard segment by an outboard pivot; and”**

158. *Waldner* discloses that discharge chute member 242 is “of a telescopically adjustable length, having a proximal section 244 and a distal section 246 that are slidably coupled together....”¹⁸⁵ Proximal section 244 is pivotally connected to bucket elevator frame 254 using mounting brackets 252a/252b, links 256/262 and pivot pins.¹⁸⁶

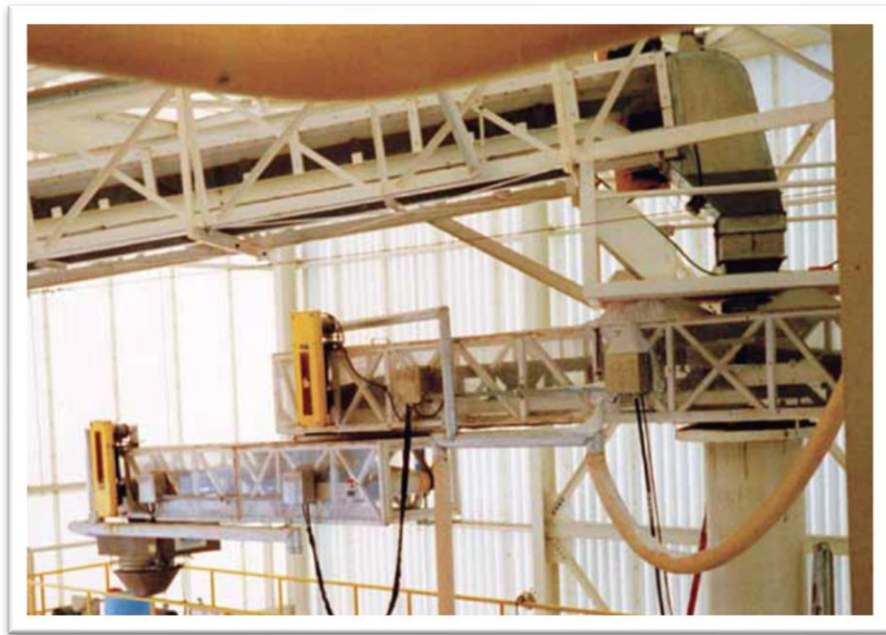
159. *Dynatek* discloses “(2) open or enclosed conveying arms, each containing its own belt conveyor.”¹⁸⁷ *Dynatek* further discloses “[m]aterial enters the

¹⁸⁵ Ex. 1004, 25:7-12, Fig. 22

¹⁸⁶ Ex. 1004, 25:30-57

¹⁸⁷ Ex. 1005 at 2.

loader through an inlet in the main arm [i.e. inboard segment] and discharges through the outlet or a dust recovery load-out spout at the end of the 2nd arm (loading arm) [outboard segment].”¹⁸⁸

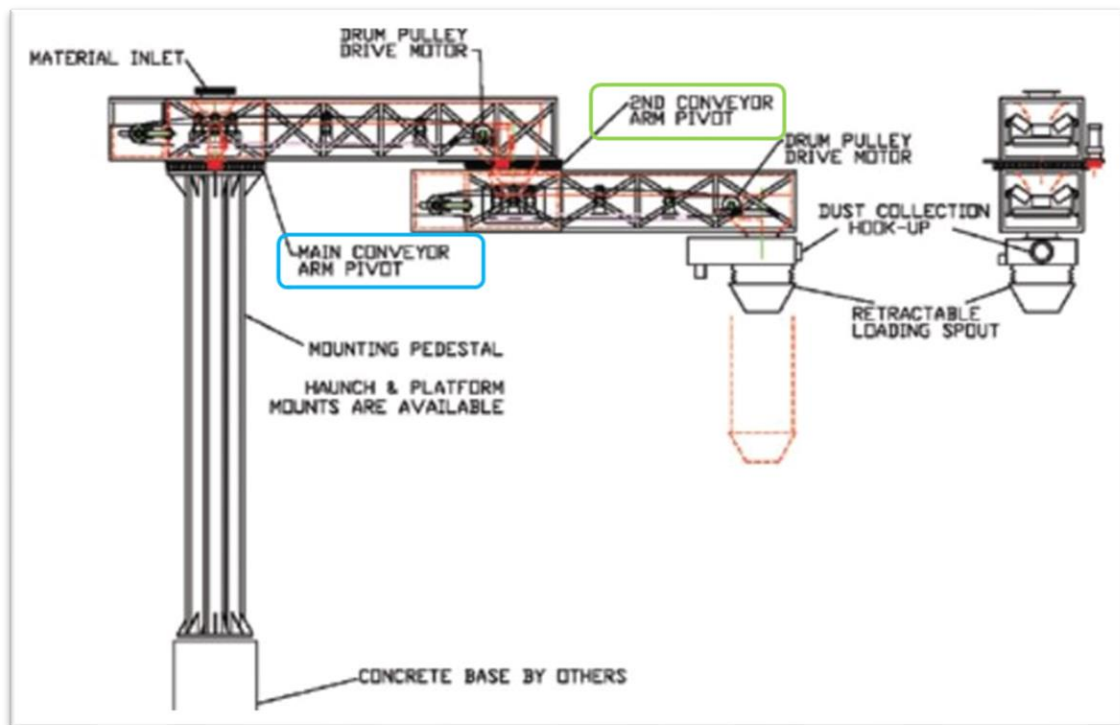


Ex. 1005 at 2.

160. Dynatek teaches the first arm is moveable relative to the “mounting pedestal”, which in the combined *Waldner/Dynatek* system would be the elevating conveyor housing. *Dynatek* teaches “[l]ike all DYNATEK loading systems, belt conveyor-based models are designed for articulated motion. Two slewing bearing-based pivots, enable both conveyor arms to pivot separately resulting in nearly 330

¹⁸⁸ Ex. 1005 at 2.

degrees of rotation and loader reach of up to 27 feet.”¹⁸⁹ The inlet arm [inboard segment] is connected to the pedestal (elevating conveyor) via a “Main Conveyor Arm Pivot” (annotated in blue), which is analogous to the brackets 252 of *Waldner*. This allows the inlet arm, and the entire discharge assembly, to pivot around the vertical axis with respect to the elevator assembly. Further, the “2nd conveyor” (outboard segment) is connected to the main conveyor (inboard segment) via “2nd conveyor arm pivot” (outboard pivot, annotated in green). This allows the outboard segment to pivot around a vertical axis with respect to the inboard segment.



Ex. 1005 at 2.

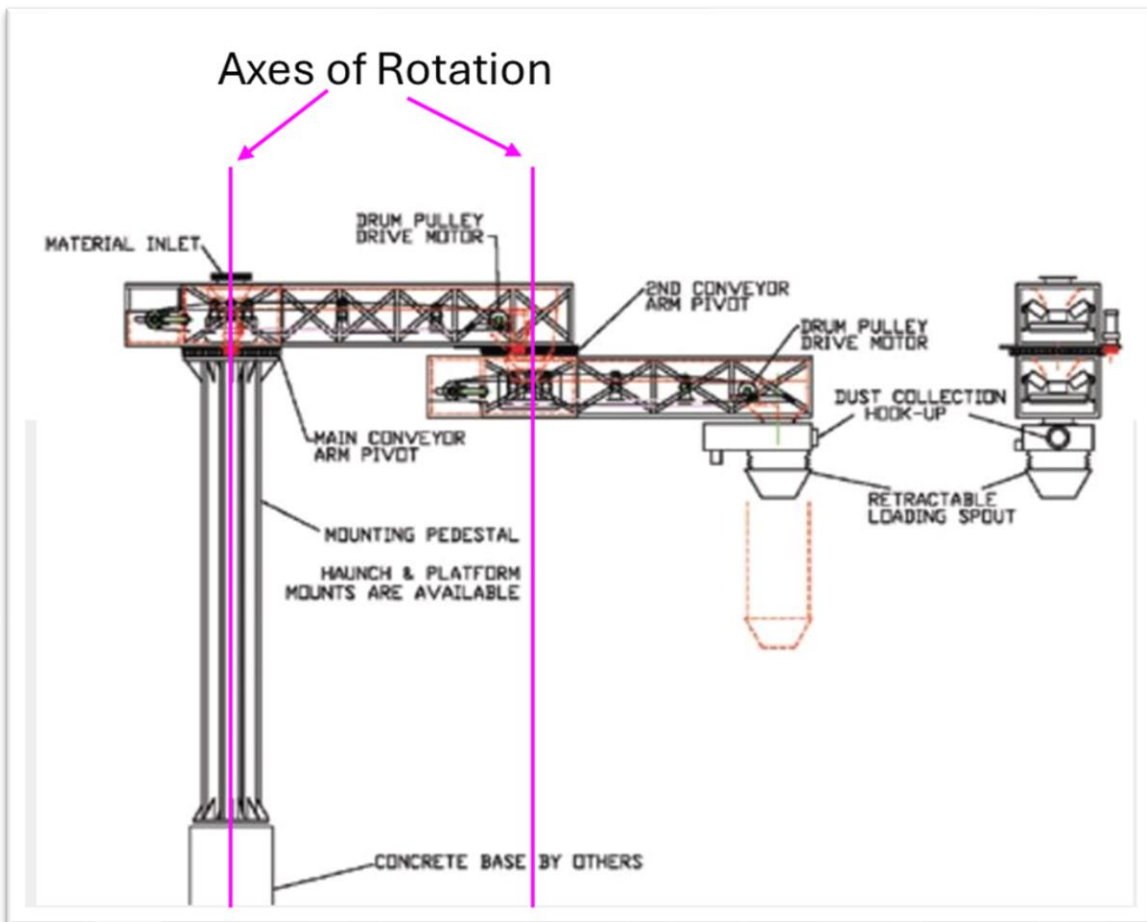
¹⁸⁹ Ex. 1005 at 2.

161. It would have been obvious for a POSITA to use the articulated belt conveyor of *Dynatek* with the system of *Waldner*, or to modify the discharge chute member 242 of *Waldner* to pivotally connect its outboard segment to its inboard segment by an outboard pivot, as discussed above regarding Reasons to Combine *Waldner* and *Dynatek*. In substituting the articulated belt conveyor of *Dynatek* for the discharge chute member 242 of *Waldner*, or modifying *Waldner*'s discharge chute member 242 in view of the teachings of *Dynatek*, the first conveying arm would be pivotally connected to the bucket elevator housing. Thus, *Waldner* in view of *Dynatek* renders Limitation 1[j] obvious.

- (f) **Limitation 1[k]: “wherein the inboard segment of the extension conveyor of the conveyor extension assembly is pivotable at the inboard pivot about a substantially vertical axis with respect to the deployable frame at the inboard pivot when the extension conveyor is in the raised position, the outboard segment of the extension conveyor being pivotable at the outboard pivot about a substantially vertical axis with respect to the inboard segment when the extension conveyor is in the raised position.”**

162. As discussed above regarding limitation 1[j], *Dynatek* discloses each one of the two conveying arms being able to independently pivot via their respective pivots. *Dynatek* further discloses that the articulated belt conveyor is capable of horizontal rotation. Further, as discussed above, a POSITA would have understood that the two conveying arms of *Dynatek* (or the two portions of discharge chute

member 242 of *Waldner*, when modified according to the teachings of *Dynatek*) must be pivotable about vertical axes (see annotated figure from *Dynatek* below showing axes of rotation annotated in magenta) in order to rotate horizontally.



Further, a POSITA would have understood that the two conveying arms of *Dynatek* could be used with the system of *Waldner* when in an operational configuration, which would be when the extension conveyor is in a raised position. Accordingly, the combination of *Waldner* and *Dynatek* renders limitation 1[k] obvious.

- b. **Claim 2: “The apparatus of claim 1 wherein the base assembly has at least one axle and a pair of wheels mounted on the at least one axle such that the base assembly is transportable across the ground surface.”**

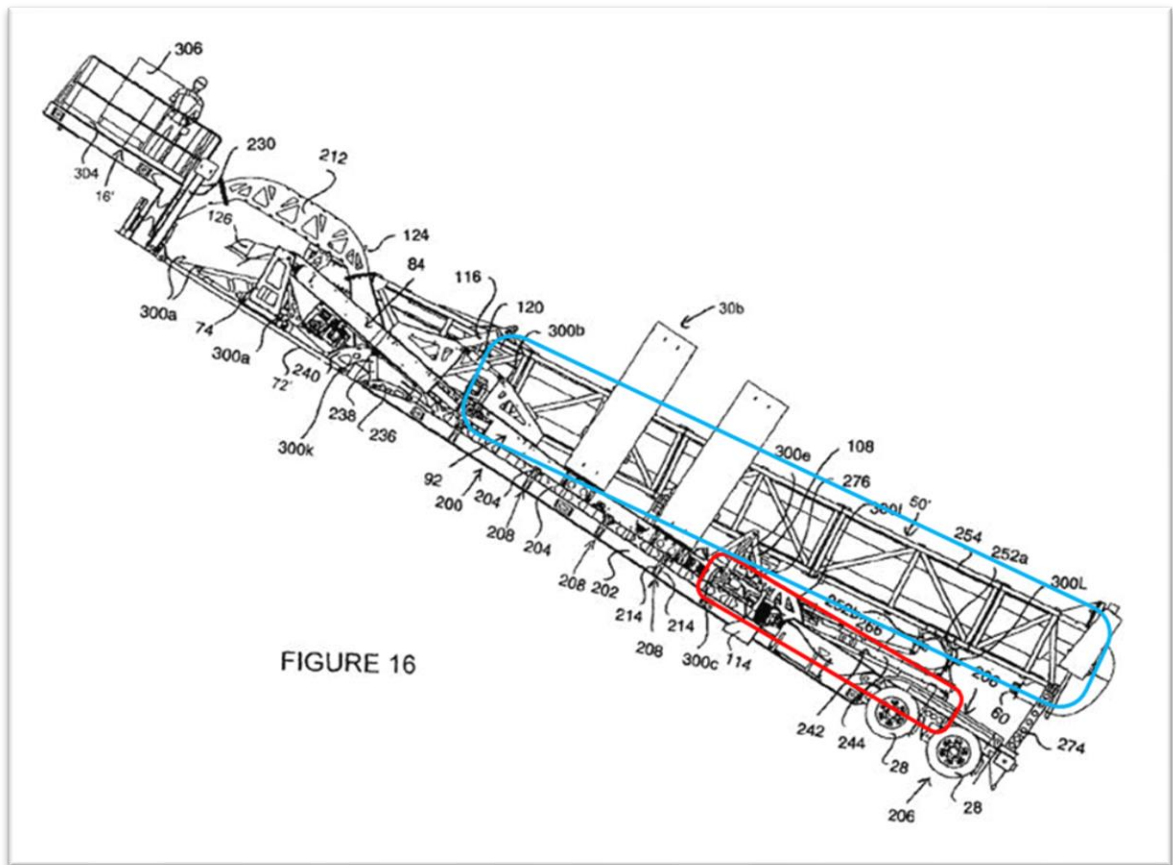
163. *Waldner* discloses “[a]t least one pair of ground wheels 28 (for example, two pairs in the first illustrated embodiment) are rotatably supported on the frame near the second end thereof with the wheels of each pair disposed on opposite sides of the frame for rolling support of the trailer frame on the ground during towing of the trailer by a suitable tow vehicle (not shown).”¹⁹⁰ Further, the Figures of *Waldner* show the wheels 28 (annotated in red) connected to an axle hub (annotated in blue).

¹⁹⁰ Ex. 1004, 12:41-47.

- c. **Claim 4: “The apparatus of claim 1 wherein the lowered position of the extension conveyor of the conveyor extension assembly is characterized by the extension conveyor being oriented substantially parallel to the deployable frame of the aggregate elevating assembly, the raised position of the extension conveyor being characterized by the extension conveyor being oriented substantially perpendicular to the deployable frame of the aggregate elevating assembly.”**

165. *Waldner* discloses “when the bucket elevator is lowered into the storage position, the collapsed discharge member 242 resides in a space between the bucket elevator 50' and the trailer.”¹⁹¹ As shown in Fig. 16 of *Waldner* the discharge chute member 242 (annotated in red, extension conveyor in the combined *Waldner* / *Dynatek* system) is substantially parallel to the bucket elevator 50' (annotated in blue, comprising deployable frame 254, elevating assembly).

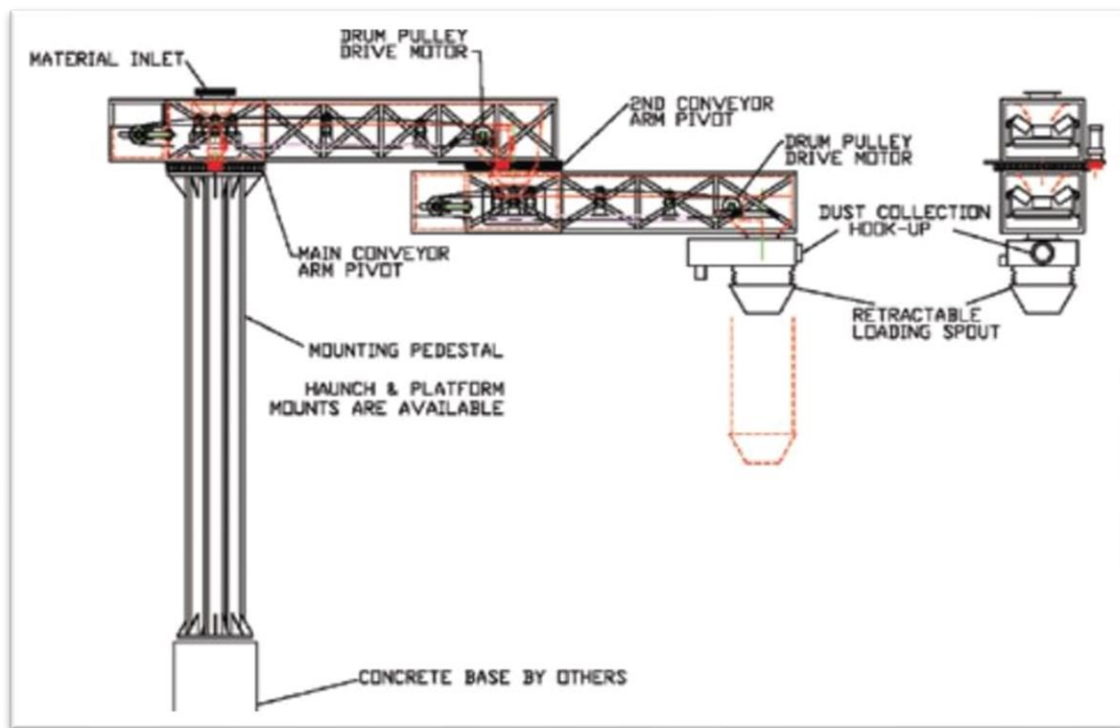
¹⁹¹ Ex. 1004 26:20-23



166. *Waldner* further discloses “[w]hen the bucket elevator 50' [annotated in blue, comprising deployable frame 254] is in the raised operational position, then extension of actuator 266 swings the discharge end 246a upwardly and outwardly away from the bucket elevator frame, whereupon actuator 270 can be used to swing the discharge member 242 [annotated in red] horizontally to a desired angle radiating outwardly away from the bucket elevator, as shown in FIG. 15.”¹⁹²

¹⁹² Ex. 1004, 26:55 – 61.

teachings of *Dynatek* further support the obviousness of this claim limitation as they show its discharge conveyor oriented substantially perpendicular to its support, which in the combined *Waldner/Dynatek* system would be the bucket elevator frame.



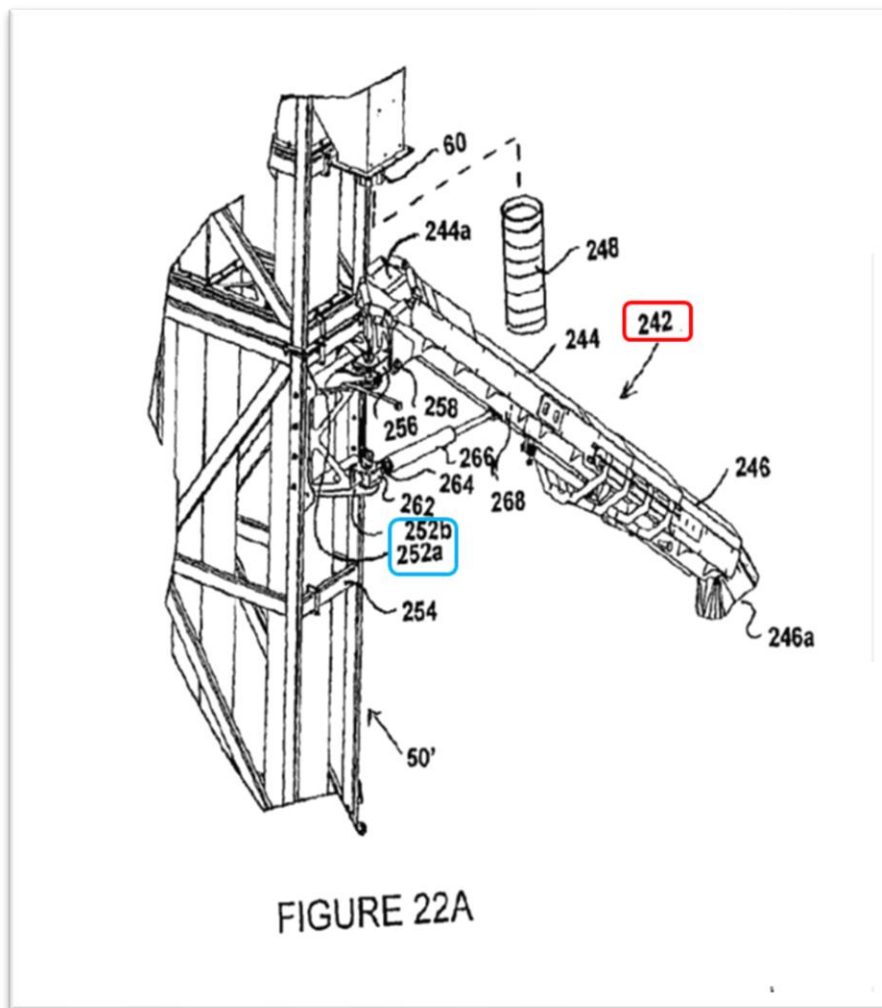
168. Thus, *Waldner*, either alone or in combination with *Dynatek* teaches or discloses the limitations of Claim 4, and the combination of *Waldner* and *Dynatek* renders Claim 4 obvious.

- d. **Claim 5: “The apparatus of claim 1 wherein the raised position of the extension conveyor of the conveyor extension assembly is characterized by the extension conveyor being cantilevered outwardly from the deployable frame of the aggregate elevating assembly.”**

169. *Waldner* teaches using brackets 252a/252b, links 256/262, and actuators 266/270 to move discharge chute 242 relative to bucket elevator 50.¹⁹³ *Waldner* discloses “to enable such movement of the discharge member 242 [annotated in red], a pair of mounting brackets 252a, 252b [annotated in blue] extend laterally outward from the frame 254 [annotated in green] of the bucket elevator 50 at a short distance below the downward-opening outlet port 60, which resides on a side of the bucket elevator frame 254.”¹⁹⁴ These brackets are used to mount the discharge chute member 242 to the frame, as shown, for example, in Figure 22A.

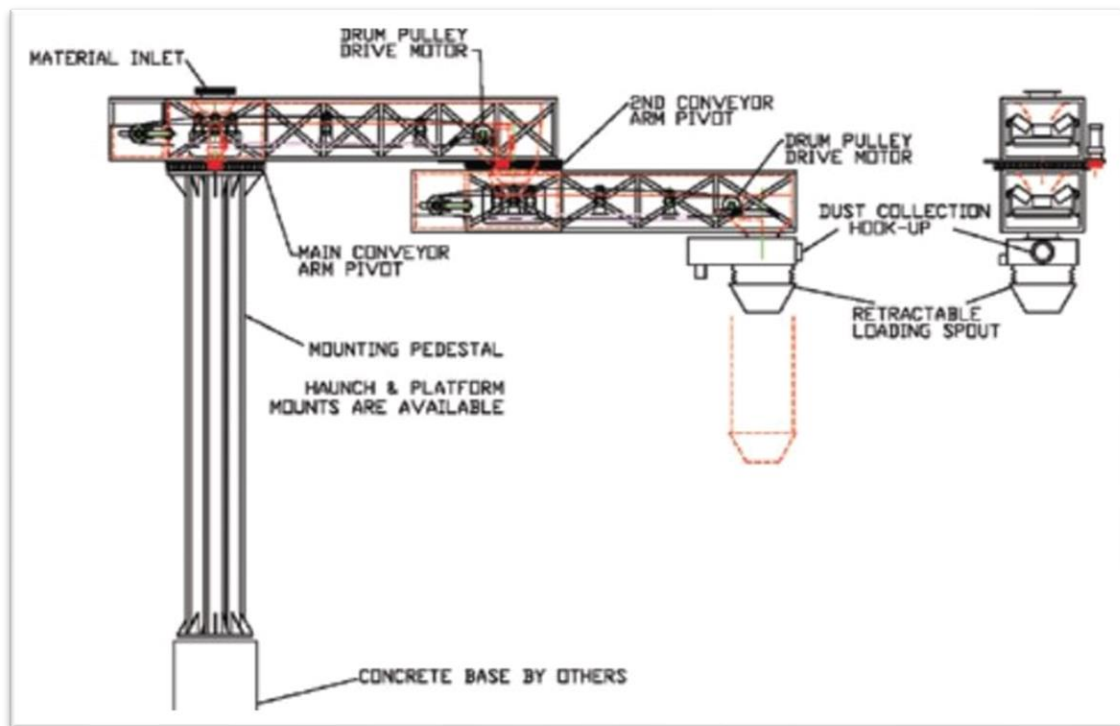
¹⁹³ Ex. 1004, 25:30-26:19, 26:46-63

¹⁹⁴ Ex. 1004 25:20 – 25.



170. As discussed above regarding Claim 4, in an operational configuration the discharge chute 242 is oriented in a substantially horizontal position, and is connected only at the brackets 252a, 252b (and the actuators 266, 270) with the other end free. Accordingly, the raised portion conveyor extension of the *Waldner/Dynatek* combination is cantilevered outward from the deployable frame (254) of the elevating assembly.

171. *Dynatek* further discloses this orientation. The figures of *Dynatek* similarly show the extension conveyor connected only at its support (frame 254 of the *Waldner/Dynatek* system) and extending horizontally with the other end free. Accordingly, *Dynatek* also discloses the configuration claimed.



172. Thus, *Waldner*, either alone or in combination with *Dynatek* teaches or discloses the limitations of Claim 5, and the combination of *Waldner* and *Dynatek* renders Claim 5 obvious.

e. Claim 6

173. It is my opinion that the combination of *Waldner* and *Dynatek* discloses, or at least suggests, each and every limitation of Claim 6. Accordingly, the combination of *Waldner* and *Dynatek* renders Claim 6 obvious.

i. Limitation 6[p]: “The apparatus of claim 1 wherein the conveyor extension assembly additionally comprises:”

174. As explained with respect to Claim 1[h] above, and incorporated herein by reference, *Waldner* anticipates or renders Limitation 6[p] obvious.

ii. *Limitation 6[a]: “a conveyor support frame supporting the segments of the extension conveyor on the aggregate elevating assembly, the conveyor support frame being movable with respect to the deployable frame of the aggregate elevating assembly when the extension conveyor moves between the lowered position and the raised position; and”*

175. As discussed above regarding Claim 5, *Waldner* discloses brackets 252a, 252b [annotated in blue] disposed on the bucket elevator 50 by being attached to frame 254.¹⁹⁵ *Waldner* further discloses actuator 266 (annotated in green) coupled to bracket 252b and to the discharge chute member 242 (annotated in red) and actuator 270 (not shown) coupled between the bucket elevator frame 254 and the bracket 252a.¹⁹⁶ *Waldner* describes that “extension of actuator 266 swings the discharge end 246a upwardly and outwardly away from the bucket elevator frame,” and actuation of actuator 270 rotates (*i.e.*, moves) a link 256 coupled to bracket 252a through a pivot pin. *Id.*, 25:30-27:19. A POSITA would have understood that

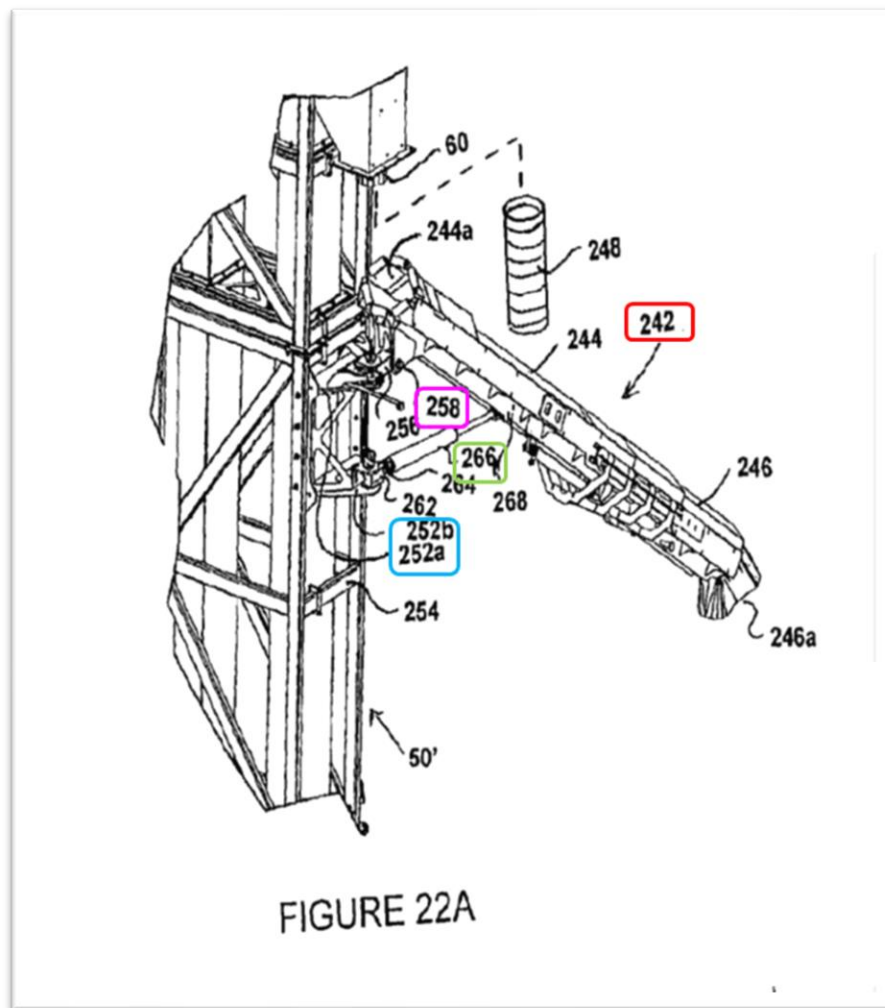
¹⁹⁵ Ex. 1004 25:20 – 25.

¹⁹⁶ See Ex. 1004 25:50 – 57.

collectively brackets 252a/252b, links 256/262, and pivot pins are a conveyor support frame that supports the extension conveyor relative to the aggregate elevating assembly and would have to be movable when transitioning between lowered and raised positions.

176. Further still, *Waldner* discloses “features a horizontal pivot pin 258 [annotated in magenta] connecting it to a pair of mounting lugs on the underside of the proximal section 244 of the discharge member 242, whereby the discharge member can pivot relative to the bucket elevator frame 254 about the horizontal axis of pivot pin 258.”¹⁹⁷ Accordingly, pivot pin 258 allows the discharge chute assembly to swing up and down (i.e. pivot about the horizontal axis of pivot pin 258).

¹⁹⁷ Ex. 1004 25:37 – 42.



