

**UNITED STATES PATENT AND TRADEMARK OFFICE**

---

**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

---

Kubota North America Corporation,  
Petitioner

---

**IPR2025-00381**  
**U.S. Patent No. 11,465,891**

**DECLARATION OF STEVEN ALAN VELINSKY, PHD, PE**  
**UNDER 37 C.F.R. § 1.68 IN SUPPORT OF PETITION FOR**  
***INTER PARTES* REVIEW**

---

**TABLE OF CONTENTS**

|       |                                                        |    |
|-------|--------------------------------------------------------|----|
| I.    | Introduction.....                                      | 4  |
| II.   | Qualifications and Professional Experience.....        | 7  |
| III.  | Level of Ordinary Skill in the Art .....               | 11 |
| IV.   | Relevant Legal Standards .....                         | 12 |
| V.    | Background Technology.....                             | 15 |
| VI.   | Overview of the '891 Patent.....                       | 26 |
| VII.  | Prosecution history of the '891 Patent.....            | 29 |
| VIII. | Effective priority date of the '891 patent .....       | 34 |
| IX.   | Claim construction.....                                | 34 |
| X.    | Identification of how the claims are unpatentable..... | 34 |
| A.    | Challenged Claims .....                                | 34 |
| B.    | Statutory grounds for challenges.....                  | 35 |
| C.    | Grounds 1 and 2 : KR996.....                           | 35 |
| 1.    | KR996 (EX1005) .....                                   | 35 |
| 2.    | Claim 1 .....                                          | 37 |
| 3.    | Claim 2 .....                                          | 69 |
| 4.    | Claim 3 .....                                          | 72 |
| 5.    | Claim 4 .....                                          | 74 |
| 6.    | Claim 5 .....                                          | 76 |
| 7.    | Claim 6 .....                                          | 79 |

---

|     |                                                        |    |
|-----|--------------------------------------------------------|----|
| 8.  | Claim 7 .....                                          | 79 |
| 9.  | Claim 8 .....                                          | 82 |
| 10. | Claim 10 .....                                         | 84 |
| D.  | Ground 3 : KR996 and Bares .....                       | 85 |
| 1.  | Bares (EX1010).....                                    | 85 |
| 2.  | Reasons to Combine KR996 and Bares (KR996-Bares) ..... | 86 |
| 3.  | Claim 9 .....                                          | 89 |
| E.  | Ground 4 : KR996 and SAE.....                          | 94 |
| 1.  | KR996 (EX1005) .....                                   | 94 |
| 2.  | SAE (EX1015) .....                                     | 94 |
| 3.  | Reasons to Combine KR996 and SAE.....                  | 95 |
| 4.  | Claim 8 .....                                          | 97 |
| XI. | Conclusion .....                                       | 99 |

I, Steven Velinsky, do hereby declare as follows:

**I. INTRODUCTION**

1. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters stated herein.

2. I have been asked by Kubota North America Corporation (“Kubota”) to provide my expert opinion connection with the *Inter Partes* Review of U.S. Patent No. **11,465,891** (“’891 Patent”) concerning whether the ’891 Patent is unpatentable over certain prior art. This declaration is a statement of my opinions on issues relating to the patentability of Claims 1-10, which are all claims of the ’891 Patent (“the Challenged Claims”). As I explain more fully below, it is my opinion that all the Challenged Claims are taught by the described references and/or would have been obvious to a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention.

3. I am being compensated for my work in this matter at my standard hourly rate. I am also being reimbursed for reasonable and customary expenses associated with my work and testimony in this investigation. My compensation is not contingent on the outcome of this matter or the specifics of my testimony. I have no other financial interest in this proceeding.

4. I have reviewed and considered the following documents in

---

connection with my analysis of the '891 Patent:

- a) U.S. Patent No. **11,465,891** (the '891 Patent) (EX1001);
- b) relevant portions of the prosecution history of the '891 Patent (“’891 File History”) (EX1002)
- c) KR 10-1041996 (“KR996”) listing inventor Jo Bunggu (EX1005) stemming from Korean Application 10-2009-0033050, which was published as 10-1041996 on June 16, 2011;
- d) U.S. Patent No. 6,832,659 (“Bares”) (EX1010), filed October 30, 2002 and issued December 21, 2004.

**5.** In forming the opinions expressed below, I have considered:

- a) the documents listed above;
- b) the relevant legal standards, including the standard for obviousness, and any additional authoritative documents as cited in the body of this declaration; and
- c) my own knowledge and experience based upon my work in the field of mechanical engineering and earth-moving equipment as described below, as well as the following materials including:

|        |                                          |
|--------|------------------------------------------|
| EX1006 | JP 2004 017705 (“JP705”)                 |
| EX1007 | U.S. Patent No. 6,397,967 (“McIlwraith”) |

---

|        |                                                                                                                                        |
|--------|----------------------------------------------------------------------------------------------------------------------------------------|
| EX1008 | U.S. Patent No. 3,586,195 (“Beltrami”)                                                                                                 |
| EX1009 | U.S. Patent No. 6,695,568 (“Bares ’568”)                                                                                               |
| EX1012 | U.S. Patent No. 6,474,933 (“Hoechst”)                                                                                                  |
| EX1013 | U.S. Patent Application Publication No. 2008/0197588 to Azure (“Azure”)                                                                |
| EX1014 | Korean Patent No. 10-1023528 including original Korean language document, certified translation, and certification                     |
| EX1015 | SAE International J2752 JUN2010 (“SAE J2752”), Surface Vehicle Recommended Practice, Personal Protection – Compact Tool Carriers       |
| EX1016 | International Organization for Standardization (ISO) 6165 (2012)                                                                       |
| EX1022 | U.S. Patent No. 8,545,163 (“Yasuda”)                                                                                                   |
| EX1023 | N. Sclater, et al., Mechanisms and Mechanical Devices Sourcebook, Fourth Edition, Table of Contents, Chapter 1, Chapter 5              |
| EX1024 | N. Nariman-Zadeh, et al., “Pareto optimal synthesis of four-bar mechanisms for path generation,” 26 March 2008                         |
| EX1025 | Four-Bar Coupler-Point Curves, Chapter 6                                                                                               |
| EX1026 | H Nolle, Linkage Coupler Curve Synthesis: A Historical Review – II. Developments after 1875*, 7 July 1973                              |
| EX1027 | Wen-Tzong Lee, et al., “Developments in quantitative dimensional synthesis (1970-present): four-bar path and function generation” 2017 |
| EX1028 | Theory of Machines and Mechanisms, Shigley, J.E. and Uicker, J.J. Jr., McGraw Hill, 1980, Table of Contents, Chapter 1                 |
| EX1032 | U.S. Patent Publication Appl. 2010/0168933 (“Rorabaugh”)                                                                               |

6. Unless otherwise noted, all emphasis in any quoted material has been

added.

## **II. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE**

7. My Curriculum Vitae (CV) is attached as EX1036. This exhibit also includes a list of my publications.

8. I earned a Ph.D. in Theoretical & Applied Mechanics from the University of Illinois at Urbana-Champaign in 1981. I earned a Bachelor of Science degree in Mechanical Engineering, State University of New York at Buffalo in 1977, and a Master of Science degree, also in Mechanical Engineering from University of Illinois at Urbana-Champaign, in 1979. After finishing my Ph.D. degree, I worked as an engineer for approximately two years in a government laboratory and in industry. I am also a Registered Professional Engineer, State of California.

9. Since 1989, I have been Faculty Member (Associate Professor, Professor, Distinguished Professor, Distinguished Professor Emeritus) in the Department of Mechanical & Aerospace Engineering, University of California, Davis. Prior to UC Davis, I was a Faculty Member in the Department of Mechanical Engineering at the University of Wisconsin-Madison.

10. I was the Director of the Advanced Highway Maintenance & Construction Technology Research Center of Department of Mechanical &

Aerospace Engineering, at University of California, Davis from September 1991 to September 2016. In this research center, we applied advanced automation and mechatronics technologies to the design and development of automated highway maintenance and construction machines. These machines have been developed to address a wide variety of highway tasks including, for example, the dispensing and retrieval of highway cones, sealing of pavement cracks, collection of roadway debris, landscape maintenance, graffiti removal and plowing of snow, and involve the use of mechanisms to allow the tasks to be performed. Our typical projects involved detailed design, fabrication of the prototype equipment and qualification testing of the machines in actual highway operations.

**11.** I have received numerous awards and honors for my work in mechanical engineering. My recognition for the design of specific machines includes: the 1996 American Society of Mechanical Engineers' Leonardo DaVinci award, the 2001 California Transportation Foundation's Tranny Award, the 2001 California State Department of Transportation's Excellence in Transportation Award, and the 2002 California Transportation Foundation's Tranny Award. Additional awards, honors and professional activities include: Fellow of the American Society of Mechanical Engineers (ASME), 2007 American Society of Mechanical Engineers' Machine Design Award for lifetime contributions to the

mechanical design field, 2005 American Society of Mechanical Engineers' Robert E. Abbott Award for contributions to design engineering, Technical Editor of the international journal *Mechanics Based Design of Structures and Machines*, Chair of the Design Engineering Division of the American Society of Mechanical Engineers, and Vice President – Systems and Design of the American Society of Mechanical Engineers. I have also received the Society of Automotive Engineers' Ralph R. Teetor Award.

**12.** My areas of specialization are in the general area of mechanical systems analysis and design, and I have extensive experience in the design and development of devices and machinery for various applications including, but not limited to, vehicles, robots, and vehicle-based automated equipment. Moreover, I have been involved in the detailed analysis of many machines, machine elements, and mechanisms including, but not limited to, the ball screw mechanism, roller screw mechanism, and differential and planar mechanisms.

**13.** I taught courses in mechanical engineering in the general area of mechanical systems analysis and design at both the undergraduate and graduate levels. For example, I taught a course on design and dynamics of machinery, which primarily involved the design and analysis of mechanisms. At the graduate level, I developed courses in advanced mechanical design and on the design and dynamics

of road vehicles, both of which taught methods of mechanism analysis. I also taught the capstone mechanical engineering senior design project course for about 20 years and have thus advised well over 100 senior design projects, virtually all of which have involved the design and analysis of mechanisms.

**14.** I regularly advised students on research projects in my area of expertise. In this role, I regularly served as an advisor to Ph.D. and master's degree candidates, and postdoctoral researchers. I have also advised student groups involved in the design of vehicles for various Society of Automotive Engineers' competitions.

**15.** I note that the term "skid steer" means that the equipment or device changes direction by propelling the opposite sides of the machine at different rates, as opposed to actively turning the wheels for example. Another term for "skid steer" is "differential steer." I have expertise on these types of devices as my initial work on differentially steered, wheeled devices started in the early 1990's when we began developing differentially steered wheeled mobile robots for use in highway maintenance tasks.

**16.** I have also published extensively in the field of mechanical systems design and analysis including those articles listed in EX1036.

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

17. I understand there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems.

18. I understand that the '891 Patent claims priority to February 20, 2015. My analysis reflects the views of a person of ordinary skill in the art ("POSITA") in the field of the '891 Patent as of February, 2015.

19. Here, a POSITA at the time of the claimed invention in February 2015 would have had a Bachelor of Science degree in Mechanical or Agricultural Engineering and two years of experience in the mechanical design of machines, or have had equivalent knowledge and experience. Lack of professional experience can be remedied by additional education, and vice versa. A person with less formal education but more experience, or more formal education but less experience, could have also met the relevant standard for POSITA. For purposes of this Declaration, in general, and unless otherwise noted, my statements and opinions, such as those regarding my experience and the understanding of a POSITA generally (and specifically related to the references I consulted herein), reflect the

knowledge that existed in the field as of the earliest proper priority date of the '891 Patent (*i.e.*, February 2015). Unless otherwise stated, when I provide my understanding and analysis below, it is consistent with the level of a POSITA prior to the earliest alleged priority date of the '891 Patent.

**20.** I met the definition of a POSITA in February 2015. I also had a greater knowledge and experience than a POSITA. In my work discussed above, including as a professor, I worked with graduate students and others who had the knowledge and experience of a POSITA in February 2015, and I am able to render opinions from the perspective of a POSITA based on my knowledge and experience.

#### **IV. RELEVANT LEGAL STANDARDS**

**21.** I am not an attorney. In preparing and expressing my opinions and considering the subject matter of the '891 Patent, I am relying on certain basic legal principles that counsel have explained to me. These principles are discussed below.

**22.** I understand that prior art to the '891 Patent includes patents and printed publications in the relevant art that predate the proper priority date of the alleged invention recited in the '891 Patent.

**23.** I have been informed by counsel that a patent claim is unpatentable as

anticipated under 35 U.S.C. § 102 if each element of that claim is present either explicitly or inherently in a single prior art reference. I have also been informed that, to be an inherent disclosure, the prior art reference must necessarily disclose the limitation, and the fact that the reference might possibly practice or contain a claimed limitation is insufficient to establish that the reference inherently teaches the limitation

**24.** I have been informed that a claimed invention is unpatentable under 35 U.S.C. § 103 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 person having ordinary skill in the art to which the subject matter pertains. I have also been informed by counsel that the obviousness analysis takes into account factual inquiries including the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter.

**25.** I have been informed by counsel that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include the following: (a) combining prior art elements according to known methods to yield predictable results; (b) simple substitution of one known element for another to

obtain predictable results; (c) use of a known technique to improve a similar device (method, or product) in the same way; (d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (e) choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and (f) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

26. I further understand that certain factors may support or rebut the obviousness of a claim. I understand that such secondary considerations include, among other things, commercial success of the patented invention, skepticism of those having ordinary skill in the art at the time of invention, unexpected results of the invention, any long-felt but unsolved need in the art that was satisfied by the alleged invention, the failure of others to make the alleged invention, praise of the alleged invention by those having ordinary skill in the art, and copying of the alleged invention by others in the field. I understand that there must be a nexus—a connection—between any such secondary considerations and the alleged invention. I also understand that contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.

27. I am not aware of any allegations by the named inventor of the '891 Patent or any assignee of the '891 Patent that any secondary considerations are relevant to my obviousness analysis of any Challenged Claim of the '891 Patent. For declarations I prepared regarding patents related to the '891 Patent, I have briefly reviewed the allegations by the Patent Owner of certain secondary considerations during earlier proceedings of at the U.S. Patent Office set forth in those related patents and find those allegations were directed to the obviousness of an alleged improvement of placing a four-bar mechanism disclosed on larger equipment *replacing* a two-bar mechanism disclosed on smaller equipment. This is not the framework of my obviousness analysis.

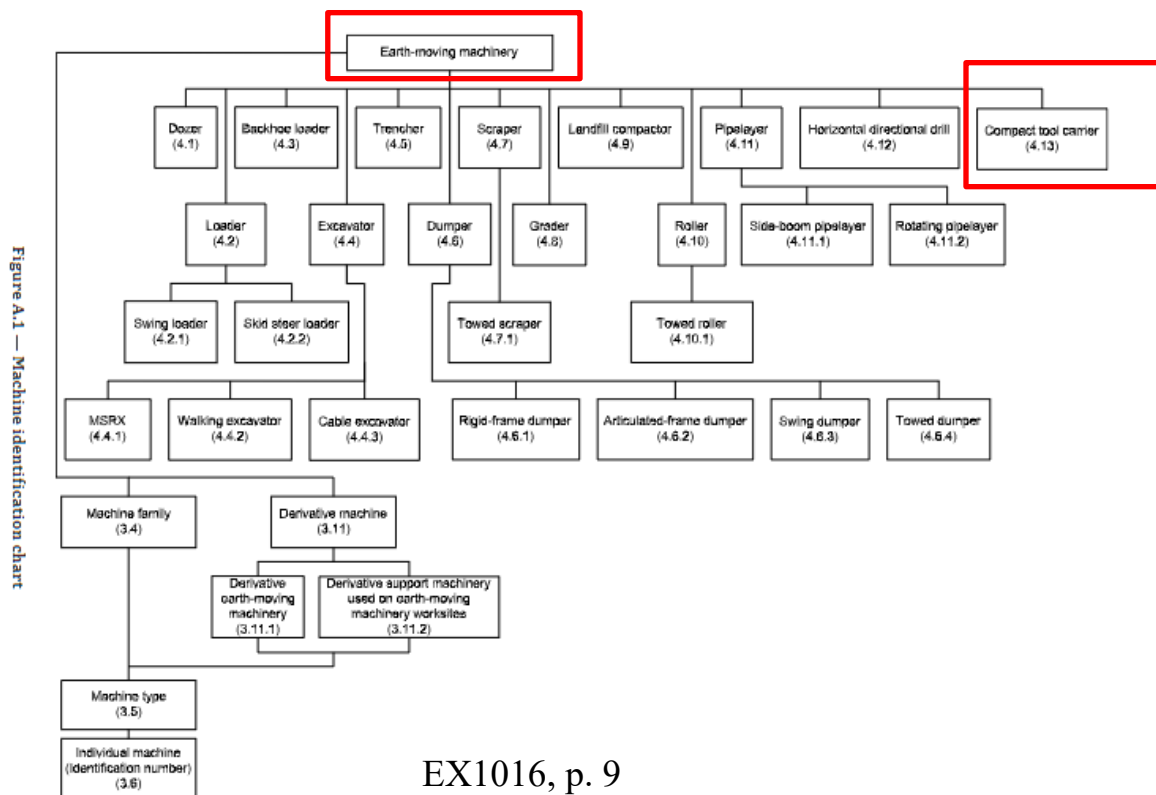
## **V. BACKGROUND TECHNOLOGY**

28. In this section, I provide some background information relating to vehicle design including mechanisms such as different types of linkages. The concepts embodied in claims of the '891 Patent are not new as of the priority date and do not represent the combination of known elements that resulted in an unexpected and unanticipated result.

### **Machinery Type**

29. As explained in the summary of the patent below, the '891 Patent is directed to a “compact tool carrier.” A compact tool carrier, as illustrated in the

'891 Patent, may also be referred to as a compact utility loader (CUL) or a mini-skid steer. These machines are smaller (e.g., in comparison with ride-on skid steers) equipment that are suitable for tight spaces and maneuverability. Exemplary uses include construction, landscaping, and the like. International Standard Organization (ISO), a well-known, recognized source for information for a POSITA, put forth ISO 6165 standard, which defines different types of equipment and is illustrative of compact tool carriers being one of those types:



30. The standard describes the class of machinery:

**4.13****compact tool carrier**

self-propelled crawler or wheeled machine having an *operating mass* (3.7) of less than 1 500 kg with a rigid frame, having either a pedestrian operating position or a standing operator platform at the rear of the machine and either front-mounted interchangeable *equipment* (3.9) or lift arms with an attachment bracket capable of coupling to interchangeable, front-mounted *attachments* (3.10)

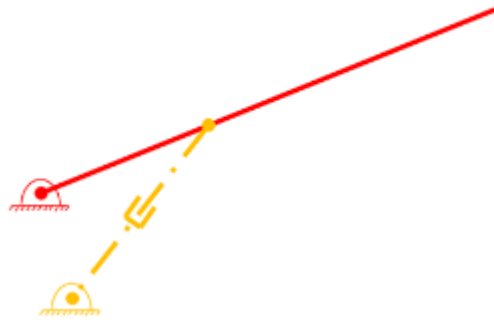
EX1016, p. 7. A POSITA would recognize the '891 Patent, like at least KR996 (EX1005), McIlwraith (EX1007), Bares '568 (EX1009), Bares (EX1010), Azure (EX1013), and KR528 (EX1014) and others, are explicitly discussing this type of machinery.<sup>1</sup> The claims of the '891 Patent are directed to a “loader apparatus,” which in line with the '891 Patent specification, at least one example of which is a compact utility loader.

