

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AUTOSTORE SYSTEM INC.,

Petitioner

v.

OCADO INNOVATION LIMITED,

Patent Owner

Case No. IPR2021-00798

U.S. Patent No. 9,796,080

DECLARATION OF DR. STEPHEN DERBY REGARDING

U.S. PATENT NO. 9,796,080

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II. TABLE OF ABBREVIATIONS

Abbreviations	
Board; PTAB	Patent Trial and Appeal Board
PTO	United States Patent and Trademark Office
IPR	<i>Inter partes</i> review
Petitioner	Petitioner AutoStore System Inc.
PO	Patent Owner Ocado Innovation Limited
'080 patent	U.S. Patent No. 9,796,080
Challenged Claims	Claims 1–23 of the '080 patent
PHOSITA	Person having ordinary skill in the art
Lert	U.S. Patent No. 9,139,363
Lert Provisional	U.S. Provisional Patent Application No. 61/794,023
Winkler	U.S. Patent 7,097,045

III. PETITIONER’S EXHIBIT LIST PURSUANT TO 37 C.F.R. §§ 42.63(E) & 42.104(B)(5)

Exhibit No.	Description ¹
AS-1001	U.S. Patent No. 9,796,080 (“’080 patent”)
AS-1002	File History for U.S. Patent No. 9,796,080
AS-1003	Declaration of Dr. Stephen Derby (“Derby”)
AS-1004	<i>Curriculum Vitae</i> of Dr. Stephen Derby
AS-1005	U.S. Patent No. 9,139,363 (“Lert”)
AS-1006	U.S. Provisional Patent Application No. 61/794,023 (“Lert Provisional”)
AS-1007	U.S. Patent 7,097,045 (“Winkler”)
AS-1008	International Patent Publication No. 1998/049075 A
AS-1009	International Patent Publication No. 2013/167907 A
AS-1010	United States Department of Labor, Occupational Safety and Health Administration, Ergonomics Overview
AS-1011	Civil Docket in <i>Marine Polymer Technologies, Inc. v. HemCon, Inc.</i> , 1:06-cv-00100 (D.N.H.)
AS-1012	Civil Docket in <i>National Pasteurized Eggs, LLC v. Davidson.</i> , 1:07-cv-00103 (D.N.H.)
AS-1013	U.S. Patent No. 9,334,081 (“’081 patent”)

¹ Descriptions are for convenience only and are not admissions or evidence.

IV. LISTING OF THE CHALLENGED CLAIMS

Limitation Identifier	Text of Claim
Independent Claim 1	
[1A]	A system for managing shipment containers, the system comprising:
[1B]	a storage-and-retrieval system comprising:
[1C]	a structural framework defining a grid of storage locations configured for receiving a plurality of shipment containers including storage containers and delivery containers;
[1D]	a plurality of robotic load handlers for retrieving shipment containers from any one of the storage locations; and
[1E]	at least one rail arranged about the grid to enable access to each of the storage locations by at least one of the plurality of robotic load handlers; and
[1F]	at least one processor configured to:
[1G]	generate signals for instructing or controlling at least one of the plurality of robotic load handlers to store, in the storage and retrieval system, the storage containers containing stored items;
[1H]	generate signals for instructing or controlling at least one of the plurality of robotic load handlers to retrieve from the storage and retrieval system at least one storage container containing stored items for delivering the retrieved at least one storage container to an order picking station; and
[1I]	generate signals for instructing or controlling at least one of the plurality of robotic load handlers to store at least one delivery container in the storage and retrieval system, the at least one delivery container containing at least one picked item from the retrieved at least one storage container,
[1J]	wherein the storage containers are of a first size and gauge for transport by at least one of the robotic handlers exclusively within the storage and retrieval system and the delivery containers are of a second size and gauge for transport outside of the storage and retrieval system for delivery and within the storage and retrieval system by at least one of the robotic handlers for storage prior to

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Limitation Identifier	Text of Claim
	delivery.
Claim 2	
	The system according to claim 1,
[2A]	wherein each of the at least one delivery container is stored in a storage container for storage in at least one of the storage locations.
Claim 3	
	The system according to claim 1,
[3A]	wherein the at least one processor is configured to generate signals for instructing or controlling at least one of the plurality of robotic load handlers to store fully or partially-picked delivery containers in the storage and retrieval system.
Claim 4	
	The system according to claim 1,
[4A]	wherein the at least one processor is configured to generate signals for instructing or controlling at least one of the plurality of robotic load handlers to store empty delivery containers in the storage and retrieval system.
Claim 5	
	The system according to claim 1,
[5A]	wherein the at least one processor is configured to generate signals for instructing or controlling at least one of the plurality of robotic load handlers to retrieve at least one of the delivery containers for delivering the retrieved at least one delivery container to an order picking station.
Claim 6	
	The system according to claim 1,
[6A]	wherein the at least one processor is configured to generate signals for instructing or controlling at least one of the plurality of robotic load handlers to retrieve at least one of the delivery containers for dispatch.