177. *Waldner* further teaches “collapse of actuator 266 pulls the discharge end 246a of the discharge member 242 inwardly toward the elevator frame 254, thus establishing a collapsed position of the discharge member 262 [*sic.* 242] lying generally parallel to the bracket equipped side of the elevator frame 254.”¹⁹⁸ Further still, *Waldner* discloses “[w]hen the bucket elevator 50' is in the raised operational

¹⁹⁸ Ex. 1004 26:15 – 19.

position, then extension of actuator 266 swings the discharge end 246a upwardly and outwardly away from the bucket elevator frame.”¹⁹⁹ Accordingly, the discharge chute member 242 is movable with respect to the frame of the elevator 254 when the discharge chute member moves between the lowered position and the raised position.

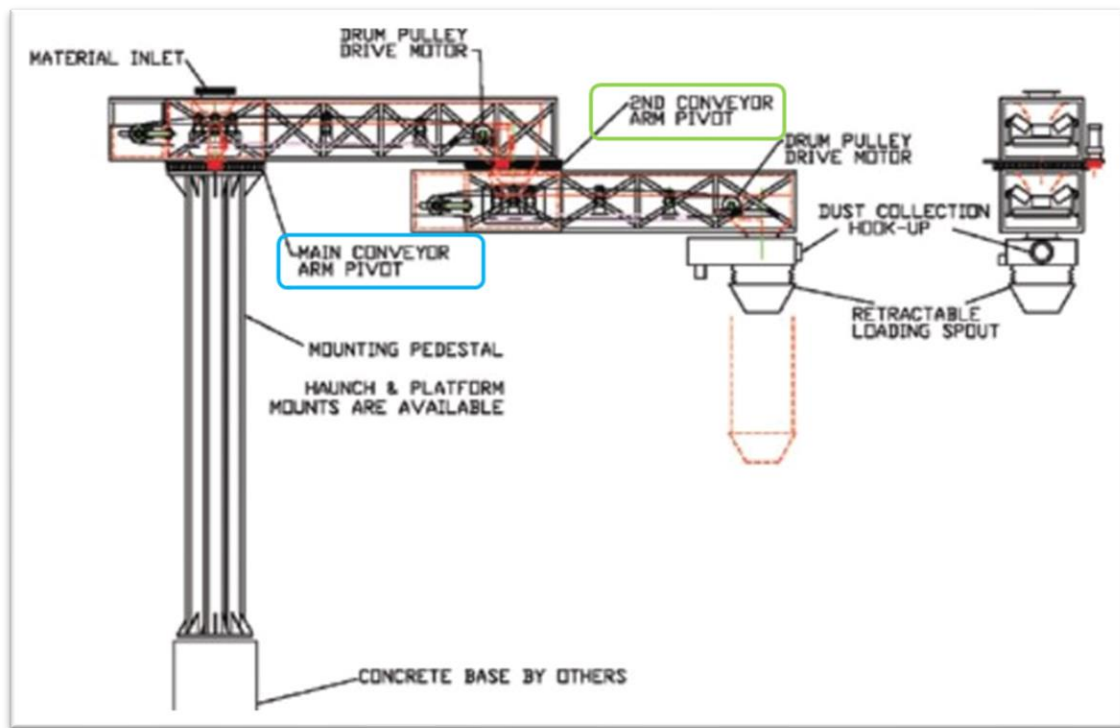
178. In the combined *Waldner/Dynatek* system, discharge chute member 242 is replaced by, or has been modified by, the teachings of *Dynatek* which include a frame around the discharge conveyor (i.e. conveyor support frame).²⁰⁰

¹⁹⁹ Ex. 1004 26:55-58.

²⁰⁰ Ex. 1005 2.



Dynatek pg 1. (annotated).



Dynatek pg 1.

179. In the combined apparatus of *Waldner* and *Dynatek*, the conveyor support frame would be movable in the same manner as discharge chute member 242. Accordingly, the combination of *Waldner* and *Dynatek* render Limitation 6[a] obvious.

- iii. ***Limitation 6[b]: “an extension conveyor lift structure acting on the conveyor support frame for moving the extension conveyor between the lowered position and the raised position.”***

180. As explained with respect to Claim 6[a] above, and incorporated herein by reference, *Waldner* discloses actuators 266/270 that act upon brackets 252a/252b, links 256/262, and pivot pins and are used for moving the extension conveyor

between the lowered position and the raised position. Accordingly, the combination of *Waldner* and *Dynatek* renders Limitation 6[b] obvious.

- f. **Claim 7: “The apparatus of claim 1 wherein the extension conveyor lift structure comprises at least one extension actuator extendable to pivot the conveyor support frame away from the deployable frame and move the extension conveyor to the raised position, the at least one extension actuator being retractable to pivot the conveyor support frame toward the deployable frame and move the extension conveyor to the lowered position.”**

181. As discussed above regarding Claim 6, *Waldner* discloses “extension of actuator 266 swings the discharge end 246a upwardly and outwardly away from the bucket elevator frame”²⁰¹ and “collapse of actuator 266 pulls the discharge end 246a of the discharge member 242 inwardly toward the elevator frame 254, thus establishing a collapsed position of the discharge member 262 [*sic.* 242] lying generally parallel to the bracket equipped side of the elevator frame 254.”²⁰² *Waldner* discloses that actuating actuator 270 allows upper link 256 of upper mounting bracket 252a to swing “under extension and retraction of this actuator 270.”²⁰³ *Waldner* further discloses that discharge chute 242 “is movable relative to the elevator frame 254 about the vertical axis shared by the pivot pins of the two

²⁰¹ Ex. 1004 26:56-58

²⁰² Ex. 1004 26:15 – 19.

²⁰³ Ex. 1004, 25:55-57.

mounting brackets, and also about the horizontal axis of the pivot pin 258 between the upper link 256 and the discharge member 242.”²⁰⁴ . A POSITA would have understood that acting upon the upper link 256 through the actuator 270 occurs through pivoting about the pivot pin in bracket 252a, and such pivoting moves upper link 256 relative to elevator frame 254. Actuators 266/270 teach the “extension actuator” claimed.

182. Further, as discussed above regarding Claims 5 and 6, in the combined system of *Waldner* and *Dynatek*, the discharge chute member 242 is replaced with *Dynatek*’s Econoloader or modified based on the teachings of *Dynatek*, and *Dynatek* includes a conveyor support frame. Accordingly, the combination of *Dynatek* and *Waldner* renders Claim 7 obvious.

- g. **Claim 8: “The apparatus of claim 1 wherein the conveyor extension assembly includes a chute mounted on the extension conveyor to extend downward from the extension conveyor and receive aggregate from the outlet of the extension conveyor.”**

183. *Waldner* discloses “the granular material is fed into the storage bin or tank that is to be filled with the granular material, for example via a discharge chute if provided.”²⁰⁵ A POSITA would have understood that the structure shown at the

²⁰⁴ Ex. 1004, 25:58-63

²⁰⁵ Ex. 1004 16:48 – 50 emphasis added.

discharge end 246a (annotated in red in the figures below) is a discharge chute as recited in Claim 8. As the discharge chute member 242 is in a substantially horizontal position, as described above, the rendering of the “chute” at the discharge end 246a shows the chute extending downward. As discussed above, in the *Waldner/Dynatek* apparatus, discharge chute member 242 is replaced or modified by the teachings of *Dynatek* and the chute shown would descend from the extension conveyor. Thus, a POSITA would have understood that *Waldner* discloses, or at least suggests, the limitations of Claim 8.

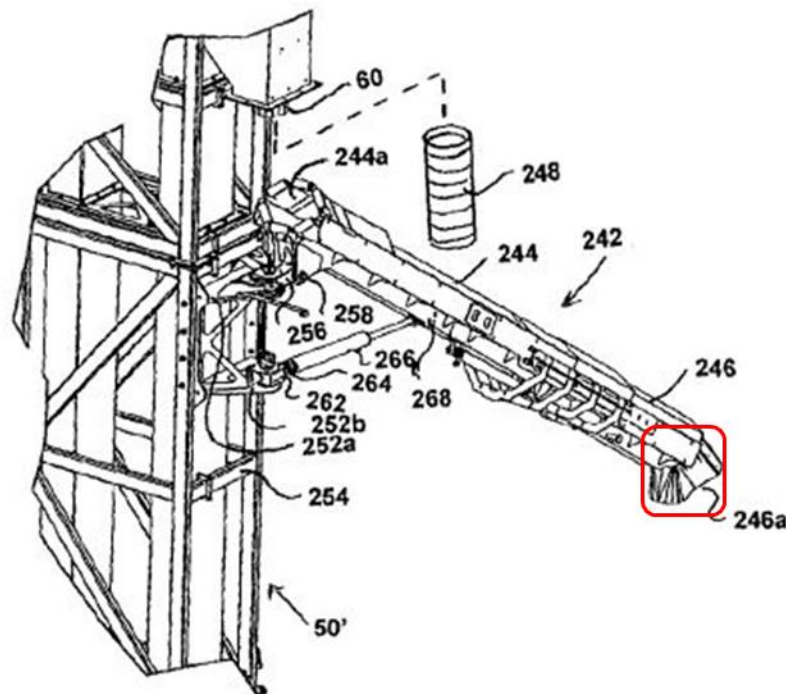
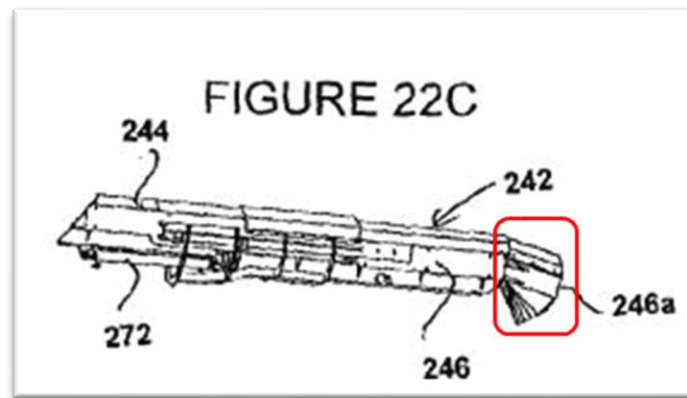


FIGURE 22A

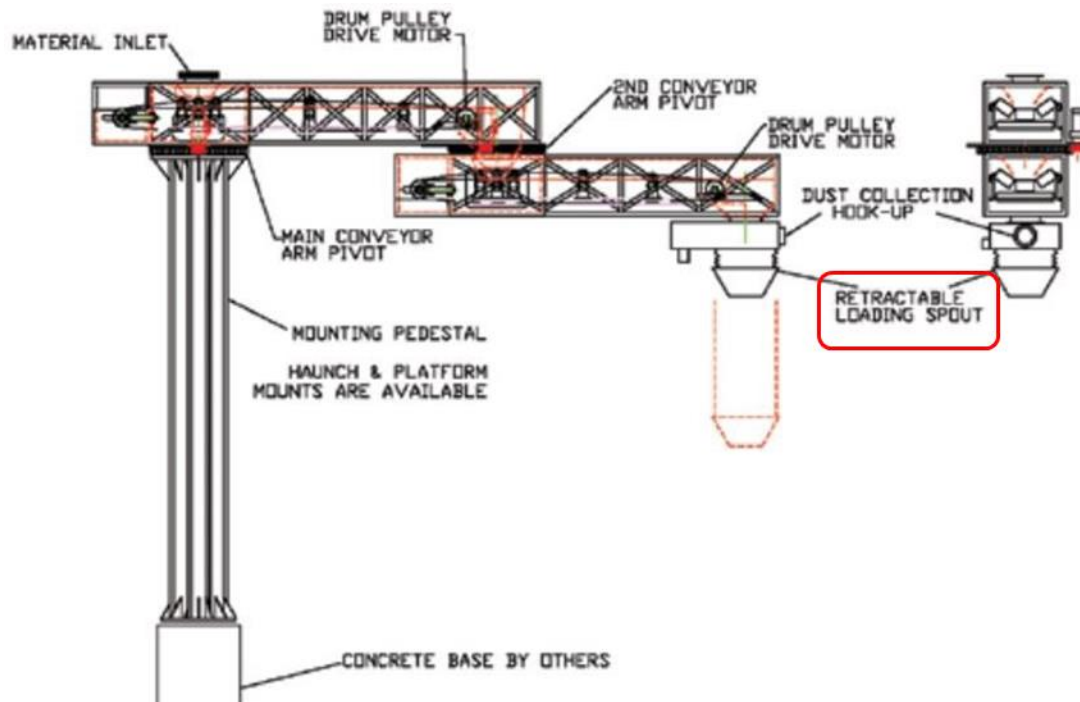


Ex. 1004, Figs. 22A & 22C (annotated)

184. To the extent that *Waldner* does not disclose or suggest this element, *Dynatek* does disclose it. *Dynatek* discloses that its system “discharges [material] through the outlet or a dust recovery load-out spout [annotated in red] at the end of the 2nd arm (loading arm).”²⁰⁶ Further, *Dynatek* discloses “retractable loading spouts with 3 to 60 feet of vertical travel and dust recovery.”²⁰⁷ The “load-out spout” (i.e. chute) is also shown in the figures of *Dynatek*. Accordingly, *Dynatek* discloses a chute which extends downward from the second conveyor. The discharge chute receives aggregate from outlet of the second conveyor (i.e. extension conveyor).

²⁰⁶ Ex. 1005 at 2.

²⁰⁷ Ex. 1005 at 2.

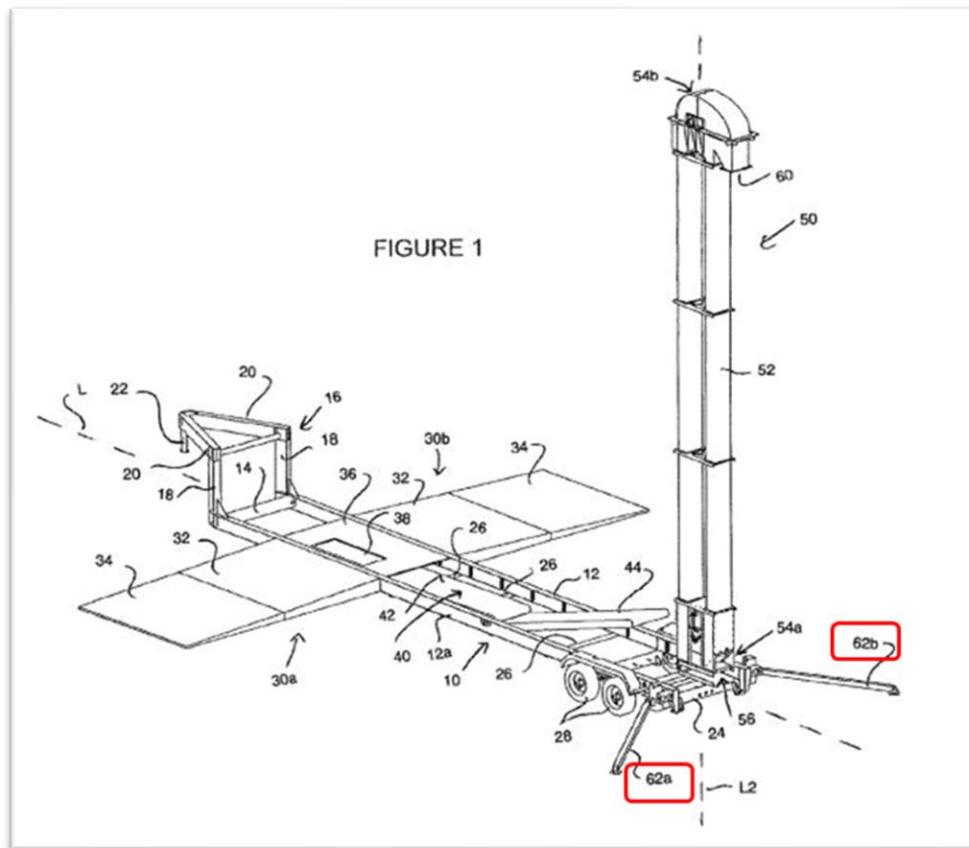


Ex. 1005, Fig. 2 on 2 (annotated).

185. As discussed above, it would have been obvious to a POSITA to substitute *Dynatek's* EconoLoader for discharge chute member 242, or to modify discharge chute member 242 to include the dust recovery loud-out spout at the end of the second segment, or to modify discharge chute member 242 based on the teachings of *Dynatek*. Accordingly, *Waldner* and/or *Waldner* in view of *Dynatek*, either alone or in view of the knowledge of a POSITA, teaches or discloses the limitations of Claim 8, and the combination of *Waldner* and *Dynatek* renders claim 8 obvious.

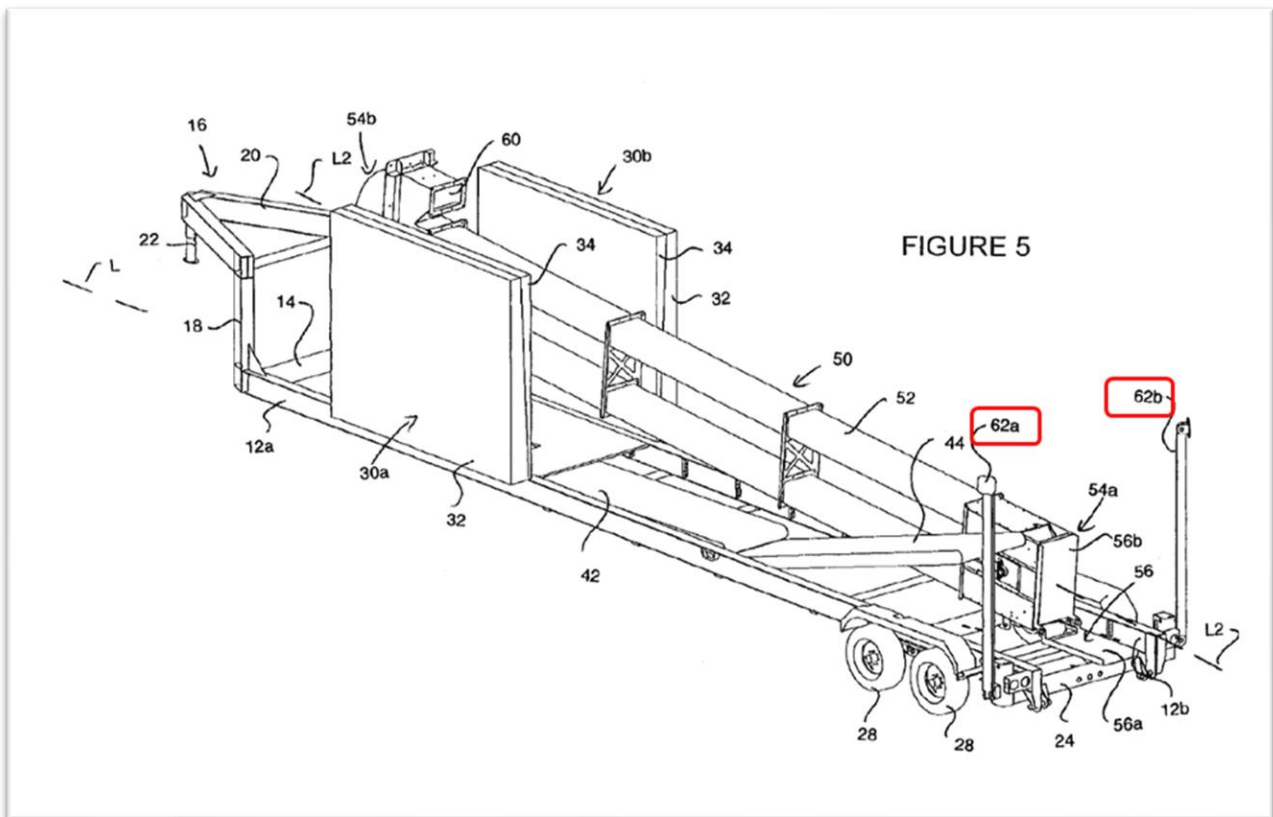
- h. **Claim 9: “The apparatus of claim 1 wherein the base assembly includes an outrigger structure mounted on the base frame, the outrigger structure being movable with respect to the base frame between a stabilizing condition corresponding to an operational configuration of the apparatus and a non-stabilizing condition corresponding to a transport configuration of the apparatus.”**

186. *Waldner* discloses a pair of outrigger arms 62a, 62b [annotated in red] mounted to the trailer frame adjacent the second end thereof at the first and second longitudinal frame beams 12a, 12b, respectively.²⁰⁸



²⁰⁸ Ex. 1004, 15:47-50, Fig. 1

187. *Waldner* further describes how the outrigger arms 62a, 62b brace the trailer frame to improve stability in a deployed position (as shown in Figs. 1-4) and are actuable to a retracted position for transport, as shown in Figures 5-9.²⁰⁹



188. As the arms are shown, and described, by *Waldner* in different positions relative to frame 10 for operational and storage configurations, a POSITA would have understood that the pair of outrigger arms 62a, 62b are movable with respect to the frame 10. Thus, *Waldner*, either alone or in view of the knowledge of

²⁰⁹ Ex. 1004, 15:50 – 16:7; Fig. 5.

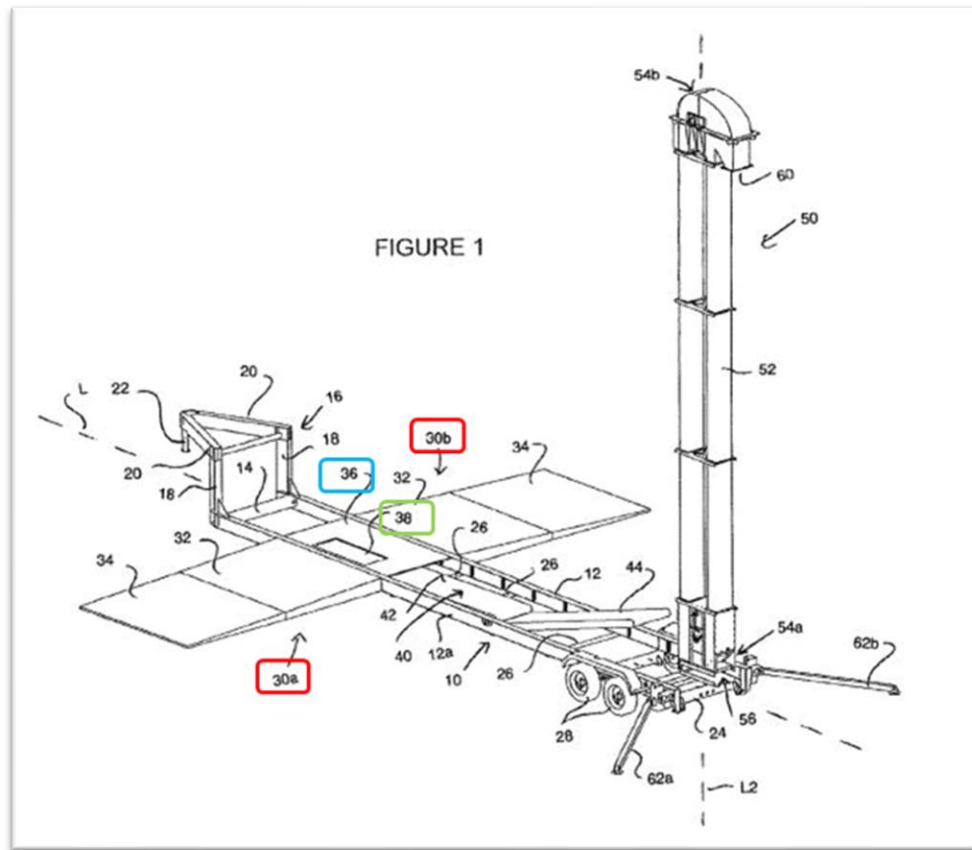
a POSITA, teaches or discloses the limitations of Claim 9, and the combination of *Waldner* and *Dynatek* renders Claim 9 obvious.

- i. **Claim 10: “The apparatus of claim 1 wherein the unloader structure includes a pair of ramps and a grate mounted on the base frame, the grate being positioned between the pair of ramps, at least a portion of the grate being reticulated to permit aggregate to pass through the grate and fall onto the base conveyor.”**

189. As explained with respect to Claim 1[c] above, and incorporated herein by reference, *Waldner* discloses a first ramp assembly 30a, a second ramp assembly 30b, [annotated in red] and a bridging platform 36 therebetween [annotated in blue], each connected to the frame 10.²¹⁰ *Waldner* further discloses an aggregate “transport vehicle is driven up one of the ramps, and over the bridging platform onto the other ramp into an unloading position placing the outlet of the transport vehicle over the opening 38 [annotated in green] of the bridging platform 36.”²¹¹

²¹⁰ See also Ex. 1004, 12:15-36.

²¹¹ Ex. 1004. 16:18-22.



190. *Waldner* further discloses “ bridging platform 36, the cutout or other opening of which [38] may be equipped with a grating of suitable strength to support the weight of a transport vehicle driven over the ramp assemblies.”²¹² *Waldner* further describes how a vehicle can drive up one of the ramps and “allow granular material to fall from the vehicle through this outlet, and onward through the opening 38 in the bridging platform 36 and onto the horizontal belt conveyor 42 below.”²¹³

²¹² Ex. 1004 16:52 – 55.

²¹³ Ex. 1004 16:37-42.

A POSITA would have understood that the grating is located on the bridging platform at cutout 38 that is between the ramp assemblies 30a, 30b, and that such grating would have been a reticulated grating (*e.g.*, a grating having a mesh) in order to allow particulate material to pass through it to the conveyor below. Accordingly, *Waldner* teaches or discloses the limitations of claim 10, and the combination of *Waldner* and *Dynatek* renders Claim 10 obvious.

191. Alternatively, a POSITA would have deemed it obvious to add a reticulated grate to opening 38. Grates to cover openings such as opening 38 were widely known and used in the field of material unloading,²¹⁴ and a POSITA would have known how to install such a grate on opening 38. In using *Waldner's* system, a grate may have been required over opening 38 to comply with worker safety regulations.²¹⁵ Moreover, a POSITA would have been motivated to include a grate, *e.g.*, to prevent materials other than the particulate material conveyed using *Waldner's* systems (*e.g.*, debris, loose parts, etc.) from falling onto the conveyor below.

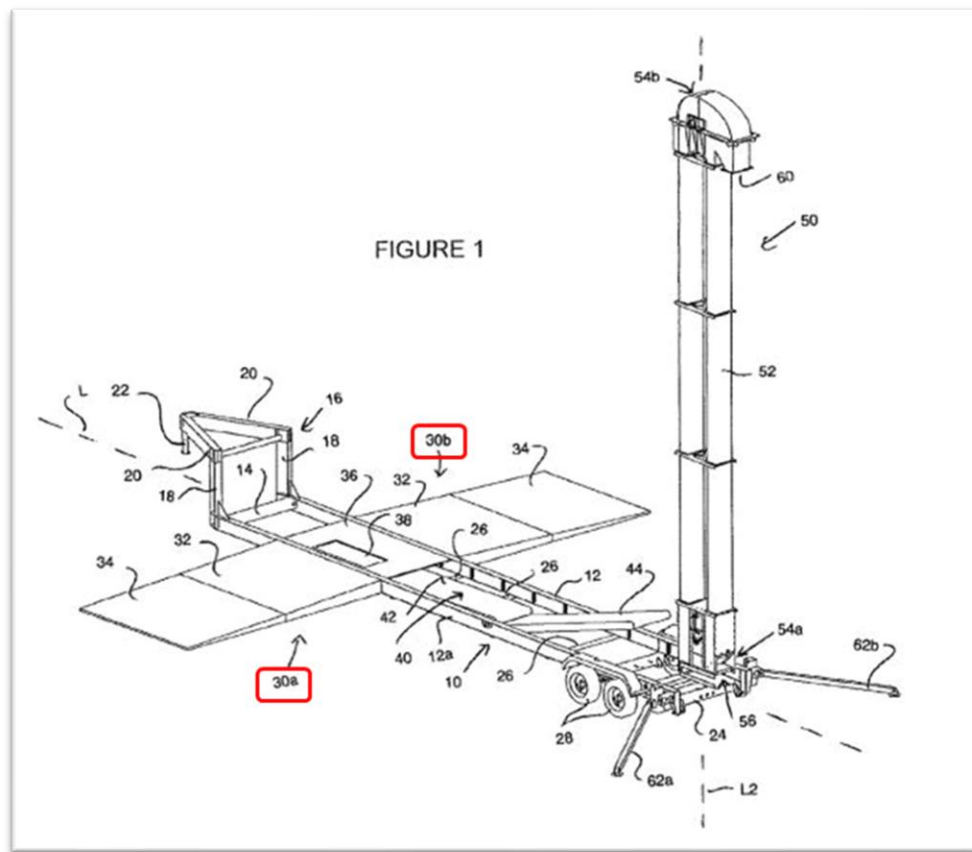
²¹⁴ See, *e.g.*, Ex. 1032 (discharge opening 19).

²¹⁵ See, *e.g.*, OSHA Regulations, 29 CFR 1910.29(e) (available at <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.29>).

- j. **Claim 11: “The apparatus of claim 10 wherein each of the ramps of the unloader structure is pivotable with respect to the base frame, the ramps extending laterally in substantially horizontal and opposite directions from the base frame in the operational condition of the apparatus, the ramps extending substantially vertical and parallel to each other in the transport condition of the apparatus.”**

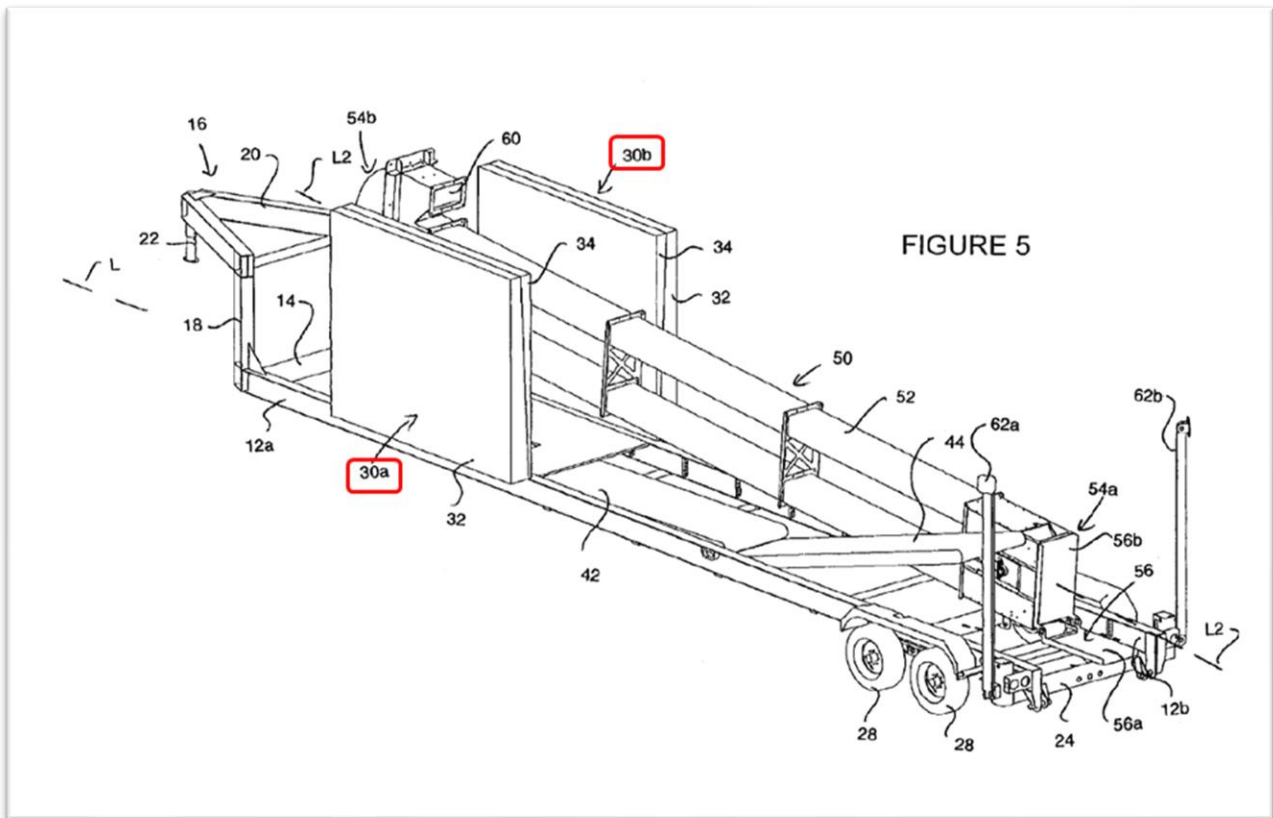
192. *Waldner* discloses each ramp assembly 30a, 30b (annotated in red) having a hinged connection to a respective longitudinal beam 12a, 12b of the frame 10.²¹⁶ *Waldner* shows these ramps extending laterally and substantially horizontal in the operational condition.