**Loader Mechanism:**

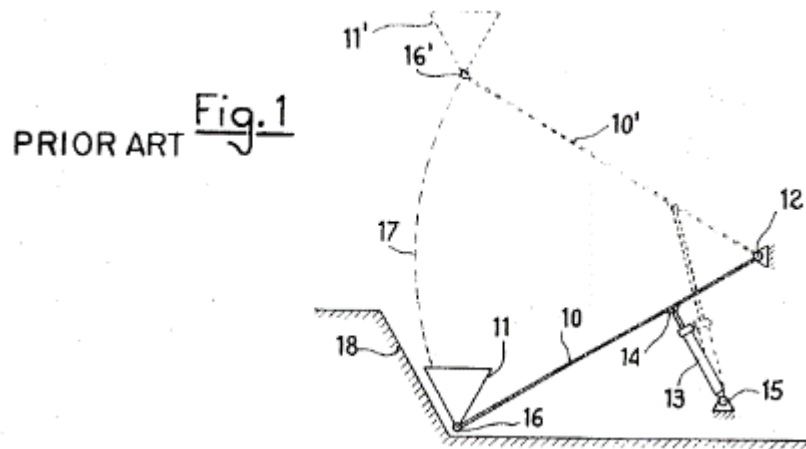
**31.** A loader or lift arm is attached to the carrier to provide for tools such as a bucket to perform the functionality of the equipment. One of the simplest well-known mechanisms providing motion for the loader arm is illustrated kinematically below. This may also be described as a two-bar or radial lift mechanism.

---

<sup>1</sup> JP705 (EX1006) and Beltrami (EX1008) are not limited to any type of machinery.



**32.** In the context of a loader, the orange illustrates an actuator (also referred to as a cylinder or jack) driving the mechanism and the red illustrates a lift arm. Beltrami at FIG. 1 describes such a system as prior art, which illustrates a jack 13 pivotally connected at 14 to the arm 10 and at 15 to the tracked vehicle body. Beltrami (EX1008), 2:41-48.



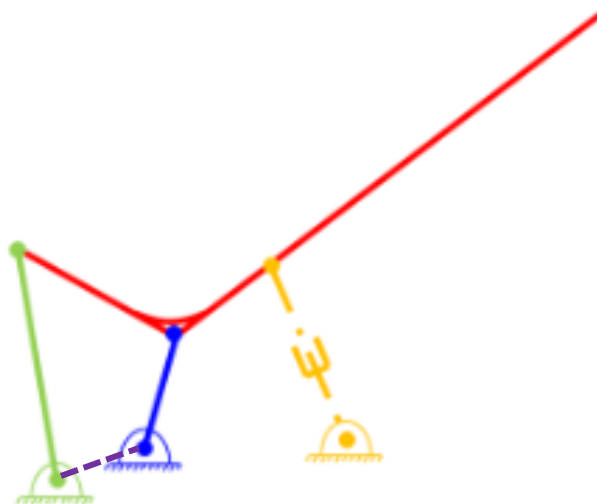
EX1008, FIG. 1

Bares '568 illustrates a similar system in its FIGS. 1, 3 with an assembly that includes an arm 24A attached at a pivot 21 to supports 22 with a cylinder 26 pivotally mounted the frame 12 and pivotally connected at pivot pins 30 to the arm 24. Bares '568 (EX1009), 2:49-2:15.

**33.** Another type of mechanism is a four-bar linkage, also called a four-bar mechanism or simply four-bar. Four-bars are, while slightly more complex than the two-bar mechanism, a very simple mechanism widely employed across various machines. Due to its wide use, this type of mechanism is introduced early in undergraduate mechanical engineering courses in which detailed methods of design and analysis are taught. *See, e.g.,* EX1028, Theory of Machines and

Mechanisms, Shigley, J.E. and Uicker, J.J. Jr., McGraw Hill, 1980; EX1023, Mechanisms and Mechanical Devices. One four-bar mechanism is illustrated schematically below. Such a mechanism is depicted by 3 moving bars or links (also referred to here as linkages), those illustrated in green, red, and blue, and 1 stationary bar, an imaginary link shown in purple connecting the fixed pivot points. Note that the fixed pivot points would have no relative motion with the machine that supports the four-bar. The red link is typically referred to as the coupler. Based on the design of the mechanism (e.g., the lengths of the 4 links), the green and blue links may make a full rotation, referred to as a crank, or move back and forth through an angle in which they are referred to as rockers. Also, the input to the mechanism is typically a motor, which is attached to either the green or blue link, and/or an actuator, illustrated in orange, which can be connected to any of the three moving links. Generally, the actuator may be attached at any location on a link to drive the mechanism. Note that the actuator position is a design choice based on the working load of the mechanism and the force that the selected actuator can generate. The four-bar mechanism has a mobility equal to one, which means that it has one-degree-of-freedom and that only one input parameter (e.g., the position one of the moving links) is needed to place the mechanism in a particular position. Note that the figure below is a kinematic diagram of the mechanism for purposes

of design and analysis. The pivot points connecting the adjacent links define the links' kinematic lengths, but the actual link shapes are determined by the specific application. Thus, as illustrated, in this implementation, the red link, or coupler, is pivoted at the points attached to the green and blue links respectively and is approximately L-shaped as shown.



**34.** The four-bar mechanism is used for 3 different types of design cases: function generation, motion generation and path generation. For function generation, one link (e.g., either the green or blue link illustrated above) is defined as the “crank” and the other link (e.g., the other one of the green or blue link illustrated above) is defined as the “follower.” Function generation involves a prescribed relationship between the crank’s angular displacement and the

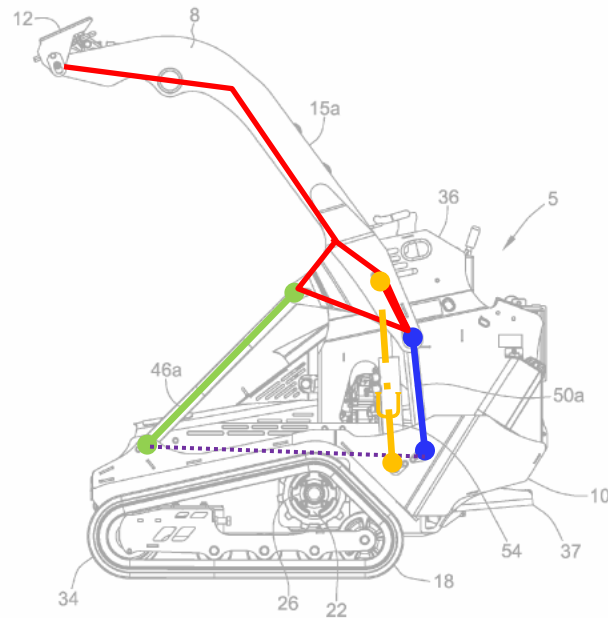
follower's angular displacement. Motion generation concerns the prescribed position and orientation of the coupler. Path generation concerns the prescribed path of a point on the coupler, which is referred to as the coupler point.

**35.** Four-bar mechanisms are found in a tremendous number of machines – large and small. For a function generation example, the windshield wipers of an automobile are a crank-rocker type of four-bar in which a continuously rotating motor drives the crank and the follower has the wiper attached and rocks back and forth. An automobile's suspension is an example of a motion generation design in which the wheel and tire are prescribed to have a specific position and orientation through their motion relative to the vehicle's frame to maintain a generally vertical orientation and a generally constant track. The four-bar of the loader such as discussed below can be considered a path generation example as the motion is prescribed of a specific coupler point, the pivot point of the tool attachment plate. The four-bar is perhaps the most widely studied mechanism in history. The initial formal design and analysis methods date back to the 1800's and there have been hundreds of publications since the 1970's on four-bar path and function generation. *See, for example, EX1026, Linkage Coupler Curve Synthesis: A Historical Review-II. Developments after 1875, Nolle, H., Mechanism and Machine Theory, Vol. 9 pp. 325-348 (1974); EX1027, Lee, W.-T. and Russell, K., Inverse Problems*

in Science and Engineering, Developments in quantitative dimensional synthesis (1970–present): four-bar path and function generation, 1280-1304.

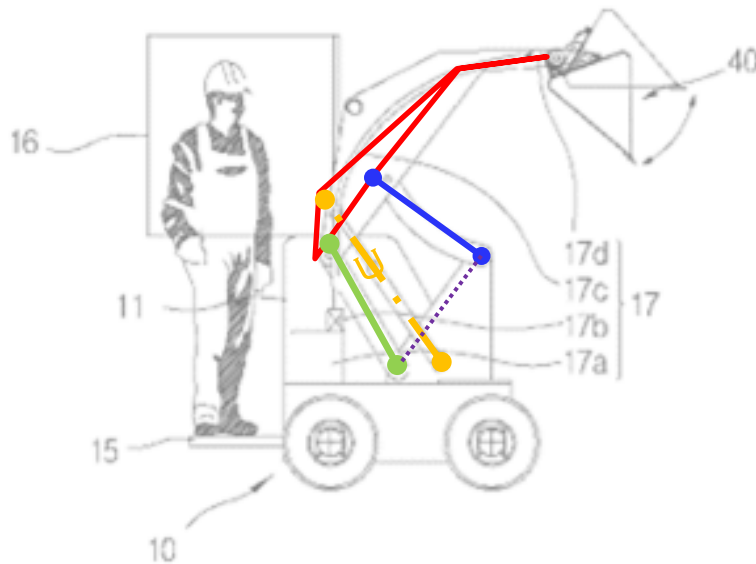
**36.** When designing a mechanism such as a four-bar mechanism for an application, one may approach the design by providing known link dimensions and calculating the output motion, which is referred to as a kinematic analysis. Or conversely, in a dimensional synthesis, the link dimensions may be calculated to achieve a prescribed output motion. The link dimensions include link lengths, link positions and joint (pivot point) coordinates. *See, e.g.*, EX1024, Pareto optimal synthesis for four-bar mechanisms for path generation, 2008; EX1028, p. 4; EX1023, p. 117.

**37.** In the context of a loader, a four-bar mechanism is implemented by a cylinder (orange) driving the mechanism, a lift arm (red) provides a coupler, the links (blue and green) (also referred to as linkages) providing the bars (follower/crank), and the frame of the loader providing the stationary fourth bar (purple) extending between the links. The '891 Patent loader arm is an example of a four-bar mechanism. In this design, the actuator is connected to the coupler (lift arm). A kinematic diagram designating the four-bar mechanism is overlaid on '891 Patent's FIG. 3:



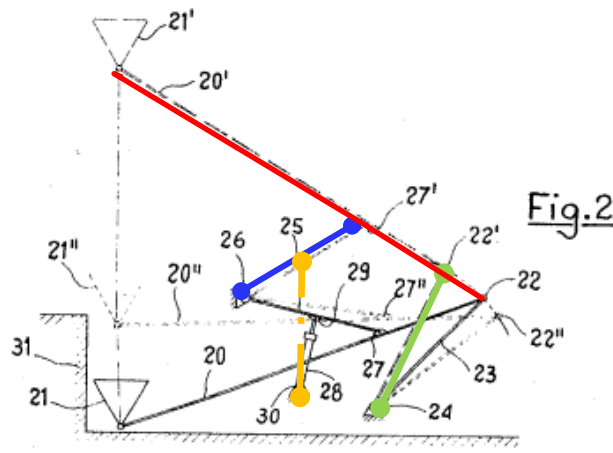
EX1001, FIG. 3  
(annotated)

**38.** Similarly, the loader of KR996 (EX1005) is an example of a four-bar. Again, a kinematic diagram designating the four-bar is overlaid on KR996's Fig.



KR996 (EX1005), FIG. 21  
(annotated)

**39.** Including in the context of its Fig. 2, Beltrami also illustrates a four-bar. In this case, the actuator is not directly connected to the coupler (lift arm), but is connected to one of the other links. Beltrami is an example of a Watt-style four-bar mechanism, which produces approximately straight-line motion. See, e.g., EX1025, p. 150; EX1023, p. 7.



EX1008, FIG. 2  
(annotated)

See also, Beltrami (EX1008), FIG. 3.

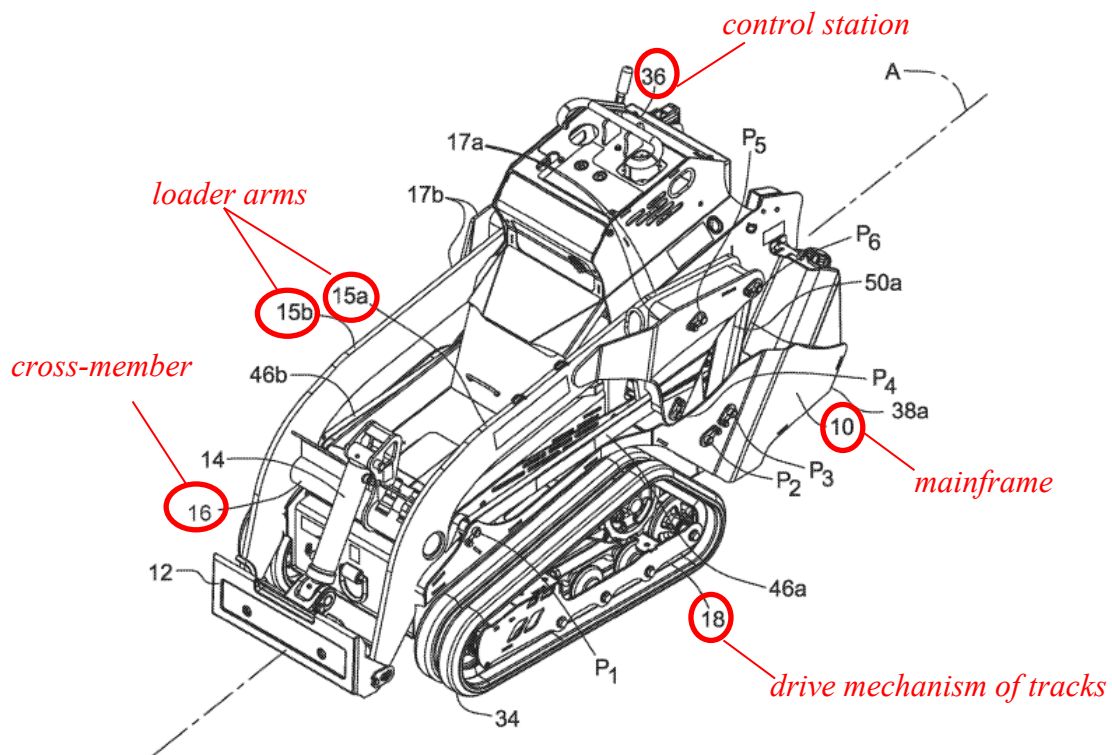
## VI. OVERVIEW OF THE '891 PATENT

**40.** The '891 Patent issued October 11, 2022 with claims 1-10. The '891 Patent claims priority through a chain of applications to U.S. Patent No. 9,321,386 ("386 Patent"), which I have also provided a declaration regarding.

41. The '891 Patent relates to a “loader apparatus” configured as a compact tool carrier designed for standing operation and having a loader (with two arms). EX1001, Abstract, 1:27-49. In its background, the '891 Patent asserts compact tool carriers “may be distinguished from much larger conventional skid steers in which

an operator is seated in the operating position.” EX1001, 1:42-46. Tools such as buckets, augers, and the like may be provided as front-mounted attachments. EX1001, 1:39-41.

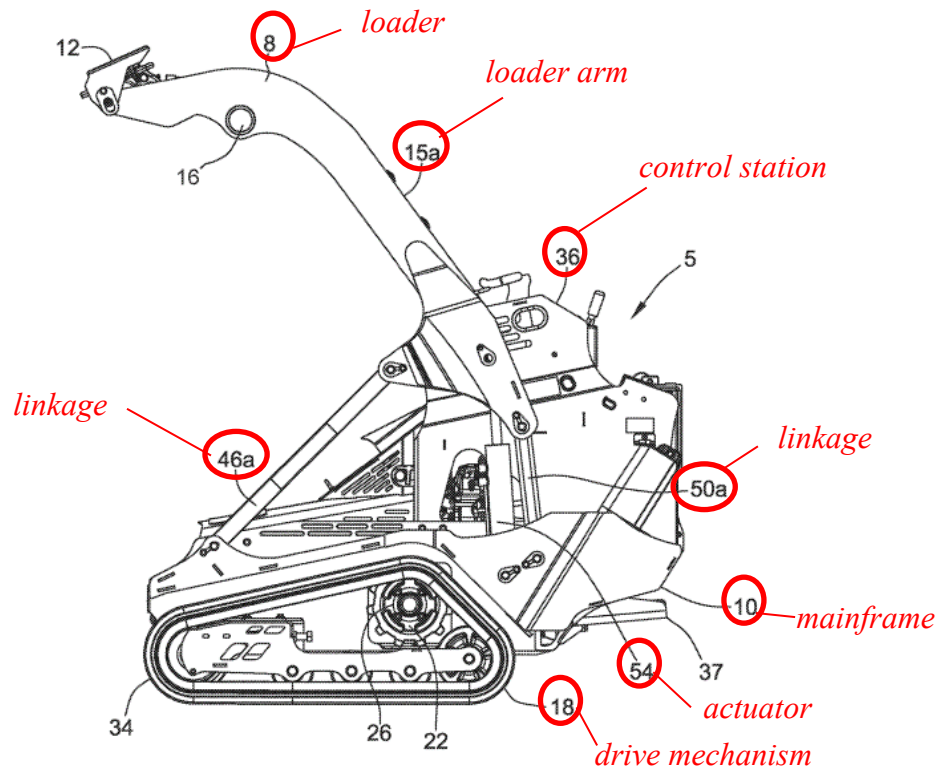
**42.** FIGS. 1 and 3 are illustrative of a compact tool carrier 5 including a loader 8 having loader arms 15a, 15b and mainframe 10. EX1001, 2:35-44, 54-64. A cross-member 16 extends from the first arm 15a to the second arm 15b. EX1001, 2:64-65. A drive mechanism 18 may include tracks 34 (as shown) or wheels and control station 36 provides operator controls. EX1001, 3:31-41.



**EX1001, FIG. 1  
(annotated)**

**43.** The first loader arm *15a* is pivotally connected to a first side *38a* of the mainframe 10 and the second loader arm *15b* is pivotally connected to a second side of the mainframe 10. EX1001, 4:23-26. Each loader arm is attached to a respective side of the mainframe by linkages *46a/50a* and an actuator 54. EX1001, 4:26-47. This configuration is a four-bar mechanism, which I discuss above, providing a path generation of the motion of the tool attachment plate 12.

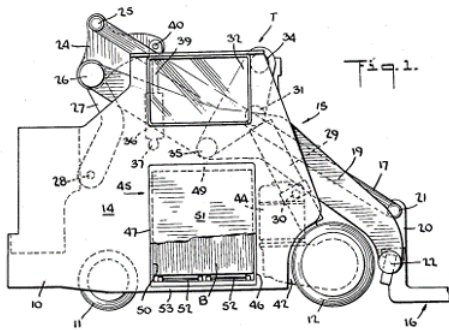
**44.** FIG. 1 above is illustrative of the carrier with the loader in a down position; FIG. 3 below is illustrative the loader in a raised position. EX1001, 2:35-41.



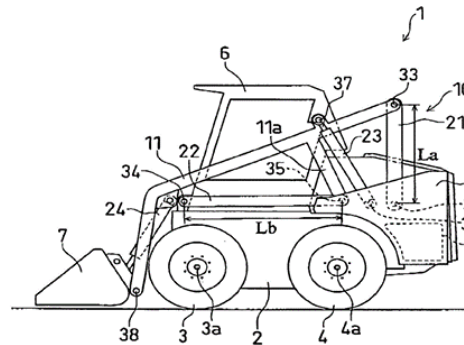
**EX1001, FIG. 3**  
**(annotated)**

## **VII. PROSECUTION HISTORY OF THE '891 PATENT**

**45.** In a first Office action, all claims were rejected. EX1002, pp. 139-148. The claims were rejected under two different primary references: U.S. Patent No. 3,074,572 (“Ulinski”) and U.S. Patent Appl. Publ. No. 2007/0128012 (“Yamada”). Representative figures of Yamada and Ulinski are each reproduced below and illustrate a loader attached by linkages and actuator to equipment with an operator cab.