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Limitation Identifier	Text of Claim
Claim 7	
	The system according to claim 1,
[7A]	wherein the grid of storage locations is configured for receiving a plurality of containers in one or more stacks.
Claim 8	
	The system according to claim 1,
[8A]	wherein at least one delivery container is nestable within a storage container.
Claim 9	
	The system according to claim 1, comprising:
[9A]	at least one mechanism for removing a delivery container from a storage container.
Claim 10	
	The system according to claim 9,
[10A]	wherein the at least one mechanism includes: at least one lifter mechanism configured to extend through one or more apertures in the bottom of the storage containers to engage and apply an upward force to the bottom of the delivery container.
Claim 11	
	The system according to claim 9,
[11A]	wherein the at least one mechanism includes: at least one lifter mechanism configured for engaging and lifting the delivery container from the stackable container using at least one of a lip, a handle, and an aperture of the delivery container.
Claim 12	
	The system according to claim 1,
[12A]	wherein the at least one lifter mechanism includes a suction device.
Independent Claim 13	
[13A]	A method of operating an order processing system including a goods

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Limitation Identifier	Text of Claim
	storage and retrieval system, the method comprising:
[13B]	storing, via at least one robotic load handler, in at least one of a plurality of storage locations in the storage and retrieval system a plurality of storage containers containing stored items;
[13C]	storing, via the at least one robotic load handler, in at least one of the plurality of adjacent stacks a plurality of delivery containers;
[13D]	retrieving, via the at least one robotic load handler, from at least one of a plurality of storage locations a plurality of storage containers containing at least one of the delivery containers, and delivering the retrieved containers to an order picking station;
[13E]	transporting the plurality of storage containers exclusively within storage and retrieval system via the at least one robotic load handler; and
[13F]	transporting the plurality of delivery containers outside of the storage and retrieval system for delivery and within the storage and retrieval system by at least one of the robotic handlers for storage prior to delivery.
Claim 14	
	The method according to claim 13, comprising:
[14A]	storing each of the plurality of delivery containers into a storage container for storage in at least one of the plurality of storage locations.
Claim 15	
	The method according to claim 13, comprising:
[15A]	storing, via the at least one robotic load handler, in at least one of the plurality of adjacent stacks at least one delivery containers containing at least one picked item.
Claim 16	
	The method according to claim 13, comprising,
[16A]	placing an empty delivery container in a storage container after a delivery container containing items has been removed from the

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Limitation Identifier	Text of Claim
	storage container.
Claim 17	
	The method according to claim 13,
[17A]	wherein at least one of the plurality of delivery containers is nestable with at least one other delivery container.
Claim 18	
	The method according to claim 13,
[18A]	wherein the plurality of storage containers have a first size and the plurality of delivery containers have a second size, the method comprising:
[18B]	placing at least one delivery container within one of the plurality of storage containers for storage in at least one of the plurality of storage locations.
Claim 19	
	The method according to claim 13, comprising:
[19A]	storing, via the at least one robotic load handler, in at least one of the plurality of adjacent stacks at least one partially or fully-picked delivery containers.
Claim 20	
	The method according to claim 19, comprising:
[20A]	retrieving, via the at least one robotic load handler, from at least one of a plurality of storage locations at least one of the delivery containers for dispatch.
Claim 21	
	The method according to claim 20 comprising:
[21A]	removing, with at least one lifter mechanism, the at least one delivery container received for dispatch from at least one storage container.
Claim 22	
	The method according to claim 21,

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Limitation Identifier	Text of Claim
[22A]	wherein the at least one storage container from which the delivery container is removed includes one or more apertures or cutouts, and removing the delivery container comprises:
[22B]	at least initiating removal, via the apertures or cutouts, the respective at least one delivery container.
Independent Claim 23	
[23A]	A system for managing storage and retrieval of containers, comprising:
[23B]	a storage and retrieval system including:
[23C]	a structural framework defining a grid of storage locations for receiving a plurality of containers;
[23D]	a plurality of robotic load handlers each configured to access any one of the storage locations in the grid of the structural framework; and
[23E]	a controller configured to control at least one robotic hander in transporting at least one of the plurality of containers to/from any one of the storage locations in the grid,
[23F]	wherein the plurality of containers includes storage containers configured to store products to be ordered, delivery containers configured to store products at least partially fulfilling an order, and combined containers including at least one delivery container nested within a storage container.