²¹⁶ Ex. 1004 12:60 – 63.



193. *Waldner* further describes for each of ramp assemblies 30a, 30b how the ramp sections “extend[] laterally outward from the hinged connection at the respective side of the trailer frame, and a retracted position (FIG. 5-8) in which the ramp section stands upwardly from the hinged connection so as not to project laterally outward therefrom.”²¹⁷ Further, *Waldner* illustrates the ramp assemblies 30a, 30b generally parallel to each other when in the upright position.

²¹⁷ Ex. 1004 12:63-13:3



194. A POSITA would have understood that the ramp assemblies 30a, 30b would be extended in the operational configuration of the system and upright in the transport configuration, as shown in the figures. Thus, *Waldner*, teaches or discloses the limitations of Claim 11, and the combination of *Waldner* and *Dynatek* renders Claim 11 obvious.

k. Independent Claim 16

195. It is my opinion that the combination of *Waldner* and *Dynatek* discloses and/or suggests each and every limitation of Claim 16, and a POSITA would have found Claim 16 to be obvious based on the combined teachings of *Waldner* and *Dynatek*.

196.

- i. ***Limitation 16[p]: “An aggregate transferring apparatus for elevating and transferring aggregate, the apparatus comprising:”***

197. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[p] obvious.

See Section X.B.a.i.

- ii. ***Limitation 16[a]: “a base assembly for receiving aggregate to be conveyed by the transferring apparatus, the base assembly comprising:”***

198. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[a] obvious.

See Section X.B.a.ii.

- iii. ***Limitation 16[b]: “a base frame being elongated along a longitudinal axis and having a leading end and a trailing end;”***

199. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[b] obvious.

See Section X.B.a.iii.

- iv. ***Limitation 16[c]: “an unloader structure mounted on the base frame to receive aggregate from a vehicle at least partially positioned over the base frame; and”***

200. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[c] obvious.

See Section X.B.a.iv.

- v. ***Limitation 16[d]: “a base conveyor mounted on the base frame and extending along a longitudinal portion of the base frame between the leading and trailing ends of the base frame, a portion of the base conveyor being positioned adjacent to the unloader structure to receive aggregate from the vehicle positioned over the base frame;”***

201. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[d] obvious.
See Section X.B.a.v.

- vi. ***Limitation 16[e]: “an aggregate elevating assembly for elevating aggregate from the base assembly, the aggregate elevating assembly comprising:”***

202. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[e] obvious.
See Section X.B.a.vi.

- vii. ***Limitation 16[f]: “a deployable frame mounted on the base frame and being movable between a storage position and a deploy position, the storage position corresponding to a transport configuration of the apparatus and the deploy position corresponding to an operational configuration of the apparatus, the deployable frame being elongated with a base end and a free end; and”***

203. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[f] obvious.
See Section X.B.a.vii.

- viii. *Limitation 16[g]: “an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward the free end of the deployable frame; and”***

204. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[g] obvious.

See Section X.B.a.viii.

- ix. *Limitation 16[h]: “a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:”***

205. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[h] obvious.

See Section X.B.a.ix.

- x. ***Limitation 16[i]: “an extension conveyor for moving aggregate from an inlet of the extension conveyor to an outlet of the extension conveyor at a location outward from the aggregate elevating assembly, the extension conveyor being movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus, the lowered position being characterized by the extension conveyor being positioned adjacent to the deployable frame of the aggregate elevating assembly, the raised position being characterized by the extension conveyor being positioned generally away from the deployable frame of the aggregate elevating assembly;”***

206. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[i] obvious.

See Section X.B.a.x.

- xi. ***Limitation 16[j]: “wherein the extension conveyor is articulated between the inlet and outlet with an inboard segment and an outboard segment, the inboard segment being pivotally connected to the deployable frame of the aggregate elevating assembly by an inboard pivot, the outboard segment being pivotally connected to the inboard segment by an outboard pivot; and”***

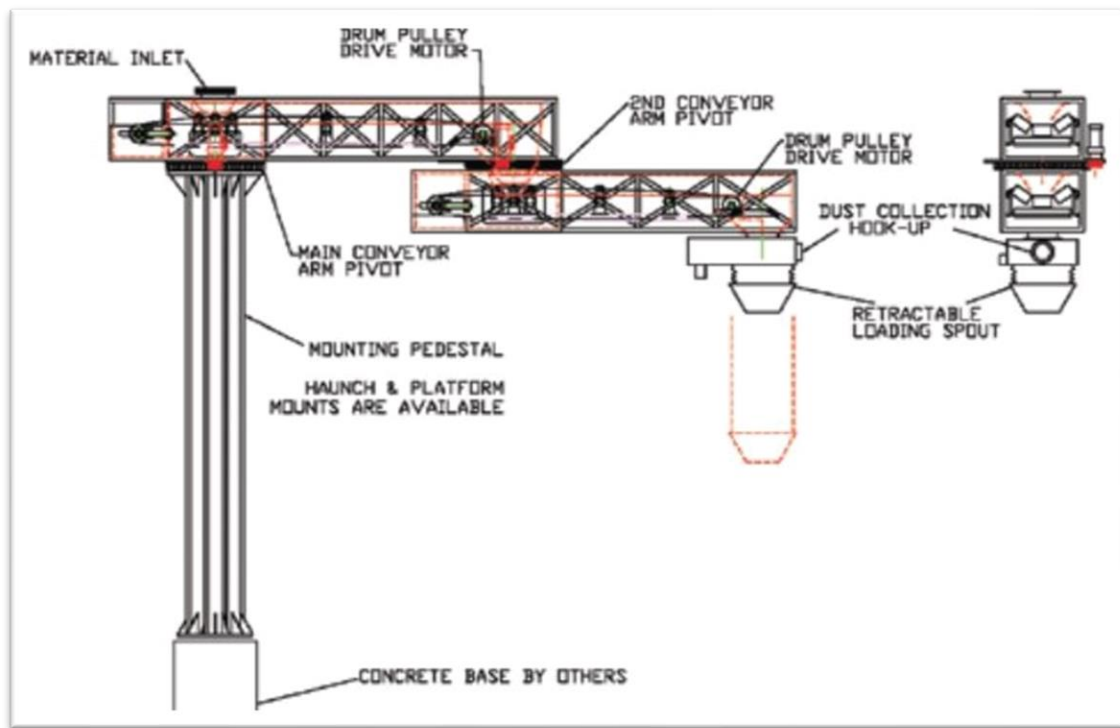
207. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 16[j] obvious.

See Section X.B.a.xi.

- xii. ***Limitation 16[k]: “wherein the outboard pivot of the extension conveyor of the conveyor extension assembly is configured to permit transfer of aggregate from the inboard segment to the outboard segment.”***

208. As discussed above, it would have been obvious to a POSITA to substitute *Dynatek*’s EconoLoader for *Waldner*’s discharge chute 242, or to modify the system of *Waldner* with the teachings of a discharge conveyor from *Dynatek*. *Dynatek* discloses material entering into the articulated belt conveyor through an inlet of the first conveying arm and discharging from a distal end of the second conveying arm.²¹⁸ As seen in the figures of *Dynatek*, the 2nd conveyor arm pivot (outboard pivot) is shown arranged that the discharge of aggregate from the “main conveyor” (inboard segment) flows through the outboard pivot and onto the 2nd conveyor. Further, some type of configuration of the outboard pivot that “permits transfer of aggregate from the inboard segment to the outboard segment” would be necessary so that the material which entered through an inlet of the first conveying arm would discharge from the distal end of the second conveying arm. In particular, based on the teachings of *Dynatek*, a POSITA would have understood that the slewing-bearing based pivots of *Dynatek* would have a structure that would allow particulate material to be passed through the center of its ring structure.

²¹⁸ Ex. 1005 at 2.



209. Alternatively, *Waldner* discloses that material is transferred from the proximal section of its discharge chute member 242 to the distal section.²¹⁹ In modifying *Waldner*'s discharge chute member 242 to connect those elements with a pivot joint, as taught by *Dynatek* it would have been obvious to use a pivot joint (*e.g.*, similar to the one in *Dynatek*) that allows the passage of particulate material from one end of the first segment to the connected end of the second segment so that the modified discharge chute still transfers material from the proximal section to the distal section. Thus, the combination of *Waldner* and *Dynatek* teaches or discloses Limitation 16[k].

²¹⁹ Ex. 1004, 25:7-20

- l. Claim 17: “The apparatus of claim 16 wherein the inboard segment of the extension conveyor of the conveyor extension assembly is pivotable at the inboard pivot about a substantially vertical axis with respect to the deployable frame at the inboard pivot when the extension conveyor is in the raised position, the outboard segment of the extension conveyor being pivotable at the outboard pivot about a substantially vertical axis with respect to the inboard segment when the extension conveyor is in the raised position.”**

210. As explained with respect to Limitation 1[k] above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 17 obvious.

m. Independent Claim 18

211. It is my opinion that the combination of *Waldner* and *Dynatek* discloses and/or suggests each and every limitation of Claim 18, and a POSITA would have found Claim 18 to be obvious based on the combined teachings of *Waldner* and *Dynatek*.

- i. Limitation 18[p]: “An aggregate transferring apparatus for elevating and transferring aggregate to elevated locations above a ground surface, the apparatus comprising:”***

212. To the extent the preamble is limiting, *Waldner* discloses a “portable conveyor system for receiving particulate material [i.e. aggregate] from a transport

vehicle and conveying the particulate material to an elevated location.”²²⁰

Specifically, *Waldner* discloses “a trailer-mounted solution employing a drive-over ramp assembly from which vehicle-transported particulate is dumped onto a first conveyor for delivery to a bucket elevator that feeds the storage bin.”²²¹

213. A POSITA would have understood that the elevated location refers to a location above a ground surface. Thus, *Waldner*, either alone or in view of the knowledge of a POSITA, teaches or discloses Claim 18[p].

ii. *Limitation 18[a]: “a base assembly configured to receive aggregate to be conveyed by the transferring apparatus, the base assembly including:”*

214. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 18[a] obvious. See Section X.B.a.ii.

iii. *Limitation 18[b]: “an elongated base frame; and”*

215. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 18[b] obvious. See Section X.B.a.iii.

²²⁰ Ex. 1004, Abstract

²²¹ Ex. 1004 1:17-20.

iv. Limitation 18[c]: “a base conveyor extending longitudinally of the base frame;”

216. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 18[c] obvious. See Section X.B.a.v.

v. Limitation 18[d]: “an aggregate elevating assembly configured to elevate aggregate from the base conveyor of the base assembly, the aggregate elevating assembly including:”

217. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 18[d] obvious. See Section X.B.a.vi..

vi. Limitation 18[e]: “a deployable frame mounted on the base frame and being movable between a storage position and a deploy position; and”

218. As explained with respect to Claim 1 above, and incorporated herein by reference, *Waldner* anticipates or renders Claim 18[e] obvious. See Section X.B.a.vii.

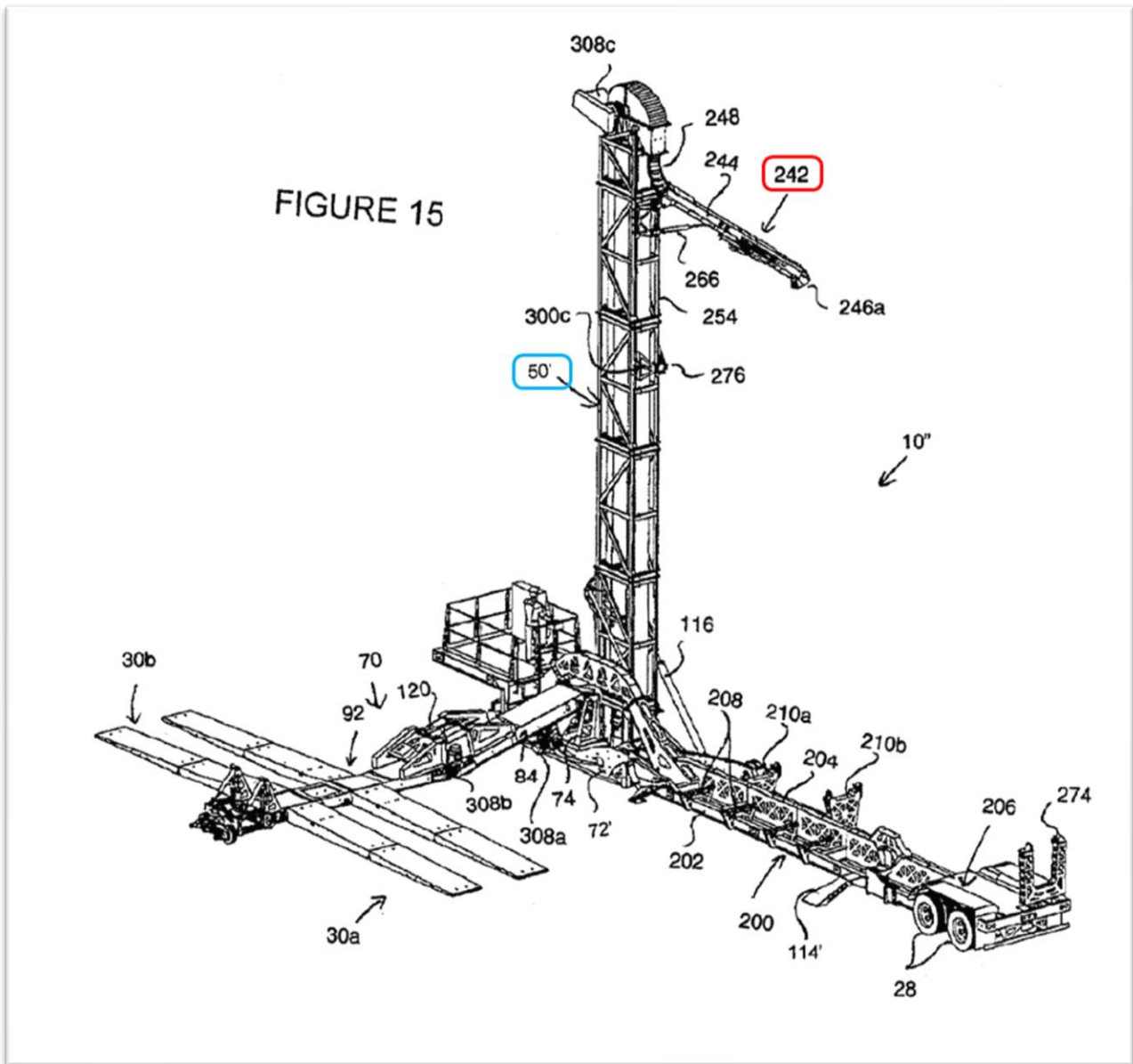
vii. Limitation 18[f]: “an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward a free end of the deployable frame; and”

219. As explained with respect to Claim 1 above, and incorporated herein by reference, *Waldner* anticipates or renders Claim 18[f] obvious. See Section X.B.a.viii.

- viii. *Limitation 18[g]: “a conveyor extension assembly configured to convey aggregate to locations elevated from the ground surface and horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:”***

220. See Section X.B.a.ix. *Waldner* discloses “a discharge chute member 242” (annotated in red) that receives the material discharged from the outlet port 60 and directs the material away from the bucket elevator 50’ (annotated in blue) in a substantially horizontal orientation.²²² See Fig. 15 of *Waldner* below:

²²² Ex. 1004 25: 7 – 29.



Ex. 1004, Fig. 15 (annotated)

221. As shown, *Waldner* discloses swinging the discharge chute member 242 “horizontally to a desired angle radiating outwardly away from the bucket

elevator.”²²³ *Waldner* further describes how an operator can aim the discharge opening 246a at a target destination, such as the fill port of a storage bin.²²⁴ As described above regarding 18[p] POSITA would have understood that the aggregate is discharged from the discharge chute member 242 at a location elevated above the ground surface.

222. A POSITA would have understood that the discharge chute member 242, modified or replaced with the belt-conveyor based discharge member of *Dynatek*, functions as the extension conveyor of the conveyor extension assembly and is configurable to discharge material from the inlet end 244a through the discharge end 246a and away from the bucket elevator 50. A POSITA would have understood that the aggregate is discharged from the discharge chute 242 at a location elevated above the ground surface.

223. Thus, the combination of *Waldner* and *Dynatek* teaches or discloses limitation 18[g].

²²³ Ex. 1004 26:59 – 60.

²²⁴ Ex. 1004 26:61-63

- ix. ***Limitation 18[h]: “an extension conveyor for moving aggregate from an inlet of the extension conveyor at the aggregate elevating assembly to an outlet of the extension conveyor at a location outward from the elevating assembly;”***

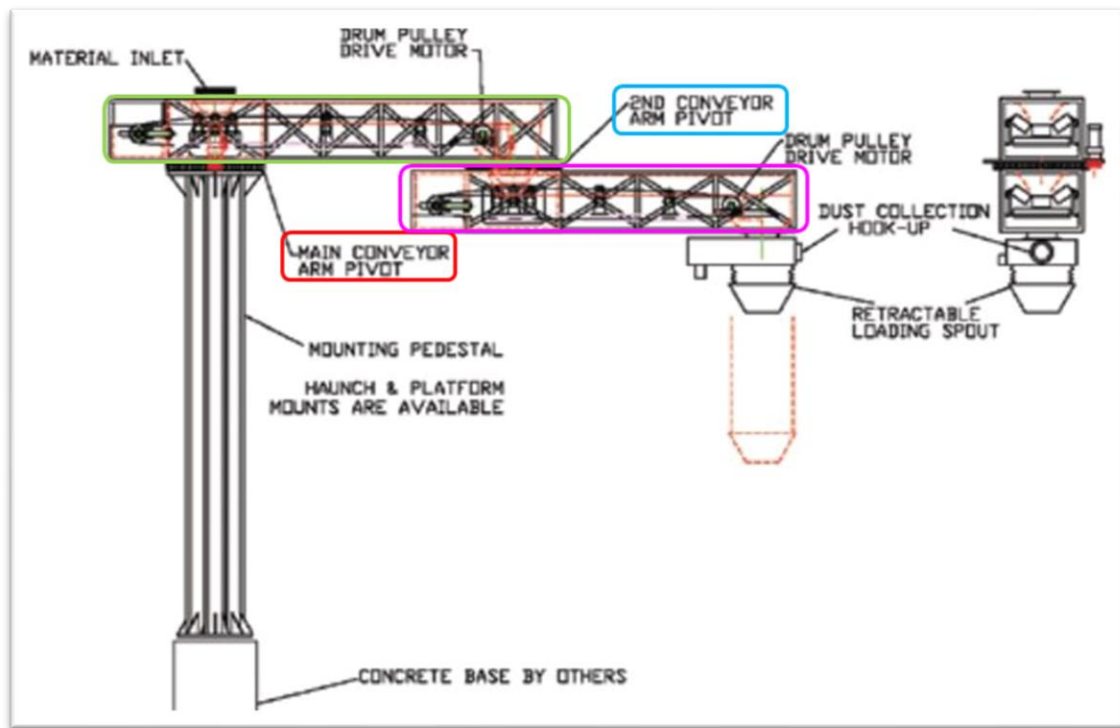
224. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 18[h] obvious.

See Section X.B.a.x.

- x. ***Limitation 18[i]: “wherein the extension conveyor includes an inboard segment and an outboard segment, the inboard and outboard segments being articulated between the inlet and outlet such that the inboard and outboard segments are pivotable with respect to each other and with respect to the aggregate elevating assembly about substantially vertical axes to permit adjustment of a position of the outlet with respect to the aggregate elevating assembly; and”***

225. See Section X.B.a.xi. *Dynatek* discloses Belt conveyor-based EconoLoaders™ consist of (2) open or enclosed conveying arms, each containing its own belt conveyor. Material enters the loader through an inlet in the main arm and discharges through the outlet or a dust recovery load-out spout at the end of the 2nd arm (loading arm).”²²⁵ Loader type. A POSITA would have understood that the two conveying arms would be the respective inboard segment and outboard segment of the extension conveyor.

²²⁵ Ex. 1005 at 2.



226. As shown, the articulated belt conveyor is connected to a vertical mounting pedestal. *Dynatek* discloses a first pivot connecting the first conveying arm (annotated in green) to the mounting pedestal (i.e. main conveyor arm pivot, annotated in red) and a second pivot connecting the second conveying arm (annotated in magenta) to the first conveying arm (i.e., 2nd conveyor arm pivot annotated in blue). Further, *Dynatek* discloses “belt conveyor-based models are designed for articulated motion. Two slewing bearing-based pivots, *enable both conveyor arms to pivot separately* resulting in nearly 330 degrees of rotation and loader reach of up to 27 feet.”²²⁶

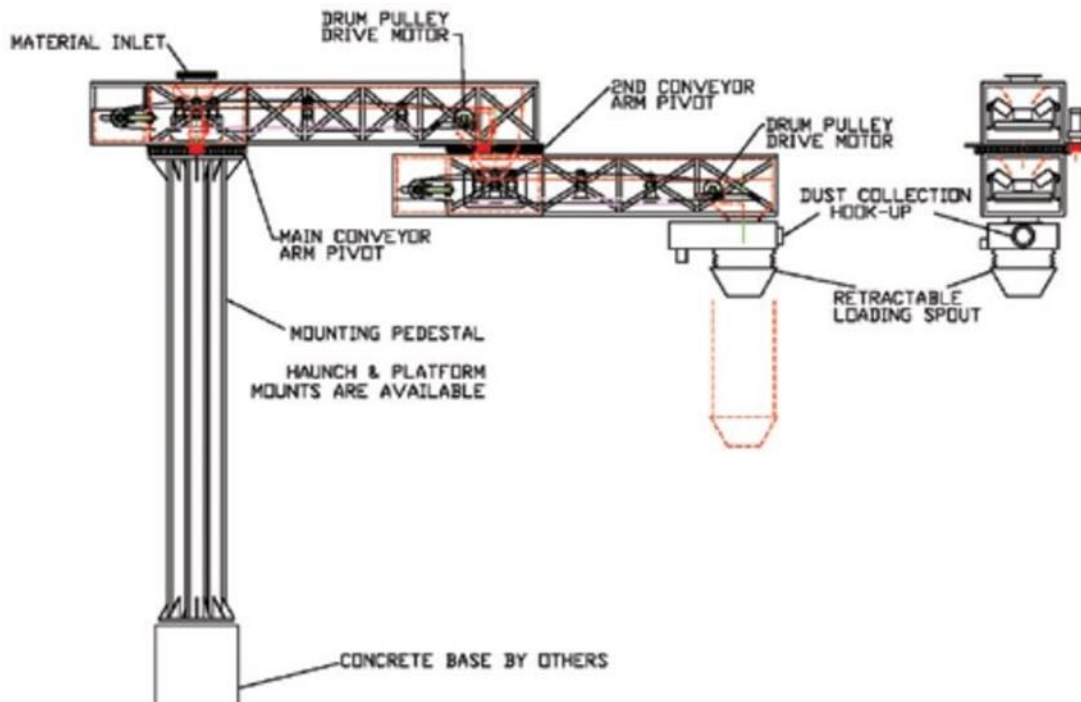
²²⁶ Ex. 1005 at 2 emphasis added

227. Based on this disclosure, a POSITA would have understood that the conveying arms of *Dynatek's* EconoLoader or the modified discharge chute of *Waldner* are pivotable with respect to each other and to *Waldner's* bucket elevator 50 about a vertical axis at each pivot point.

228. As discussed above, it would have been obvious to a POSITA to substitute *Dynatek's* EconoLoader for discharge chute member 242, or to modify discharge chute member 242 to pivotally connect its outboard segment to its inboard segment by an outboard pivot. Thus, the combination of *Waldner* and *Dynatek* teaches or discloses limitation 18[i].

xi. *Limitation 18[j]: “wherein the inboard and outboard segments of the extension conveyor are pivotable with respect to each other in a substantially horizontal operational plane.”*

229. See Section X.B.a.xii. As discussed above regarding limitation 18[i], *Dynatek* discloses each one of the two conveying arms being able to independently pivot via their respective pivots. *Dynatek* further discloses that the articulated belt conveyor is capable of horizontal rotation. A POSITA would have understood that the two conveying arms of *Dynatek* or the two portions of discharge chute 242 of *Waldner* when modified according to the teachings of *Dynatek* are pivotable in a substantially horizontal plane. Further, the *Dynatek* figures show the conveyor arms in a horizontal orientation with the pivots in the vertical rotation, teaching that the two segments are pivotable in a substantially horizontal operational plane.

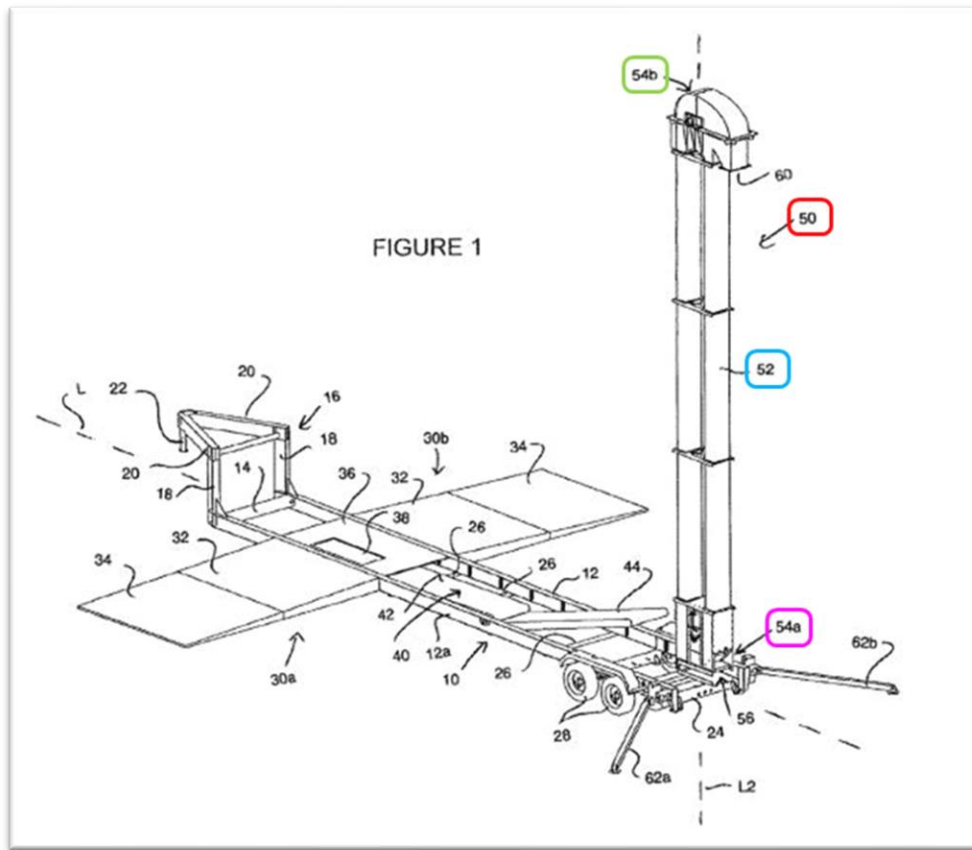


230. As discussed above, it would have been obvious to a POSITA to substitute *Dynatek's* EconoLoader for discharge chute member 242, or to modify discharge chute member 242 to pivotally connect its outboard segment to its inboard segment by an outboard pivot thereby providing motion of the segments along a horizontal plane. Accordingly, the combination of *Waldner* and *Dynatek* teaches or discloses limitation 18[j].

- n. **Claim 19: “The apparatus of claim 18 wherein the extension conveyor is movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus for movement of the inboard and outboard segments in a substantially horizontal operational plane.”**

231. See Sections X.B.a.x and X.B.a.xii. A POSITA would have understood that the two conveying arms of *Dynatek* or the two portions of discharge chute 242 of *Waldner* when modified according to the teachings of *Dynatek* are pivotable in a substantially horizontal plane. *Waldner* discloses the bucket elevator 50 [annotated in red] including “an elongated housing structure 52 [i.e. frame] having first and second ends 54a, 54b spaced apart along a longitudinal axis L2 of the bucket elevator.”²²⁷

²²⁷ Ex. 1004. 14:8-11



Ex. 1004 Fig. 1 (annotated)

232. *Waldner* further teaches the bucket elevator is contained in “bucket elevator frame 254.”²²⁸

233. *Waldner* further describes the first end 54a [annotated in green] being connected to the trailer frame through the pivotal connection 56 and material being conveyed up to the top of bucket elevator housing 52 to second end 54b [annotated

²²⁸ See, e.g. Ex. 1004 25:20 – 26:45.

in magenta] then discharged.²²⁹ A POSITA would have understood this to mean the housing (i.e. frame) to have a base end (first end 54a) and a free end (second end 54b)

234. *Waldner* discloses that “the bucket elevator housing can be pivoted about the axis of its pivotal connection 56 to the frame into a lowered storage position in which the longitudinal dimension of the bucket conveyor lies generally horizontally along the longitudinal axis L of the trailer,” and for operations, it can be pivoted to “an upright operational position in which the longitudinal axis L2 of the bucket elevator lies perpendicular to the longitudinal trailer axis L.”²³⁰ A POSITA would have understood, based on the teachings of *Waldner*, that the system in the “lowered storage position” is transportable and that deploying the bucket elevator housing upright places the system in the operational configuration.²³¹

235. As discussed above regarding Claim 18, the inboard and outboard segments move and are located in a substantially horizontal plane. Accordingly, the combination of *Waldner* and *Dynatek* renders Claim 19 obvious.

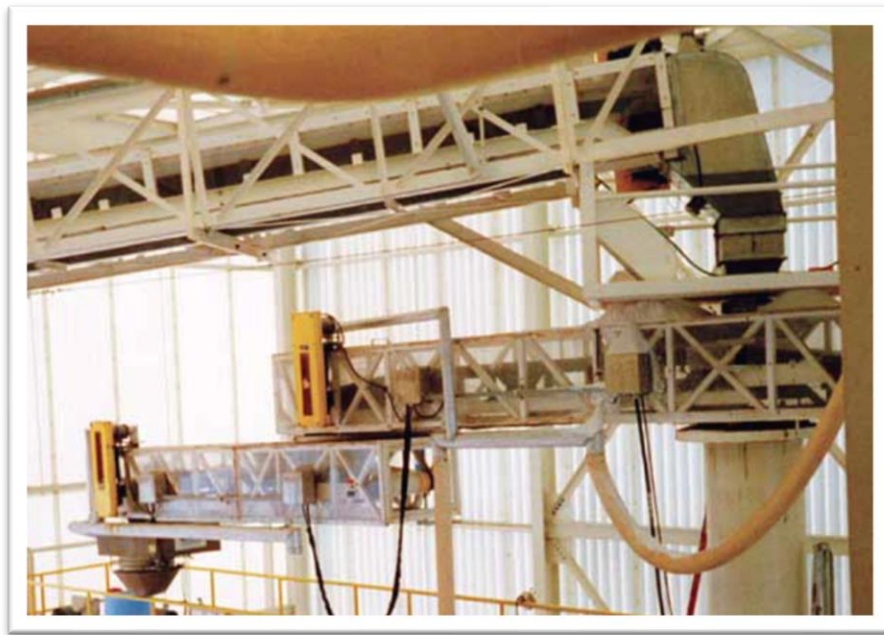
²²⁹ Ex. 1004 14:12-13; 16:45-46

²³⁰ Ex. 1004 14:39-43; 14:30-34.