**USP 3,074,572 (Ulinski)**  
**Fig. 1**



**USP Publ. No. 2007/0128012 (Yamada)**  
**Fig. 1**

**46.** In response, Applicant amended its prosecution claim 1 to recite “the loader apparatus does not include an operator’s seat” to overcome the obviousness rejection based on Yamada. EX1002, pp. 101, 110, 120. Further amendments required the actuator have a “direct” connection to the loader it raises in an attempt to contrast with Ulinski’s alleged actuator connected to a bell crank that was at an opposing end connected to the loader. EX1002, pp. 103-104, 114-116. Applicant also added to the specification the lines not at 2:64-66 of EX1001 describing a cross-member 16 and amended the figures to provide corresponding annotation alleging support for the amendments were found in the original Figure 1 (i.e., unlabeled component). EX1002, pp. 108-109, 111. Amendments to prosecution claim 1 are illustrative:

1. (Currently amended) A loader apparatus configured for standing operator control and comprising:

a loader adapted to carry a tool, the loader being moveable between a down position and a vertically raised position;

a loader support having a first side and a second side, the loader being free from direct attachment to the loader support;

a first actuator for tilting of a tool connected to the loader;

a first linkage connected to the first side of the loader support and connected to the loader, the first linkage being pivotal relative to the first side of the loader support;

a second linkage connected to the first side of the loader support and connected to the loader, the ~~first~~ second linkage being pivotal relative to the first side of the loader support;

[[an]] a second actuator for raising the loader, the second actuator being connected to the loader support and connected to the loader, the second actuator being directly attached to the loader, the second actuator being pivotal relative to at least the first side of the loader support;

a control station having operator controls for propelling the loader apparatus forward and for raising and lowering the loader; and

an operator platform for standing operation of the operator controls of the control station; and

wherein the loader apparatus does not include an operator's seat.

**EX1002, pp. 100-102**

47. U.S. Patent No. 6,695,568 (EX1009) (“Bares ’568”) was relied upon as a secondary reference for its teachings of a “cross-member.” EX1002, p. 143. Applicant argued against the combination of aspects of Bares ’568’s radial lift loader onto Ulinski’s vertical lift loader, alleging it rendered Ulinski’s apparatus being unsuitable for its intended purpose due to inhibiting access to a battery compartment. EX1002, pp. 114-122. And Applicant further argued Ulinski’s apparatus with Bares ’568’s cross-member means the cross-member “would not be

disposed forward of the operator platform[,]" which is at the middle of Ulinski's apparatus. *Id.*

**48.** The Office again rejected all claims relying upon two different primary references: U.S. Patent No. 7,695,236 ("Green") and KR 2008-0003426 ("KR426"), each in an obviousness context of modifying an operator's position in the apparatus. EX1002, pp. 64-67. After an Examiner interview and amendments incorporating previously rejected, dependent claims into prosecution claim 1, an allowance was mailed and the remaining rejected claims canceled. EX1002, pp. 14-17, 44-57. Applicant argued a cross-member cannot be added to the base apparatus due to interference with components. EX1002, pp. 53.

---

1. (Currently amended) A loader apparatus configured for standing operator control and comprising:

a loader adapted to carry a tool, the loader being moveable between a down position and a vertically raised position, the loader comprising:

a first loader arm;

a second loader arm; and

at least one cross-member that extends from the first loader arm to the second loader arm;

a loader support having a first side and a second side, the loader being free from direct attachment to the loader support;

a first actuator for tilting of a tool connected to the loader;

a first linkage connected to the first side of the loader support and connected to the loader, the first linkage being pivotal relative to the first side of the loader support;

a second linkage connected to the first side of the loader support and connected to the loader, the second linkage being pivotal relative to the first side of the loader support;

a second actuator for raising the loader, the second actuator being connected to the loader support and connected to the loader, the second actuator being directly attached to the loader, the second actuator being pivotal relative to at least the first side of the loader support;

a control station having operator controls for propelling the loader apparatus forward and for raising and lowering the loader; and

an operator platform for standing operation of the operator controls of the control station;

a drive mechanism for propelling the loader apparatus over a supporting surface, at least a portion of the operator platform being disposed rearward of the drive mechanism relative to a longitudinal axis of the loader apparatus; and

wherein the loader apparatus does not include an operator's seat.

### EX1002, pp. 44-45

49. In contrast to those invalidity positions previously presented, I discuss a primary reference, KR996, that shows it was known in the art to provide, in a single embodiment, a compact tool carrier having a vertical lift loader implementing a four-bar mechanism and a cross-member extending between the

arms of the loader.

## **VIII. EFFECTIVE PRIORITY DATE OF THE '891 PATENT**

**50.** I have been told to assume that the '891 Patent is entitled to a priority date of February 20, 2015. I have not undertaken a priority date analysis for the purposes of this declaration.

## **IX. CLAIM CONSTRUCTION**

**51.** It is my understanding that in order to properly evaluate the '891 Patent, the terms of the claims must first be interpreted. It is my understanding that for the purposes of this *inter partes* review, the claims are to be construed under the so-called *Phillips* standard, under which claim terms are given their ordinary and customary meaning as would have been understood by one of ordinary skill in the art in light of the specification and prosecution history, unless the inventor has set forth a special meaning for a term. For the purposes of this declaration, it is my opinion that the claim terms should be given their plain and ordinary meaning.

## **X. IDENTIFICATION OF HOW THE CLAIMS ARE UNPATENTABLE**

### **A. Challenged Claims**

**52.** This declaration is directed to claims 1-10 of the '891 Patent.

---

**B. Statutory grounds for challenges**

| <b>Grounds</b> | <b>Claims</b> | <b>Basis</b>                        |
|----------------|---------------|-------------------------------------|
| #1 / #2        | 1-8, 10       | 35 U.S.C. §§ 102/103 over KR996     |
| #3             | 9             | 35 U.S.C. §103 over KR996 and Bares |
| #4             | 8             | 35 U.S.C. §103 over KR996 and SAE   |

KR996 discloses all the elements of claims 1-8 and 10. KR996 also renders obvious claims 1-8 and 10. To the extent that Patent Owner argues that a single embodiment of KR996 does not disclose all the limitations of any of claims 1-8 and 10, POSITA would have found claims 1-8 and 10 obvious, in view of the POSITA's own knowledge and/or the disclosures suggested by KR996 as explained herein.

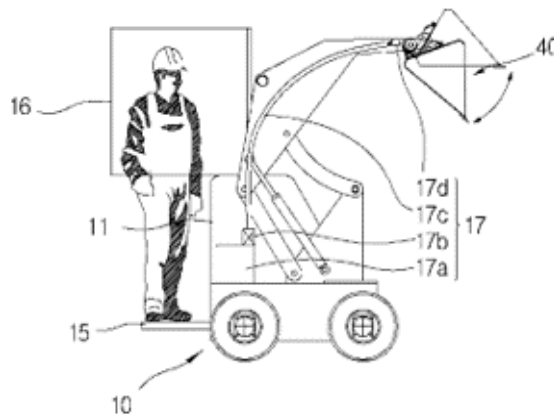
**C. Grounds 1 and 2 : KR996****1. KR996 (EX1005)**

**53.** KR996 is entitled “Environmentally Friendly Construction Equipment for Building Deconstruction Work.” KR996 (EX1005), (54).<sup>2</sup> KR996 describes construction equipment that “can enter narrow buildings and carry out dismantling work inside the building” and “effectively perform difficult tasks in narrow spaces, allowing for efficient operations such as building interior demolition, road

---

<sup>2</sup> Citations are to the English translation of KR996. EX1005.

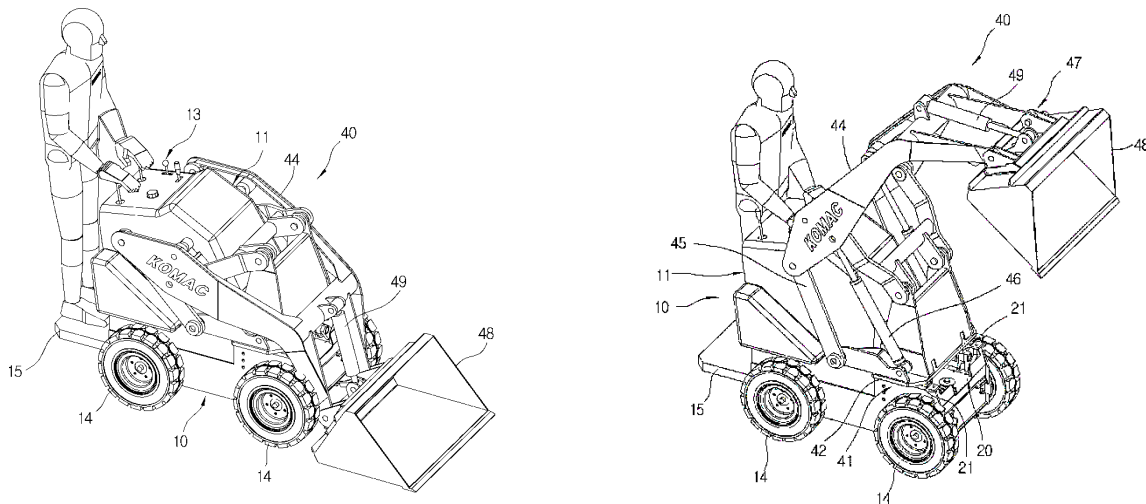
maintenance, snow removal, and towing.” KR996 (EX1005), [0001]-[0002]. In particular, KR996 provides a vehicle 10 to which, interchangeably, a loader unit 40 or an arm unit 60 is attached. KR996 (EX1005), [0041], Figs. 1-13, 21 illustrating the loader unit 40 and Figs. 14-20, 22 illustrating the arm unit 60. Fig. 21, reproduced below, illustrates a side view of the vehicle with the loader unit 40. KR996 (EX1005), [0113]-[0114].



**KR996 (EX1005), Fig. 21**

**54.** The vehicle 10 includes a control unit 13 for operating of the vehicle including the installed unit (here the loader unit 40) by an operator positioned on a folding safety step 15 at the rear of the vehicle. KR996 (EX1005), [0042], [0049], [0072], Figs. 8-9. The loader 40 includes a boom 44 connected to the mainframe of the vehicle by intermediary parts—a link 45, a link (unlabeled), and a boom cylinder

46. *Id.* Fig. 8 and Fig. 9 are illustrative of the loader in lowered and raised positions, respectively.



**KR996 (EX1005), Fig. 8 (portion), Fig. 9**

## 2. Claim 1

**[1.0] *A loader apparatus configured for standing operator control and comprising:***

**55.** KR996 discloses this limitation.

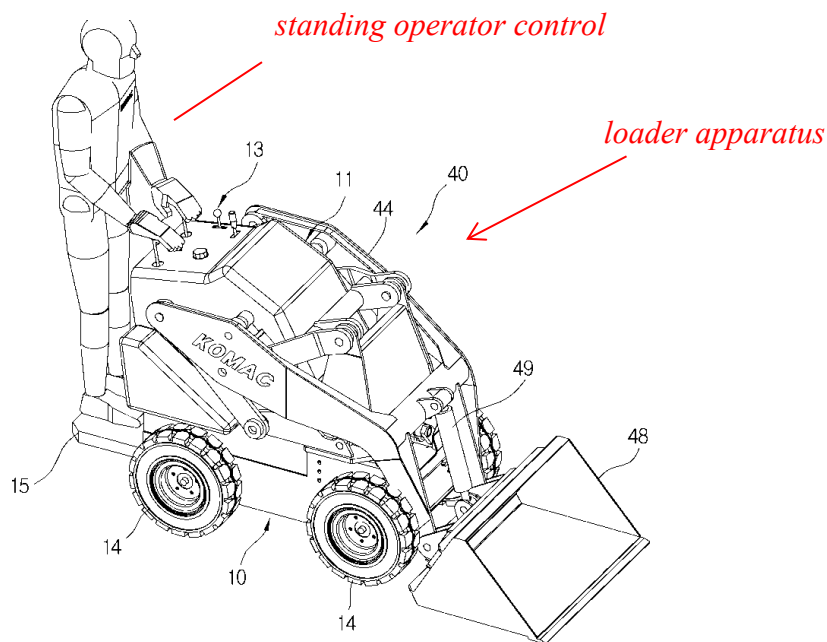
**56.** KR996 discloses *a loader apparatus*<sup>3</sup> because as discussed above, KR996 describes a vehicle that includes a loader (loader unit 40) for carrying and moving materials, specifically, a self-propelled vehicle capable of carrying interchangeable equipment for building deconstruction work, providing

---

<sup>3</sup> In this declaration, claim terms are generally italicized for ease of reference.

maneuverability in small spaces, and having the functionality of a mini skid loader with an attachment of a bucket. EX1005, Abstract, [0001]-[0012]. The KR996 vehicle is equipped with a mounted “loader unit 40.” EX1005, Abstract.

57. KR996’s Fig. 8 is illustrative:



**EX1005, Fig. 8 (portion)  
(annotated)**

58. The standing operator control of the KR996 vehicle is the same configuration for operator control as provided in the '891 Patent. EX1001, 3:49-54 (“As used herein, ‘**standing operation**’ generally refers to operation in which the operator **stands on a platform** attached to the compact tool carrier[.]”). See also, my discussion at starting at paragraph 29 above. See KR996, Figs. 1, 7-9, 21, claim

---

1 (“A vehicle (10) equipped with a control until (13) for operating the equipment while a worker is on board at the rear...”), [0049] (“...a folding safety step (15) is installed on the main body (11)...so that the operator can board the vehicle (10) when driving...”).

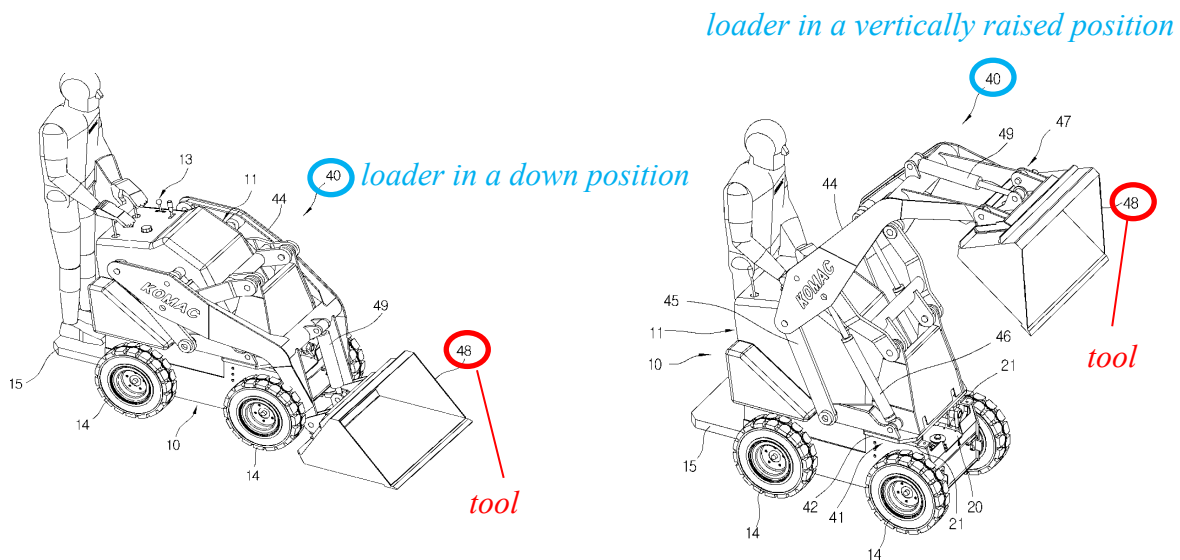
**59.** A POSITA would also understand that the KR996 vehicle is a compact tool carrier as used in the '891 Patent it has the same configuration as described in the '891 Patent (*see, e.g.*, Fig. 1). The *loader apparatus* of the '891 Patent at least includes a compact tool carrier. And a POSITA would recognize that the KR996 vehicle also falls under the “compact tool carrier” as defined by ISO 6165 as being earth-moving machinery that is a “compact tool carrier [a] self-propelled crawler or wheeled machine ...having either a pedestrian operating position or a standing operator platform at the rear of the machine and either front-mounted interchangeable equipment (3.9) or lift arms with an attachment bracket capable of coupling to interchangeable, front-mounted attachments (3.10).” ISO 6165 (EX1016), pp. 7, 9. See also, EX1015.

**60.** Thus, KR996 teaches a vehicle that provides the *loader apparatus* of [1.0].

**[1.1]** *a loader adapted to carry a tool, the loader being moveable between a down position and a vertically raised position, the loader comprising:*

**61.** KR996 teaches this element.

62. KR996 provides *a loader* including loader unit 40, which is *moveable between a down position and a vertically raised position*. EX1005, (57), [0016], [0036], [0040], [0054], [0131], Fig. 8 illustrating a down position; Figs. 7, 9, 21 illustrating a vertically raised position. The loader unit 40 is also *adapted to carry a tool* because a bucket 48 (a *tool*) is described and shown as attached to the loader's arm, boom 44. EX1005, claim 1, [0054], [0074]-[0075], Figs. 8-9; *see also*, EX1001, 1:40-41 (“tools such as buckets, augers...and the like.”)



EX1005, Fig. 8 (portion) and Fig. 9  
(annotated)

63. Thus, KR996 discloses [1.1].

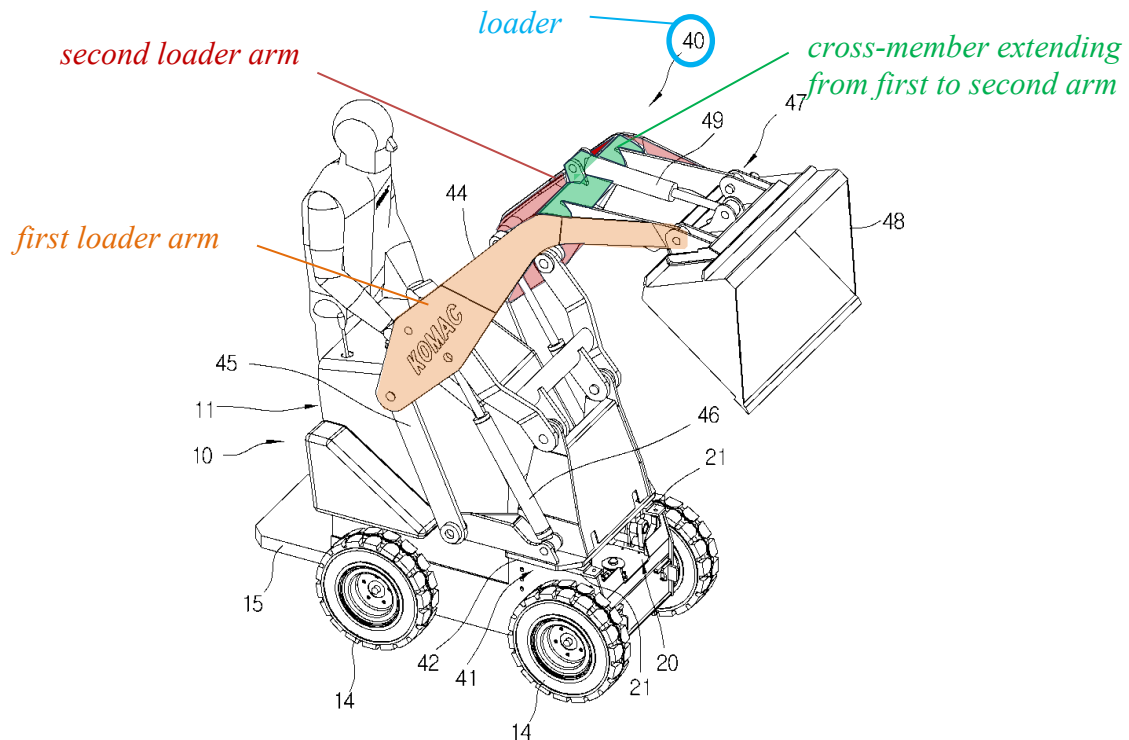
[1.2] [the loader comprising:] *a first loader arm; a second loader arm; and at least one cross-member that extends from the first loader arm to the second loader arm;*

**64.** KR996 teaches this element.

**65.** KR996's loader unit 40, described in element [1.1], includes a first boom 44 (*a first loader arm*) and a second boom 44 (*a second loader arm*). EX1005, [0054], claim 1, Figs. 1, 8-11. The first boom 44 is at the first side of the vehicle and the second boom 44 is at the second, opposing side of the vehicle. EX1005, Figs. 1, 8-11. The booms 44 are each connected to the frame of the vehicle through a four-bar mechanism, which I discuss above.