V. INTRODUCTION

A. Engagement

1. I, Dr. Stephen Derby, have been retained by counsel for Petitioner, AutoStore System Inc. (“AutoStore”) as an expert witness in the above-captioned Petition for *inter partes* review (“IPR”) of U.S. Patent No. 9,796,080 (the “’080 patent”).

2. I have been asked to provide my opinions regarding whether claims 1–23 of the ’080 patent (“Challenged Claims”) are anticipated or would have been obvious to a person having ordinary skill in the art (“PHOSITA”) at the time of the alleged invention.

3. I am being compensated for my time in connection with this IPR at my standard consulting rate of \$400 per hour. My compensation is in no way affected by the outcome of this matter or the content of my testimony.

4. I am not an employee of AutoStore, AutoStore System AS, or AutoStore Technology AS.

5. The opinions in this report are mine. They are based on my analyses in this matter, informed by the knowledge, education, experience, training, and skill I have accumulated in the course of my career of over three decades in academia and the automated storage industry.

B. Background and Qualifications

6. A copy of my current *Curriculum Vitae* is AS-1004 and provides accurate identification of my background and experience. For the Board's convenience, I provide an overview of my qualifications here.

7. I am an expert in the fields of packaging and automation, including the design, development, operation, and optimization of packaging and packaging machinery.

8. I am currently an Associate Professor Emeritus in the Mechanical Engineering, Aeronautical Engineering and Nuclear Engineering Department at Rensselaer Polytechnic Institute ("RPI") in Troy, New York.

9. I am the President of Distributed Robotics LLC, which focuses on novel robotic automation, including for packaging applications. For example, we developed a machine for separating and sorting a bulk collection of packaged products into a uniformly separated, spaced flow (which we refer to as a "product singulator"). We developed a machine for stacking cases of packaged products on pallets (which we refer to as a "palletizer").

10. I am the Automation Director for Pack Flow Concepts, LLC, a company that focuses on packaging automation and new product development. For example, we developed a machine for high-speed case packing that is directly connected to a packaging machine. The machine receives packaged products from

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the packaging machine and automatically places the products in cases at a high speed. I was the Head Automation Consultant for Home Delivery Services, which focuses on e-commerce robotic automation, such as order fulfillment of packaged goods for home-delivery groceries.

11. I received a Bachelor of Science in Mechanical Engineering from RPI in 1976. I received a Master of Engineering in Mechanical Engineering in 1977 and a Ph.D. in Mechanical Engineering in 1981 from RPI. My Ph.D. thesis was titled “General Robot Arm Simulation Program,” which related to computer graphic simulation of robot arms.

12. After receiving my Ph.D., I served as an Assistant Professor in Mechanical Engineering at RPI from 1981 to 1986. In 1986, I became an Associate Professor of Mechanical Engineering at RPI. I have taught various packaging-related courses at RPI, including “Modular Automation Concepts” and “Design of Automatic Machinery,” which are courses related to the design and development of packaging machinery. I also taught the course “Advanced Manufacturing Lab,” in which students design custom packaging for an item and are graded on the aesthetics, functionality, and appropriateness of the packaging. I also have taught various courses related to machine operation, design, and development at RPI. In addition to the courses listed above, I have taught “Mechanisms” and “Kinematic Synthesis,”

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both of which teach students to design machines for a variety of applications, including but not limited to packaging applications.

13. My research has focused on various areas of automation and design, including designing machines for packaging goods. I have served on consulting teams for many companies on projects related to manufacturing, automation, and robotics, including in the packaging area.

14. Over the years, I have actively served leadership roles on a number of organizations, including on the Conference Planning Board for the American Society of Mechanical Engineers (“ASME”). Since 2005, I have been a Fellow of ASME, which is a distinction given to select ASME members to recognize outstanding achievements in the engineering field. I also received the ASME Best Paper Award in 2005 for the Material Handling Engineering Division.

15. I have published over 80 peer-reviewed publications, as well as authored several book chapters, books, and trade journal contributions in the field of robotics and packaging. For example, I am the author of the textbook “Design of Automatic Machinery” which, among other things, examines options for practical design of automated processes and provides a desk-reference for designers of automated machines on many automation concepts used in history.

16. I am also an inventor of several United States patents and published patent applications in the automated storage and retrieval systems (“AS/RS”). For

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example, U.S. Patent No. 9,399,529, titled “Automated product engager, transporter and patterned depositor system,” relates “to automated systems for engaging products to process the products and then position them on a transporter to transport the products to a patterned depositor for depositing the products in a pattern. An example includes filling bags with food, placing the bags on a conveyor and depositing the bags in a packing pattern within a packing case.” Another patent on which I am a named inventor, U.S. Patent No. 9,334,081, titled “containers utilized in transport of goods typically sold at retail stores, such as pharmacy chain stores, hardware stores, etc., and in particular relates to such a container having a folding side wall.” AS-1013, Cover. In one “embodiment of the disclosure, the folding side wall container may also include a corrugated, semi-rigid cardboard-type box nested within the container.” AS-1013, 3:21–24. Another patent, U.S. Patent No. 6,688,451, titled “Multi-head robot system and method of use,” relates to “a number of robotic devices, each of which is able to operate independently at any of a number of discrete destinations.”