²³¹ See Ex. 1004 generally.

- o. **Claim 20: “The apparatus of claim 18 wherein the inboard segment of the extension conveyor is pivotable with respect to the aggregate elevating assembly at an inboard pivot, the outboard segment of the extension conveyor being pivotable with respect to the inboard segment at an outboard pivot spaced from the elevating assembly by the inboard segment.”**

236. See Sections X.B.a.xi and X.B.a.xii *Dynatek* discloses “(2) open or enclosed conveying arms, each containing its own belt conveyor”²³² *Dynatek* further discloses “[m]aterial enters the loader through an inlet in the main arm [i.e. inboard segment] and discharges through the outlet or a dust recovery load-out spout at the end of the 2nd arm (loading arm) [outboard segment].”²³³



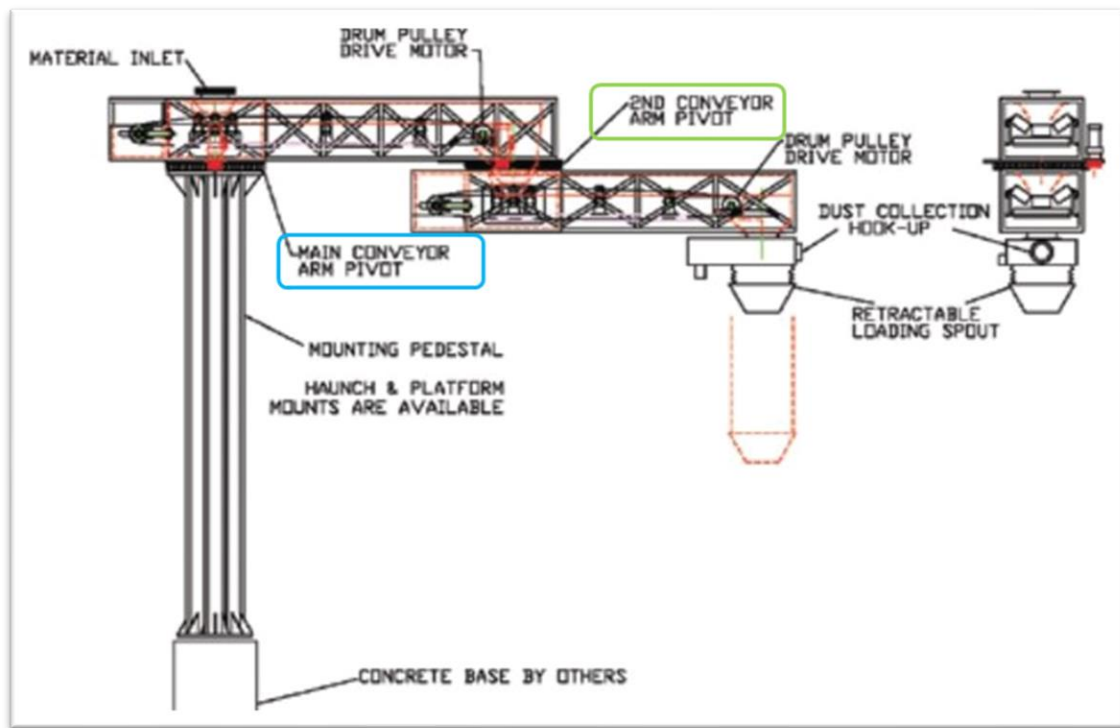
²³² Ex. 1005 at 2.

²³³ Ex. 1005 at 2.

Ex. 1005 at 2.

237. Dynatek teaches the first arm is moveable relative to the “mounting pedestal”, which in the combined *Waldner/Dynatek* system would be the elevating conveyor housing. *Dynatek* teaches “[l]ike all DYNATEK loading systems, belt conveyor-based models are designed for articulated motion. Two slewing bearing-based pivots, enable both conveyor arms to pivot separately resulting in nearly 330 degrees of rotation and loader reach of up to 27 feet.”²³⁴ The inlet arm [inboard segment] is connected to the pedestal (elevating conveyor) via a “Main Conveyor Arm Pivot” (annotated in blue) , which is analogous to the brackets 252 or *Gardner*. This allows the inlet arm, and the entire discharge assembly, to pivot around the vertical axis with respect to the elevator assembly. Further, the “2nd conveyor” (outboard segment) is connected to the main conveyor (inboard segment) via “2nd conveyor arm pivot” (outboard pivot, annotated in green). This allows the outboard segment to pivot around a vertical axis with respect to the inboard segment.

²³⁴ Ex. 1005 at 2.



Ex. 1005 at 2.

238. It would have been obvious for a POSITA to use the articulated belt conveyor of *Dynatek* with the system of *Waldner*, or to modify the discharge chute member 242 of *Waldner* to pivotally connect its outboard segment to its inboard segment by an outboard pivot, as discussed above regarding Reasons to Combine *Waldner* and *Dynatek*. In substituting the articulated belt conveyor of *Dynatek* for the discharge chute member 242 of *Waldner*, or modifying *Waldner*'s discharge chute member 242 in view of the teachings of *Dynatek*, the first conveying arm would be pivotally connected to the bucket elevator housing. A POSITA would have understood that the second pivot of *Dynatek* or the outboard pivot connecting

the distal and proximal sections of *Waldner*'s modified discharge chute is spaced from the bucket elevator by the first conveying arm or the proximal section. Thus, *Waldner* in view of *Dynatek* renders Claim 20 obvious.

p. Independent Claim 22

- i. *Claim 22[p]: "An aggregate transferring apparatus for elevating and transferring aggregate to elevated locations above a ground surface, the apparatus comprising:"***

239. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[p] obvious. See Section X.B.m.i.

- ii. *Claim 22[a]: "a base assembly configured to receive aggregate to be conveyed by the transferring apparatus, the base assembly including:"***

240. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[a] obvious. See Section X.B.m.ii..

- iii. *Claim 22[b]: "an elongated base frame; and"***

241. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[b] obvious. See Section X.B.m.iii.

iv. Claim 22[c]: “a base conveyor extending longitudinally of the base frame;”

242. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[c] obvious.
See Section X.B.m.iv.

v. Claim 22[d]: “an aggregate elevating assembly configured to elevate aggregate from the base conveyor of the base assembly, the aggregate elevating assembly including:”

243. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[d] obvious.
See Section X.B.m.v.

vi. Claim 22[e]: “a deployable frame mounted on the base frame and being movable between a storage position and a deploy position; and”

244. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[e] obvious.
See Section X.B.m.vi.

vii. Claim 22[f]: “an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward a free end of the deployable frame; and”

245. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[f] obvious.
See Section X.B.m.vii.

- viii. Claim 22[g]: “a conveyor extension assembly configured to convey aggregate to locations elevated from the ground surface and horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:”**

246. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[g] obvious.
See Section X.B.m.viii.

- ix. Claim 22[h]: “an extension conveyor for moving aggregate from an inlet of the extension conveyor at the aggregate elevating assembly to an outlet of the extension conveyor at a location outward from the elevating assembly;”**

247. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[h] obvious.
See Section X.B.m.ix.

- x. Claim 22[i]: “wherein the extension conveyor includes an inboard segment and an outboard segment, the inboard and outboard segments being articulated between the inlet and outlet such that the inboard and outboard segments are pivotable with respect to each other and with respect to the aggregate elevating assembly about substantially vertical axes to permit adjustment of a position of the outlet with respect to the aggregate elevating assembly;”**

248. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[i] obvious.
See Section X.B.m.x.

- xi. Claim 22[j]: “wherein the inboard segment of the extension conveyor is pivotable with respect to the aggregate elevating assembly at an inboard pivot, the outboard segment of the extension conveyor being pivotable with respect to the inboard segment at an outboard pivot spaced from the elevating assembly by the inboard segment; and”**

249. As explained with respect to Claim 20 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 22[j] obvious. See Section X.B.o.

- xii. Claim 22[k]: “wherein the inboard segment of the extension conveyor of the conveyor extension assembly is pivotable at the inboard pivot about a substantially vertical axis with respect to the deployable frame at the inboard pivot when the extension conveyor is in the raised position, the outboard segment of the extension conveyor being pivotable at the outboard pivot about a substantially vertical axis with respect to the inboard segment when the extension conveyor is in the raised position.”**

250. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders renders Claim 22[k] obvious. See Section X.B.a.xii.

q. Independent Claim 23

- i. *Claim 23[p]: “An aggregate transferring apparatus for elevating and transferring aggregate to elevated locations above a ground surface, the apparatus comprising:”***

251. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[p] obvious. See Section X.B.m.i.

- ii. *Claim 23[a]: “a base assembly configured to receive aggregate to be conveyed by the transferring apparatus, the base assembly including:”***

252. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[a] obvious. See Section X.B.m.ii.

- iii. *Claim 23[b]: “an elongated base frame; and”***

253. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[b] obvious. See Section X.B.m.iii.

- iv. *Claim 23[c]: “a base conveyor extending longitudinally of the base frame;”***

254. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[c] obvious. See Section X.B.m.iv.

- v. ***Claim 23[d]: “an aggregate elevating assembly configured to elevate aggregate from the base conveyor of the base assembly, the aggregate elevating assembly including:”***

255. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[d] obvious. See Section X.B.m.v.

- vi. ***Claim 23[e]: “a deployable frame mounted on the base frame and being movable between a storage position and a deploy position; and”***

256. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[e] obvious. See Section X.B.m.vi.

- vii. ***Claim 23[f]: “an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward a free end of the deployable frame; and”***

257. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[f] obvious. See Section X.B.m.vii..

- viii. Claim 23[g]: “a conveyor extension assembly configured to convey aggregate to locations elevated from the ground surface and horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:”**

258. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[g] obvious. See Section X.B.m.viii.

- ix. Claim 23[h]: “an extension conveyor for moving aggregate from an inlet of the extension conveyor at the aggregate elevating assembly to an outlet of the extension conveyor at a location outward from the elevating assembly;”**

259. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[h] obvious. See Section X.B.m.ix.

- x. Claim 23[i]: “wherein the extension conveyor includes an inboard segment and an outboard segment, the inboard and outboard segments being articulated between the inlet and outlet such that the inboard and outboard segments are pivotable with respect to each other and with respect to the aggregate elevating assembly about substantially vertical axes to permit adjustment of a position of the outlet with respect to the aggregate elevating assembly;”**

260. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[i] obvious. See Section X.B.m.x.

- xii. *Claim 23[j]: “wherein the inboard segment of the extension conveyor is pivotable with respect to the aggregate elevating assembly at an inboard pivot, the outboard segment of the extension conveyor being pivotable with respect to the inboard segment at an outboard pivot spaced from the elevating assembly by the inboard segment; and”*

261. As explained with respect to Claim 20 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[j] obvious.
See Section X.B.o.

- xii. *Claim 23[k]: “wherein the outboard pivot of the extension conveyor of the conveyor extension assembly is configured to permit transfer of aggregate from the inboard segment to the outboard segment.”*

262. As explained with respect to Claim 16 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 23[k] obvious.
See Section X.B.k.xii.

- r. **Claim 24: “The apparatus of claim 23 wherein the inboard and outboard segments of the extension conveyor are pivotable with respect to each other in a substantially horizontal operational plane.”**

263. As explained with respect to Claim 18 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 24 obvious.
See Section X.B.m.xi.

XI. GROUND 1A: CLAIMS 1-2, 4-11, 16-20, AND 22-24 ARE RENDERED OBVIOUS BY WALDNER IN VIEW OF DYNATEK AND SLEEMAN

264. It is my opinion that *Waldner* in view of *Dynatek* and *Sleeman* discloses and/or suggests all limitations of Claims 1-2, 4-11, 16-20, and 22-24, and thus renders those claims obvious.

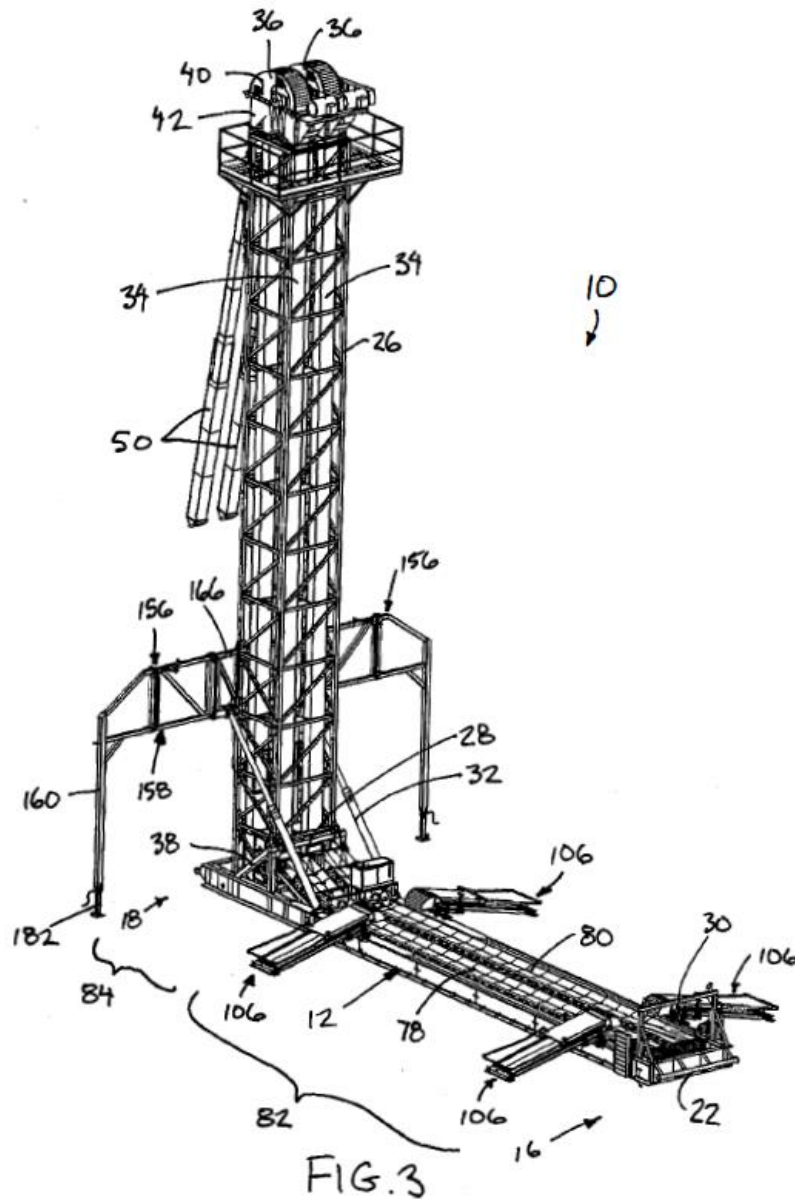
A. REASONS TO COMBINE WALDNER, DYNATEK, AND SLEEMAN

265. A POSITA would have been motivated to combine the teachings of *Waldner* and *Dynatek* for the same reasons as those discussed above in Ground 1 Section X.A. A POSITA would have been further motivated to combine the teachings of *Sleeman* with those of *Waldner* and *Dynatek* for similar reasons. Nothing in any of the three references teaches against such a combination.

266. Initially, *Sleeman* is analogous art to *Waldner* and *Dynatek* as well as the ‘689 Patent. All three references teach loading aggregate material, such as sand, through a system of conveyors to an elevated location. In addition to the teachings of *Waldner* and *Dynatek* discussed above, *Sleeman* discloses “A portable conveyor system receives and conveys particulate material to downstream equipment.”²³⁵ Further, *Sleeman* teaches elevated systems for conveying the aggregate material, as do *Waldner* and *Dynatek*. *Sleeman* teaches “The material handling assembly includes a main conveyor assembly to convey material along the base frame from

²³⁵ Ex. 1006 Abstract

the feed conveyors to an elevating assembly at one end of the base frame,” e.g., for delivery to a silo used to store proppants used in fracturing operations.²³⁶



Sleeman Fig. 3

²³⁶ Ex. 1006 Abstract. See Ex. 1006 1:47 – 52; see also 34:13 – 18.

267. In addition to looking at the teachings of *Waldner*, a POSITA would have been motivated to look to the teachings of *Sleeman* when finding solutions to handle particulate matter (e.g. proppant) at an oil and gas site because *Sleeman* teaches use for handling proppant at fracturing sites. *Sleeman* teaches “In the oil and gas industry, the process of hydraulic fracturing typically requires large volumes of granular proppant material to be stored in upright silos on site to be ready for use on demand, in which granular proppant material must be transferred from transport vehicles into the silos on an ongoing basis.”²³⁷ Specifically, *Sleeman* discloses “The system 10 is positioned adjacent to any related equipment, such as a blender, or various storage silos when handling particulate material such as proppant used in a hydraulic fracking operation in the field of oil production.”²³⁸ Accordingly, *Sleeman*, like both *Waldner* and *Dynatek*, was relevant to a problem allegedly solved by the ‘689 Patent, using conveyor belt systems to transfer and discharge material from an elevated location.

268. A POSITA would have recognized that *Sleeman* teaches closely related technology to *Waldner* and *Dynatek*. Like *Waldner* and *Dynatek*, *Sleeman* discusses handling not only sand, but other aggregate type materials. *Sleeman* teaches that “[a]

²³⁷ Ex. 1006 1:26 – 29.

²³⁸ Ex. 1006 43: 12 – 14.

known problem in various industries is the time and cost efficient means of managing particulate material handling [] and the conveyance of the particulate material to elevated locations such as the loading opening at the top of an upright storage bin or silo”.²³⁹ *Sleeman* further teaches “in the agricultural industry, various particulate materials including seed, granular fertilizer, and the like are transported between different sites and stored in upright bins.”²⁴⁰

269. As discussed above regarding Ground 1, *Waldner* teaches a discharge chute member, with an adjustable length which is rotatable relative to the elevator. Further, *Dynatek* teaches an articulated, two part, discharge conveyer with 330 degrees of rotation, loader reach of up to 27 feet, and a discharge spout with 3-60 feet of vertical travel. Each allow discharge of materials to various locations in 3D space. Similarly, *Sleeman* further teaches “first and second gravity discharge spouts 50. Each discharge spout 50 includes a first duct 52 and a second duct 54 which are coupled to one another in a telescoping configuration such that the combined length of the first and second ducts which define the overall length of the discharge spout can vary by telescoping the second duct relative to the first duct.”²⁴¹ *Sleeman* further

²³⁹ Ex. 1006 1:24-25.

²⁴⁰ Ex. 1006 1:30-31

²⁴¹ Ex. 1006 24:20-23.

teaches the discharge spout has “pivotal movement about the [vertical] swing axes together with the spout and the horizontal pivot shaft 60 of the spout.”²⁴²

270. In addition to vertical pivoting, the system of *Sleeman* contains a “tilt actuator 70 [that] is pivotally coupled at a top end on the first duct of the respective discharge spout 50 such that extension and retraction of the tilt actuator varies the angular orientation of the discharge spout about the horizontal pivot shaft 60 relative to the main frame 26.”²⁴³ This allows for “each discharge spout [to be] operable from a stored position to a working position thereof. In the stored position the discharge spout extends vertically and parallel along the rear side of the main frame 26 of the elevating assembly in the working position or along the top side of the main frame of the elevating assembly in the stored position thereof.”²⁴⁴ By using the extendable spout, and the swing actuator 68 and the tilt actuator 70, “the discharge opening at the bottom discharge end of the spout 50 can be repositioned in a large variety of positions and orientations relative to the main frame 26.”²⁴⁵ Accordingly, each of *Waldner*, *Dynatek* and *Sleeman* teach different approaches, each with its advantages

²⁴² Ex. 106 25: 4-13.

²⁴³ Ex. 1006 25:16-20

²⁴⁴ Ex. 1006 25:21-25.

²⁴⁵ Ex. 1006 :26-27.

and disadvantages, to solving the same problem: positioning the discharge spout to various positions in 3D space.

271. Not only does *Sleeman* teach actuators to rotate the discharge to various points in space, it also teaches “two lift actuators 32 are provided for pivoting the main frame 26 of the elevating assembly between the working and stored positions thereof.”²⁴⁶ *Sleeman* further teaches “Extending the lift actuators 32 will pivot the elevating assembly from the stored position to the working position.”²⁴⁷

272. As a POSITA would have recognized, *Sleeman* and *Waldner* disclose systems with numerous similarities that are directed to solving similar problems. In optimizing the design of *Waldner*, a POSITA would have considered *Sleeman*’s similar system and its different features that may have certain advantages. For example, *Waldner* teaches detaching its discharge chute 242 from the outlet port of the bucket elevator and attaching it to the elevator frame using brackets 276 when the system is placed in its collapsed (transport) position.²⁴⁸ *Sleeman* discloses discharge spouts 50 that are permanently attached to the elevator assembly and can

²⁴⁶ Ex. 1006 18:14 - 16.

²⁴⁷ Ex. 1006 18:26 – 28.

²⁴⁸ Ex. 1004, 26:46-54.

be collapsed vertically down alongside its main frame when the system is articulated to its stored position or transport mode.²⁴⁹ .

273. A POSITA would have found *Sleeman's* teaching to provide a potentially more user-friendly and less labor-intensive design for moving the discharge chute 242 or *Dynatek's* articulated conveyor system as substituted for it to the stored position, at least because it would not require an operator to detach and reattach those components. This configuration would have more easily met *Waldner's* goal of a portable "trailer-mounted solution".²⁵⁰ By moving the discharge spout to a "stored position", in particular a stored position that is parallel to the main frame of the elevating assembly, as taught by *Sleeman*, the combined system can be more easily transported on *Waldner's* trailer. This would be quicker than having to attach / detach the discharge chute 242 each time. Accordingly, a POSITA would be motivated to modify the combined Waldner-Dynatek system to attach the discharge chute member 242 or EconoLoader with actuators that it can collapse vertically down, into the stored position, not just move it horizontally, using the components of *Sleeman* discussed below. This is simply using a known technique (actuators to move the discharge assembly to a stored position) to improve the similar system of

²⁴⁹ Ex. 1006, 19:10-38, 20:1-12, Figs. 1 & 4.

²⁵⁰ Ex. 1004 1:17

Waldner / Dynatek. *Waldner* already teaches the use of actuators to raise / lower components of its conveyer system.²⁵¹ *Sleeman* simply teaches specific arrangement of actuators to assist in the raising / lowering of the discharge assembly.

274. A POSITA would have had a reasonable expectation of success in combining the teachings of *Sleeman* with those of *Waldner* and *Dynatek*. As discussed above, *Waldner* already teaches the use of actuators to raise / lower components of its conveyer system. *Sleeman* simply adds additional attachment and arrangement of actuators to assist in the raising / lowering of the discharge assembly. The teachings of *Sleeman* would allow a POSITA to position the actuators for predictable raising / lowering of the discharge assembly to allow the assembly to be stowed on the trailer for transport. *Waldner* already teaches a discharge member 242 that is removably attached to the bucket elevator. *Sleeman* simply provides a permanent attachment to the elevator, with the ability to be stowed for transportation, as are the discharge spouts of *Sleeman*.

²⁵¹ See, e.g. 19:58 – 61; 24:25-34; 28:59- 29:12.

B. DISCLOSURE OF WALDNER IN VIEW OF DYNATEK AND SLEEMAN

a. Limitations 1[p]-1[g]

275. As explained with respect to Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders limitations 1[p]-[g] obvious. See section X.B.a.i-viii.

b. Limitation 1[h]: “a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:”

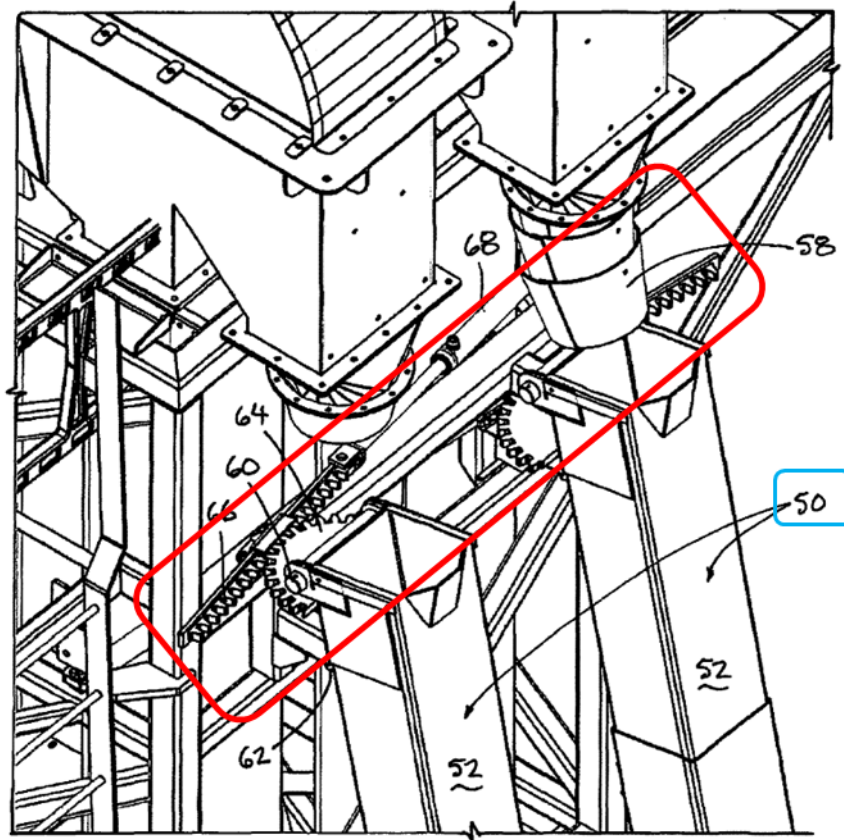
276. As discussed above regarding Ground 1, Limitation 1[h], *Waldner* and *Dynatek* discloses a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly. *Sleeman* further discloses discharge spouts 50 connected to the main frame 26 of the elevating assembly 24.²⁵² Spouts 50 convey particulate material from main frame 26 to a silo.²⁵³ *Sleeman* further teaches that each spout 50 “is coupled to the main frame 26 by a horizontal pivot shaft 60 defining a horizontal tilt axis of the discharge spout relative to the main frame 26.”²⁵⁴ *Id.*, A gear and rack member configuration (annotated in red) between the spouts 50 (annotated in blue) and main frame 26 (not

²⁵² Ex. 1006 19:33 – 35.

²⁵³ Ex. 1006 7:59 – 8:8; see also Figs. 3-4.

²⁵⁴ Ex. 1006 19:33-35, see also Fig. 12.

shown) provides control of a swing motion for the respective spout coupled thereto about a vertical swing axis.



Ex.1006, Fig. 12. (annotated)

277. It would have been obvious to a POSITA to substitute *Sleeman's* spouts 50, pivot shaft 60, and gear and rack member configuration for discharge chute 242 and a combination of brackets, links, and pivot pins connecting discharge chute 242 to bucket elevator 50 of *Waldner*, and/or to modify the discharge chute 242 of

Waldner (as modified in view of or substituted with *Dynatek's* conveyor system) with the permanent coupling of *Sleeman's* spouts 50 to main frame 26.

- c. **Limitation 1[i]: “an extension conveyor for moving aggregate from an inlet of the extension conveyor to an outlet of the extension conveyor at a location outward from the aggregate elevating assembly, the extension conveyor being movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus, the lowered position being characterized by the extension conveyor being positioned adjacent to the deployable frame of the aggregate elevating assembly, the raised position being characterized by the extension conveyor being positioned generally away from the deployable frame of the aggregate elevating assembly,”**

278. As discussed above regarding Ground 1, Limitation 1[i], *Waldner* and *Dynatek* discloses and renders obvious this limitation. *Sleeman* further discloses discharge spouts 50 that are connected to the main frame 26 of the elevating assembly 24.²⁵⁵ Further, *Sleeman* discloses “[e]ach discharge spout 50 includes a first duct 52 and a second duct 54 which are coupled to one another in a telescoping configuration such that the combined length of the first and second ducts which define the overall length of the discharge spout can vary by telescoping the second

²⁵⁵ Ex. 1006, 19:33 - 35.

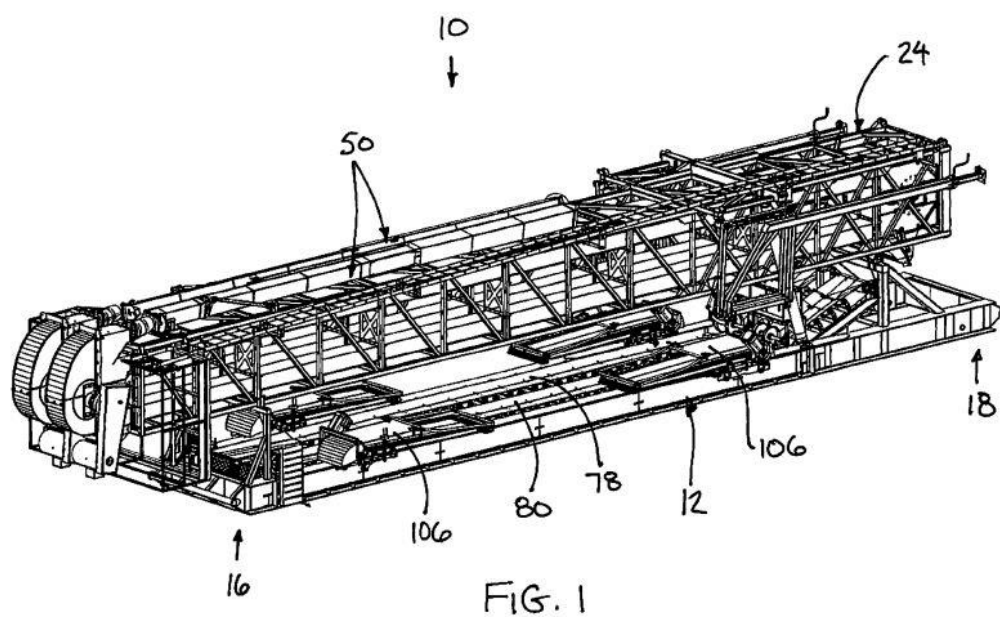
duct relative to the first duct.”²⁵⁶ To the extent *Waldner* does not disclose that its discharge chute is “movable with respect to the aggregate elevating assembly between a lowered position ... and a raised position...”, *Sleeman* discloses such an arrangement. *Sleeman* discloses that spouts 50 receive material from the elevating assembly through an inlet that later exits through a “discharge opening at the bottom discharge end” of each spout 50, which “can be repositioned in a large variety of positions and orientations relative to the main frame 26.”²⁵⁷ Each spout 50, through first duct 52, “is coupled to the main frame 26 by a horizontal pivot shaft 60 defining a horizontal tilt axis of the discharge spout relative to the main frame 26.”²⁵⁸ *Sleeman* describes a gear and rack member configuration between the spouts 50 and main frame 26 that provide control of a swing motion for the respective spout coupled thereto about a vertical swing axis.²⁵⁹

²⁵⁶ Ex. 1006 19:11 -16.