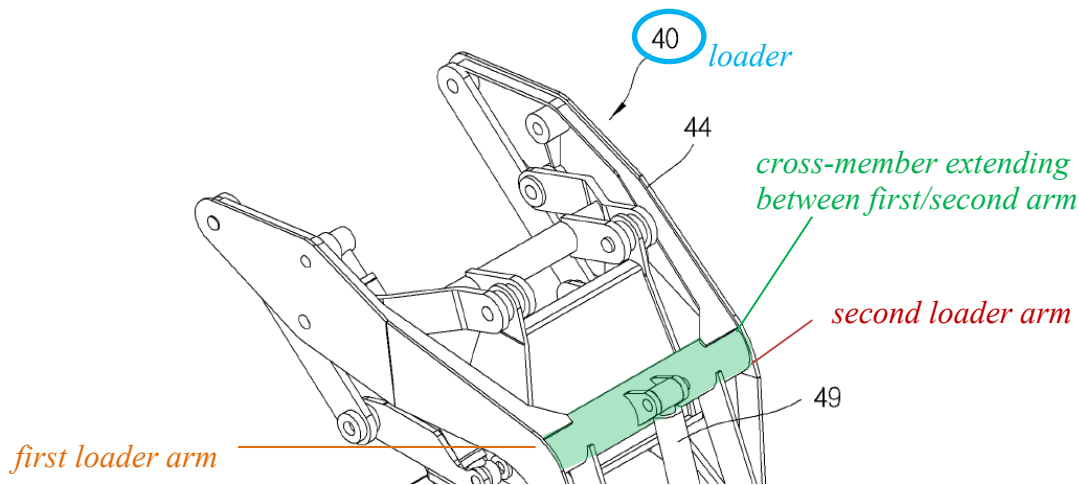
**66.** Figures, such as KR996's Figs. 1, 5, 11, confirm the two sides of the KR996 vehicle have the same mechanism for the loader. Further, balance and weight distribution motivate a POSITA to provide symmetry between the sides of the vehicle. I explain this further in paragraph 79.

**67.** KR996 also illustrates a cross-member (*at least one cross-member*) that extends between booms 44 as annotated below. EX1005, [0054], Figs. 1, 5, 7-9.



**EX1005, Fig. 9**  
**(annotated)**

KR996's Fig. 5, for example, details the *at least one cross-member* extends from the first loader arm to the second loader arm.



**EX1005, Fig. 5 (portion)  
(annotated)**

68. KR996's *cross-member* is just like what is illustrated in the '891 Patent. The function of the *cross-member* is to provide structural rigidity to the loader, e.g., minimizing the individual loader arms' ability to twist under non-symmetric loading. Additionally, the *cross-member* allows for an individual, centrally-located attachment plate tilt actuator and thus equal distribution of the tilt actuator's load on the loader arms. POSITA would recognize that a cross-member provides this same function in each of the '891 Patent and KR996.

69. Claim element [1.2] is disclosed by KR996.

**[1.3] *a loader support having a first side and a second side, the loader being free from direct attachment to the loader support;***

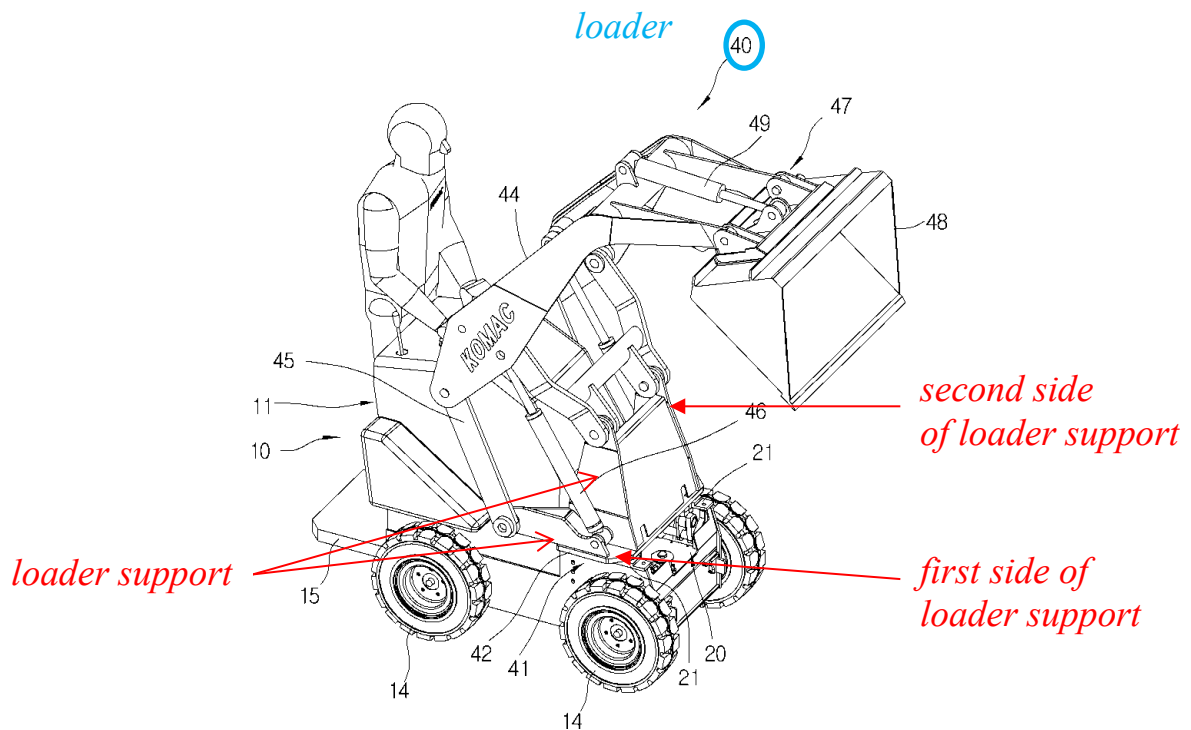
70. KR996 discloses this limitation.

71. KR996 discloses *a loader support having a first side and a second side*.

In particular, the *loader support* includes the portions of the frame of the KR996 vehicle that when in operation, support the attached loader unit 40 having loader arms of the booms 44. These frame portions have *a first side* and *a second side* as generally provided by the left and right sides of the frame of the vehicle relative to the operator. This is consistent with the '891 patent, which describes the second side 38b "generally opposite" the first side 38a. EX1001, 4:14-15, FIG. 4.

72. In particular, the *loader support* of KR996 includes the portions of the frame having pivot attachments with respective ends of each of the intermediary parts (*i.e.*, the boom cylinder 46, link 45, and forward link of [1.5]-[1.7] below), which are connected at their opposing ends to a boom 44 of the loader unit 40. For example, KR996's *loader support* includes the bracket to which the link 45 and boom cylinder 46 attach, as well as the frame protrusion, connected to the bracket, to which the forward link attaches.

73. KR996's Fig. 9 is illustrative.



**EX1005, Fig. 9  
(annotated)**

See also, KR996, Figs. 8-10, 21. In other words, the *loader support* of KR996 includes the bracket to which the link 45 and boom cylinder 46 attach, as well as the frame protrusion, connected to the bracket, to which the forward link attaches.

74. This is consistent with the '891 patent. The '891 Patent does not use the term *loader support* outside of the claims, however, it does discuss a "mainframe." See EX1001, 4:18-20 ("mainframe 10 includes bracket[s]...through which various pivot linkages are attached"). EX1001, Figs. 1, 4, 7.

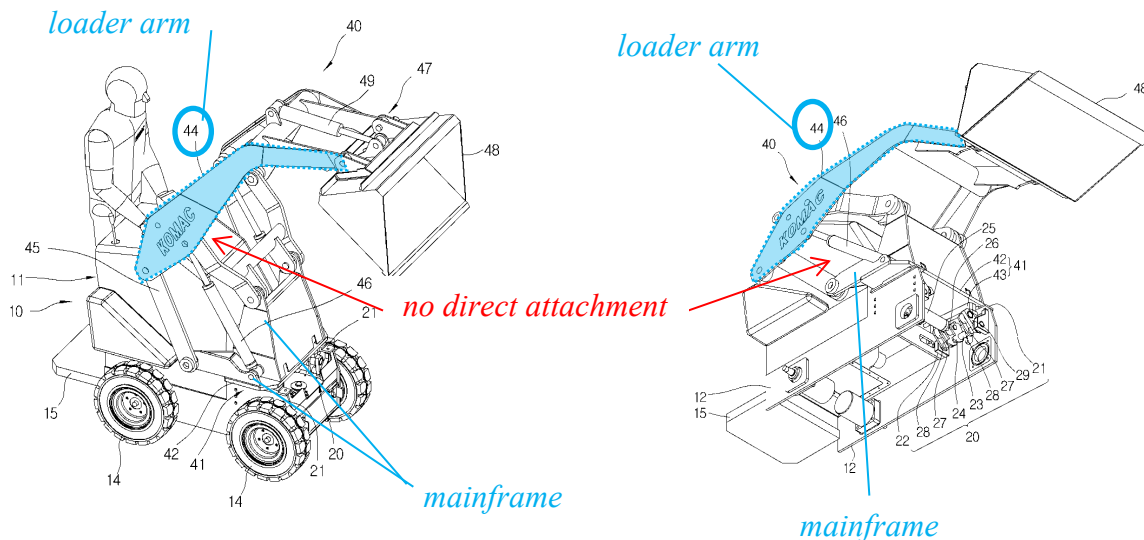
75. To the extent the Patent Owner argues or the dependent claims further

require (see [3]) that the *loader support* includes additional components on top of those providing direct attachment to the intermediary parts, KR996's *loader support* also includes its other frame portions including main body 11 and side plates 12. EX1005, [0044], [0049], Figs. 1, 7-9. These portions are part of a frame of the vehicle and also provide structural and weight-bearing support for the loader unit 40, when in operation, in addition to support for other features such as the control station and drive mechanism. This is also consistent with the '891 Patent. The '891 Patent illustrates its frame as having multiple pieces including an upper frame to which the operator controls are attached and lower frame where linkages/actuator are attached (*see* FIG. 7), just like KR996 (*see* EX1005, FIG. 1). While KR996 describes embodiments of its frame in two portions, when in operation the mainframe of the vehicle is in one piece providing support for the loader. See also, '891 Patent, FIG. 7. It is also an obvious modification to provide a frame in a unitary piece as discussed in claim 2.

76. Again, to the extent that the Patent Owner argues (and see dependent claim 3) that the *loader support* includes all components that provide for physical support (e.g., weight-bearing) of the loader unit 40 when in operation, KR996's *loader support* also includes main body 11, side plates 12, and the components also providing support for the loader 40 in addition to the control station 13, drive

mechanism, and other vehicle components. In sum, each of the components that provides for weight-bearing support of the loader. This is also consistent with the '891 Patent. EX1001, 2:12-14, 3:35-37 discussing drive mechanism attached to mainframe, 4:5-7 providing an upper frame supported by a mainframe 10, 4:9-10 equating "mainframe" with "body [] of the carrier."

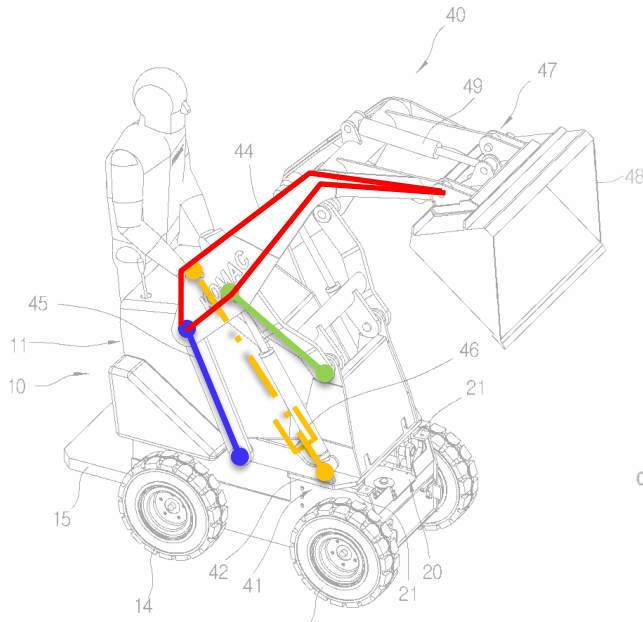
77. KR996 illustrates a vertical lift loader, which is a *loader being free from direct attachment to the mainframe*, as the loader is attached to the mainframe only through intermediary parts including the boom cylinder 46 and links 45/unlabeled, which are discussed in [1.5]-[1.7] below.



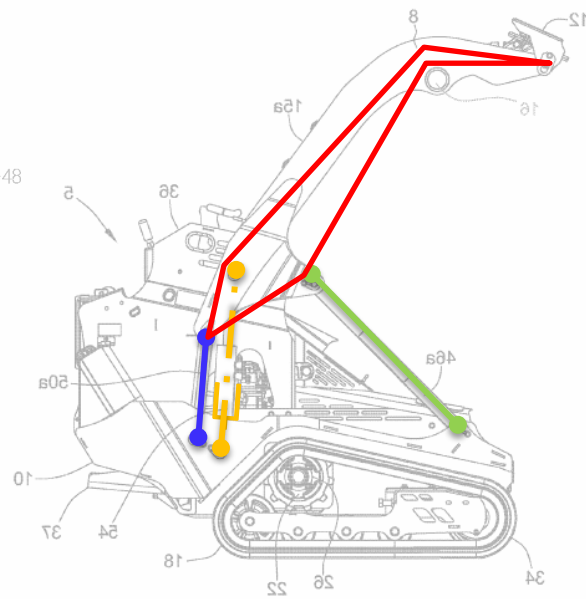
**EX1005, Figs. 9, 10  
(annotated)**

78. This is a feature of a four-bar mechanism. I have provided the below

schematic view of the KR996 vehicle in comparison with a schematic view of the '891 Patent to illustrate they are similarly not directly attached. In particular, that each configuration is an assembly that includes a four-bar mechanism.



EX1005, Fig. 9  
(annotated)



EX1001, Fig. 3  
(annotated)

79. Note, one side of the loader (one boom 44 (arm) of the loader 40) is highlighted above to illustrate the lack of direct attachment between the loader and the loader support. The same configuration is provided on the opposing side. See EX1005, Figs. 1, 5, 11. Further, POSITA would have recognized advantages to providing the same configuration on each of two opposing sides of the vehicle and the loader unit. This allows for a balanced weight profile, important for mitigating the risk of tipping. Obviously, the 4-bar configuration needs to be identical on either

side to allow for the system to move up and down. Also, the structural rigidity of the two 4-bars needs to be the same to ensure that they experience generally the same amount of deflection under load thus preventing the possibility of the mechanisms' binding. Furthermore, identical configuration of the 2 actuators allows for a more even actuation load distribution.

**80.** To the extent the Patent Owner argues that the *loader support* is a contiguous piece or requires certain aspects to be a contiguous piece, this is an obvious configuration in view of POSITA's knowledge. As I discuss in claim 2, whether to form pieces as separate components or unitary pieces was a known design choice with predictable trade-offs. *See* Claim 2. *See also*, KR996 Fig. 21 suggests in its illustration of a singular piece that includes pivot point connections with each of the links and actuator. To the extent that the Patent Owner argues that the *loader support* or portion thereof has any specific configuration or shape, this is not what a POSITA would understand the term to require. Nonetheless, these are typical design choices in providing a frame or body of a vehicle. For example, components can be modified in shape to accommodate other features of the equipment such as a drive mechanism, operator area, safety fences or barriers, and the like and/or to provide a suitable attachment area. For example, the shape or extension of components such as a bracket into/out of the plane (e.g., a jog) may be determined based on the extent

desired to accommodate features or to provide a planar surface.

81. Thus, [1.3] is taught or rendered obvious by KR996.

**[1.4] *a first actuator for tilting of a tool connected to the loader;***

82. KR996 illustrates a bucket cylinder 49 that is a *first actuator*. EX1005, [0054] (“A boom (44) and a bucket attachment (47) are equipped with a bucket cylinder (49) that rotates the bucket (48)”), claim 1, Figs. 1, 4, 5, 7-9. A POSITA would recognize a cylinder is an actuator cylinder, or simply actuator. See, e.g., Bares (EX1010) 3:15-24 (“The cylinder 41 has a base end connected as at 42 to an upright strut 44 mounted on a cross member 70 that holds the lift arms 24A and 24B together to form the lift arm assembly. The rod end of **the actuator or cylinder** 41 is connected as at 46 to a bracket on the attachment plate 40. A bucket 48 is shown in position on the attachment plate 41, and this too is supported on the attachment plate 41 in a known manner.”)

83. The bucket 48 is *a tool connected to* the bucket attachment 47 of the loader unit 40, *the loader*. EX1005, claim 1, [0054], [0074]-[0075], Figs. 8-9; see also, EX1001, 1:40-41 (“tools such as buckets, augers...and the like.”).

84. KR996 describes that the operation of the bucket cylinder 49, *first actuator*, is for “rotat[ing]” the bucket 48. EX1005, [0054], claim 1, [0003]. A POSITA would understand and the KR996 figures illustrate rotating of the bucket

---

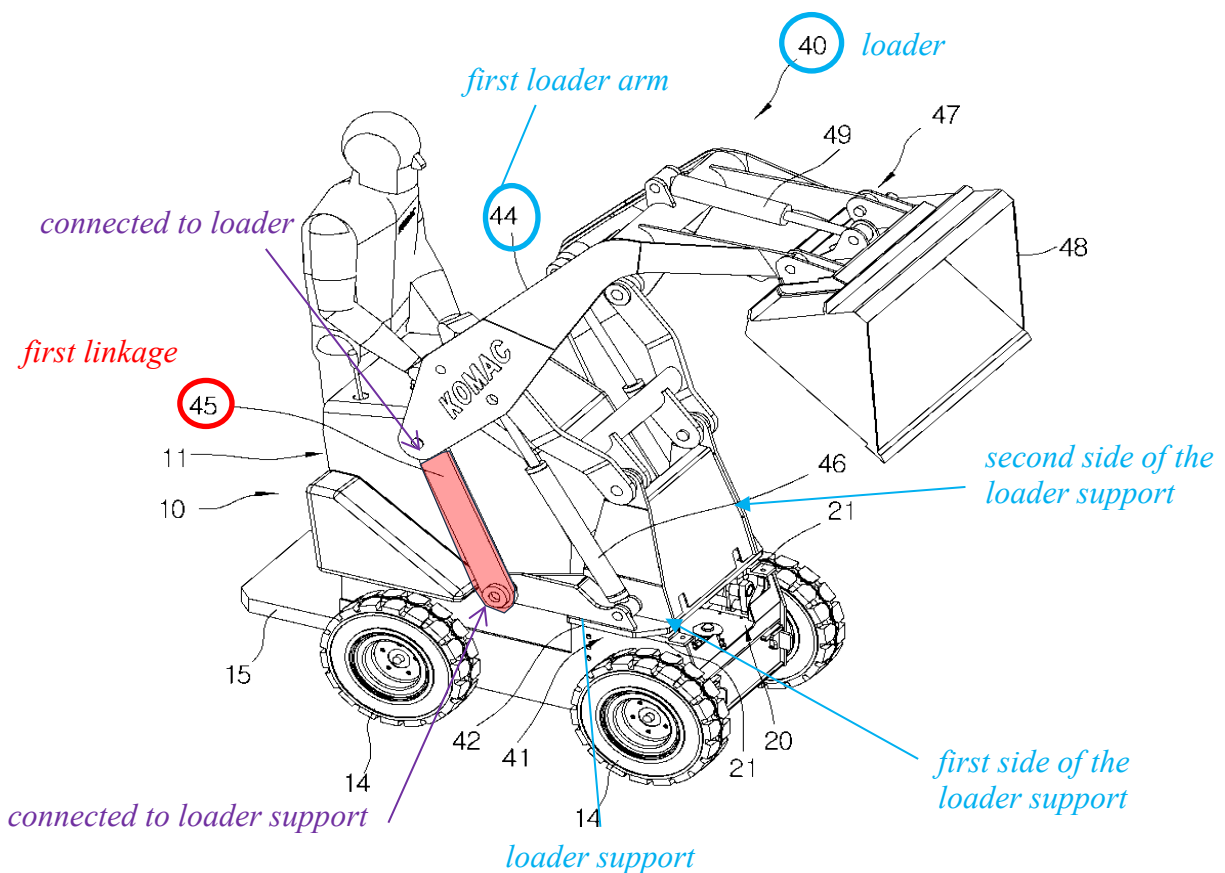
includes *tilting*. The function of the bucket and the loader includes carrying the load over a distance after which time the load is released by tilting the bucket. The common function of an actuator connected to the attachment plate provides this tilt to the bucket. Bares '568 (EX1009), 2:6-10 (“... a cross member at the front end of the lift arms that also supports an upright strut for mounting a cylinder or actuator that is used for tilting the bucket or work implement.”). EX1008, 4:50-72 discusses the known function of tilting the bucket. EX1013, [0033] (“...hydraulic tilt cylinder 134 (see also FIG. 3) may extend between the attachment plate 132 and a cross-member 136 extending between the loader arms 110 to vary the angle of inclination of attachment plate (relative to loader arms)”). EX1010, 5:4-9 (“The quick attachment plate 124 is pivotally mounted on pivots 126, and can be controlled with a tilt cylinder shown schematically at 128 in FIG. 6, that is supported on a tilt cylinder upright support 130.”). Fig. 9 of KR996 illustrates the cylinder 49 extended with the bucket 48 tilted or with an angle of inclination downward compared to Fig. 8, which illustrates the cylinder 49 compressed with the bucket 48 at a substantially horizontal level.