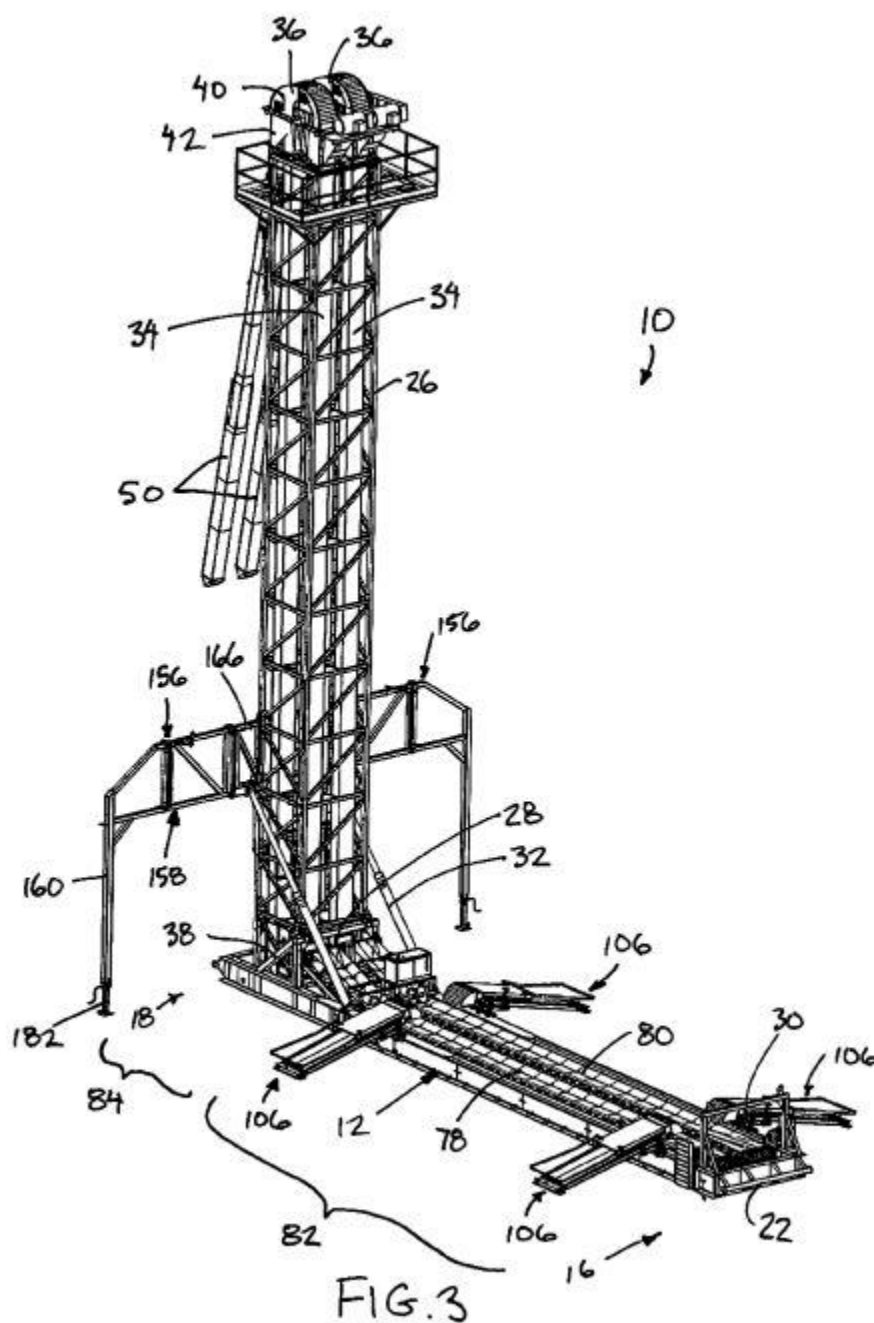
²⁵⁷ Ex. 1006 19:27; 20:9 - 12.

²⁵⁸ Ex. 1006 19:33 – 35.

²⁵⁹ Ex. 1006 19:39 – 55.



Ex. 1006, Fig. 1.



Ex. 1006, Fig. 1.

279. *Sleeman* further discloses that “each discharge spout is operable from a stored position to a working position thereof. In the stored position the discharge spout extends vertically and parallel along the rear side of the main frame 26 of the elevating assembly in the working position or along the top side of the main frame of the elevating assembly in the stored position thereof. In the working position, the discharge spout can be controlled by the extension actuator 56, the swing actuator 68 and the tilt actuator 70 so that the discharge opening at the bottom discharge end of the spout 50 can be repositioned in a large variety of positions and orientations relative to the main frame 26.”²⁶⁰ It would have been obvious to a POSITA to substitute *Sleeman*’s spouts 50 and main frame 26 for discharge chute member 242 and bucket elevator frame 254 of *Waldner*, and/or to modify the discharge chute member 242 of *Waldner* (as modified in view of or substituted with *Dynatek*’s conveyor system) with the permanent coupling / actuator configuration of *Sleeman*’s spouts 50 to main frame 26. It would have been further obvious to replace or modify the spouts 50 with the conveyor system of *Dynatek*. Thus, *Waldner* in view of *Dynatek* and *Sleeman*, teaches or discloses limitation 1[i].

²⁶⁰ Ex. 1006 20:1-12.

- d. **Limitation 1[j]: “wherein the extension conveyor is articulated between the inlet and outlet with an inboard segment and an outboard segment, the inboard segment being pivotally connected to the deployable frame of the aggregate elevating assembly by an inboard pivot, the outboard segment being pivotally connected to the inboard segment by an outboard pivot; and”**

280. As discussed above regarding limitation 1[i], *Sleeman’s* discharge spouts 50 each include a first duct 52 and a second duct 54 that are coupled to one another in a telescopic configuration.²⁶¹ The first duct 52 is connected to main frame 26 at a horizontal pivot shaft 60 which is connected to a vertical shaft 62 which defines a vertical swing axis of movement of the spout with respect to the main frame.²⁶² A POSITA would have understood from this disclosure that the first duct 52 is pivotally connected to the main frame 26.

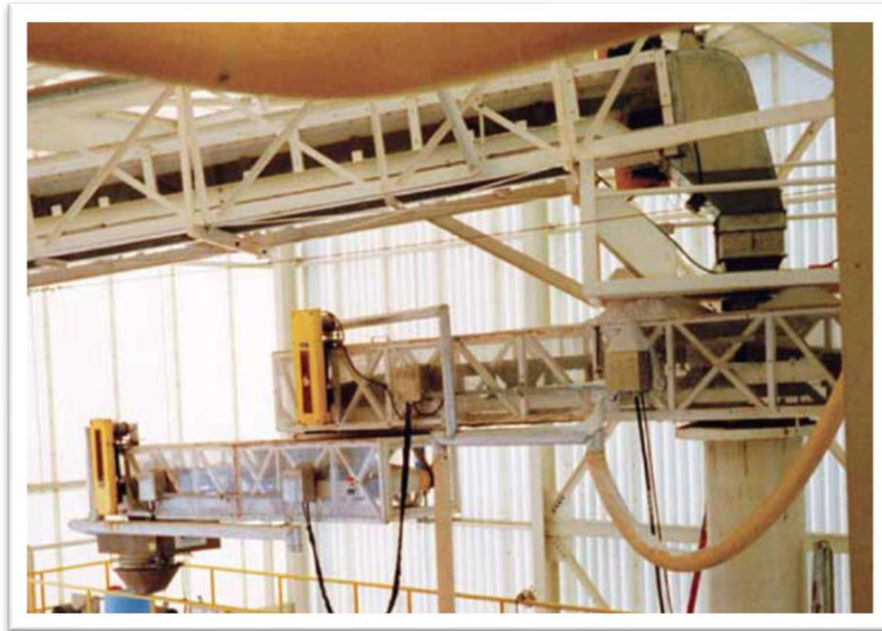
281. *Dynatek* discloses “(2) open or enclosed conveying arms, each containing its own belt conveyor”²⁶³. *Dynatek* further discloses “[m]aterial enters the loader through an inlet in the main arm [i.e. inboard segment] and discharges

²⁶¹ Ex. 1006 19:11-16.

²⁶² Ex. 1006 19:55 – 67.

²⁶³ Ex. 1005 at 2.

through the outlet or a dust recovery load-out spout at the end of the 2nd arm (loading arm) [outboard segment].”²⁶⁴



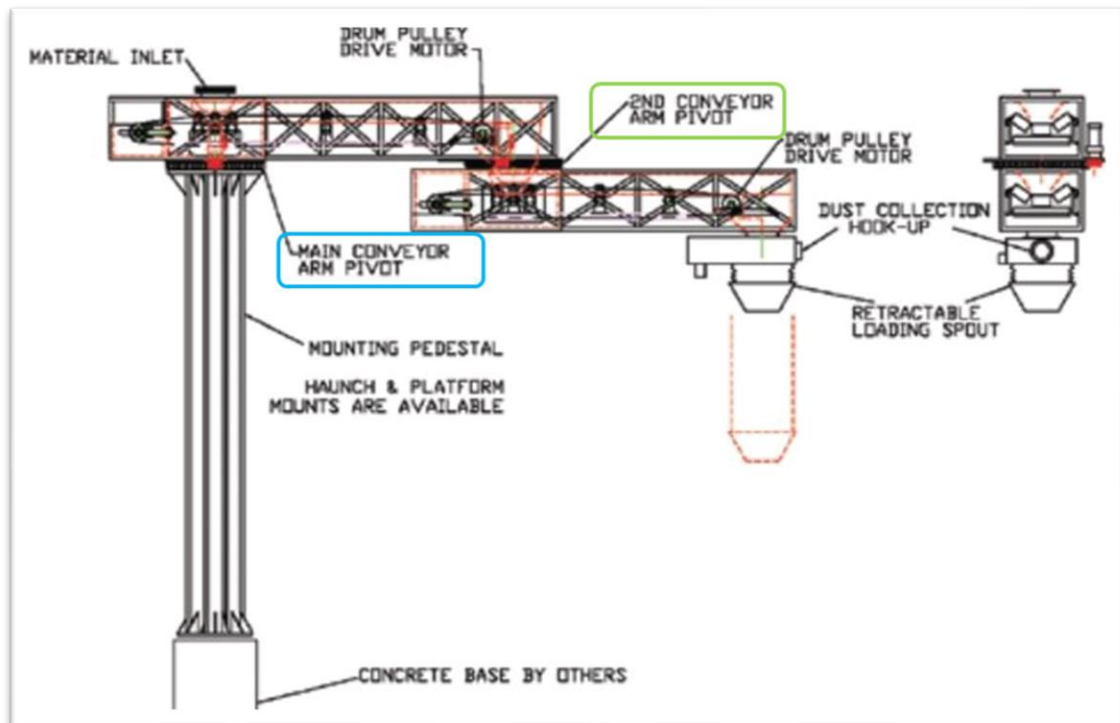
Ex. 1005 at 2.

282. Dynatek teaches the first arm is moveable relative to the “mounting pedestal”, which in the combined *Waldner/Dynatek* system would be the elevating conveyor housing. *Dynatek* teaches “[l]ike all DYNATEK loading systems, belt conveyor-based models are designed for articulated motion. Two slewing bearing-based pivots, enable both conveyor arms to pivot separately resulting in nearly 330 degrees of rotation and loader reach of up to 27 feet.”²⁶⁵ The inlet arm [inboard

²⁶⁴ Ex. 1005 at 2.

²⁶⁵ Ex. 1005 at 2.

segment] is connected to the pedestal (elevating conveyor) via a “Main Conveyor Arm Pivot” (annotated in blue) , which is analogous to the brackets 252 or *Gardner*. This allows the inlet arm, and the entire discharge assembly, to pivot around the vertical axis with respect to the elevator assembly. Further, the “2nd conveyor” (outboard segment) is connected to the main conveyor (inboard segment) via “2nd conveyor arm pivot” (outboard pivot, annotated in green). This allows the outboard segment to pivot around a vertical axis with respect to the inboard segment.



Ex. 1005 at 2.

283. It would have been obvious for a POSITA to use the articulated belt conveyor of *Dynatek* with the system of *Waldner*, or to modify the discharge chute

member 242 of *Waldner* to pivotally connect its outboard segment to its inboard segment by an outboard pivot, as discussed above regarding Reasons to Combine *Waldner* and *Dynatek*. In substituting the articulated belt conveyor of *Dynatek* for the discharge chute member 242 of *Waldner*, or modifying *Waldner*'s discharge chute member 242 in view of the teachings of *Dynatek*, the first conveying arm would be pivotally connected to the bucket elevator housing. For the same reasons, it would have been obvious for a POSITA to use the articulated belt conveyor of *Dynatek* with the system of *Waldner* as modified per *Sleeman*, or to modify the spouts 50 of *Sleeman* and/or the discharge chute 242 of *Waldner* to pivotally connect its outboard segment to its inboard segment by an outboard pivot. Thus, *Waldner* in view of *Dynatek*, further in view of *Sleeman* renders Limitation 1[j] obvious.

- e. **Limitation 1[k]: “wherein the inboard segment of the extension conveyor of the conveyor extension assembly is pivotable at the inboard pivot about a substantially vertical axis with respect to the deployable frame at the inboard pivot when the extension conveyor is in the raised position, the outboard segment of the extension conveyor being pivotable at the outboard pivot about a substantially vertical axis with respect to the inboard segment when the extension conveyor is in the raised position.”**

284. Like *Waldner*, *Sleeman*'s first duct 52 of each discharge spout 50 is pivotably connected with respect to the main frame 26.²⁶⁶ . *Dynatek* discloses each

²⁶⁶ Ex. 1006 19:55-67.

one of the two conveying arms being able to independently horizontally pivot via their respective pivots.²⁶⁷ A POSITA would have understood that the two conveying arms of *Dynatek* or either a) the two portions of discharge chute 242 of *Waldner*; or 2) the first and second ducts 52, 54 of *Sleeman*, when modified according to the teachings of *Dynatek* would have been pivotable about substantially vertical axes in order to rotate horizontally. Further, a POSITA would have understood that *Dynatek*'s two conveying arms, the two portions of *Waldner*'s discharge chute 242, or the first and second ducts 52, 54 of *Sleeman* would be so pivotable when in *Waldner*'s operational configuration, i.e., when the extension conveyor is in a raised position.

285. Further, as discussed above regarding Ground 1, a POSITA would have understood that the two conveying arms of *Dynatek* (or the two portions of discharge chute member 242 of *Waldner*, when modified according to the teachings of *Dynatek*) are pivotable about a vertical axis in order to rotate horizontally. Further, a POSITA would have understood that the two conveying arms of *Dynatek* would be used with the system of *Waldner* when in an operational configuration, which would be when the extension conveyor is in a raised position. Accordingly, the combination of *Waldner* with *Dynatek* and *Sleeman* renders limitation 1[k] obvious.

²⁶⁷ Ex. 1005 pg 2 (“Arm Positioning”)

f. Claims 2, 4-5, 8-11, 16-20, and 22-24

286. See Sections XI.B.a-e. As explained above in Ground 1, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders Claims 2, 4-5, 8-11, 16-20, and 22-24 obvious. Nothing in *Sleeman* teaches against the combination discussed in Ground 1. Accordingly, *Waldner* in view of *Dynatek* further in view of *Sleeman* renders Claims 2, 4-5, 8-11, 16-20, and 22-24 obvious.

g. Claims 6-7

i. Claim 6[p]

287. As explained with respect to Claim 1[h] in Ground 1 above, and incorporated herein by reference, *Waldner* anticipates or renders Limitation 6[p] obvious.

ii. Claim 6[a]

288. As discussed with respect to Claim 6[a] in Ground 1 above, and incorporated herein by reference, a POSITA would have understood that the conveyor support frame shown in *Dynatek* is a conveyor support frame that supports the extension conveyor relative to the aggregate elevating assembly and would have to be movable when transitioning between lowered and raised positions.

iii. Claim 6[b]

289. As discussed above regarding Limitation 1[h] in Section **XI.B.b**, *Sleeman* discloses a swing actuator 68 “mounted in a generally lateral direction between the rack member 66 and the main frame 26 so that extension and retraction of the swing actuator 68 displaces the rack to in turn control swing motion of the respective spout.”²⁶⁸ A POSITA would have further understood the swing actuator 68 to be an extension conveyor lift structure that acts on the conveyor support frame to move the extension conveyor. Thus, *Waldner* in view of *Dynatek* and *Sleeman*, either alone or in view of the knowledge of a POSITA, teaches or discloses Claim 6[b].

290. Further, as explained above in Ground 1, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders Claim 6 obvious. Nothing in *Sleeman* teaches against the combination discussed in Ground 1. Accordingly, *Waldner* in view of *Dynatek* further in view of *Sleeman* renders Claim 6 obvious.

²⁶⁸ Ex. 1006 19:39-55.

- iv. **Claim 7: “The apparatus of claim 1 wherein the extension conveyor lift structure comprises at least one extension actuator extendable to pivot the conveyor support frame away from the deployable frame and move the extension conveyor to the raised position, the at least one extension actuator being retractable to pivot the conveyor support frame toward the deployable frame and move the extension conveyor to the lowered position.”**

291. As discussed above regarding Claim 6 in Section XI.B.g.i, *Sleeman* discloses swing actuator 68 being “a linear piston cylinder hydraulic actuator” that induces pivotal motion. Ex. 1006, 19:39-42 & 49-50. As explained above in Ground 1, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders Claim 7 obvious. Nothing in *Sleeman* teaches against the combination discussed in Ground 1. A POSITA would have understood that as the conveyor system 10 transitions between stored and working positions, the conveyor support frame would be pivoted away from or towards the main frame 26, depending on the desired position, by extending or retracting the swing actuator 68 coupled thereto. Accordingly, *Waldner* in view of *Dynatek* further in view of *Sleeman* renders Claim 7 obvious.

**XII. GROUND 2: CLAIMS 6-7 ARE RENDERED OBVIOUS BY
WALDNER IN VIEW OF DYNATEK AND PHAM**

292. It is my opinion that *Waldner* in view of *Dynatek* and *Pham* discloses and/or suggests all limitations of Claims 6-7, and thus renders those claims obvious.

A. REASONS TO COMBINE WALDNER, DYNATEK, AND PHAM

293. A POSITA would have been motivated to combine the teachings of *Waldner* and *Dynatek* for the same reasons as those discussed above in Ground 1 Section X.A. A POSITA would have been further motivated to combine the teachings of *Pham* with those of *Waldner* and *Dynatek* for similar reasons. Nothing in any of the three references teaches against such a combination. *Pham* is analogous art to *Waldner* and *Dynatek* and to the '689 Patent. Like *Waldner*, *Pham* teaches “mobile apparatus and methods for transferring oilfield materials.”²⁶⁹ The “oilfield materials” include “Proppant [that] may comprise naturally occurring sand grains or gravel, man-made proppants, e.g. fibers or resin coated sand, high-strength ceramic materials, e.g. sintered bauxite, or other suitable materials.”²⁷⁰ *Pham* also discloses storing such materials in vertically oriented silos with inlets at an elevated location and a means of conveying the transported component,²⁷¹ which would have been relevant to the problem that the '689 Patent purports to solve.

294. Further, *Waldner*, *Dynatek* and *Pham* all teach discharging particulate matter, including sand (used as proppant) from an elevated position. As discussed

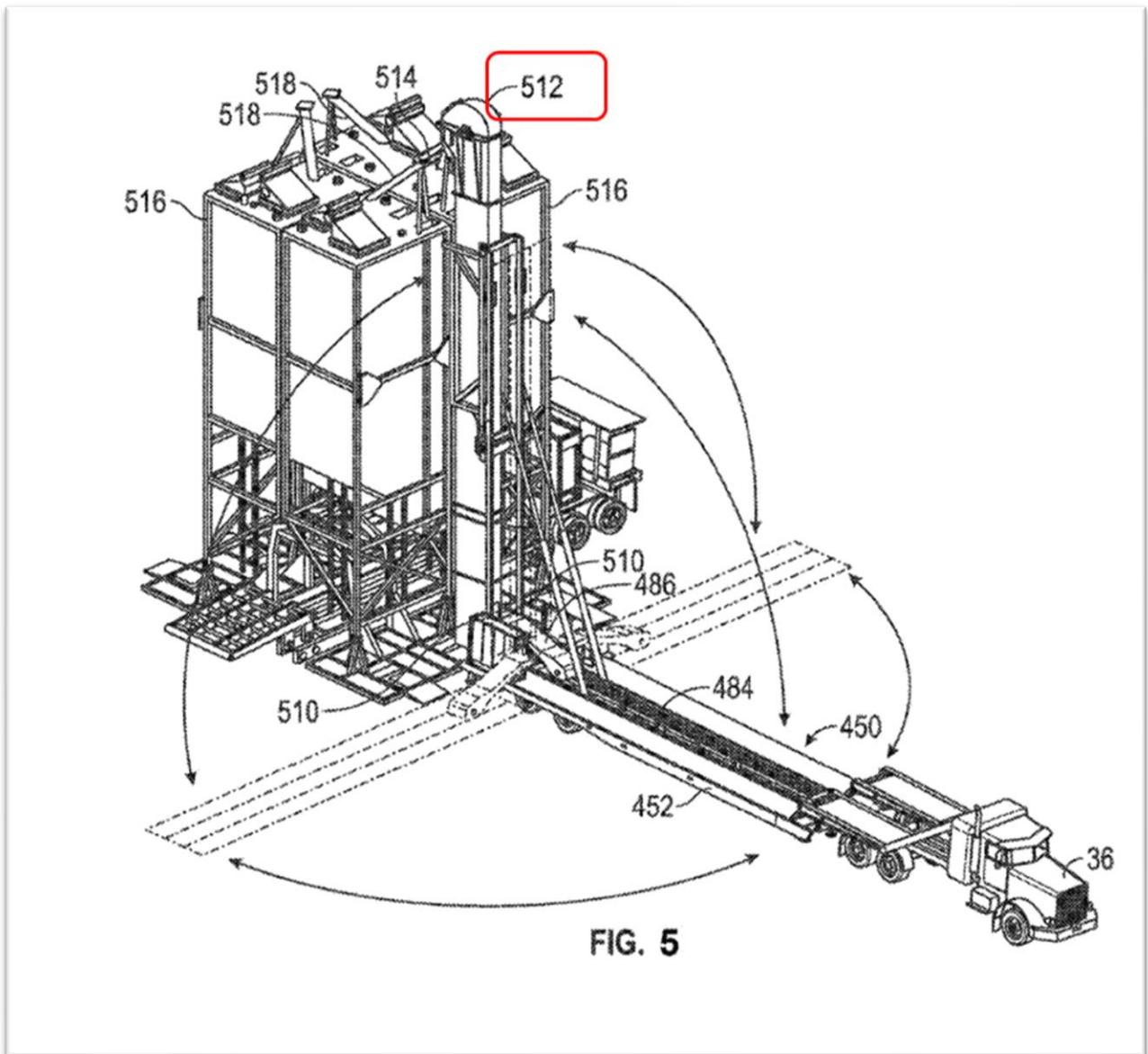
²⁶⁹ Ex. 1008 1:16-18.

²⁷⁰ Ex. 1007 1:35-38.

²⁷¹ See Ex. 1008 2:51-67, 12:5-33

above regarding Ground 1, both *Waldner* and *Dynatek* teach elevated discharge. Further, *Pham* discloses “Referring now to FIGS. 4-5, the first conveyor 502 may include an inlet 510 and an upper discharge portion 512. [] The upper discharge portion 512 may include a discharge chute 514 which may be a dual-discharge chute configured to fill two or more modular silos 516 simultaneously.”²⁷²

²⁷² Ex. 1008 8:43-52.



Ex. 1008 Fig. 5

As can be seen from Fig. 5, “upper discharge portion 512” (annotated in red) discharges material from an elevated position, like the discharges of *Waldner* and *Dynatek*.

295. In addition to looking at the teachings of *Waldner*, a POSITA would have been motivated to look to the teachings of *Pham* when finding solutions to handle particulate matter (e.g. proppant) at an oil and gas site because *Pham* teaches use for handling proppant at fracturing sites. *Sleeman* teaches “To facilitate the recovery of hydrocarbons from oil and gas wells, the subterranean formations surrounding such wells can be hydraulically fractured.”²⁷³ Further, *Pham* teaches “The fracturing fluids may be loaded with proppant which are sized particles that may be mixed with the liquids of the fracturing fluid to help form an efficient conduit for production of hydrocarbons from the formation to the wellbore. Proppant may comprise naturally occurring sand grains or gravel, man-made proppants, e.g. fibers or resin coated sand, high-strength ceramic materials, e.g. sintered bauxite, or other suitable materials.”²⁷⁴ Accordingly, *Pham*, like both *Waldner* and *Dynatek*, was relevant to a problem allegedly solved by the ‘689 Patent, using conveyor belt systems to transfer and discharge material from an elevated location.

296. Further, like the system of *Waldner* which teaches “the system is convertible between an expanded ready for-use operational state, and a collapsed

²⁷³ Ex. 1008 1:23-25.

²⁷⁴ Ex. 1008 1:31 – 38.

ready-for-travel transport state”,²⁷⁵ *Pham* discloses “methods where at least one mobile oilfield material transfer unit is provided to a well-site in a stowed orientation, where each of the at least one mobile oilfield material transfer units comprises at least one vertical conveyor assembly moveable between a horizontal position and a vertical position.”²⁷⁶ Accordingly, both systems teach a portable material handling system that can be raised from a “stowed” orientation for movement between well sites and an “elevated” position for use in delivering particulate matter. Further still, both references teach means or raising and lowering the apparatus from a horizontal position to a vertical position. *Waldner* teaches the use of actuators to raise / lower components of its conveyer system.²⁷⁷ *Pham* teaches “The actuator system 490 engages the mast 488 and at least one of the support beams 468-1 and 486-2 of the chassis 452 to move the mast 488 in an arc-shaped path for moving the first conveyor assembly 458 between the horizontal and vertical positions.”²⁷⁸ Accordingly, both *Waldner* and *Pham* are in the field of endeavor: material handling systems for aggregate/material in oil/gas applications

²⁷⁵ Ex. 1004 12:2-4.

²⁷⁶ Ex. 1008 3:53-58.

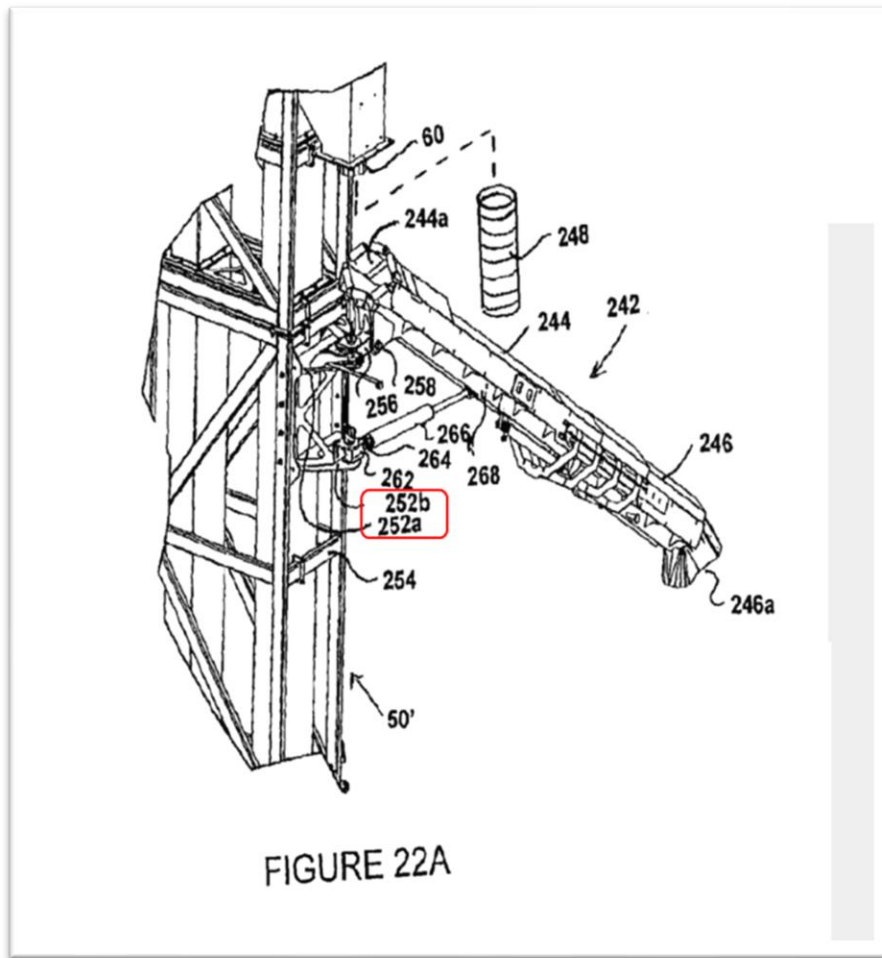
²⁷⁷ See, e.g. 19:58 – 61; 24:25-34; 28:59- 29:12.

²⁷⁸ Ex. 1008 8:4 – 8.

297. A POSITA would be motivated to combine the teachings of *Pham* with those of *Waldner* and *Dynatek* both because of their similarities and because of the advantages taught by *Pham*. To the extent that *Waldner* does not explicitly teach a conveyor support frame being movable with respect to the deployable frame of the aggregate elevating assembly when the extension conveyor moves between the lowered position and the raised position, *Pham* contains such teachings.

298. *Waldner* already teaches “to enable such movement of the discharge member 242, a pair of mounting brackets 252a, 252b [annotated in red] extend laterally outward from the frame 254 of the bucket elevator 50 at a short distance below the downward-opening outlet port 60, which resides on a side of the bucket elevator frame 254 that faces longitudinally toward the rear end of the trailer when the bucket elevator is raised, and faces downwardly toward the open trailer framework 200 when the bucket elevator 50' is lowered for storage.”²⁷⁹

²⁷⁹ Ex. 1004 25:20-29.



299. *Pham* teaches “Auger conveyors 804, 806 [annotated in red, discharge assembly] (also shown in FIG. 9) are disposed onto, and supported by, an articulated support frame 802.[annotated in blue] Support frame 802 may be supported by and movably connected with mast assembly 608 [annotated in green] thus enabling support frame 802 to move to/from an operational and stowed orientation.”²⁸⁰

²⁸⁰ Ex. 1008 14:13-18.

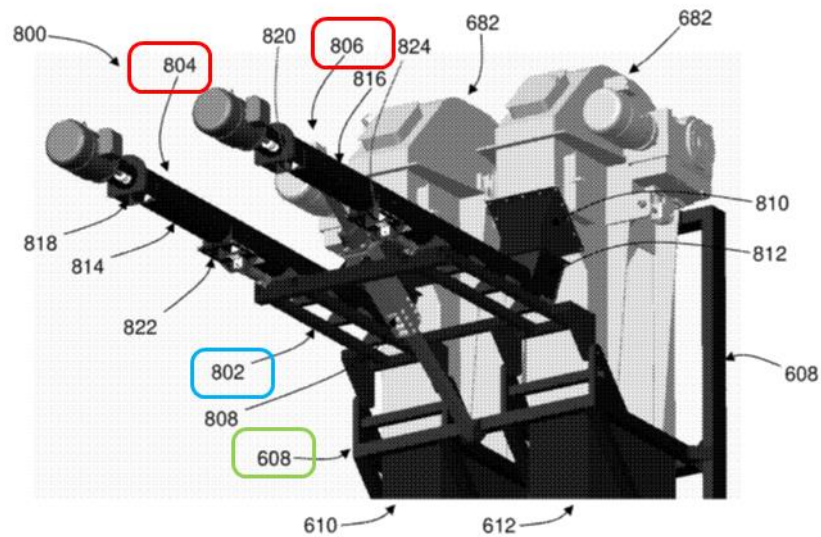


FIG. 19

Ex. 1008 Fig. 19 (annotated)

300. A POSITA would be motivated to add the teachings of *Pham* so that the combined system more easily meets *Waldner's* goal of a “trailer-mounted solution”.²⁸¹ By having conveyor support frame movable with respect to the deployable frame, as taught by *Pham*, the combined system can be more easily transported on *Waldner's* trailer. Accordingly, a POSITA would be motivated to modify the combined *Waldner-Dynatek* system to add the teachings of an articulation mechanism 808 which moves an auger conveyor from a stowed to an

²⁸¹ Ex. 1004 1:17

operational position.²⁸² to *Waldner's* conveyer system to allow for easier stowing of the discharge system on *Waldner's* trailer. This would involve substituting one known component (the support frame and articulation mechanism of *Pham*) for another (brackets 252 of *Waldner*) to obtain predictable results (easier to move the conveyor system between a deployed and stowed position). Alternatively, the brackets 252 of *Waldner* would have been improved, based on the teachings of *Pham*, to be movable relative to the bucket elevator to obtain predictable results (easier to move the conveyor system between a deployed and stowed position).

301. A POSITA would have had a reasonable expectation of success in combining the teachings of *Pham* with the system of *Waldner/Dynatek* without undue experimentation. *Waldner* already teaches brackets 252 to support the discharge assembly, and perform the function of *Pham's* frame 802. *Pham* teaches the frame 802 being movable by articulation mechanism 808. As *Waldner* already teaches used of articulating mechanisms to raise and lower components of its material handling system, a POSITA would have had no trouble implementing the teachings of *Pham's* movable support in place of, or to modify, *Waldner's* brackets 252.

²⁸² See, e.g. Ex. 1009 14:14-18

B. DISCLOSURE OF WALDNER IN VIEW OF DYNATEK AND PHAM

a. Claim 6

302. It is my opinion that the combination of *Waldner*, *Dynatek* and *Pham* discloses, or at least suggests, each and every limitation of Claim 6. Accordingly, the combination of *Waldner*, *Dynatek* and *Pham* renders Claim 6 obvious.

- i. Limitation 6[a]: “The apparatus of claim 1 wherein the conveyor extension assembly additionally comprises: a conveyor support frame supporting the segments of the extension conveyor on the aggregate elevating assembly, the conveyor support frame being movable with respect to the deployable frame of the aggregate elevating assembly when the extension conveyor moves between the lowered position and the raised position; and”**

303. As explained in Ground 1 regarding limitation 6[a] and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 6[a] obvious. To the extent that *Dynatek* does not explicitly teach Claim 6[a], *Pham* disclose, *Pham* discloses “the first conveyor 502²⁸³ may include an inlet 510 and an upper discharge portion 512. [] The upper discharge portion 512 may include a discharge chute 514 which may be a dual-discharge chute configured to fill two or

²⁸³ In some embodiments, modified with auger conveyors 804/806.

more modular silos 516 simultaneously.”²⁸⁴ In another embodiment, the dual discharge chutes support “auger conveyors 804/806” as discussed below.

304. Pham further teaches “the system is convertible between an expanded ready for-use operational state, and a collapsed ready-for-travel transport state”,²⁸⁵ *Pham* discloses “methods where at least one mobile oilfield material transfer unit is provided to a well-site in a stowed orientation, where each of the at least one mobile oilfield material transfer units comprises at least one vertical conveyor assembly moveable between a horizontal position and a vertical position.”²⁸⁶

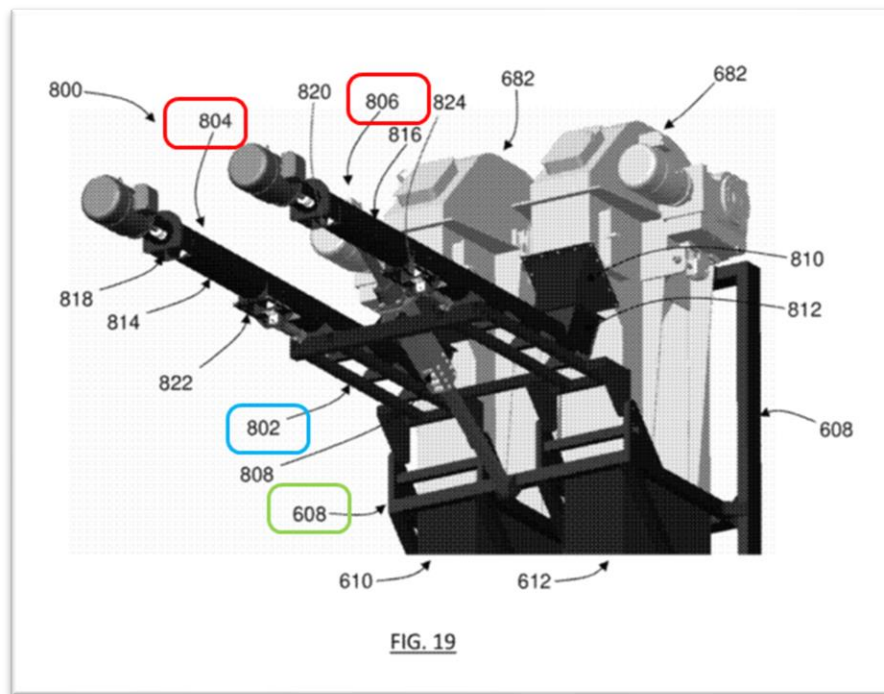
305. As part of this convertibility, *Pham* teaches “Auger conveyors 804, 806 [annotated in red, discharge assembly] (also shown in FIG. 9) are disposed onto, and supported by, an articulated support frame 802.[annotated in blue] Support frame 802 may be supported by and movably connected with mast assembly 608 [annotated in green] thus enabling support frame 802 to move to/from an operational and stowed orientation.”²⁸⁷

²⁸⁴ Ex. 1008 8:43-52.

²⁸⁵ Ex. 1004 12:2-4.

²⁸⁶ Ex. 1008 3:53-58.

²⁸⁷ Ex. 1008 14:13-18.



Ex. 1008 Fig. 19 (annotated)

306. *Pham* describes how an articulation mechanism 808 is included with the support frame 802 and moves the auger conveyor arrangement 800 from a stowed position to an operational position.²⁸⁸ *Pham* further teaches “Support frame 802 may further include an articulation mechanism 808 for moving the auger conveyor arrangement 800 into a desired position.”²⁸⁹ A POSITA would have understood that the support frame 802 is moved when the auger conveyors are actuated by the

²⁸⁸ Ex. 1008 14:18 – 15:5.

²⁸⁹ Ex. 1008 14:18 – 20.

articulation mechanism 808 to move between a stowed position and an operational position (a desired position). It would have been obvious for a POSITA to use the support frame 802 of *Pham* with the modified system of *Waldner* and *Dynatek*, or to modify the collective brackets 252a, 252b and actuators 266, 270 of *Waldner* with the movability of support frame 802 of *Pham* to allow the system to be more easily transported on *Waldner's* trailer. Thus, *Waldner* in view of *Dynatek* and *Pham* teaches or discloses limitation 6[a]. *Id.*

ii. Limitation 6[b]: “an extension conveyor lift structure acting on the conveyor support frame for moving the extension conveyor between the lowered position and the raised position.”

307. As explained in Ground 1 regarding limitation 6[b] and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 6[b] obvious. To the extent that *Waldner* does not explicitly teach Claim 6[b], *Pham* discloses an articulation mechanism 808 “which moves support frame 802 to any securable position at any point in the range of motion.”²⁹⁰ Further *Pham* teaches “auger conveyor arrangement 800 articulated into an operational position by mechanism 808.”²⁹¹ A POSITA would have understood that the articulation mechanism 808 moves the support frame 802 when moving the auger conveyors

²⁹⁰ Ex. 1008 14:23 – 25.

²⁹¹ Ex. 1008 15:4-5.

between the stored and operational positions (a desired position). It would have been obvious for a POSITA to use the articulation mechanism 808 of *Pham* with the modified system of *Waldner* and *Dynatek* to allow the system to be more easily transported on *Waldner's* trailer. Thus, *Waldner* in view of *Dynatek* and *Pham*, teaches or discloses Limitation 6[b]. *Id.*

- b. **Claim 7: “The apparatus of claim 1 wherein the extension conveyor lift structure comprises at least one extension actuator extendable to pivot the conveyor support frame away from the deployable frame and move the extension conveyor to the raised position, the at least one extension actuator being retractable to pivot the conveyor support frame toward the deployable frame and move the extension conveyor to the lowered position.”**

308. As explained in Ground 1 regarding Claim 7 and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Claim 7 obvious. To the extent that *Waldner* does not explicitly teach Claim 7, *Pham* discloses that articulation mechanism 808 is “any suitable device including, hydraulic, pneumatic, drive screw, or any other mechanical actuation means, which moves support frame 802 to any securable position at any point in the range of motion.”²⁹² *Pham* further describes how the articulation mechanism 808 moves the auger conveyor

²⁹² Ex. 1008 14: 21 – 25.

arrangement 800 from a stowed position to an operational position.²⁹³ Further Pham teaches “auger conveyor arrangement 800 articulated into an operational position by mechanism 808.” A POSITA would have understood that such articulation mechanisms can be extended and/or retracted during operation (i.e. extension actuators that are extendable) to move support frame. It would have at least been obvious to try the arrangement claimed as there are only two arrangements possible, extension of mechanism 808 to move the frame to the operational raised position or extension of mechanism 808 to move the frame to the portable storage position. Further, it would have been obvious for a POSITA to use the articulation mechanism 808 and movability of support frame 802 of *Pham* with the modified system of *Waldner* and *Dynatek* to allow the system to be more easily stored on *Waldner’s* trailer. A POSITA would have understood that what is taught as the “conveyor support frame” by *Waldner* and/or *Pham* can be pivoted towards and away from the “deployable frame” when transitioning between positions. Thus, *Waldner* in view of *Dynatek* and *Pham*, renders Claim 7 obvious.

²⁹³ Ex. 1008 14:18 – 15:5.

**XIII. GROUND 2A: CLAIMS 6-7 ARE RENDERED OBVIOUS BY
WALDNER IN VIEW OF DYNATEK, SLEEMAN, AND PHAM**

309. It is my opinion that *Waldner* in view of *Dynatek*, *Sleeman*, and *Pham* discloses and/or suggests all limitations of Claims 6-7, and thus renders those claims obvious.

A. REASONS TO COMBINE WALDNER, DYNATEK, SLEEMAN, AND PHAM

310. As discussed above regarding Grounds 1 and 1A, a POSITA would have been motivated to combine *Waldner*, *Dynatek* and *Sleeman*. Further, as discussed above regarding Ground 2, a POSITA would have been motivated to combine the teaches of *Waldner*, *Dynatek* and *Pham*. For the same reasons, a POSITA would have been motivated to combine the teaches of *Waldner*, *Dynatek*, *Sleeman* and *Pham*. The same motivations discussed above still apply, and there is nothing in any of the four references to teach against the combination.

**B. DISCLOSURE OF WALDNER IN VIEW OF DYNATEK, SLEEMAN,
AND PHAM**

a. Claims 6-7

311. As explained above in Ground 2, and incorporated herein by reference, *Waldner* in view of *Dynatek*, and *Pham* renders Claims 6-7 obvious. Nothing in *Sleeman* teaches against the combination discussed in Ground 2. Accordingly, *Waldner* in view of *Dynatek* further in view of *Sleeman* and *Pham* renders Claims 6-7 obvious.

**XIV. GROUND 3: CLAIMS 3, 12, 21, AND 25 ARE RENDERED OBVIOUS
BY WALDNER IN VIEW OF DYNATEK AND AULD**

312. It is my opinion that *Waldner* in view of *Dynatek* and *Auld* discloses and/or suggests all limitations of Claims 3, 12, 21, and 25, and thus renders those claims obvious.

A. REASONS TO COMBINE WALDNER, DYNATEK, AND AULD

313. A POSITA would have been motivated to combine the teachings of *Waldner* and *Dynatek* for the same reasons as those discussed above in Ground 1 Section X.A. A POSITA would have been further motivated to add the teachings of *Auld* to the combined *Waldner* / *Dynatek* system. Nothing in any of the three references teaches against such a combination.

314. *Waldner* teaches its system or related technologies not only for handling proppant at a hydraulic fracturing site but also “to fill grain bins in the agricultural industry,”²⁹⁴ as well as concrete / bulk cement systems.²⁹⁵ Based on this system, a POSITA would have looked to other conveying systems used in agricultural or concrete/cement industries for teachings on how to improve the system of *Waldner*. *Auld* discloses “concrete batching plants and, more particularly,

²⁹⁴ Ex. 1004 12:4-12.

²⁹⁵ Ex. 1004 2:12-18.

to portable batching plants.”²⁹⁶ *Auld* further teaches “Batching plants for use on construction and building projects frequently must be transported considerable distances and it is desirable that they be so constructed that they can be set up in a minimum of time with a minimum of effort and, also, can be transported along highways with maximum allowable height and width limitations.”²⁹⁷

315. *Auld* is analogous art to *Waldner* and *Dynatek* and to the ’689 Patent. Like the ’689 Patent, *Waldner*, and *Dynatek*, *Auld* discloses a portable system used for handling and storage of aggregate material (*i.e.*, concrete / cement).²⁹⁸ *Auld* also discloses storing such materials in a vertically oriented silo and a means of raising and lowering the transported component²⁹⁹ which would have been relevant to the problem that the ’689 Patent purports to solve.

316. *Waldner* teaches a portable conveyor system having a bucket elevator that can lie along the trailer frame and be pivoted vertically upright.³⁰⁰ *Auld* teaches a portable cement batching plant “so constructed that it can be upended to the

²⁹⁶ Ex. 1009 1:8-9.

²⁹⁷ Ex. 1009 14-19.

²⁹⁸ Ex. 1009 1:8 – 13.

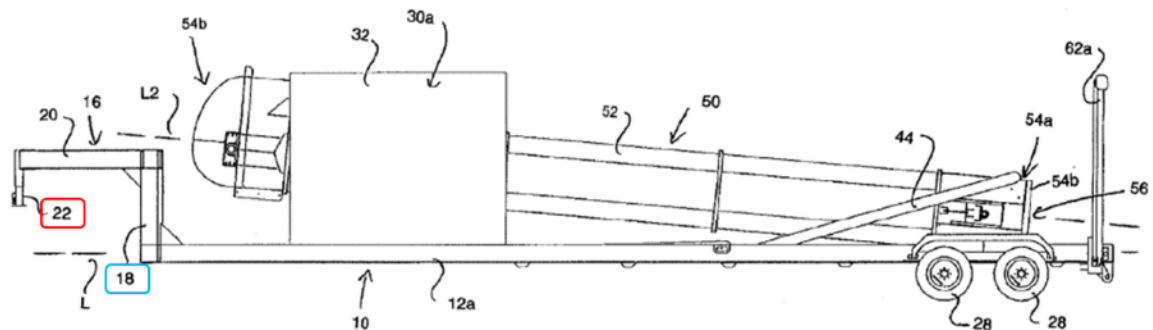
²⁹⁹ Ex. 1009 4:30 – 44, 5:3 – 4.

³⁰⁰ See, e.g. 19:58 – 61; 24:25-34.

operating position and lowered to a horizontal position for travel without removing the road wheels therefrom.”³⁰¹ Further, the cement batching plant stores and handles “stone, gravel, and sand.”³⁰² Accordingly, *Auld* and *Waldner* are both directed to portable systems for handling aggregate material.

317. *Waldner* contains an express motivation to combine. *Waldner* teaches a “hitch coupler 22 [annotated in red] is mounted to the converging beams 18 [annotated in blue] where their forward ends meet in a central vertical plane of the trailer that contains the longitudinal axis L. The trailer is thus equipped to form a gooseneck connection to a suitable towing vehicle in a conventional manner. Other hitch types may alternatively be employed.”³⁰³

FIGURE 6

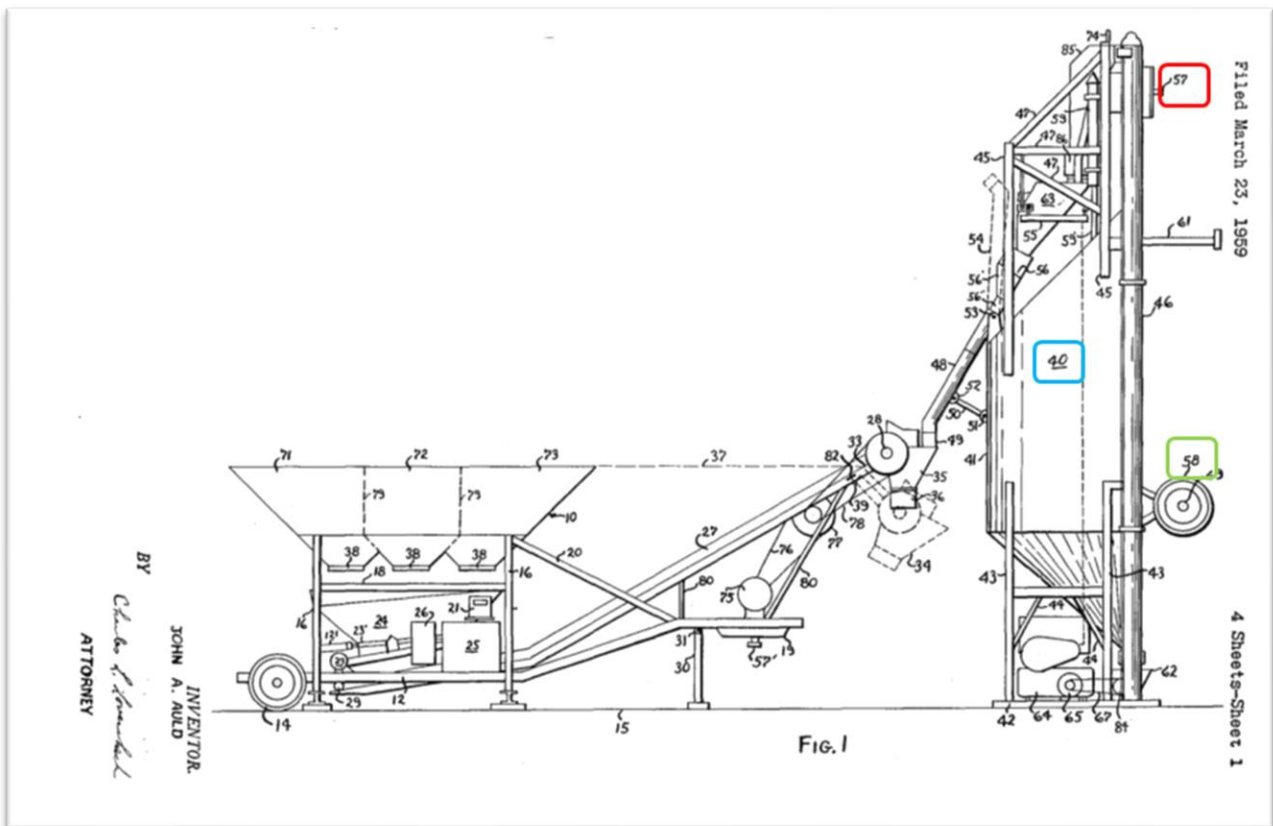


³⁰¹ Ex. 1009 1:70-73.

³⁰² Ex. 1009 1:45-46. See also 4:2-18.

³⁰³ Ex. 1004 12:28 – 34.

318. Based on this express teaching of *Waldner*, a POSITA would have been motivated to look for “other hitch types” that are an alternative to the arrangement. *Auld* contains one such hitch arrangement. *Auld* describes a “A king pin 57 [annotated in red] is welded to a fifth wheel which is in turn attached to the cement batching plant 40 [annotated in blue] and road engaging wheels 58 [annotated in green] are supported on an axle 69 which is in turn welded to the cement silo 41.”³⁰⁴



Auld Fig. 1

³⁰⁴ Ex. 1009, 4:65 – 67.

319. Although Fig. 1 shows the cement batching plant in the vertical operating position, a POSITA would have easily seen that the cement batching plant would be rotated 90 degrees clockwise to be in the “road” position, placing the wheels in contact with the earth.

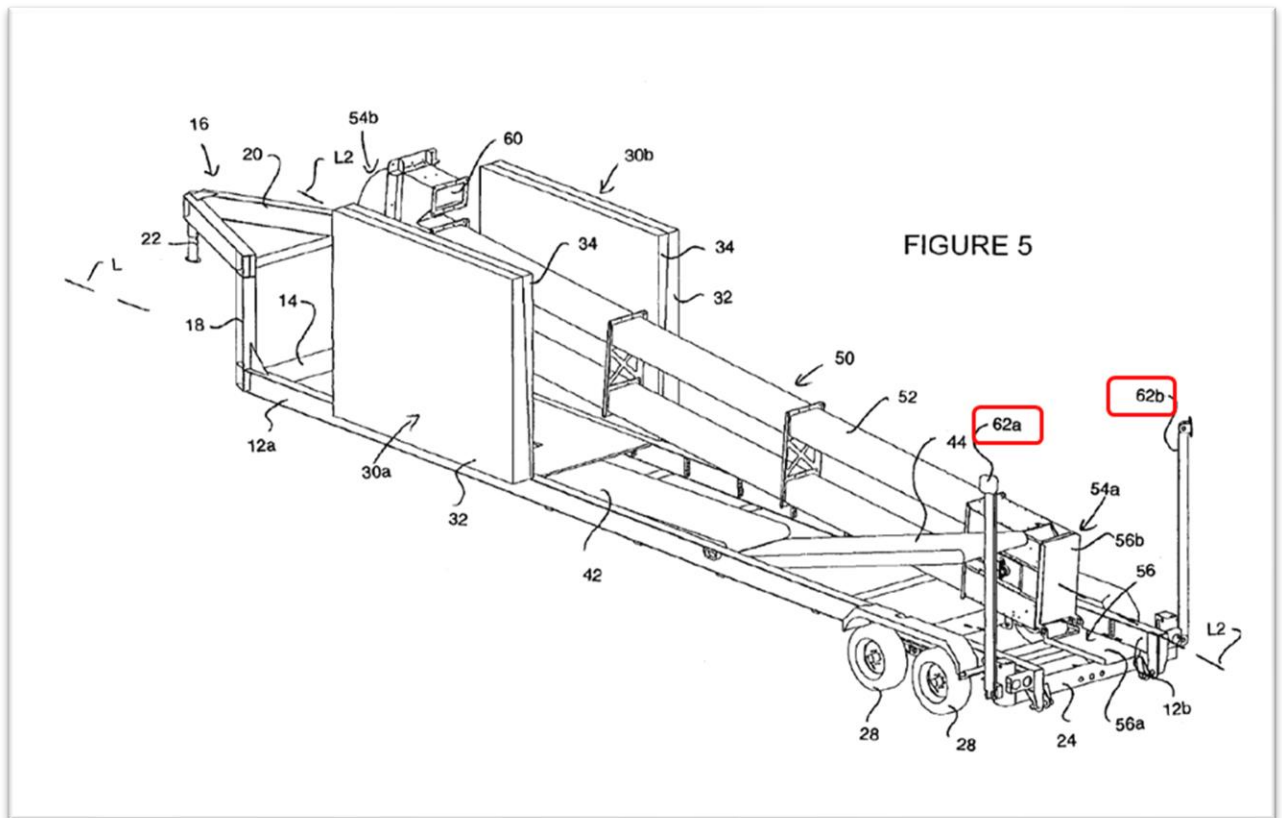
320. A POSITA would have recognized the advantages of replacing the “hitch coupler” 22 of *Waldner* with the king pin 57 of *Auld*, connected directly to *Waldner’s* elevator 50, and would have been motivated to gain those advantages, including a reduction in frame material and a reduction in overall length of the trailer. A POSITA would have also recognized that the same vehicle could be used for transport of the modified *Waldner/Dynatek/Auld* trailer by simply replacing the ball of a gooseneck connection with the fifth wheel of the kingpin connection. This would have resulted in a distribution of load more evenly across the bed of the transport vehicle (truck). This combination is simply the substitution of one known component (*Auld’s* kingpin 57) for another (hitch coupler 22 of *Waldner*) to obtain predictable results (reduction in frame material and shorten overall length).

321. Alternatively, a POSITA would have been motivated to modify *Waldner’s* hitch coupler 22 to connect to *Waldner’s* elevator 50 to gain the same advantage. Both structures have a common purpose of providing a structure to engage with a towing vehicle.

322. A POSITA would have had a reasonable expectation of success in the combination as both couplers, a hitch coupler and kingpin, were well known and commonly used devices applicable across a broad selection of towing applications. Both are simple mechanical devices, used to engage with another component for towing. There is no indication that *Auld's* kingpin 57 would be difficult to use or incompatible with Waldner system. Waldner already teaches a hitch coupler 22 coupled to the trailer that performs the function of the *Auld's* kingpin 57. *Auld* just teaches placing the kingpin 57 (or alternatively the hitch coupler 22) at a different location (i.e., on the structure to be raised).

323. Further, *Waldner* teaches outrigger arms 62a, 62b (annotated in red) to provide stability to a trailer when transitioning to an operational mode.³⁰⁵

³⁰⁵ Ex. 1004 15:47 – 56.



324. *Auld* teaches a parking stand 61 (annotated in red below) attached to the silo such that the parking stand 61 is raised as the silo transitions to a vertical position.³⁰⁶

³⁰⁶ Ex. 1009, Fig. 1, 4:74-5:3.

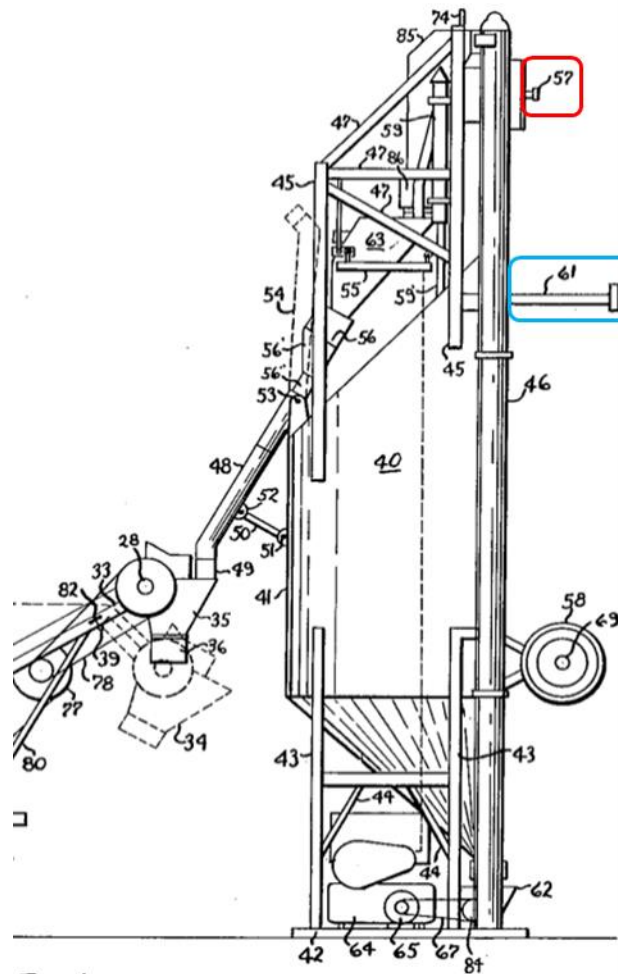


FIG. 1

Ex. 1009 Fig. 1 (excerpted and annotated)

325. A POSITA would have recognized the advantages of including *Auld's* parking stand with *Waldner's* system, e.g., providing stability to the bucket elevator 50 when lowered in the stored position. A POSITA would have had a reasonable expectation of success in the combination to obtain predictable results since landing legs were well known and commonly used devices applicable across a broad

selection of towing/storing applications, and would have been compatible with similar structures to support a load when disengaged from a towing vehicle.

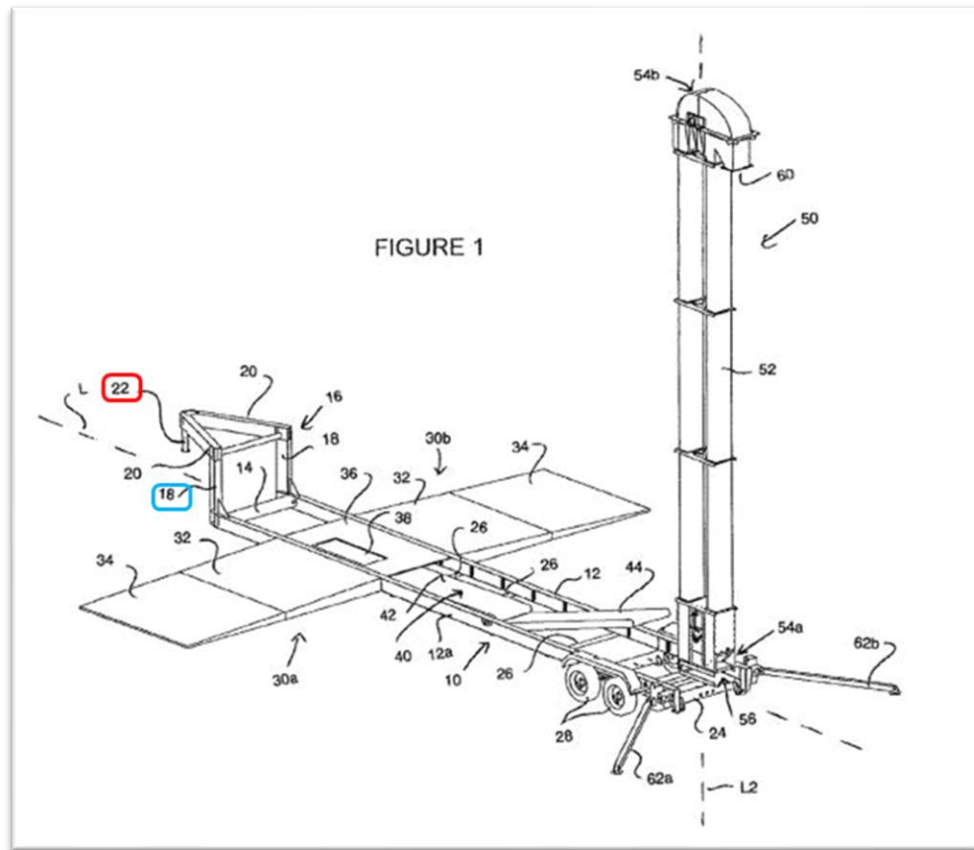
326. Although Auld describes kingpins and landing legs on a silo, a POSITA using or designing the Waldner system would have also been familiar with silos (e.g., silos filled using that system) and conveyors because they would have seen and used both types of equipment at the same job sites. Therefore, a POSITA would have understood that kingpins and landing legs useful for transporting silos would also be useful in transporting conveyor systems used to fill them.³⁰⁷

B. DISCLOSURE OF WALDNER IN VIEW OF DYNATEK AND AULD

- a. **Claim 3: “The apparatus of claim 2 wherein the aggregate elevating assembly includes trailer structure configured to permit the apparatus to be towed across a ground surface, the trailer structure being positioned adjacent to the ground surface when the deployable frame is in the storage position.”**

327. *Waldner* teaches a “hitch coupler 22 [annotated in red] is mounted to the converging beams 18 [annotated in blue] where their forward ends meet in a central vertical plane of the trailer that contains the longitudinal axis L.

³⁰⁷ Compare, for example, Ex. 1011 (self erecting silos) with Ex. 1010 (Self-erecting conveyor for filling silos).



Ex. 1004, Fig. 1 (annotated).

328. The trailer is thus equipped to form a gooseneck connection to a suitable towing vehicle in a conventional manner. Other hitch types may alternatively be employed.”³⁰⁸ *Auld* discloses “concrete batching plants and, more particularly, to portable batching plants.”³⁰⁹ *Auld* further teaches “Batching plants for use on construction and building projects frequently must be transported

³⁰⁸ Ex. 1004 12:28 – 34.