85. Thus, [1.4] is disclosed by KR996.

***[1.5] a first linkage connected to the first side of the loader support and connected to the loader, the first linkage being pivotal relative to the first side of the loader support;***

**86.** KR996 illustrates a link 45 (*a first linkage*) *connected to the first side of the loader support and connected to the boom 44 of the loader 40 (loader).* EX1005, Figs. 5, 8-10, 21, [0054] (“A boom (44) connected by a link (45)...”), [0134].

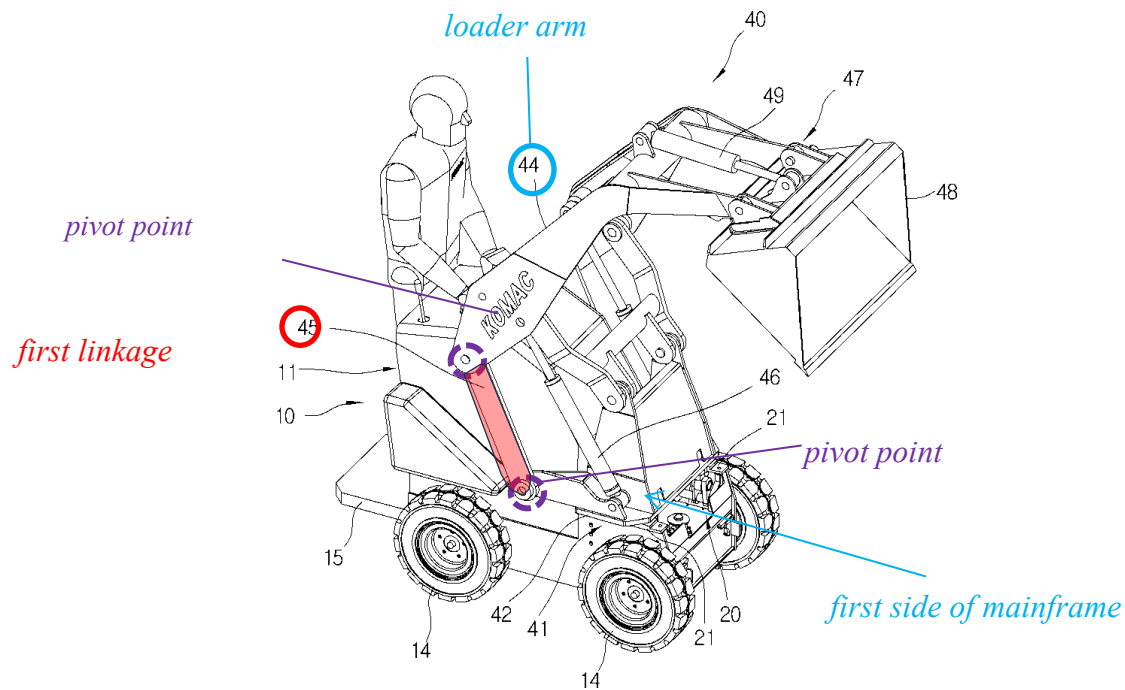
**87.** Fig. 9 is illustrative:



**EX1005, Fig. 9**  
**(annotated)**

**88.** The link 45 (*first linkage*) is *pivotal relative to the first side of the*

*loader support*. There are pivot point connections, each a point of relative rotation between the linkage 45 and each of the boom 44 (top end of link 45) and the frame (bottom end of link 45). The attachment at each end of the link is pivotable as it is a joint that allows for rotary motion. See KR996, Figs. 8, 9. The pivot point between the link 45 and the frame is a fixed or anchor pivot point; the pivot point between the link 45 and the boom 44 is a moving pivot point relative to the equipment as the loader 40 raises. These pivot point connections are standard in a four-bar mechanism. *See, e.g.*, EX1023, p. 6, EX1028, p. 21. That is, as described starting in paragraph 33, the four-bar mechanism contains two fixed pivot points and an imaginary fixed linkage between them, and the other 3 bars and 2 pivot points move relative to the fixed pivots.



**EX1005, Fig. 9**  
**(annotated)**

**89.** This is also confirmed by Beltrami, which also describes a similar mechanism for raising an arm as discussed below and discusses the connection between the linkage, which it refers to as connecting rod 23, and the frame as being “pivot point 24” and also provides a second pivot point at the opposing end of rod 23. Beltrami (EX1008), 3:12-34; FIG. 2; FIG. 3; 5:26-73.

**90.** This is consistent with '891 Patent's disclosure of a loader linkage (e.g., a loader linkage 46a or 50a) pivotally attached to the first side of the mainframe and pivotally attached to the loader arm. *See, e.g., '891 Patent*

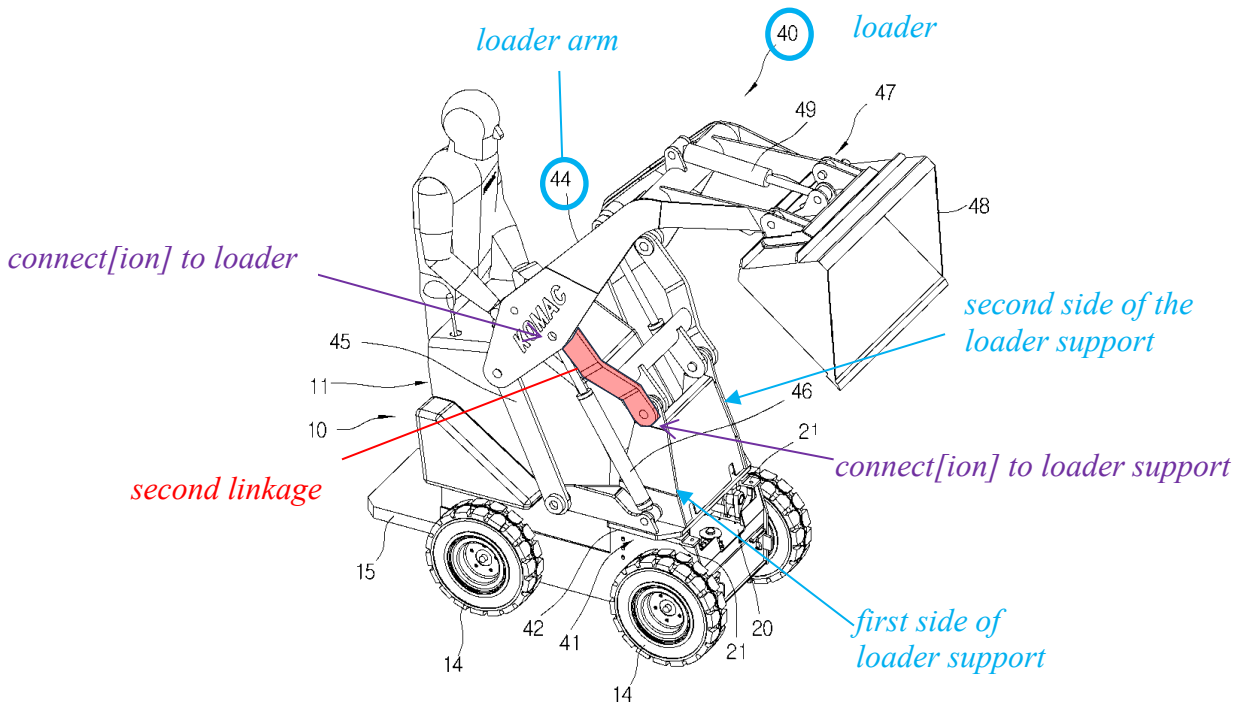
(EX1001), FIG. 3, 4:14-20. The KR996 bracket to which the link 45 is directly attached is part of the *loader support* as it supports the loader unit 40. See also, KR996's Fig. 21, which illustrates a first side of the loader support and the connections thereto.

91. Thus, [1.5] is taught by KR996.

**[1.6] *a second linkage connected to the first side of the loader support and connected to the loader, the second linkage being pivotal relative to the first side of the loader support;***

92. KR996 teaches this element.

93. KR996 also illustrates another link (*second linkage*) *connected to the first side of the loader support and connected to the boom 44 of the loader unit 40 (loader)*. EX1005, claim 1, [0054], [0134], Figs. 1-10. This link is forward of the link 45.



**EX1005, Fig. 9  
(annotated)**

**94.** See also, KR996's Fig. 21, which illustrates a first side of the loader support and the connections thereto.



57

---

point connections are standard in a four-bar mechanism. *See, e.g.*, EX1023, p. 6, EX1028, p. 21. That is, as described beginning in paragraph 33, the four-bar mechanism contains two fixed pivot points and an imaginary fixed linkage between them, and the other 3 bars and 2 pivot points move relative to the fixed pivots.

96. This is also confirmed by Beltrami, which also describes a similar mechanism for raising an arm as discussed below and discusses the connection between the linkage, which it refers to as connecting rod 23, and the mainframe as being “pivot point 24.” Beltrami (EX1008), 3:12-22; FIG. 2; FIG. 3; 5:26-73.

97. This is consistent with '891 Patent's disclosure of a loader linkage (e.g., a loader linkage 46a, 50a) pivotally attached to the first side of the mainframe and pivotally attached to the loader arm. *See, e.g.*, '891 Patent (EX1001), FIG. 3, 4:18-20.

98. Thus, [1.6] is taught by KR996.

***[1.7] a second actuator for raising the loader, the second actuator being connected to the loader support and connected to the loader, the second actuator being directly attached to the loader, the second actuator being pivotal relative to at least the first side of the loader support;***

99. KR996 discloses a boom cylinder 46 (*second actuator*) that “drives the boom” 44 of the loader unit 40. EX1005, [0054]; see also, EX1005, claim 1, [0134], Figs. 7-9, 21. A POSITA would recognize a boom cylinder is an actuator cylinder, or simply actuator. *See, e.g.*, Bares (EX1010) 2:66-3:1 (“The lift arm

Diagram illustrating the exploded perspective view of a loader arm assembly, showing the relationship between various components and their assembly points:

- 40**: Loader arm assembly (indicated by a blue line pointing to the main structure).
- 44**: Loader arm (indicated by a blue line pointing to the main structure).
- 45**: Loader arm support (indicated by a purple line pointing to the support structure).
- 46**: Actuator (indicated by a red line pointing to the hydraulic cylinder).
- 47**: Loader bucket (indicated by a blue line pointing to the bucket).
- 48**: Loader bucket (indicated by a blue line pointing to the bucket).
- 49**: Loader bucket (indicated by a blue line pointing to the bucket).
- 10**: Loader support (indicated by a purple line pointing to the support structure).
- 11**: Loader support (indicated by a purple line pointing to the support structure).
- 14**: Mainframe (indicated by a blue line pointing to the mainframe).
- 15**: Mainframe (indicated by a blue line pointing to the mainframe).
- 20**: Mainframe (indicated by a blue line pointing to the mainframe).
- 21**: Mainframe (indicated by a blue line pointing to the mainframe).
- 41**: Mainframe (indicated by a blue line pointing to the mainframe).
- 42**: Mainframe (indicated by a blue line pointing to the mainframe).

Additional labels and connections:

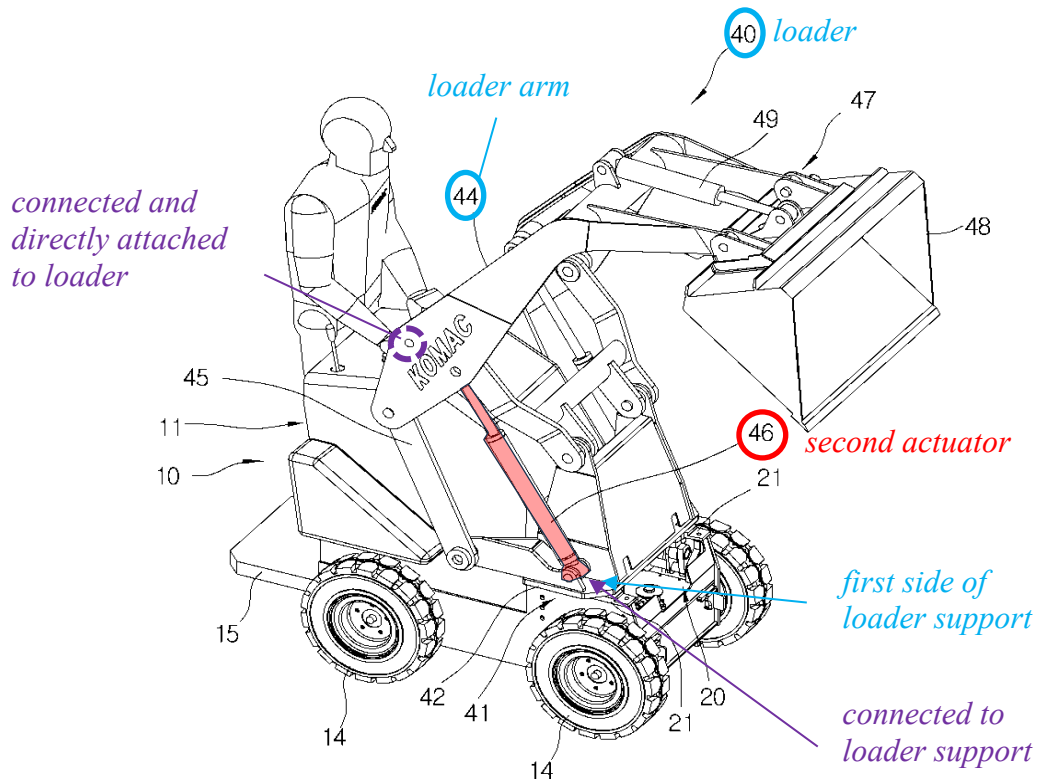
- connected to loader**: Indicated by a purple line pointing to the loader arm support (45).
- connected to loader support**: Indicated by a purple line pointing to the loader support (10).
- mainframe**: Indicated by a blue line pointing to the mainframe (14).
- actuator**: Indicated by a red line pointing to the actuator (46).

**100.** The second actuator being pivotal relative to at least the first side of

the loader support. This is illustrated by Figs. 8 and 9 of KR996. In particular, there are pivot point connections – points of rotation within mechanical systems - between the actuator and each of the boom 44 and the loader support. The attachment at each end of the actuator highlighted above is pivotable as it is a joint that allows for rotary motion, which is shown by KR996's Figs. 8-9. The pivot point between the boom cylinder 46 and the loader support is a fixed or anchor pivot point; the pivot point between the actuator and the boom 44 is a moving pivot point relative to the mainframe as the loader 40 raises. The boom cylinder 46 drives the movement of the boom 44. See KR996 (EX1005), Figs. 8-9. The pivot points are annotated with circles in Fig. 9 above.

**101.** This is also confirmed by Beltrami, which also describes a similar mechanism for raising an arm as discussed below and discusses the connection between the actuator, which it refers to as, in one example, hydraulic jack 28, being “pivotally connected to the vehicle at 30.” Beltrami (EX1008), 3:16-21; FIG. 2; 4:20-25; FIG. 3; 5:25-50. See also, my discussion of four-bar mechanisms beginning at paragraph 33 above.

**102.** The boom cylinder 46 (*second actuator*) is *connected to the loader support* at one end and *directly attached to the boom 44* that is part of the loader unit 40 (*loader*) at the other end. EX1005, Figs. 7-9. KR996's Fig. 9 below is illustrative:



**EX1005, Fig. 9  
(annotated)**

**103.** The boom cylinder 46 is *directly attached* to the boom 44 because there are no intervening components, rather the boom cylinder 46 is fastened to the boom 44 at a rotational joint just like the '891 Patent. EX1005, Fig. 8-9, 21, [0054]; EX1001, FIG. 3, 4:44-47.

**104.** Thus, [1.7] is taught by KR996.

**[1.8] a control station having operator controls for propelling the loader apparatus forward and for raising and lowering the loader; and**

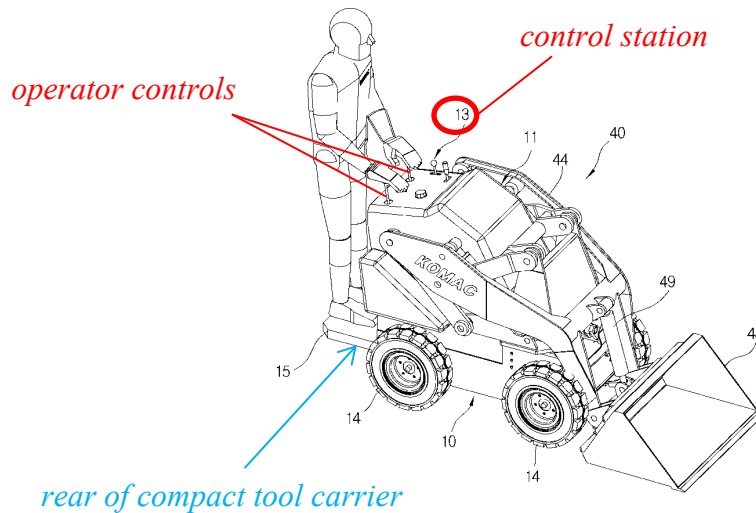
**105.** KR996 teaches this element.

**106.** KR996 describes a control unit 13 (*control station*) *having operator controls* to “operate the equipment while the worker is on board at the rear.” EX1005, [0042], Figs. 1, 8-9. The control unit 13 has *operator controls* for *propelling the compact tool carrier forward*. EX1005, Abstract (“when the vehicle moves forward and separates from the front side of the vehicle when the vehicle moves backward”), [0016]-[0017], [0072].

**107.** The control station 13 also controls the *raising and lowering* of the boom 44 (arm of *loader*): “When the loader unit (40) is coupled to the vehicle (10)...the **control unit (13)** of the vehicle (10) can be operated to **operate the loader unit (40)**.” EX1005, [0072]. Operating the loader is raising and lowering it. This is shown by KR996’s Fig. 7-9, which illustrate the boom 44 at different positions. Fig. 7 is a raised position. Fig. 9 is a raised position (at a greater lift height). Fig. 8 is a lower position. One function of KR996 vehicle is to raise the boom 44 and bucket attachment such that a load in the bucket can be placed on an elevated surface such as a dump truck. See KR996, [0006] discussing “load the waste onto the dump truck”.

**108.** The control station 13 is at the rear of the vehicle and accessible by an operator on the operator platform. EX1005, Figs. 8-9, 21, [0016] (“The construction equipment...includes a vehicle with a control unit **installed** operate

the equipment while a worker is on board at the rear.”)

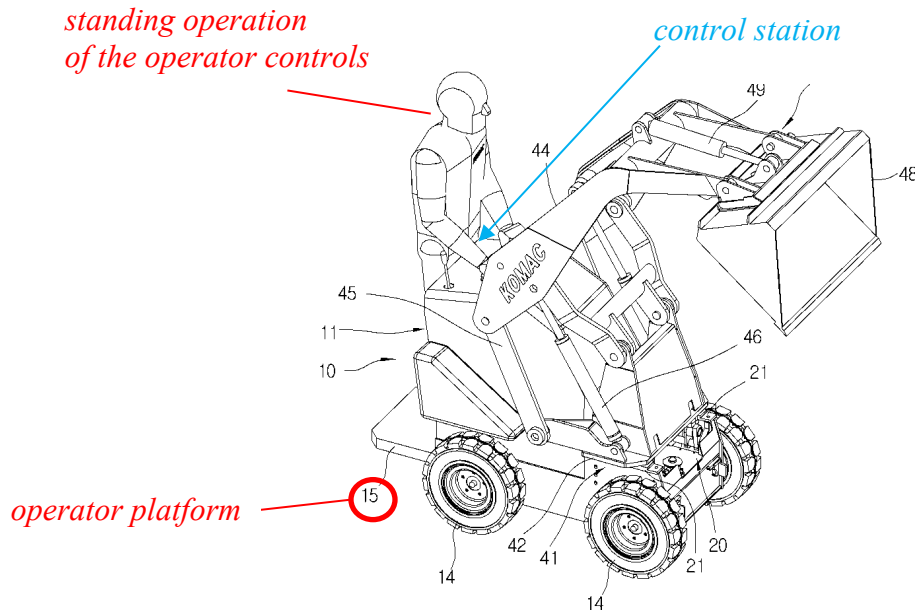


**EX1005, Fig. 8 (portion)  
(annotated)**

**109.** Thus, [1.8] is disclosed by KR996.

**[1.9] *an operator platform for standing operation of the operator controls of the control station;***

**110.** KR996 describes a safety step 15 (*operator platform*) for *standing operation of the operator controls* of the control unit 13 (*control station*) discussed in [1.8] above. EX1005, Figs. 1, 7-10, 21, [0033] (“a **foldable safety step** is installed on the lower rear part of the vehicle, allowing the **operator to board** and alight from the vehicle when driving and fold it towards the body of the vehicle when stopped.”), [0049], [0118].



**EX1005, Fig. 9  
(annotated)**

**111.** Thus, [1.9] is taught by KR996.

**[1.10]** *a drive mechanism for propelling the loader apparatus over a supporting surface, at least a portion of the operator platform being disposed rearward of the drive mechanism relative to a longitudinal axis of the loader apparatus; and*

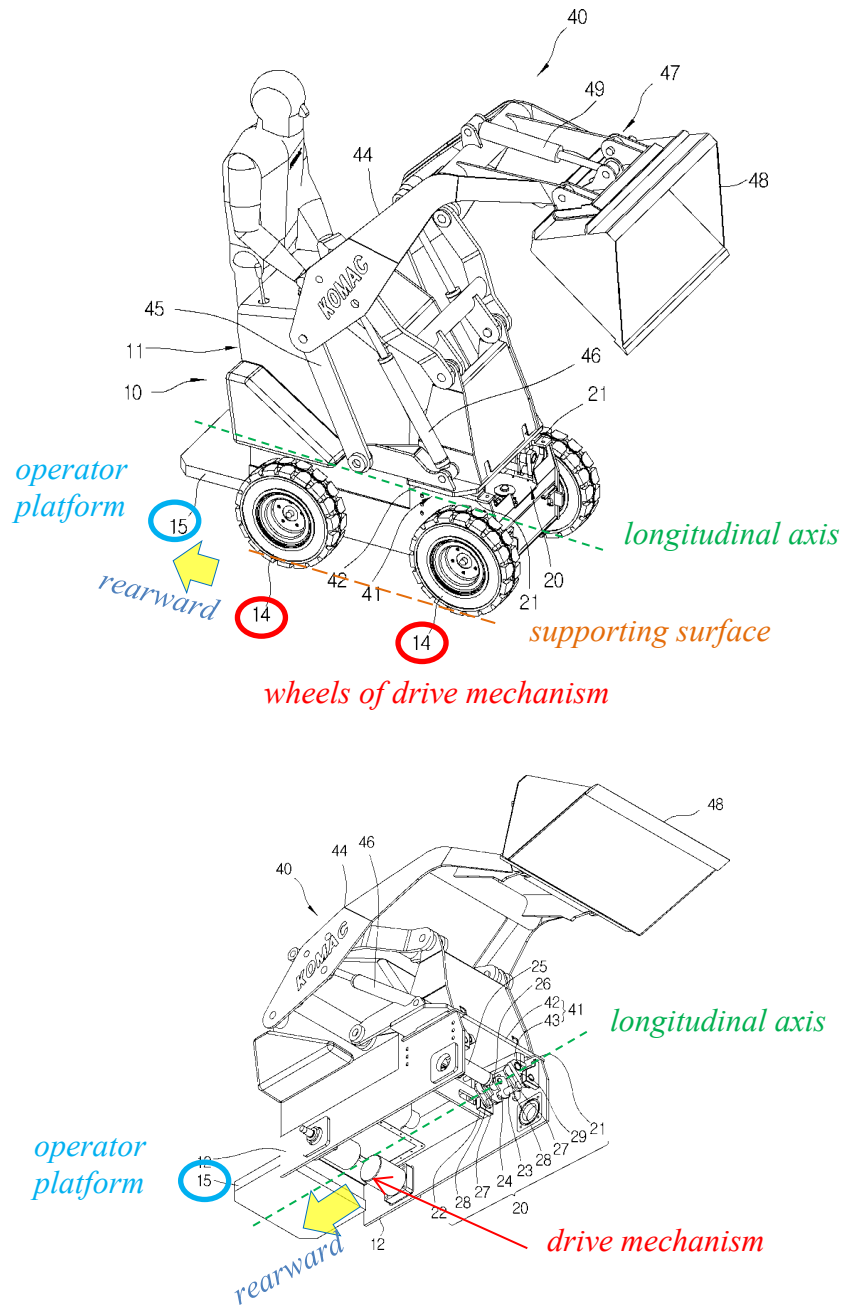
**112.** KR996 describes a drive mechanism including “wheels (14).” KR996 (EX1005), [0042], Figs. 1, 8-10.

**113.** The *drive mechanism* including wheels 14 is *for propelling the loader apparatus over a supporting surface*. This is the standard function of a drive mechanism and its wheels for self-propelled equipment. The operation of KR996’s vehicle is on a *supporting surface* such as a ground or a floor when performing its tasks. EX1005, [0002] (“operations such as building interior demolition, road

---

maintenance, snow removal, and towing, as well as quick and effective operations for fruit farming, gardening, and landscaping.”). And KR996’s vehicle moves forward/backward over this supporting surface. EX1005, [0016] (“The construction equipment for green building deconstruction work of the present invention to achieve the above object includes a vehicle with a control unit installed to **operate the equipment** while a worker is on board at the rear.”), (“when the vehicle moves forward [backward]”), [0036], [0050]. The propelling or moving backward/forward is by the drive mechanism. This is a standard vehicle operation. *See, e.g.*, EX1009 (Bares ’568), FIGS. 1-2, 2:34-47. EX1010 (Bares) 2:35-46.

**114.** Further, *at least a portion of the* safety step 15 (*operator platform*) of KR996’s vehicle discussed in element [1.9] is disposed *rearward of the drive mechanism* including wheels 14 *relative to a longitudinal axis of the loader apparatus*. Figs. 9 and 10 are illustrative of the platform being rearward of the drive mechanism.



**EX1005, Figs. 9, 10  
(annotated)**

See also, Fig. 10, Fig. 12 illustrating an engine for propelling the vehicle, claims 1,

2, [0002]-[0005] showing the vehicle is self-propelling. The presence of an engine, attached to the drive mechanism as illustrated by KR996 is confirmed by EX1014, a Korean patent publication having the same inventor, assignee, and directed to a substantially similar “green building deconstruction work” vehicle and further illustrating an engine. EX1014, (54), FIG. 3.

**115.** A POSITA would recognize an engine is a commonly implemented power source for these types of vehicles to provide the propelling. *See, e.g.*, ISO 6165 (EX1016), p. 7 (“self-propelled”), SAE J2752 (EX1015), p. 4 suggesting “engine” components; Azure (EX1013), [0003] “Walk-behind power machines such as wide-area lawn mowers and compact utility skid-steer loaders have been in use for some time. These vehicles generally include a frame having an engine that not only powers drive members, but an optional implement such as a cutting deck or trencher as well.”); EX1009 (Bares ’568), 2:32-48 (“a small loader indicated generally at 10 is a walk behind powered loader ...driven by an internal combustion engine 45...”).

**116.** Thus, KR996 discloses element [1.10].

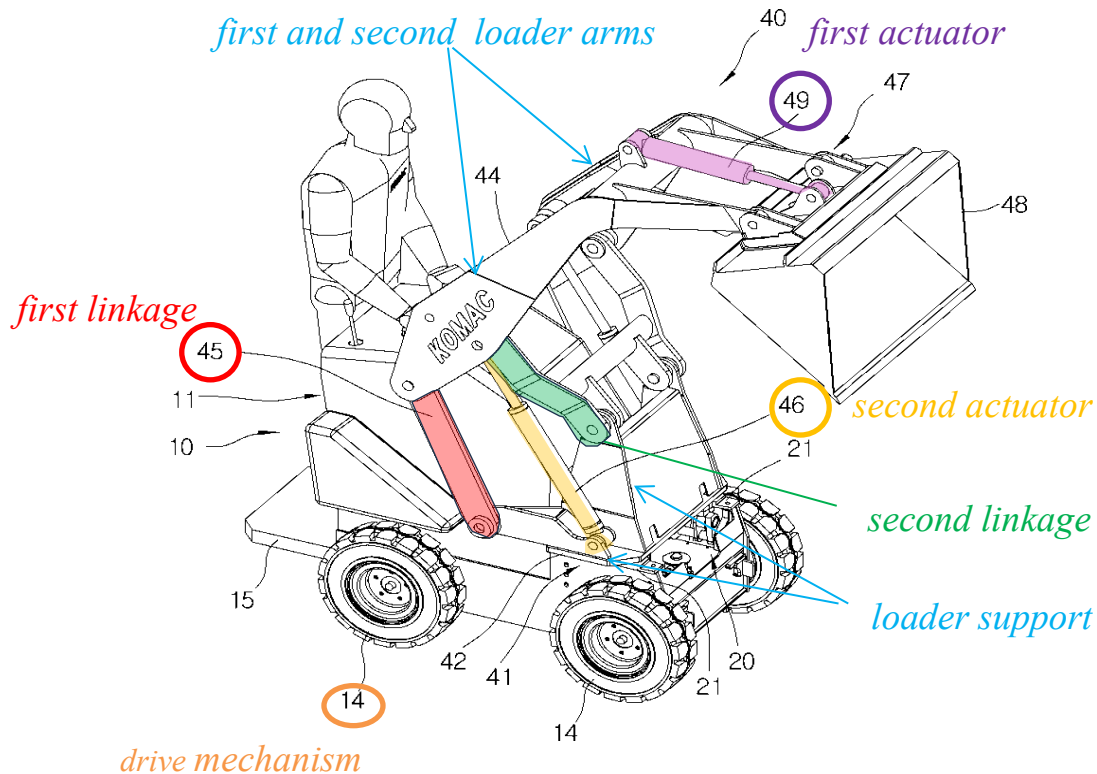
**[1.11] *wherein the loader apparatus does not include an operator's seat.***

**117.** KR996 discloses this element.

**118.** The vehicle of KR996 *does not include an operator's seat*. Rather, as

discussed above, the operator is at a standing position on the safety step 15 during the vehicle's operation. EX1005, [0090] (“... the driver, **who is standing** upright, ... during operation.”); [0049]; [0033]; Figs. 1, 8-9, 21, claim 19. Further, no seat is shown in KR996's illustrations.

**119.** Therefore, KR996's vehicle providing stand-behind operation from a step 15 (*operator platform*), without a seat, and a loader unit 40 (*loader*) with two booms 44 (*first and second loader arm[s]*) attached by links 45/unlabeled (*first and second linkage[s]*) and boom cylinder 46 (*actuator*) along with the other elements discussed above discloses or renders obvious claim 1.



**EX1005, Fig. 9**  
**(annotated)**

120. Thus, claim 1 is disclosed or rendered obvious by KR996.

### 3. Claim 2

**[2] The loader apparatus as set forth in claim 1 wherein the loader support incorporates a single weldment.**

121. KR996 discloses or renders obvious claim 1 and further describes this limitation. The '891 Patent does not define a "single weldment," but does, with respect to a different component, contrast a "single weldment" with use of "fasteners (e.g., nuts and bolts)." See EX1001, 2:66-3:1.

**122.** KR996 describes a loader support that would be recognized as incorporating a single weldment as this is a common technique for forming a frame such as illustrated in KR996.

**123.** A POSITA would have found it obvious to form one or more portions of the loader support of KR996 as a *single weldment* because use of welding to join components of a support frame for a loader apparatus was a well-known method of fabrication. There are numerous examples of implementing a welding technique in substantially similar compact tool carriers. Bares, EX1010, 4:8-34 (“The body or frame 12, as shown, is a unitized welded body that includes side walls 90A and 90B extending in fore and aft direction.... The body 12 is fully welded together with the components...”). And implementing welding in other earth-moving vehicles known to have vertical lift mechanisms was typical. See Yasuda (EX1022) 4:50-11:25 discussing “welding.” See also, EX1006 discussing a suitable mainframe [0020] (“general mounting means such as welding or the like,”) [0016] (“enabling welding work to be stably performed, easily and efficiently,”)

**124.** A POSITA would recognize that there are known trade-offs in the engineering or design choice between a single weldment and attachment by, for example, nuts and bolts. These factors include aesthetics (e.g., a weld can provide

a smooth surface), ease of manufacturability of the component (*e.g.*, welding is a simple, easy to apply process), reliability of the attachment, positioning the surrounding components (*e.g.*, placement of the engine in the loader apparatus), replaceability of parts, structural rigidity, and/or costs. One benefit of connecting pieces by a weld allows for forming a smooth, continuous surface. JP705 (EX1006), (“attaching means such as welding...to form a smooth, continuous surface.”) [0031]. And this reduction of parts allows for a reduction in component costs and weight. JP705 (EX1006), [0008]. In addition to reducing the number of parts, welding connections can reduce the need for additional intermediate fasteners that could loosen over time thus reducing both the security of the attachment and the corresponding structural rigidity of the system. JP705 describes enabling welding work to be stably performed, easily and efficiently. [0016].

**125.** To the extent Patent Owner argues certain components of the mainframe are required to be coupled by a weldment, POSITA would have been motivated to form KR996’s mainframe consisting of a *single weldment* because the fastening method was well within their skill set and provides benefits discussed above to predictably form a welded structure. EX1006, [0019] (“The main frame 1 is construed from case steel for welding construction); EX1010, 4:8-10, 4:31-34 implementing a unitary frame on a compact loader (“The body or frame 12, as

shown, is a unitized welded body that includes side walls 90A and 90B extending in fore and aft direction.... The body 12 is fully welded together with the components...”)

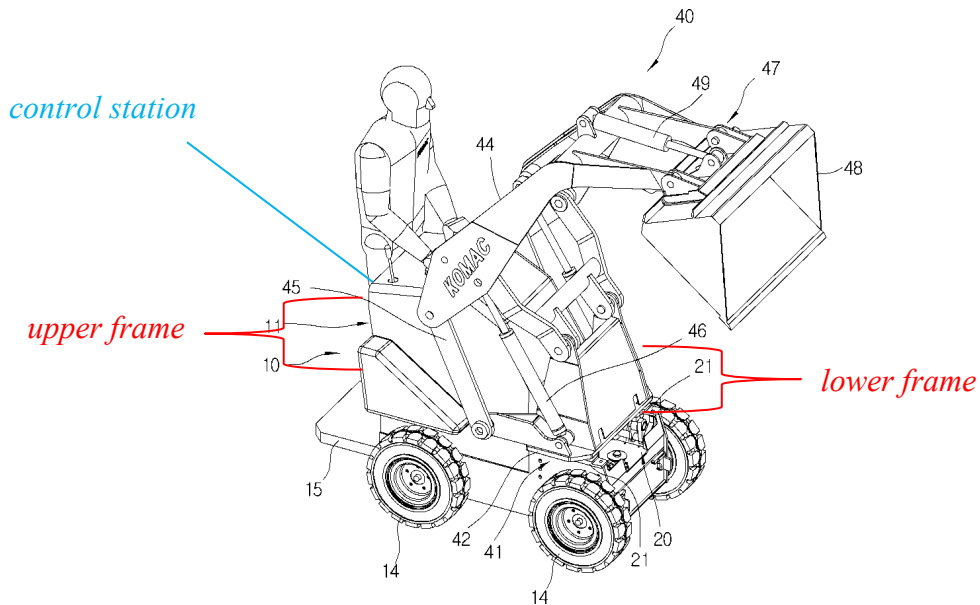
126. Thus, claim 2 is disclosed or rendered obvious by KR996.

#### 4. Claim 3

**[3] *The loader apparatus as set forth in claim 1 wherein the loader support comprises a lower frame and an upper frame, the control station being mounted to the upper frame.***

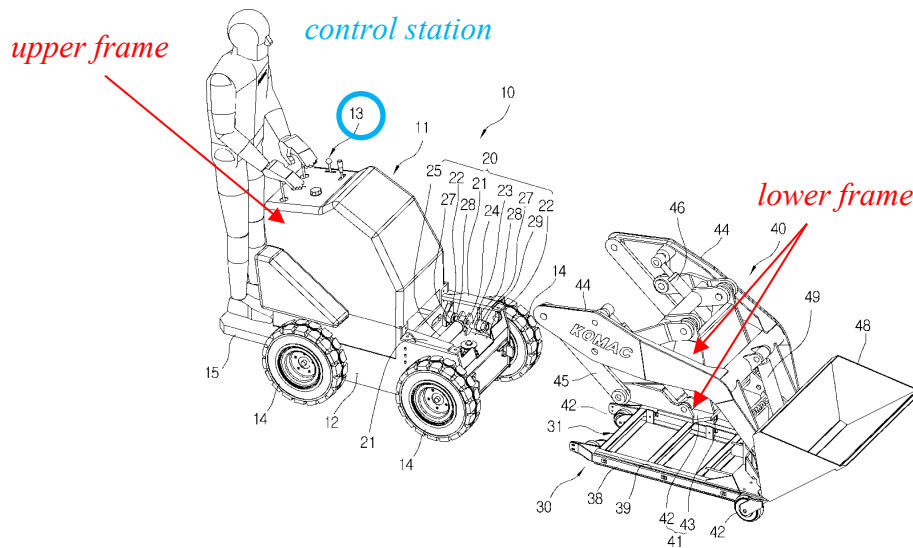
127. KR996 discloses or renders obvious claim 1, and KR996’s *loader support* also includes *a lower frame* and *an upper frame*. To the extent that these terms are merely relative designations of portions of the body forming the equipment, the body of the equipment of KR996 similarly includes an *upper frame* and a *lower frame*.

128. The control unit 13 (*control station*) is *mounted* on the main body 11, which forms at least part of the *upper frame*. KR996 (EX1005), [0017] (“a control unit **installed**...”).



**EX1005, Fig. 9**  
**(annotated)**

**129.** I have reviewed the '891 Patent and it does not use the term "lower frame" in its specification and while providing no definition of "upper frame," in its FIG. 7 includes "an upper frame 39." See '891 Patent (EX1001), 4:5-7. To the extent Patent Owner asserts the *upper frame* and *lower frame* must be separable, KR996 teaches this. Fig. 1 illustrates a portion of a main body 11 (*upper frame*) separable from a portion of the loader support having the pivot point attachments with the linkages/actuator to the *lower frame*, just like the '891 Patent's illustration.