³⁰⁹ Ex. 1009 1:8-9.

considerable distances and it is desirable that they be so constructed that they can be set up in a minimum of time with a minimum of effort and, also, can be transported along highways with maximum allowable height and width limitations.”³¹⁰ *Auld* teaches a portable cement batching plant “so constructed that it can be upended to the operating position and lowered to a horizontal position for travel without removing the road wheels therefrom.”³¹¹ Further, the cement batching plant stores and handles “stone, gravel, and sand.”³¹²

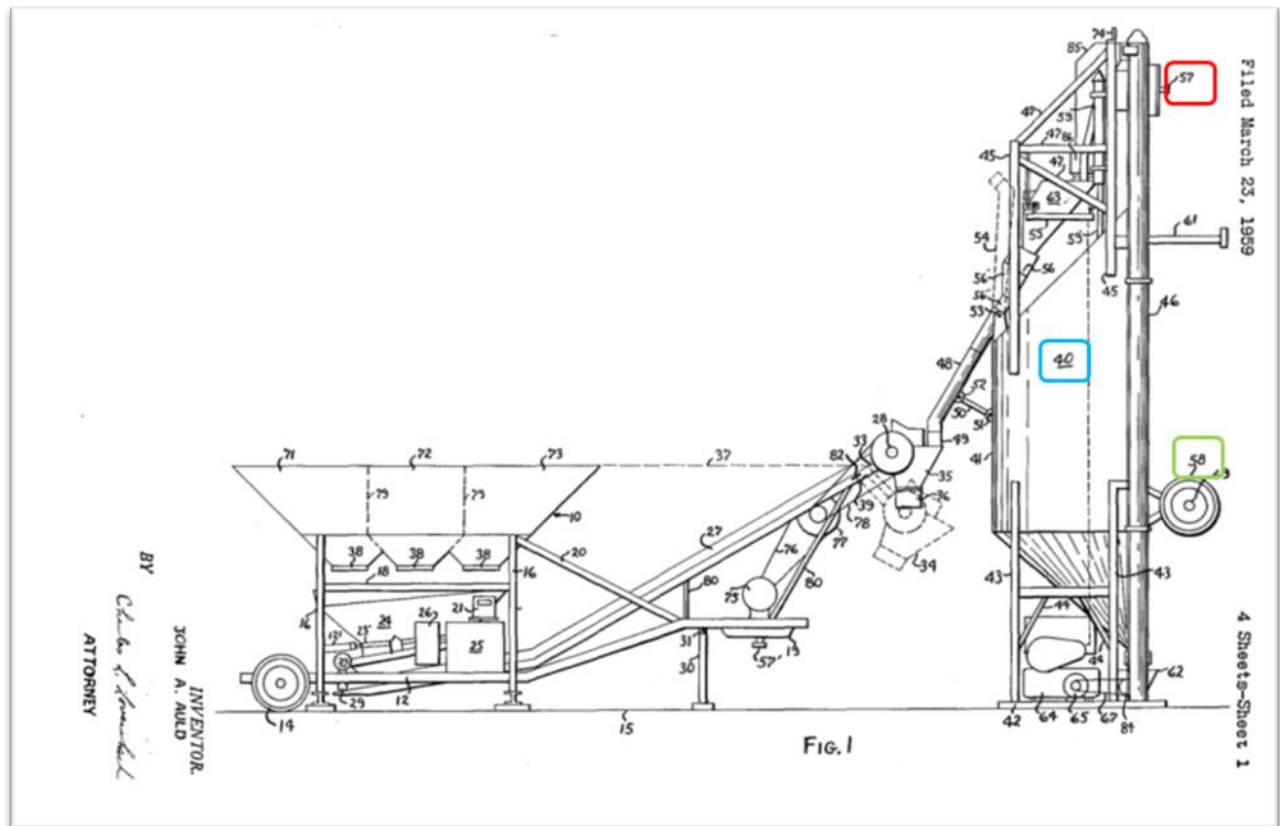
329. *Auld* describes a “A king pin 57 [annotated in red] is welded to a fifth wheel which is in turn attached to the cement batching plant 40 [annotated in blue] and road engaging wheels 58 [annotated in green] are supported on an axle 69 which is in turn welded to the cement silo 41.”³¹³

³¹⁰ Ex. 1009 14-19.

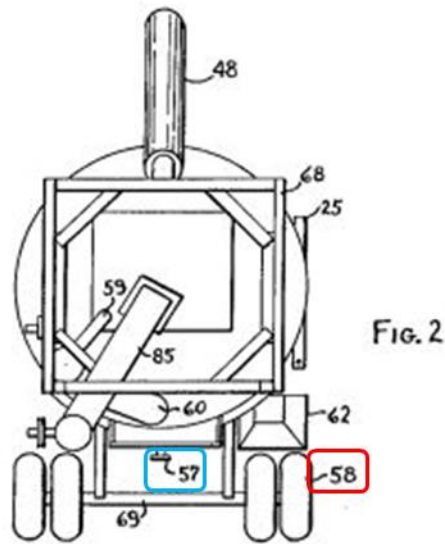
³¹¹ Ex. 1009 1:70-73.

³¹² Ex. 1009 1:45-46. See also 4:2-18.

³¹³ Ex. 1009, 4:65 – 67.



330. Although Fig. 1 shows the cement batching plant in the vertical operating position, a POSITA would have easily seen that the cement batching plant would be rotated 90 degrees clockwise to be in the “road” position, placing the wheels 58 (annotated in red) in contact with the earth. In this position, king pin 57 (annotated in blue) would be adjacent to the earth.



Ex. 1009, Fig. 2.

331. *Auld* describes that the king pin 57 “[attaches] ... to a tractor of the type generally used for pulling trailers along a road for transportation.”³¹⁴ A POSITA would have understood that, like *Waldner’s* bucket elevator 50, *Auld’s* cement silo 41 is raised and lowered between horizontal and vertical positions. It would have been obvious for a POSITA to use the king pin 57 of *Auld* with the modified system of *Waldner* and *Dynatek* or to modify the hitch coupler 22 of *Waldner* with the location of the king pin 57 of *Auld* to gain reduction in frame material and a reduction in overall length of the trailer. A POSITA would have also recognized that the same vehicle could be used for transport of the modified *Waldner/Dynatek/Auld* trailer by

³¹⁴ Ex. 10093:20-25

simply replacing the ball of a gooseneck connection with the fifth wheel of the kingpin connection. This would have resulted in a distribution of load more evenly across the bed of the transport vehicle (truck). *Id.* Thus, *Waldner* in view of *Dynatek* and *Auld*, renders Claim 3 obvious. *Id.*

b. Independent Claim 12

332. It is my opinion that the combination of *Waldner*, *Dynatek* and *Auld* discloses and/or suggests each and every limitation of Claim 12, and a POSITA would have found Claim 12 to be obvious based on the combined teachings of *Waldner*, *Dynatek* and *Auld*.

i. Limitation 12[p]: “An aggregate transferring apparatus for elevating and transferring aggregate, the apparatus comprising:”

333. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[p] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 12[p] obvious. See Section X.B.a.i.

ii. Limitation 12[a]: “a base assembly for receiving aggregate to be conveyed by the transferring apparatus, the base assembly comprising:”

334. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders

Limitation 12[a] obvious. Accordingly, the combination of Waldner, Dynatek and *Auld* renders Limitation 12[a] obvious. See Section X.B.a.ii.

iii. Limitation 12[b]: “a base frame being elongated along a longitudinal axis and having a leading end and a trailing end;”

335. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[b] obvious. Accordingly, the combination of Waldner, Dynatek and *Auld* renders Limitation 12[b] obvious. See Section X.B.a.iii.

iv. Limitation 12[c]: “an unloader structure mounted on the base frame to receive aggregate from a vehicle at least partially positioned over the base frame; and”

336. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[c] obvious. Accordingly, the combination of Waldner, Dynatek and *Auld* renders Limitation 12[c] obvious. See Section X.B.a.iv.

v. Limitation 12[d]: “a base conveyor mounted on the base frame and extending along a longitudinal portion of the base frame between the leading and trailing ends of the base frame, a portion of the base conveyor being positioned adjacent to the unloader structure to receive aggregate from the vehicle positioned over the base frame;”

337. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders

Limitation 12[d] obvious. Accordingly, the combination of Waldner, Dynatek and *Auld* renders Limitation 12[d] obvious. See Section X.B.a.v.

vi. Limitation 12[e]: “an aggregate elevating assembly for elevating aggregate from the base assembly, the aggregate elevating assembly comprising:”

338. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[e] obvious. Accordingly, the combination of Waldner, Dynatek and *Auld* renders Limitation 12[e] obvious. See Section X.B.a.vi.

vii. Limitation 12[f]: “a deployable frame mounted on the base frame and being movable between a storage position and a deploy position, the storage position corresponding to a transport configuration of the apparatus and the deploy position corresponding to an operational configuration of the apparatus, the deployable frame being elongated with a base end and a free end; and”

339. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[f] obvious. Accordingly, the combination of Waldner, Dynatek and *Auld* renders Limitation 12[f] obvious. See Section X.B.a.vii.

- viii. Limitation 12[g]: “an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward the free end of the deployable frame; and”**

340. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[g] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 12[g] obvious. See Section X.B.a.viii.

- ix. Limitation 12[h]: “a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:”**

341. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[g] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 12[g] obvious. See Section X.B.a.ix.

- x. **Limitation 12[i]: “an extension conveyor for moving aggregate from an inlet of the extension conveyor to an outlet of the extension conveyor at a location outward from the aggregate elevating assembly, the extension conveyor being movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus, the lowered position being characterized by the extension conveyor being positioned adjacent to the deployable frame of the aggregate elevating assembly, the raised position being characterized by the extension conveyor being positioned generally away from the deployable frame of the aggregate elevating assembly,”**

342. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[i] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 12[i] obvious. See Section X.B.a.x.

- xi. **Claim 12[j]: “wherein the extension conveyor is articulated between the inlet and outlet with an inboard segment and an outboard segment, the inboard segment being pivotally connected to the deployable frame of the aggregate elevating assembly by an inboard pivot, the outboard segment being pivotally connected to the inboard segment by an outboard pivot; and”**

343. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[j] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 12[j] obvious. See Section X.B.a.xi.

- xii. Limitation 12[k]: “wherein the base assembly has at least one axle and a pair of wheels mounted on the at least one axle such that the base assembly is transportable across the ground surface”**

344. As explained with respect to Ground 1, Claim 2 above, and incorporated herein by reference, the combination of *Waldner* and *Dynatek* renders Limitation 12[k] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 12[k] obvious. See Section X.B.b.

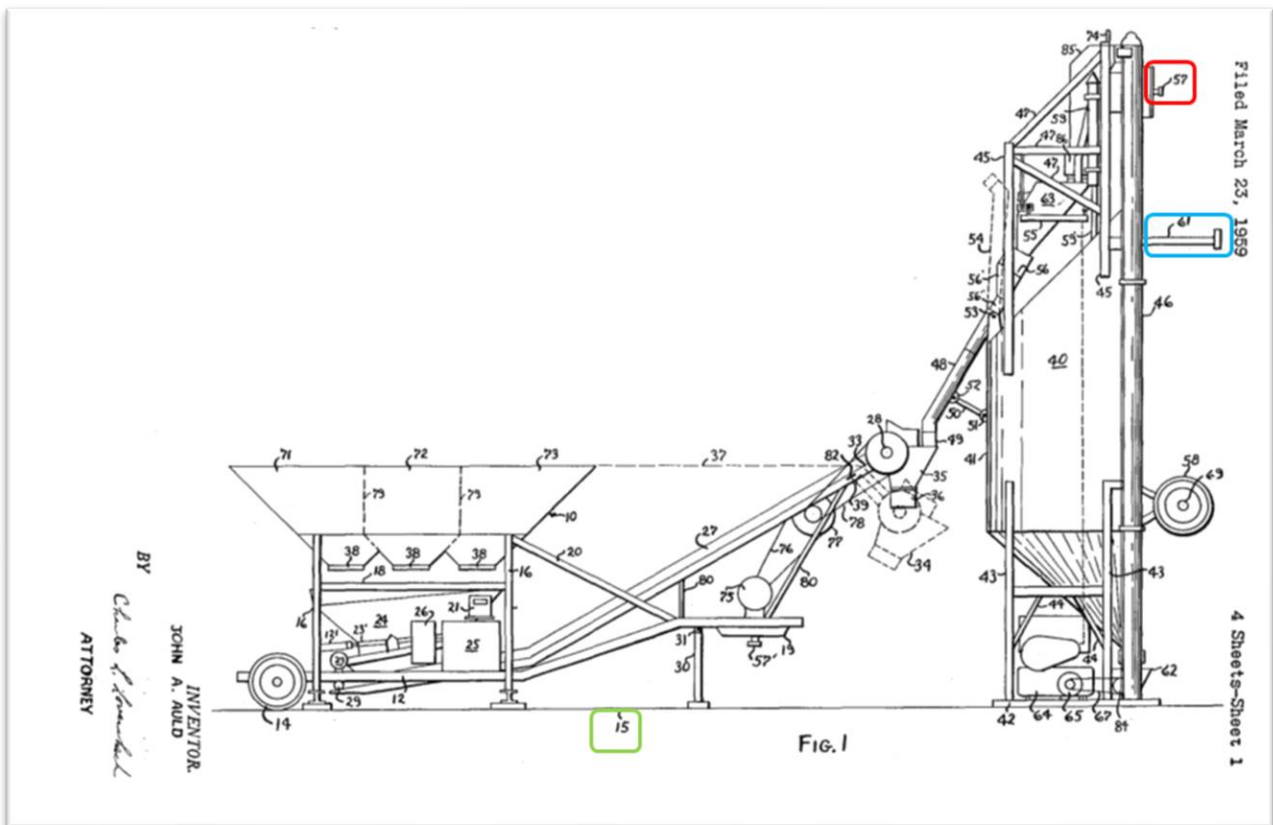
- xiii. Limitation 12[l]: “wherein the aggregate elevating assembly includes trailer structure configured to permit the apparatus to be towed across a ground surface, the trailer structure being positioned adjacent to the ground surface when the deployable frame is in the storage position;”**

345. As explained with respect to Ground 3, Claim 3 above, and incorporated herein by reference, The combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 12[l] obvious. See Section XIV.B.a.

- xiv. Limitation 12[m]: “wherein the trailer structure comprises: at least one landing leg mounted on the deployable frame to rest upon the ground surface when the deployable frame is in the storage position; and”**

346. *Auld* discloses a pivoted parking stand 61 [annotated in blue] is “swingably attached to the silo 41 and swingable outwardly ... to hold the silo 41 temporarily in [a] stored position when the truck is moved away from under the king

pin 57 [annotated in red].”³¹⁵ A POSITA would understand that the pivoted parking stand 61 rests on the grade line 15 [annotated in green], or the ground surface, to support the cement silo 41 in the stored position.



347. It would have been obvious for a POSITA to use the parking stand 61 of *Auld* with the modified system of *Waldner* and *Dynatek* to stabilize *Waldner*'s trailer when disconnected from the towing truck. Thus, *Waldner* in view of *Dynatek*

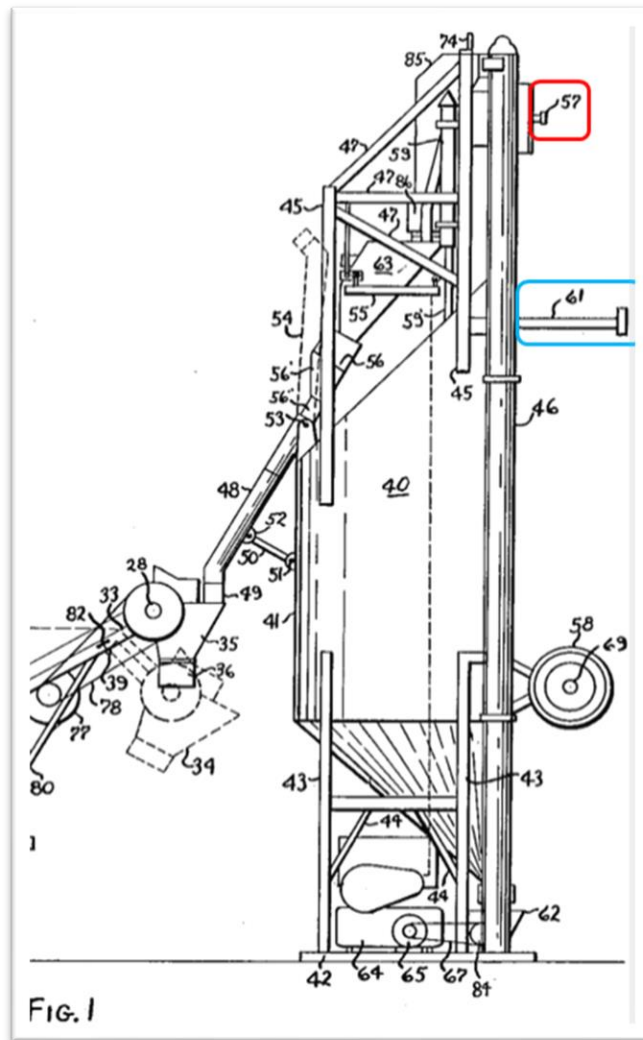
³¹⁵ Ex. 1009 4:74 – 5:3.

and *Auld*, either alone or in view of the knowledge of a POSITA, renders limitation 12[m] obvious.

- xv. **Limitation 12[n]: “a kingpin mounted on the deployable frame toward the free end of the deployable frame, the kingpin being directed in a same direction as the at least one landing leg to engage a hitch of a towing vehicle when the deployable frame is in the storage position.”**

348. *Auld* discloses that the king pin 57 is coupled to an upper end of the cement silo 41.³¹⁶ To better illustrate, a relevant portion of Fig. 1 of *Auld* is depicted below.

³¹⁶ Ex. 1009 6:47-52.



Ex. 1009, Fig. 1 (cropped, annotated)

349. As depicted above, the king pin 57 is directed in the same direction as the pivoted parking stand 61. It would have been obvious for a POSITA to use the king pin 57 of *Auld* with the modified system of *Waldner* and *Dynatek* or to modify the hitch coupler 22 of *Waldner* with the location of the king pin 57 of *Auld* to gain reduction in frame material and a reduction in overall length of the trailer. A POSITA would have also recognized that the same vehicle could be used for transport of the

modified *Waldner/Dynatek/Auld* trailer by simply replacing the ball of a gooseneck connection with the fifth wheel of the kingpin connection. This would have resulted in a distribution of load more evenly across the bed of the transport vehicle (truck). Additionally, it would have been obvious for a POSITA to use the parking stand 61 of *Auld* with the modified system of *Waldner* and *Dynatek* to stabilize *Waldner*'s trailer when disconnected from the towing truck. *Id.* Thus, *Waldner* in view of *Dynatek* and *Auld*, either alone or in view of the knowledge of a POSITA, teaches or discloses Claim 12[n].

- c. **Claim 21: “The apparatus of claim 18 wherein the aggregate elevating assembly includes trailer structure configured to permit the apparatus to be towed across a ground surface, the trailer structure being positioned adjacent to the ground surface when the deployable frame is in the storage position.”**

350. As explained with respect to Ground 3, Claim 3 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Claim 21 obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Claim 21 obvious. See Section XIV.B.a.

- d. **Independent Claim 25**

351. It is my opinion that the combination of *Waldner*, *Dynatek* and *Auld* discloses and/or suggests each and every limitation of Claim 25, and a POSITA

would have found Claim 25 to be obvious based on the combined teachings of *Waldner*, *Dynatek* and *Auld*.

i. Limitation 25[p]: “An aggregate transferring apparatus for elevating and transferring aggregate to elevated locations above a ground surface, the apparatus comprising:”

352. As explained with respect to Ground 1, Claim 18 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[p] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[p] obvious. See Section X.B.m.i.

ii. Limitation 25[a]: “a base assembly configured to receive aggregate to be conveyed by the transferring apparatus, the base assembly including:”

353. As explained with respect to ground 1, Claim 18 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[a] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[a] obvious. See Section X.B.m.ii.

iii. Limitation 25[b]: “an elongated base frame; and”

354. As explained with respect to Ground 1, Claim 18 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[b] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[b] obvious. See Section X.B.m.iii.

iv. Limitation 25[c]: “a base conveyor extending longitudinally of the base frame;”

355. As explained with respect to Ground 1, Claim 18 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[c] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[c] obvious. See Section X.B.m.iv.

v. Limitation 25[d]: “an aggregate elevating assembly configured to elevate aggregate from the base conveyor of the base assembly, the aggregate elevating assembly including;”

356. As explained with respect to Ground 1, Claim 18 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[d] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[d] obvious. See Section X.B.m.v.

vi. Limitation 25[e]: “a deployable frame mounted on the base frame and being movable between a storage position and a deploy position; and”

357. As explained with respect to Ground 1, Claim 18 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[e] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[e] obvious. See Section X.B.m.vi.

- vii. Limitation 25[f]: “an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward a free end of the deployable frame; and”**

358. As explained with respect to Ground 1, Claim 18 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[f] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[f] obvious. See Section X.B.m.vii.

- viii. Limitation 25[g]: “a conveyor extension assembly configured to convey aggregate to locations elevated from the ground surface and horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:”**

359. As explained with respect to Ground 1, Claim 18 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[g] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[g] obvious. See Section X.B.m.viii.

- ix. Limitation 25[h]: “an extension conveyor for moving aggregate from an inlet of the extension conveyor at the aggregate elevating assembly to an outlet of the extension conveyor at a location outward from the elevating assembly;”**

360. As explained with respect to Ground 1, Claim 18 above, and incorporated herein by reference, *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[h] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[h] obvious. See Section X.B.m.ix.

- x. **Limitation 25[i]: “wherein the extension conveyor includes an inboard segment and an outboard segment, the inboard and outboard segments being articulated between the inlet and outlet such that the inboard and outboard segments are pivotable with respect to each other and with respect to the aggregate elevating assembly about substantially vertical axes to permit adjustment of a position of the outlet with respect to the aggregate elevating assembly;”**

361. As explained with respect to Ground 1, Claim 18 above, and incorporated herein by reference, the combination of *Waldner* in view of *Dynatek* renders the limitations of Limitation 25[i] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[i] obvious. See Section X.B.m.x.

- xi. **Limitation 25[j]: “wherein the aggregate elevating assembly includes trailer structure configured to permit the apparatus to be towed across a ground surface, the trailer structure being positioned adjacent to the ground surface when the deployable frame is in the storage position; and”**

362. As explained with respect to limitation 12[l] above, and incorporated herein by reference, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[j] obvious. See Section XIV.B.b.xiii.

- xii. **Limitation 25[k]: “wherein the trailer structure comprises: at least one landing leg mounted on the deployable frame to rest upon the ground surface when the deployable frame is in the storage position; and”**

363. As explained with respect to limitation 12[m] above, and incorporated herein by reference, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[k] obvious. See Section XIV.B.b.xiv.

- xiii. **Limitation 25[l]: “a kingpin mounted on the deployable frame toward a free end of the deployable frame, the kingpin being directed in a same direction as the at least one landing leg to engage a hitch of a towing vehicle when the deployable frame is in the storage position.”**

364. As explained with respect to limitation 12[n] above, and incorporated herein by reference, the combination of *Waldner*, *Dynatek* and *Auld* renders Limitation 25[l] obvious. See Section XIV.B.b.xv.

XV. GROUND 3A: CLAIMS 3, 12, 21, AND 25 ARE RENDERED OBVIOUS BY WALDNER IN VIEW OF DYNATEK, SLEEMAN, AND AULD

365. It is my opinion that *Waldner* in view of *Dynatek*, *Sleeman*, and *Auld* discloses and/or suggests all limitations of Claims 3, 12, 21, and 25, and thus renders those claims obvious.

A. REASONS TO COMBINE WALDNER, DYNATEK, SLEEMAN, AND AULD

366. As discussed above regarding Grounds 1 and 1A, a POSITA would have been motivated to combine *Waldner*, *Dynatek* and *Sleeman*. Further, as

discussed above regarding Ground 3, a POSITA would have been motivated to combine the teaches of *Waldner*, *Dynatek* and *Auld*. For the same reasons, a POSITA would have been motivated to combine the teachings of *Waldner*, *Dynatek*, *Sleeman* and *Auld*. The same motivations discussed above still apply, and there is nothing in any of the four references to teach against the combination.

B. DISCLOSURE OF WALDNER IN VIEW OF DYNATEK, SLEEMAN, AND AULD

a. Claims 3, 12, 21, and 25

367. As explained above, in Ground 3, and incorporated herein by reference, *Waldner* in view of *Dynatek*, and *Auld* renders Claims 3, 12, 21, and 25 obvious. Nothing in *Sleeman* teaches against the combination discussed in Ground 3. Accordingly, *Waldner* in view of *Dynatek*, *Sleeman*, and *Auld* renders Claims 3, 12, 21 and 25 obvious.

XVI. GROUND 4: CLAIMS 13-15 ARE RENDERED OBVIOUS BY WALDNER IN VIEW OF DYNATEK AND MCIVER

368. It is my opinion that *Waldner* in view of *Dynatek* and *McIver* discloses and/or suggests all limitations of Claims 13-15, and thus renders those claims obvious.

A. REASONS TO COMBINE WALDNER, DYNATEK, AND MCIVER

369. A POSITA would have been motivated to combine the teachings of *Waldner* and *Dynatek* for the same reasons as those discussed above in Ground 1

Section X.A. A POSITA would have been further motivated to combine the teachings of *McIver* with those of *Waldner* and *Dynatek* for similar reasons. Nothing in any of the three references teaches against such a combination.

370. *McIver* is analogous art to *Waldner* and *Dynatek* and to the '689 Patent. Like the '689 Patent, *Waldner*, and *Dynatek*, *McIver* is directed to transportable silo systems that receive and store material, such as sand or proppants, used in hydraulic fracturing.³¹⁷ Moreover, *McIver* discloses storing such materials in a vertically oriented silo with an inlet at an elevated location,³¹⁸ which would have been relevant to the problem that the '689 Patent purports to solve. In optimizing the design of *Waldner*, a POSITA would have considered *McIver*'s similar system and its different features that may have certain advantages.

371. In addition to looking at the teachings of *Waldner*, a POSITA would have been motivated to look to the teachings of *McIver* when finding solutions to handle particulate matter (e.g. proppant) at an oil and gas site because *McIver* teaches handling proppant at fracturing sites. *McIver* teaches "The large amount of water and proppant required in a fracking operation at a well site requires that these

³¹⁷ Ex. 1011, 1:13-18, 1:64-67

³¹⁸ Ex. 1011 1:64 – 67, 5:11 – 13.

materials be stored close to the well site so that they may be used as needed.”³¹⁹ *McIver* teaches the “granular material” is proppant “such as grains of sand, ceramic, or other particulates, that prevents the fractures from closing when the injection is stopped.”³²⁰ Both *Waldner* and *McIver* teach portable systems for use in oil and gas fracturing operations that have a self-erecting mechanism. *Waldner* discloses its “system is convertible between an expanded ready for-use operational state, and a collapsed ready-for-travel transport state.”³²¹ Further, *Waldner* teaches “Preferably there are respective conveyor repositioning mechanisms for the main and feeder conveyors, by which the main conveyor is movable between the storage and operational positions.”³²² *Waldner* teaches the use of various hydraulic actuators and a control system for erecting the assembly.³²³ *McIver* discloses “self-erecting silo storage systems for use in the oil and natural gas mining and drilling industries.”³²⁴ Accordingly, *Waldner* and *McIver* are in the same field of endeavor: material

³¹⁹ Ex. 1011 1:64 - 67.

³²⁰ Ex. 1011 1:52-54.

³²¹ Ex. 1004 12:2-4.

³²² Ex. 1004 4:57-60.

³²³ See Ex. 1004 generally.

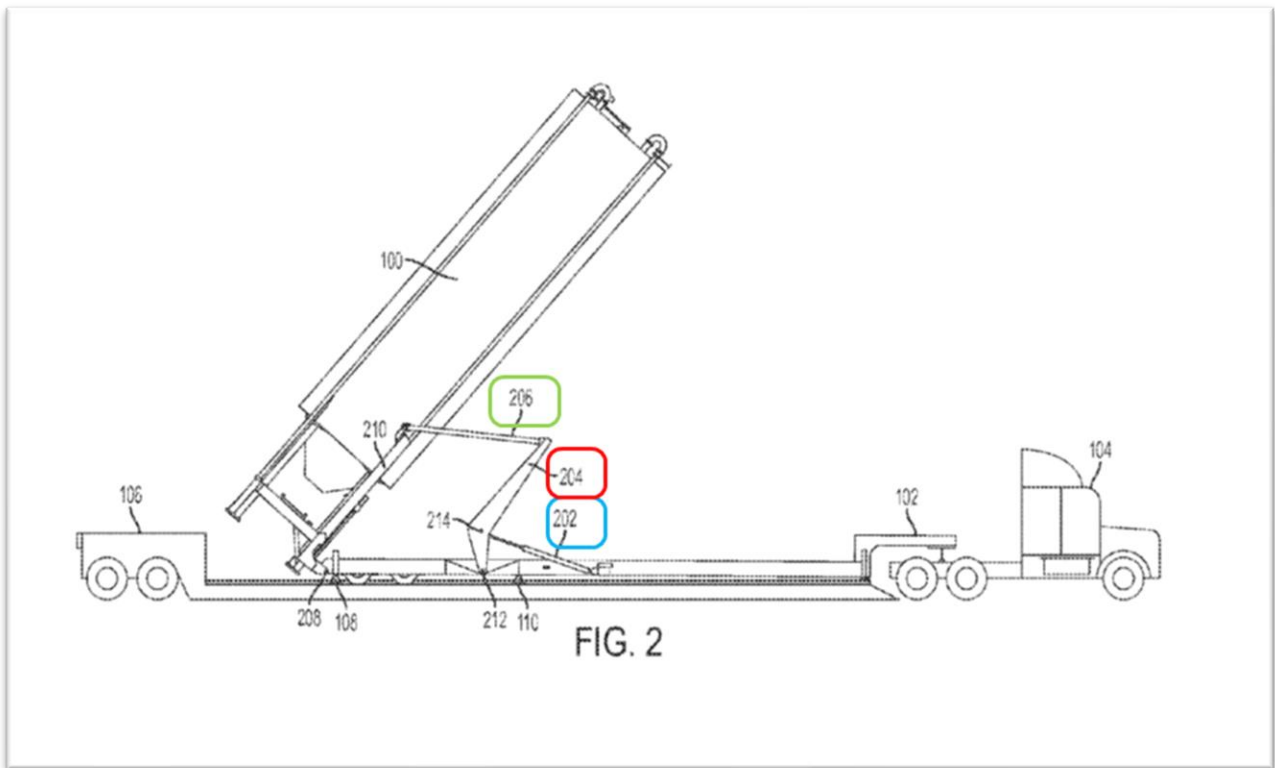
³²⁴ Ex. 1011 5:21-23.

handling systems for aggregate/material in oil/gas applications. Further, *Waldner* and *McIver* each teach different approaches, each with its advantages and disadvantages, to solving the same problem: erecting proppant handling equipment from a stored position on a trailer to a vertical operational position.

372. A POSITA would be motivated to combine the teachings of *McIver* with those of *Waldner* and *Dynatek* both because of their similarities and because of the advantages taught by *McIver*. *Waldner* discloses single actuating hydraulic cylinders 116 used to raise the bucket elevator 50 relative to the trailer frame 10 in order to move the assembly from a “stored” to an “operational” configuration.³²⁵ *McIver* teaches “The silo 100 may be raised to a vertical position (or lowered to a horizontal position) by activating the actuator 202 [annotated in blue] such that the rocker arm 204 [annotated in red] and arm 206 [annotated in green] rotate the flipper mechanism 210 from a horizontal to a vertical position”.³²⁶

³²⁵ .” Ex. 1004, 15:22-24; see also 19:25-62.

³²⁶ Ex. 1011 9:6-10



373. A POSITA would have recognized that the rocker arm mechanism of *McIver* would increase range of motion of the system without extending the length of the cylinder 202, and would increase compactness when in the folded / lowered configuration, and would have been motivated to include the rocker arm mechanism in the system of *Waldner/Dynatek* to take advantage of these benefits. This combination would be substituting one known component (*McIver* actuator 202 and rocker arm 204) for another (hydraulic cylinders 116 coupled between trailer frame and bucket elevator of *Waldner*) to obtain predictable results (raising of the elevator to the vertical position). Alternatively, the combination would be simply modifying *Waldner* to include a rocker arm and/or another arm linkage to a hydraulic cylinder

to obtain predictable results. This is also using a known technique of a physical linkage being actuated by an actuator from *McIver* instead of solely a hydraulic cylinder in *Waldner* to increase compactness of folding/lowered configuration.

374. A POSITA would have had a reasonable expectation of success in the combination of *McIver* with the assembly of the *Waldner/Dynatek* combination. Both arrangements are relatively simple mechanical devices, used to apply a force and move a structure. There is no indication that *McIver's* rocker arm assembly would be difficult to use or incompatible with the *Waldner* system. *Waldner* already teaches a hydraulic cylinder as an actuator moving the bucket elevator relative to the trailer frame. The *McIver* rocker arm assembly adds pivotally connected arms between a hydraulic cylinder and the structure to be raised.