**EX1005, Fig. 1**  
**(annotated)**

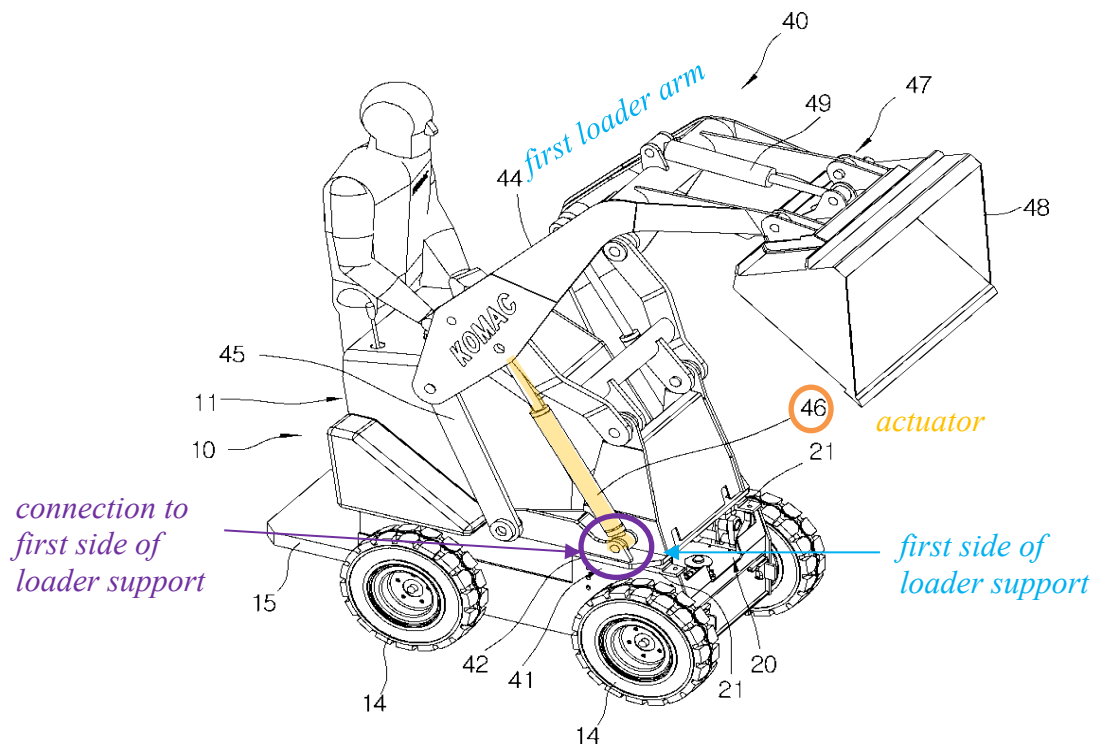
As discussed above, to any extent that the Patent Owner argues that certain of its claim terms require integral formation despite the silence of its specification, it would have been obvious. These are merely design choices with predictable trade-offs between separability and contiguous structures with impacts to their ease of fabrication, replacement, structural rigidity, fastening component requirements, and the like. See, e.g., claim 2.

**130.** Thus, claim 3 is disclosed or rendered obvious by KR996.

## **5. Claim 4**

**[4]** *The loader apparatus as set forth in claim 1 wherein the second actuator is connected to the first side of the loader support.*

131. KR996 discloses or renders obvious claim 1, and KR996 also discloses its boom cylinder 46 (*second actuator*) discussed in element [1.7] is connected to *the first side of the loader support*. EX1005, [0054], Figs. 1, 7, 9, 10, 21. Fig. 9 is illustrative:



**EX1005, Fig. 9  
(annotated)**

132. See also, KR996's Fig. 21, which illustrates a first side of the loader support and the connections thereto.

133. Thus, KR996 discloses or renders obvious Claim 4.

## 6. Claim 5

**[5] *The loader apparatus as set forth in claim 1 wherein the loader apparatus comprises:***

***a third linkage connected to the second side of the loader support and connected to the loader, the third linkage being pivotal relative to the second side of the loader support;***

***a fourth linkage connected to the second side of the loader support and connected to the loader, the fourth linkage being pivotal relative to the second side of the loader support; and***

***a third actuator for raising the loader, the third actuator being connected to the loader support and connected to the loader, the third actuator being pivotal relative to at least the second side of the loader support.***

**134.** KR996 discloses or renders obvious claim 1 and KR996 also discloses these elements. This is because Claim 5 merely recites the configuration of the loader with respect to the second side of the loader support. In KR996, the loader unit 40, *loader*, includes a second loader arm (boom 44) (see element [1.2]) that is attached to the *second side of the loader support* (opposing side of KR996's frame/body) (see [1.3]). The opposing side of the loader unit 40 is connected in the same manner as the first side of the loader support.

**135.** Each side of the KR996 vehicle has the same loader support configuration. That is, the same vertical lift mechanism based on a four-bar configuration, is present on each side of the vehicle attaching the first boom 44 to the frame on the first side and attached the second boom 44 to the frame on the second side in a symmetrical configuration. See KR996, Figs. 1, 3, 5, 9, 11

illustrating each side has the same function. Further, there is an advantage to providing the same configuration on each side of the vehicle. Providing symmetry allows for a balanced loader apparatus. With symmetric 4-bar mechanisms, the working load is distributed along both sides of the machine. Also, an off-center working load has the potential to twist the arm of a system with a single mechanism; thus the loader arm would need to be much stiffer in torsion adding weight and dimension to the machine. A symmetric dual 4-bar system allows for 2 smaller actuators than a single mechanism system.

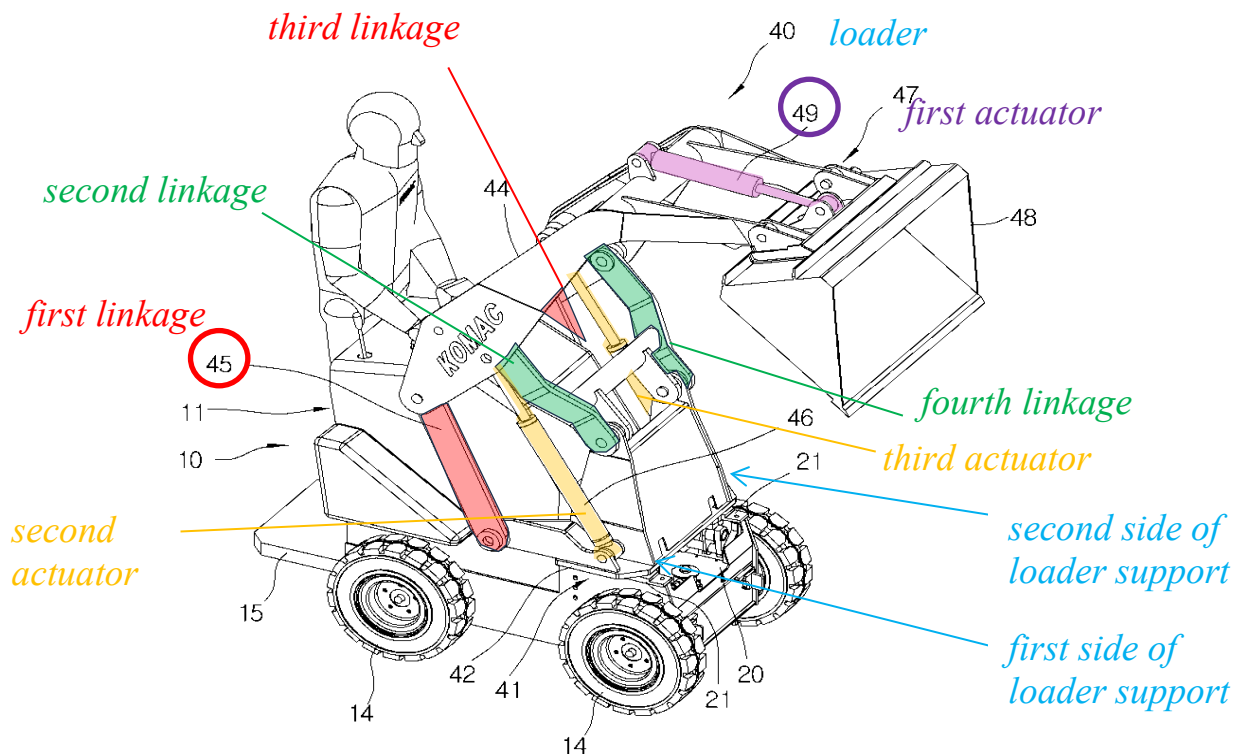
**136.** Thus, KR996's second link 45 on the opposing side of the loader from that discussed in element [1.5] is *a third linkage connected to the second side of the loader support and connected to the loader, the third linkage being pivotal relative to the second side of the loader support* for the same reasons as discussed above. See also, KR996, Fig. 2, which illustrates the link 45 attached to the boom 44 and loader support on relative to the *second side*.

**137.** And KR996's forward link on the opposing side of the loader from that discussed in element [1.6] is *a fourth linkage connected to the second side of the loader support and connected to the loader, the fourth linkage being pivotal relative to the second side of the loader support* for the same reasons as discussed above. See also, KR996, Figs. 1, 9, which illustrate the forward link attached to the

boom 44 and loader support on relative to the *second side*.

**138.** Similarly, KR996's boom cylinder 46 on the opposing side of the loader from that discussed in element [1.7] is a *third actuator for raising the loader, the third actuator being connected to the loader support and connected to the loader, the third actuator being pivotal relative to at least the second side of the loader support* for the same reasons as discussed above. See also, KR996, Figs. 1, 9, 11, which illustrate the boom cylinder 46 relative to the *second side*.

Fig. 9 is annotated for illustration.



**EX1005, Fig. 9  
(annotated)**

**139.** Thus, claim 5 is disclosed or rendered obvious by KR996.

## 7. Claim 6

**[6] *The loader apparatus as set forth in claim 5 wherein the second actuator is connected to the first side of the loader support and the third actuator is connected to the second side of the loader support.***

140. KR996 discloses or renders obvious claim 5 and further describes boom cylinder 46 (*second actuator*) of element [1.5] is connected to the *first side of the loader support* as shown in claim 4. And another boom cylinder 46 (*third actuator*) as discussed in claim 5 drives a second boom 44 arm and is attached to a *second side of the loader support*. KR996, Figs. 1, 8-11. As I discussed above, the two sides of the vehicle have the same loader mechanism configuration. Thus, a POSITA would recognize that boom cylinder 46 (*third actuator*) *connected to the second side of the loader support* in the same way as illustrated for the opposing side and boom cylinder 46. *See* KR996, Figs. 9, 11. That is, a pivot point connection to a bracket of the loader support.

141. Thus, claim 6 is disclosed or rendered obvious by KR996.

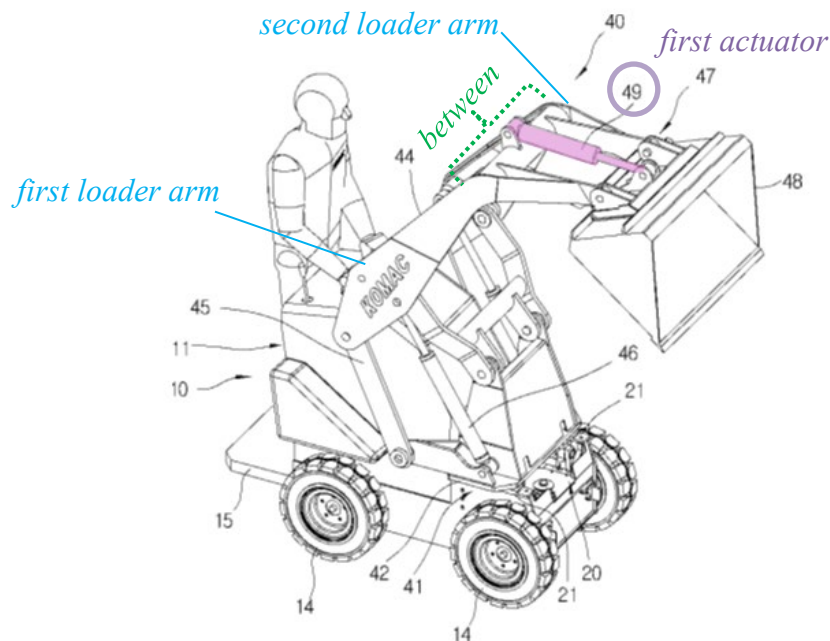
## 8. Claim 7

**[7] *The loader apparatus as set forth in claim 1 wherein: the first actuator is at least partially disposed between the first loader arm and the second loader arm; and each cross-member is disposed forward of the operator platform relative to a longitudinal axis of the loader apparatus in the vertically raised position of the loader.***

142. Claim 1 is disclosed or rendered obvious by KR996, which also

discloses this element.

**143.** First, KR996's bucket cylinder 49, a *first actuator* as discussed in element [1.4], is *at least partially disposed between* the first and second booms 44, *the first loader arm and the second loader arm*.

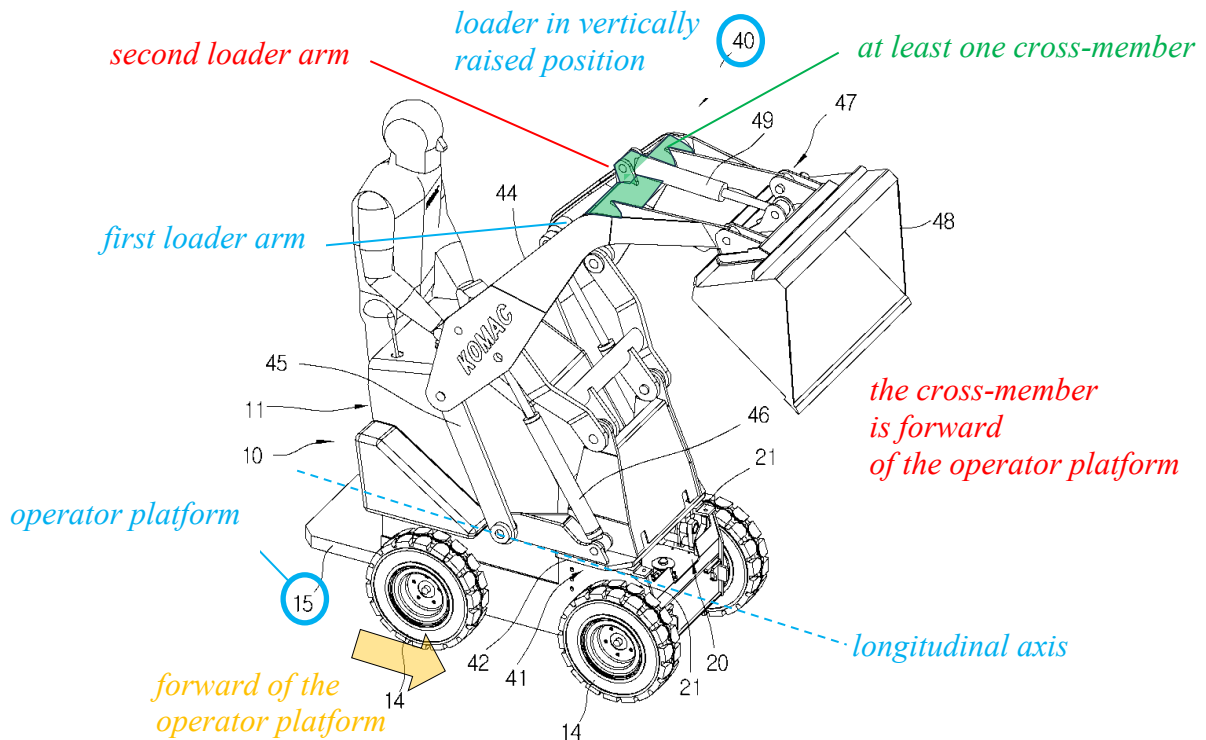


**EX1005, Fig. 9  
(annotated)**

This is a standard configuration of a loader to have the actuator providing a tilt of the bucket to be attached to the cross-member extending between the loader arms. See, e.g., EX1010 (Bares), FIG. 2. EX1013, [0033] (“...hydraulic tilt cylinder 134 (see also FIG. 3) may extend between the attachment plate 132 and a cross-member 136 extending between the loader arms 110 to vary the angle of inclination of

attachment plate (relative to loader arms)"). EX1010, 5:4-9 ("The quick attachment plate 124 is pivotally mounted on pivots 126, and can be controlled with a tilt cylinder shown schematically at 128 in FIG. 6, that is supported on a tilt cylinder upright support 130.").

**144. Second,** KR996 illustrates a cross-member (*at least one cross-member*) that extends between arms of the loader unit 40 as annotated below and discussed in [1.2] above. KR996, [0054], Figs. 1, 5, 7-9. And KR996 shows this cross-member (*each cross-member of the at least one cross-member*) is *disposed forward of the safety step 15 (operator platform) relative to the longitudinal axis* when the loader unit 40 is *in the vertically raised position* (e.g., Fig. 9, [0101]).



**EX1005, Fig. 9**  
**(annotated)**

145. Thus, claim 7 is disclosed or rendered obvious by KR996.

## 9. Claim 8

**[8] The loader apparatus as set forth in claim 1 wherein the loader apparatus has a mass of less than 1500 kg.**

146. Claim 1 is disclosed or rendered obvious by KR996, and KR996 also discloses or renders obvious this element.

147. A POSITA would readily appreciate the KR996 vehicle has a mass of less than about 1500 kg based on its illustrations, suitable tasks, and operator position. This is because KR996 describes its functions as “building interior

---

demolition,” “effective operations for fruit farming, gardening, and landscaping,” “suitable for narrow spaces.” KR996 (EX1005), [0002]. And the standing operator platform suggests a light-weight carrier, illustrated with a scale with respect to a human.

**148.** Further, recognized standards covering the KR996 vehicle define a weight of less than about 1500 kg, as recognized by the '891 Patent. EX1016, Organization for Standardization (ISO) 6165 (2012), p. 7 states compact tool carriers having an operator standing platform are less 1500 kg. EX1015, Society of Automotive Engineers (SAE), J2752 June 2010, p. 2 confirms “an operating mass of less than 1500 kg.” *See also*, '891 Patent (EX1001) in its Background Section (1:27-39) that states “tool-mounted machines that are capable of working in tight spaces for utility...[and are] walk-behind units of include a platform on which the operator may stand during use [] are **generally defined** [as] having **an operating mass of less than 1500 kg.**”<sup>4</sup> Thus, a POSITA would recognize a benefit to keeping the weight of KR996 vehicle less than 1500 kg to comply with the relevant standards as well as provide a maneuverable vehicle.

**149. Second** to the extent it is that Patent Owner argues that claim 8 is not

---

<sup>4</sup> All bold emphasis in quotations is added.

anticipated by KR996, a POSITA would have found it obvious to make the KR996 vehicle *less than 1500 kg* to better perform its functions requiring maneuverability for quick and efficient operations and to be in line with the standards. Light weight frames are well known. EX1006. And POSITA would have had reason to provide the weight of the vehicle in line with the industry standards related to the vehicle type to ensure compliance with the standards. EX1015, EX1016.

**150.** Thus, claim 8 is disclosed or rendered obvious by KR996.

**10. Claim 10**

**[10]** *The loader apparatus as set forth in claim 1 wherein the loader apparatus comprises a single actuator for tilting of a tool connected to the loader, the first actuator being the single actuator.*

**151.** Claim 1 is disclosed or rendered obvious by KR996, which also discloses this element.

**152.** As discussed in [1.4] above, KR996 illustrates a bucket cylinder 49 that is a *first actuator* that *tilt[s]* a bucket 48, a *tool*, that is *connected to* the loader unit 40, *loader*. EX1005, Fig. 1, 7-0, [0054], claim 1. The bucket cylinder 49 is a *single actuator*. Thus, KR996 shows the *first actuator comprises a single actuator*. This is the same configuration as the '891 Patent, which illustrates in its Fig. 1, one actuator extending from the cross-member to the attachment plate. This is a common configuration with one actuator centrally attached to the tool attachment

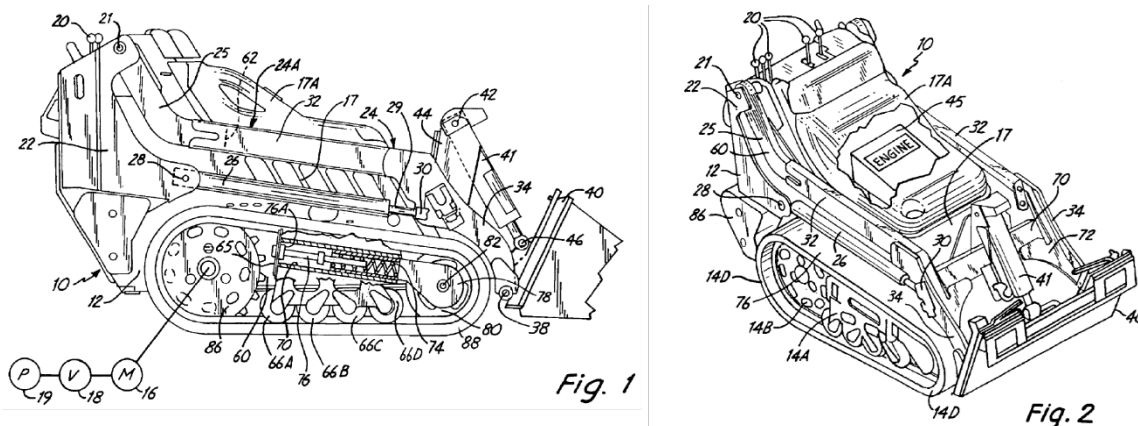
plate. EX1009, FIG. 2, 3:31-39.

**153.** Thus, KR996 discloses or renders obvious claim 10.

**D. Ground 3 : KR996 and Bares**

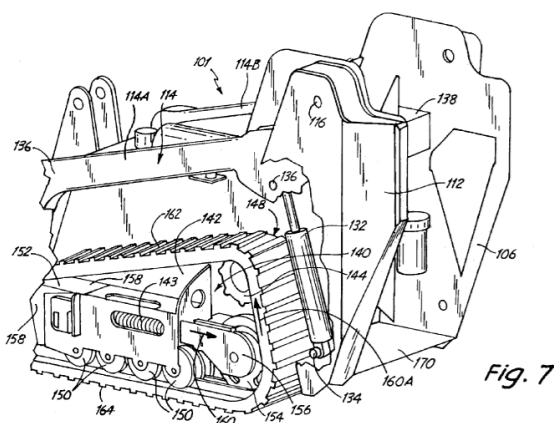
**1. Bares (EX1010)**

**154.** Bares “relates to a small...walk behind loader that is, in the form shown, track propelled.” Bares (EX1010), 1:33-35. Bares provides a first embodiment illustrated by side and perspective views in FIGS. 1-2, reproduced below. Bares (EX1010), 2:14-16.



**EX1010, FIGS. 1, 2**

**155.** A track assembly 14 is on each side of the loader for propelling the loader in a forward or reverse direction through use of drive hydraulic motors indicated generally at 16, which are operated through a pump 19 “driven by an internal combustion engine 45 mounted on the [frame] 12.” Bares (EX1010), 2:35-



**EX1010, FIGS. 6, 7**

## 2. Reasons to Combine KR996 and Bares (KR996-Bares)

86

---

FIG. 21; EX1010, 5:55-57, FIGS. 1-8; EX1001, 1:27-41, 2:54-3:15, FIG. 1. KR996, Bares, and '891 Patent are also each reasonably pertinent to a same problem faced by the inventor of configuration of loader arms and tools attached thereto to provide efficient lifting of the tool. EX1005, [0011], [0016], FIG. 21; EX1001, 1:47-49; EX1010, 1:46-58.

**158.** A POSITA would have been motivated to combine the teachings of Bares with KR996 to produce a predictable and beneficial configuration of a track assembly on the vehicle. The simple substitution of Bares' track assembly for the wheels in the KR996 vehicle would have been predictable with a reasonable expectation of success because both KR996 and Bares relate to similar vehicle types with a similar mainframe having a drive mechanism attached thereto.

**159.** Designing this vehicle type with a drive mechanism of either a wheeled assembly or a tracked assembly was a known alternative. See Rorabaugh (EX1032) (U.S. Patent Appl. 2010/0168933), [0011], which describes a compact tool carrier having a track or "[a]lternatively, ...a wheeled unit." Bares itself recognizes that wheel and track assemblies were known alternatives. Bares (EX1010), 2:1-2. Bares '568 (EX1009), 4:30-39 ("[t]he propulsion system for moving the loader is disclosed specifically as a track unit. However, skid steer loaders are commonly mounted on wheels...Thus the propulsion system that supports the loader for

---

movement can be sets of wheels mounted in place of the tracks shown.”). Industry standards for compact tool carriers also recognize these two common alternatives: “self-propelled crawler [tracked assembly] or wheeled machine.” SAE J2752 (EX1015), p. 2, ISO 6165 (EX1016), p. 5 (“self-propelled [] machine on wheels, crawlers or legs...”.) A crawler is a track assembly. EX1033, FIG. 1, [0020]-[0021].

**160.** It was a known practice to market compact tool carriers such as KR996 and Bares to provide the buyer a choice of a wheel configuration or a track configuration. The buyer’s choice may be dependent upon the target terrain for the carrier’s use. For example, depending on the terrain, a buyer may choose a tracked assembly for example, if targeting applications with a more diverse or rocky terrain. KR996 provides for use in deconstruction work, which can provide uneven terrain and debris that its vehicle must traverse, which would benefit from a tracked configuration. The traction provided by a tracked configuration is also typically greater than the traction provided by wheeled configurations. Tracked vehicles spread their ground load over a much greater surface area than wheeled vehicles. This results in lower pressure over the ground and less likelihood of the vehicle sinking on soft surfaces such as mud. Moreover, the significantly larger contact patch (surface area in contact with the ground) allows for much higher torque transmitted to the ground without slippage, i.e., better traction. Also, by having a

continuous tread, tracked vehicles have the ability to cross holes and trenches in which wheels would sink.

**161.** In some desired applications for the vehicle, a POSITA would have had reason to replace the wheel configuration, which can provide higher pressure to the supporting surface of the vehicle, with a track configuration, which can provide a reduced pressure to the supporting surface. The choice to provide the tracked configuration can be driven by the surface composition and/or need to mitigate impact to said surface intended for the vehicles use. For example, track configuration, providing lower ground pressure, can be advantageous on soft surfaces.

**162.** A POSITA would have recognized a reasonable expectation of success in providing a tracked assembly on the KR996 vehicle as track assemblies were well known in the art and perform the same function as the wheel mounted drive mechanism illustrated in KR996. This is simple substitution of one known, equivalent element for another to obtain predictable results and performing the same function. And Bares describes its track assembly can be easily installed. Bares (EX1010), 1:8-16.

### **3. Claim 9**

**[9] *The loader apparatus as set forth in claim 1 wherein the loader apparatus comprises a drive mechanism for propelling the loader apparatus over a***

---

*supporting surface, the drive mechanism having a drive sprocket defining a rotational axis R, at least a portion of the operator platform being disposed rearward to the rotational axis R relative to a longitudinal axis of the loader apparatus.*

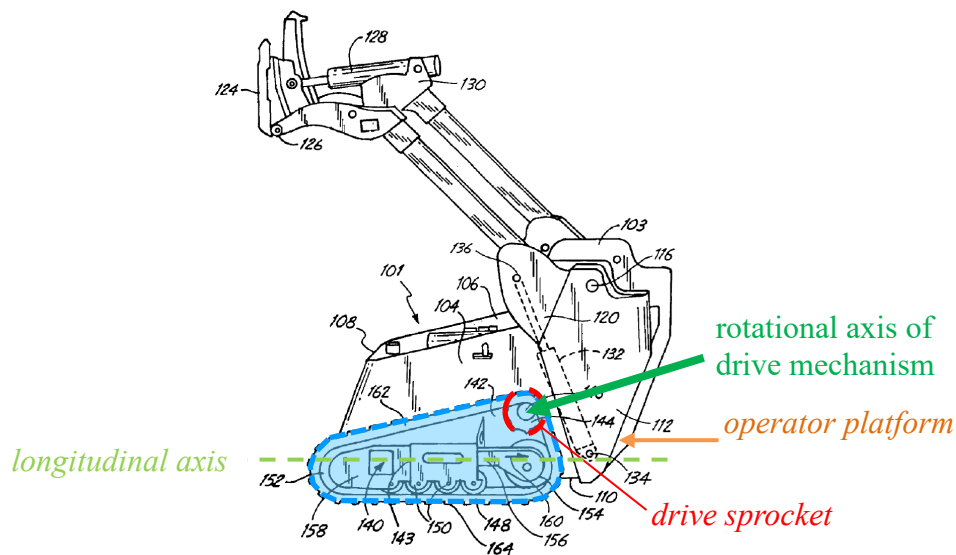
163. KR996 discloses or renders obvious claim 1 and in combination with Bares renders obvious this element. For this declaration, I have assumed the drive mechanism of claim 9 is referring to the drive mechanism introduced in claim 1.

164. KR996 describes a drive mechanism including “wheels (14)” for *propelling its compact tool carrier over a supporting surface (e.g., ground)*. EX1005, [0042], Figs. 1, 8-10. It would have been obvious, as a simple substitution for the wheeled assembly of KR996, to provide Bares’ track assembly drive mechanism for the reasons discussed above.

165. Bares illustrates track assembly (*drive mechanism*) for *propelling* a small loader vehicle. EX1010, Figs. 1, 8, 2:36-37, 3:24-32, 5:18-43. In an embodiment of Bares, each track assembly includes a frame 142, a drive sprocket 144 (*drive sprocket*) and wheels 150, 154 over which a track 148 is mounted. EX1010, 5:18-42, FIGS. 6-8. Bares’ drive sprocket 144 driven by motor 146 and rotates around *a rotational axis R*, just like in the ’891 Patent. Bares explains its drive mechanism is *for propelling the loader apparatus over a supporting surface*. See EX1010, 2:37-39 (“**[ground drive] assembly []**” on each side of the loader for

propelling the loader in forward and reverse directions.”), 5:18-43 (“to power the unit and propel it over the ground.”) Bares’ drive mechanism as illustrated and on KR996’s provides these same features.

166. Bares also teaches providing its drive mechanism such that *at least a portion* of an operator platform of a compact tool carrier is *disposed rearward to the rotational axis R* relative to a longitudinal axis of the loader apparatus. Bares’ apparatus “can be used as a walk behind unit, or can have a support platform 170 for supporting an operator, if that is desired.” EX1010, 5:55-57, Fig. 7.



EX1010, FIG. 8  
(annotated)

167. These same configurations would remain when applied to the similarly configured (e.g., rear-operated compact tool carrier from a standing platform) KR996's vehicle for the reasons discussed above.

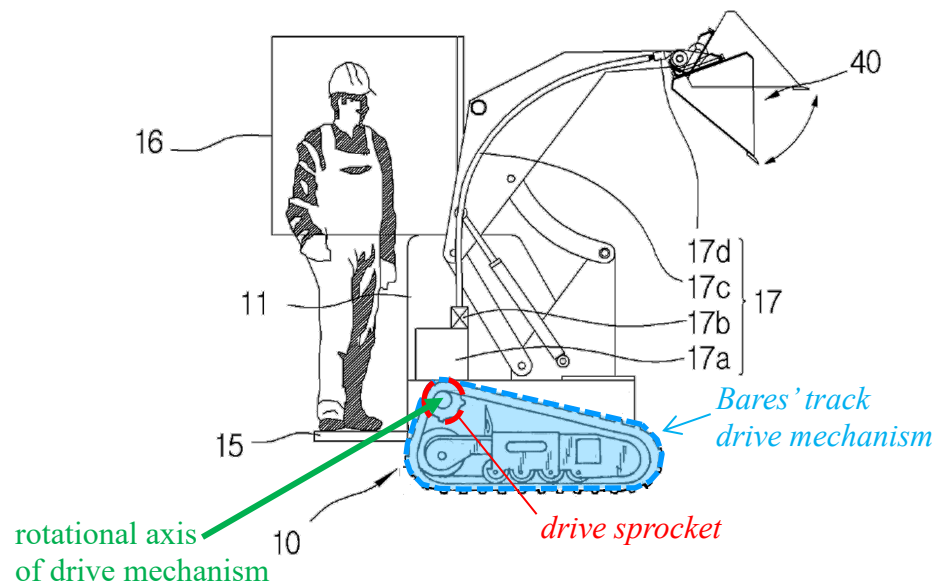
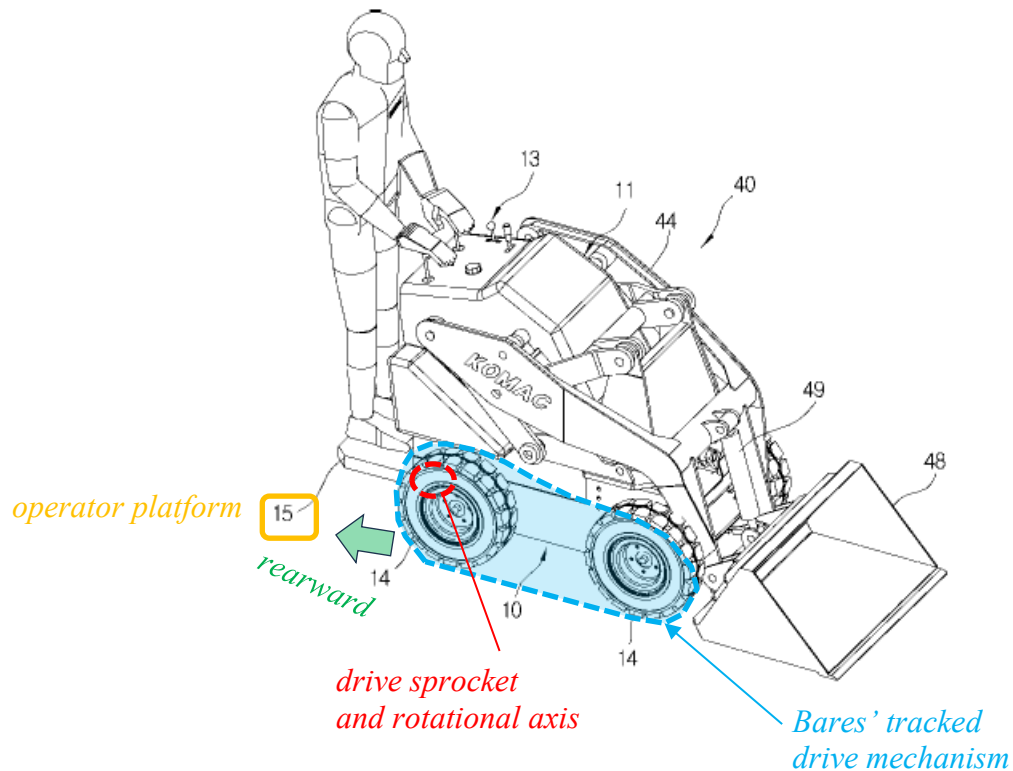


**FIGURE A**  
**KR996's Fig. 21 (annotated)**  
**and modified with Bares' FIG. 8 track assembly**

Figure A is but one example of implementation based on Figure 21 of KR996, with how a POSITA would understand Bares' track assembly, taken from Bares' FIG. 8, would be applied to the vehicle. (The illustration of the tracked assembly of Bares'

FIG. 8 is flipped and lead lines/labels removed substituted for KR996's Fig. 21's wheel assembly.)

**168.** Providing the drive mechanism of KR996 vehicle as Bares' track assembly, the predictably resulting KR996-Bares vehicle has *at least a portion of the operator platform being disposed rearward to the rotational axis R relative to a longitudinal axis of the loader apparatus*. This is because KR996's safety step 13 (*operator platform*) is *disposed rearward of the rotational axis of the rear of its drive mechanism relative to a longitudinal axis of the loader apparatus* and thus, the operator platform is also *disposed rearward of the rotational axis relative to a longitudinal axis of the loader apparatus* when provided by the *drive sprocket* in the track assembly of KR996-Bares.



**EX1005, Fig. 8 (portion)**  
**(annotated including Bares' track mechanism)**

169. Thus, claim 9 is rendered obvious by KR996 and Bares.

**E. Ground 4 : KR996 and SAE**

**1. KR996 (EX1005)**

170. I discuss KR996 above.

**2. SAE (EX1015)**

171. SAE International provides standards that are internationally recognized for their role in the safety, quality and effectiveness of products and services in the mobility engineering industry. SAE is a Surface Vehicle

Recommended Practice published in June 2010. EX1015. SAE published practices would be commonly accessed by POSITA when designing a vehicle such as in KR996. This is confirmed by the '891 Patent itself, which discusses the SAE J2752 standard in its Background (1:29-39) and again at column 3, lines 11-15.

**172.** When approaching the design of any machine, as part of the initial stages of the design process mechanical engineering students are taught to gather all relevant information such as patents, and other published information such as industry standards. This is essential for a wide variety of reasons including, but not limited to, ensuring that existing safety standards are met. Moreover, SAE is the primary source for standards related to vehicles; students are also instructed to research any other applicable standards, e.g., ISO and ANSI. In general, SAE standards often include specific test methods that the machine must meet, which facilitates the development of later machine verification testing.

### **3. Reasons to Combine KR996 and SAE**

**173.** SAE, like KR996, is in the same field of endeavor as the '891 Patent, pertaining to working vehicles (*e.g.*, earth-moving equipment) and in particular, vehicles with a stand behind operation and a loader arm. KR996 (EX1005), Abstract, [0001], FIG. 21; SAE (EX1015), SCOPE, p. 1, FIGS. 1-8; '891 Patent (EX1001), 1:27-41, 2:54-3:15, FIG. 1. A POSITA would have been motivated to combine the

teachings of SAE with KR996 to produce a predictable and beneficial configuration of a self-propelled machine having an operating mass of less than 1500 kg.

**174.** First, compliance with industry practices and standards such as SAE provides benefits recognized by POSITA. For example, compliance may mitigate legal risks regarding product safety and protect consumers. Compliance with standards is also a beneficial marketing practice. Further, compliance with an industry standard such as SAE confirms that the product produced implements accepted engineering practices that have been proved to the extent of supporting a standard. It was a known practice to consult with industry publications such as SAE and ISO when developing vehicles such as KR996 to ensure compliance with industry practices and developments.

**175.** Further, in at least some desired applications for the vehicle, POSITA would have had reason to minimize the weight to under 1,500 kg, to the extent it is not apparent in KR996 itself, to allow for better function of the KR996 vehicle and/or mitigated impact on the surroundings. KR996, [0001]-[0008]. A POSITA would recognize maneuverability can be improved with a vehicle less than 1,500 kg, which allows for “people to move smoothly in confirmed spaces...to carry out demolition work for the renovation of urban buildings.” KR996, [0005]. Implementing SAE’s weight of less than 1,500 kg would also provide for reduced impact on the supporting

---

surface, such as when gardening or working within a building. KR996, [0002], [0005].

**176.** A POSITA would have recognized a reasonable expectation of success in providing equipment less than 1,500 kg as the limit was recognized not only in SAE but also other industry standards. See EX1016.

#### **4. Claim 8**

**[8] *The loader apparatus as set forth in claim 1 wherein the loader apparatus has a mass of less than 1500 kg.***

**177.** KR996 discloses or renders obvious claim 1 and in combination with SAE renders obvious this claim.

**178.** As discussed above, a POSITA would readily appreciate the KR996 vehicle has *a mass of less than about 1500 kg* based on its illustrations, suitable tasks, and operator position. Further, the general motivation of a POSITA to make equipment light-weight for quick and efficient operations, POSITA would have provided KR996's vehicle is less than 1,500 kg as suggested by SAE.

**179.** SAE discloses “self-propelled [] wheeled machine...having...standing operator platform at the rear of the machine” and lift arms with an attachment bracket or otherwise interchangeable equipment have “an operating mass of less than 1500 kg.” EX1015, p. 2. It would have been obvious to provide KR996's vehicle, which shares these same features, less than 1,500 kg as discussed above in

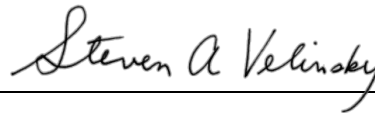
the reasons to combine KR996 and SAE. See also, my discussion at claim 8 of Grounds 1 and 2.

**180.** Thus, claim 8 is rendered obvious by KR996 in view of SAE.

**XI. CONCLUSION**

This declaration and my opinions herein are made to the best of my knowledge and understanding, and based on the material available to me, at the time of signing this declaration. I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 or Title 18 of the United States Code.

Date: January 6, 2025

  
\_\_\_\_\_