375. Although *McIver* applies this solution in a self-erecting silo, a POSITA would have recognized that similar types of lift arm systems have been used successfully in conveyor systems used to fill silos as well, at least because they would have seen and used both types of equipment at the same job sites.³²⁷

376. *Friesen* provides an exemplary teaching of using a lifting arm, similar to *McIver*, for deploying a conveyor system.³²⁸ Like *McIver*, *Friesen* is analogous

³²⁷ See, e.g., Ex. 1010 10:62 – 65.

³²⁸ Ex. 1010 10:62-65

art to *Waldner* and *Dynatek* and to the '689 Patent. *Friesen* is directed to portable conveyor systems that receive and convey particulate material such as sand, grain, fertilizer, and proppants used in hydraulic fracturing.³²⁹ Further, *Friesen* teaches that its system is “suited for transferring the particulate material into tall containment structures for which the material needs to be discharged at a sufficient height,” including a “bin [or] silo”³³⁰, which would have been relevant to the problem that the '689 Patent purports to solve.

377. As a POSITA would have recognized, *Friesen* and *Waldner* disclose systems with numerous similarities that are directed to solving similar problems. In optimizing the design of *Waldner*, a POSITA would have considered *Friesen*'s similar system and its different features that may have certain advantages. For example, *Waldner* discloses actuating hydraulic cylinders 116 to raise the bucket elevator 50 relative to the trailer frame 10 from a “stored” to an “operational” configuration.³³¹ *Friesen*'s apparatus uses “a hydraulically actuated scissor-style linkage 73” for a similar purpose.”³³² A POSITA would have recognized that

³²⁹ Ex. 1010 7:50-63, 14:34-42.

³³⁰ Ex. 1010 7:58-63

³³¹ Ex. 1004, 15:22-24; see also 19:25-62.

³³² Ex. 1010 10:62-65.

Friesen's scissor-style linkage 73 is more compact and has a longer range of motion than *Waldner*'s cylinders 116,^{333 334} and so similar structures could have been used in place of *Waldner*'s cylinders. Further, *Waldner*'s cylinders could have been modified to connect to an arm structure forming a linkage between the trailer frame and bucket elevator to provide those same advantages. This would have further motivated a POSITA to use the lifting arm structure as disclosed in silo system of *McIver* in the conveyor system of *Waldner* (as combined with *Dynatek* and optionally *Sleeman*) and to have a reasonable expectation of success in that combination.

B. DISCLOSURE OF WALDNER IN VIEW OF DYNATEK AND MCIVER

a. Independent Claim 13

i. Limitation 13[p]: “An aggregate transferring apparatus for elevating and transferring aggregate, the apparatus comprising:”

378. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[p] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[p] obvious. See Section X.B.a.i.

³³³ Ex. 1010 11:4-6.

³³⁴ See., e.g, Ex. 1010 Fig. 7.

ii. Limitation 13[a]: “a base assembly for receiving aggregate to be conveyed by the transferring apparatus, the base assembly comprising:”

379. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[a] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[a] obvious. See Section X.B.a.ii.

iii. Limitation 13[b]: “a base frame being elongated along a longitudinal axis and having a leading end and a trailing end;”

380. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[b] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[b] obvious. See Section X.B.a.iii.

iv. Limitation 13[c]: “an unloader structure mounted on the base frame to receive aggregate from a vehicle at least partially positioned over the base frame; and”

381. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[c] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[c] obvious. See Section X.B.a.iv.

- v. **Limitation 13[d]: “a base conveyor mounted on the base frame and extending along a longitudinal portion of the base frame between the leading and trailing ends of the base frame, a portion of the base conveyor being positioned adjacent to the unloader structure to receive aggregate from the vehicle positioned over the base frame;”**

382. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[d] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[d] obvious. See Section X.B.a.iv.

- vi. **Limitation 13[e]: “an aggregate elevating assembly for elevating aggregate from the base assembly, the aggregate elevating assembly comprising:”**

383. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[e] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[e] obvious. See Section X.B.a.vi.

- vii. **Limitation 13[f]: “a deployable frame mounted on the base frame and being movable between a storage position and a deploy position, the storage position corresponding to a transport configuration of the apparatus and the deploy position corresponding to an operational configuration of the apparatus, the deployable frame being elongated with a base end and a free end; and”**

384. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders

Limitation 13[f] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[f] obvious. See Section X.B.a.vii.

viii. Limitation 13[g]: “an elevating conveyor configured to receive aggregate from the base conveyor and convey the aggregate upwardly from the base assembly toward the free end of the deployable frame; and”

385. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[g] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[g] obvious. See Section X.B.a.viii.

ix. Limitation 13[h]: “a conveyor extension assembly for conveying aggregate to locations horizontally outward from the aggregate elevating assembly, the conveyor extension assembly comprising:”

386. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[h] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[h] obvious. See Section X.B.a.ix.

- x. **Limitation 13[i]: “an extension conveyor for moving aggregate from an inlet of the extension conveyor to an outlet of the extension conveyor at a location outward from the aggregate elevating assembly, the extension conveyor being movable with respect to the aggregate elevating assembly between a lowered position corresponding to the transport configuration of the apparatus and a raised position corresponding to the operational configuration of the apparatus, the lowered position being characterized by the extension conveyor being positioned adjacent to the deployable frame of the aggregate elevating assembly, the raised position being characterized by the extension conveyor being positioned generally away from the deployable frame of the aggregate elevating assembly,”**

387. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[i] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[i] obvious. See Section X.B.a.x.

- xi. **Limitation 13[j]: “wherein the extension conveyor is articulated between the inlet and outlet with an inboard segment and an outboard segment, the inboard segment being pivotally connected to the deployable frame of the aggregate elevating assembly by an inboard pivot, the outboard segment being pivotally connected to the inboard segment by an outboard pivot; and”**

388. As explained with respect to Ground 1, Claim 1 above, and incorporated herein by reference, The combination of *Waldner* and *Dynatek* renders Limitation 13[j] obvious. Accordingly, the combination of *Waldner*, *Dynatek* and *McIver* renders Limitation 13[j] obvious. See Section X.B.a.xi.

- xii. Limitation 13[k]: “wherein the aggregate elevating assembly includes a frame deployment assembly configured to move the deployable frame with respect to the base frame between the storage and deploy positions, the frame deployment structure comprising:”**

389. *Waldner* discloses one or more hydraulic cylinders 116 (annotated in red) used to raise the bucket elevator 50 (annotated in blue) relative to the trailer frame 10 in order to move the assembly from a “stored” to an “operational” configuration.³³⁵ The hydraulic cylinders are further operably coupled between the trailer frame and bucket elevator 50.³³⁶

³³⁵ Ex. 1004, 15:22-24; see also 19:25-62.

³³⁶ Ex. 1004, 15:22-24; see also 19:25-62.

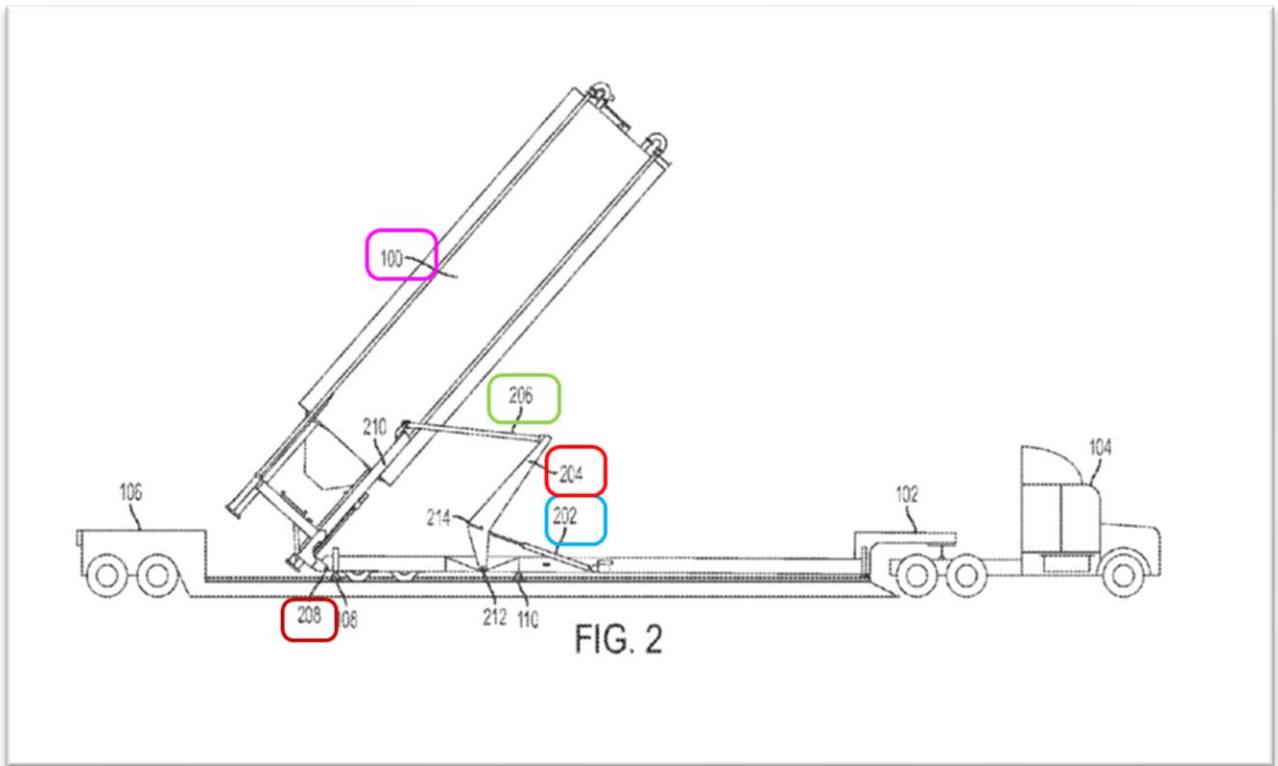


Ex. 1004, Fig. 15 (annotated)

390. As depicted above, the hydraulic cylinders 116 are configured to move the bucket elevator 50 relative to the trailer frame 10. To the extent Fig. 15 illustrates a different embodiment by *Waldner* of a mobile conveyor system, it would have been

obvious for a POSITA to use a combination of components from the different embodiments presented by *Waldner*.

391. *McIver* teaches “The silo 100 [annotated in magenta] may be raised to a vertical position (or lowered to a horizontal position) by activating the actuator 202 [annotated in blue] such that the rocker arm 204 [annotated in red] and arm 206 [annotated in green] rotate the flipper mechanism 210 from a horizontal to a vertical position”.³³⁷



Ex. 1011, Fig. 2 (annotated)

³³⁷ Ex. 1011 9:6-10

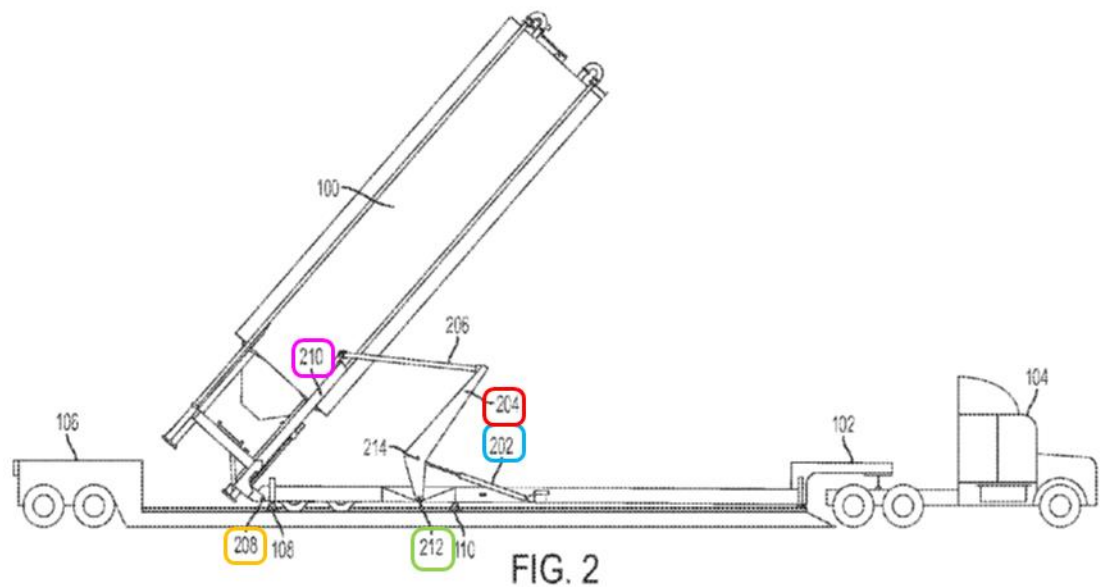
392. As shown, the rocker arm 204 is actuated by the actuator 202 to rotate and move the arm 206 to rotate the silo 100. It would have been obvious for a POSITA to collectively use the actuator 202, rocker arm 204, and arm 206 of *McIver* with the modified system of *Waldner* and *Dynatek*, *e.g.*, in place of *Waldner's* hydraulic cylinders. Further, a POSITA would have understood that the silo 100 is raised from a transportable, storage position to a deployable position. Thus, *Waldner* in view of *Dynatek* and *McIver* renders Claim 13[k] obvious.

xiii. Limitation 13[l]: “at least one lift arm structure mounted on the base frame and the deployable frame and forming a linkage between the base frame and the deployable frame, the at least one lift arm structure being articulated between opposite first and second ends of the arm structure; and”

393. *McIver* discloses the rocker arm 204 coupled to the trailer 102 at pin 212 and is indirectly coupled to the silo 100 through the arm 206 and the flipper mechanism 210.³³⁸ *McIver* discloses “an actuator 202 (which in certain embodiments may be a hydraulic cylinder or rod) [annotated in red] that is coupled to the trailer 102 and a rocker arm 204 [annotated in blue]. The rocker arm 204 is coupled to the trailer 102 at a pin 212 [annotated in green] which serves as a pivot point for the rocker arm 204 about which the rocker arm 204 can rotate. The rocker arm 204 is also coupled to an arm 206. Arm 206 is coupled to the flipper mechanism

³³⁸ Ex. 1011, 8:63-9:13

210 [annotated in magenta] which is in turn coupled to the silo 100. The flipper mechanism 210 is also coupled to the trailer 102 at pin 208 [annotated in orange]. Pin 208 serves as a pivot point for the flipper mechanism 210 about which the flipper mechanism 210 can rotate. The silo 100 may be raised to a vertical position (or lowered to a horizontal position) by activating the actuator 202 such that the rocker arm 204 and arm 206 rotate the flipper mechanism 210 from a horizontal to a vertical position (or conversely from a vertical to a horizontal position.) The base platform 106 provides stability to the silo 100 as well as the trailer 102 during and after deployment or retraction of the silo 100.”³³⁹



³³⁹ Ex. 1011 8:63-9:13

Ex. 1011, Fig. 2 (annotated).

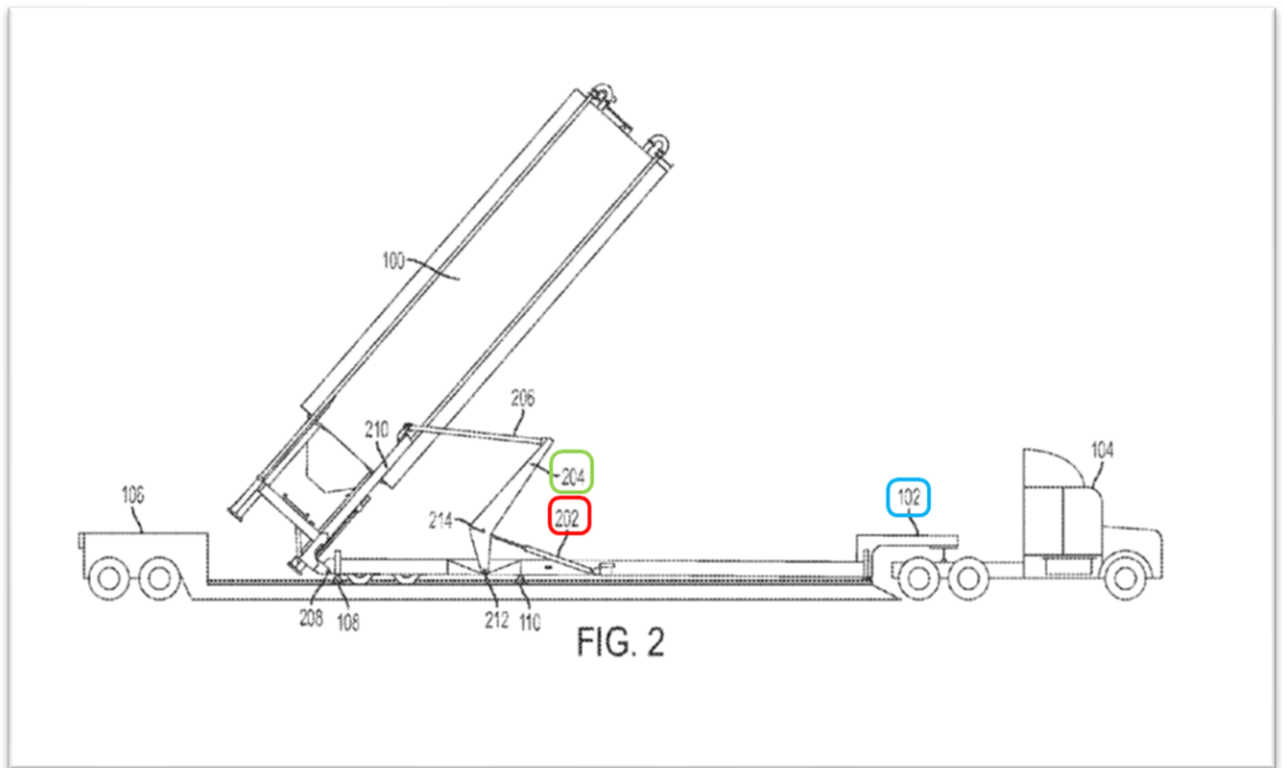
394. A POSITA would have understood that the rocker arm 204, arm 206, and flipper mechanism 210 form a linkage between the trailer 102 and the silo 100. *McIver* further discloses the actuator 202 being connected to and applying a force between the ends of the rocker arm 204 and that rocker arm is articulated between opposite first and second ends of the arm structure. It would have been obvious for a POSITA to use the rocker arm 204 of *McIver* with the system of *Waldner*, or to modify the hydraulic cylinders 116 of *Waldner* to connect to an arm structure, thereby increasing compactness when in the folded / lowered configuration. Thus, *Waldner* in view of *Dynatek* and *McIver* renders Claim 13[l] obvious.

xiv. Limitation 13[m]: “an actuator mounted on the base frame and the at least one lift arm structure to move the at least one lift arm structure with respect to the base frame.”

395. *McIver* discloses that the actuator 202 [annotated in red] “is coupled to the trailer 102 [annotated in blue] and a rocker arm 204 [annotated in green].”³⁴⁰ *McIver* further discloses “activating the actuator 202 such that the rocker arm 204 and arm 206 rotate.”³⁴¹

³⁴⁰ Ex. 1011, 8:63 - 65.

³⁴¹ Ex. 1011, 9:8 – 9.

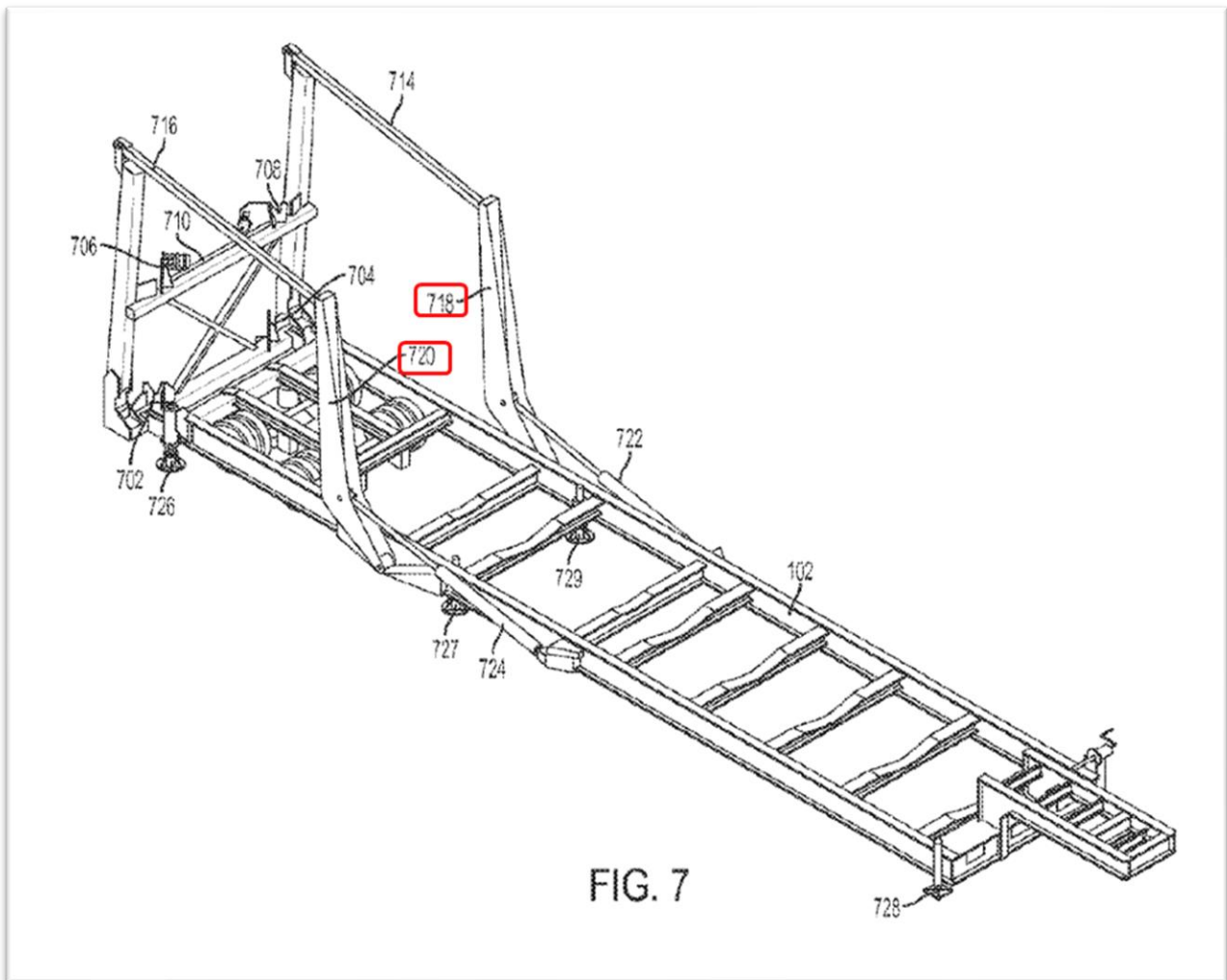


Ex. 1011, Fig. 2 (annotated).

396. A POSITA would have understood that the actuator 202 is used to move the rocker arm 204 relative to the trailer 102 (base frame). It would have been obvious for a POSITA to use actuator 202 of *McIver* with *Waldner's* system or to modify *Waldner's* hydraulic cylinders 116 to connect to an arm structure. Thus, *Waldner* in view of *Dynatek* and *McIver* renders Claim 13[m] obvious.

- b. **Claim 14: “The apparatus of claim 13 wherein the at least one lift arm structure comprising a pair of the lift arm structures mounted on the base frame and the deployable frame, the pair of lift arm structures being located on opposite lateral sides of the deployable frame.”**

397. *McIver* discloses a pair of rocker arms 718, 720 (annotated in red) disposed on opposite sides of the trailer 102.³⁴²



³⁴² Ex. 1011, 9:37-44, Fig. 7

398. Similar to the arrangement discussed above regarding Claim 13, a POSITA would have understood that the rocker arms 718, 720 are indirectly coupled to the silo 100 through the respective arms 714, 716 and flipper mechanism 710. Further, a POSITA would have understood that the rocker arms 718, 720 are in-line with opposing edges of a side of the silo 100. It would have been obvious for a POSITA to use the pair of rocker arms 718, 720 of *McIver* with the system of *Waldner*, or to modify the hydraulic cylinders 116 of *Waldner* to connect to a pair of lift arm structures in order to increase compactness when in the folded / lowered configuration, Thus, *Waldner* in view of *Dynatek* and *McIver* renders Claim 14 obvious.

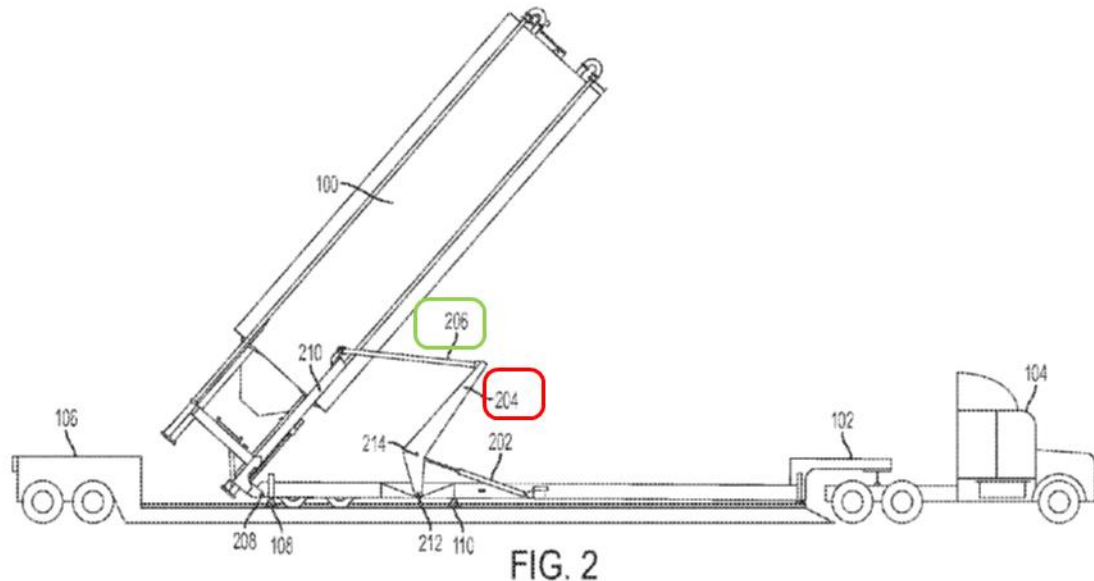
c. **Claim 15**

i. **Limitation 15[a]: “The apparatus of claim 13 wherein the at least one lift arm structure comprises a first link member and a second link member pivotally mounted together; and”**

399. As discussed above regarding Claim 13, *McIver* discloses a rocker arm 204 [annotated in red] pivotally connected to an arm 206 [annotated in green].³⁴³ It would have been obvious for a POSITA to use the rocker arm 204 and arm 206 of *McIver* with the system of *Waldner*, or to modify the hydraulic cylinders 116 of *Waldner* to connect to a first link member and second link member in order to

³⁴³ Ex. 1011, 8:63-9:13.

increase compactness when in the folded / lowered configuration, Thus, *Waldner* in view of *Dynatek* and renders Limitation 15[a] obvious.



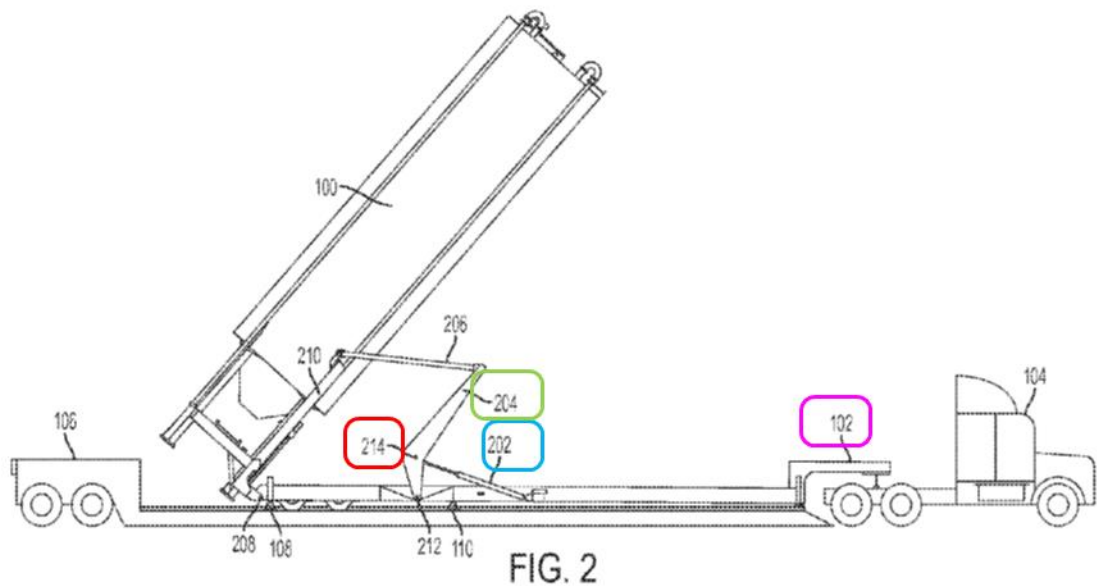
Ex. 1011, Fig. 2 (annotated).

- ii. **Limitation 15[b]: “wherein the actuator of the frame deployment assembly is mounted on a base mount point on the base frame and a medial mount point on the second link member.”**

400. *McIver* discloses that the actuator 202 “is coupled to the trailer 102 [annotated in magenta],” at a location a POSITA would have understood as a base mount point.³⁴⁴ *McIver* further discloses that the actuator 202 (annotated in blue) is

³⁴⁴ Ex. 1011, 8:63-65,

coupled to the rocker arm 204 (annotated in green) at pin 214 (annotated in red), which is located between the ends of the rocker arm 204 and a POSITA would have understood as a medial mounting point.



Ex. 1011, Fig. 2 (annotated)

401. Thus, *Waldner* in view of *Dynatek* and *McIver* and renders limitation 15[b] obvious.

**XVII. GROUND 4A: CLAIMS 13-15 ARE RENDERED OBVIOUS BY
WALDNER IN VIEW OF DYNATEK, SLEEMAN, AND MCIVER**

402. It is my opinion that *Waldner* in view of *Dynatek*, *Sleeman*, and *McIver* discloses and/or suggests all limitations of Claims 13-15, and thus renders those claims obvious.

**A. REASONS TO COMBINE WALDNER, DYNATEK, SLEEMAN, AND
MCIVER**

403. As discussed above regarding Grounds 1 and 1A, a POSITA would have been motivated to combine *Waldner*, *Dynatek* and *Sleeman*. Further, as discussed above regarding Ground 4 a POSITA would have been motivated to combine the teaches of *Waldner*, *Dynatek* and *McIver*. For the same reasons, a POSITA would have been motivated to combine the teachings of *Waldner*, *Dynatek*, *Sleeman* and *McIver*. The same motivations discuss above still apply, and there is nothing in any of the four references to teach against the combination.

**B. DISCLOSURE OF WALDNER IN VIEW OF DYNATEK, SLEEMAN,
AND MCIVER**

a. Claims 13-15

404. As explained above in Ground 4, and incorporated herein by reference, *Waldner* in view of *Dynatek*, *Sleeman*, and *McIver* renders Claims 13-15 obvious. Nothing in *Sleeman* teaches against the combination discussed in Ground 4. Accordingly, *Waldner* in view of *Dynatek*, *Sleeman*, and *McIver* renders Claims 13-15 obvious.

XVIII. SECONDARY CONSIDERATIONS

405. Should the Patent Owner put forth any alleged evidence of secondary considerations in this proceeding or the related litigation, I reserve the right to consider such evidence, to consider whether any such evidence has a nexus to any claims of the Challenged Patent, and to update my analysis.

XIX. CONCLUSION

406. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. I further understand that willful false statements and the like are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code. I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 19, 2024.



Dr. Robert A. Durham