17. I am also an inventor of numerous United States patents and published patent applications in the area of machine design and operation. For example, U.S. Patent No. 6,565,308, titled “Bulk mail container unloading system, apparatus and method,” relates to a system for material loading and unloading, and more particularly, to an apparatus for moving a bulk mail container from an upright

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position to an upended position to allow dumping of the container's contents onto an unloading surface. U.S. Patent No. 7,712,598, titled "Robotic tread system having a net-zero motion head for moving objects," relates to a continuous robotic tread system for picking and placing packaged goods, which eliminates repeated stopping and starting of the system.

18. I am an active consultant, expert witness and speaker on matters related to packaging and machine design, including the design and operation of packaging machinery.

19. I have served as an expert witness on multiple cases including cases involving IPRs, contract disputes, and civil litigation in federal courts and state courts. My resume lists these cases.

C. Prior Testimony

20. I have provided testimony in a deposition or trial in the past four years in the following proceedings:

- *Fanuc Robotics America, Inc. v. United States*, No. 1:04-cv-00197 (Ct. Int'l Trade);
- *Formax, Inc. v. Alkar-Rapidpak-MP Equip., Inc.*, No. 11-cv-00298 (E.D. Wis.);
- *Knapp Logistics Automation, Inc., v. R/X Automation Solutions, Inc.*, No. 1:14-cv-00319-RBJ (Supreme Court, Denver, Colorado);

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- *MRSI Systems, LLC v. Palomar Techs., Inc.*, Case No. IPR2015-00043;
- *In re: Certain Personal Transporters and Components Thereof, an Packaging and Manuals Therefor and Certain Personal Transporter and Components Thereof*, Inv. Nos. 337-TA-1007 and 337-TA-1021 (U.S. Int'l Trade Comm'n);
- *Changer & Dresser, Inc. v. Ontario Ltd.*, Case No. IPR2015-00341;
- *Automated Packaging Systems, Inc., v. Free-Flow Packaging International, Inc.*, Case No. IPR2018-00849.

D. Materials Considered

21. In connection with my work on this matter, I have reviewed and considered the materials cited herein and listed in the attached Appendix A in forming my opinions.

22. I have generally reviewed and considered the '080 patent, the '080 prosecution history, the Lert and Winkler prior art references, and the materials listed in Petitioner's Exhibit List.

23. I have relied upon my training, knowledge, and experience in the relevant art.

24. My analysis of the materials relating to this proceeding is ongoing, and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date. I reserve the right to revise,

supplement, or amend my opinions based on new information and on my continuing analysis of the materials referred to herein.

VI. UNDERSTANDING OF PATENT LAW

25. I am not an attorney. I have been informed, however, about several principles and standards of patent law, which I have used in developing my opinions expressed herein.

26. I understand that patent claims and the prior art are viewed through the eyes of a PHOSITA. This concept refers to a hypothetical person trained in the relevant technical field of a patent without possessing extraordinary or otherwise exceptional skill. Factors such as the educational level of those working in the field, the sophistication of the technology, the types of problems encountered in the art, prior-art solutions to those problems, and the speed at which innovations are made may help to establish the level of skill in the art. The level of skill of the person of ordinary skill in the art is to be assessed at the time of the claimed invention.

27. Documents and materials, such as patent and publications, that qualify as prior art can be used to invalidate a patent claim as anticipated or as obvious. I am not offering an opinion about whether a document or material qualifies as prior art under the Patent Laws. However, a prior art patent is entitled to claim the benefit of a provisional application, if the prior art patent is shown to have at least one claim that is supported by the disclosure of a provisional application.

28. A claim is invalid if it is anticipated or obvious.

29. Anticipation of a claim requires that every element of a claim be disclosed expressly or inherently in a single prior-art reference, arranged in the prior-art reference as arranged in the claim. To anticipate a claim, the prior art need not use the same words as the claim, but all of the requirements of the claim must have been disclosed, either expressly in words, or inherently to a person of ordinary skill in the art at the time of the alleged invention such that, by looking at that one reference, that person could make and use the claimed invention.

30. When a prior-art document does not expressly disclose every limitation of the claim, it may inherently anticipate the claim when the reference's disclosure makes clear to a PHOSITA that any missing descriptive matter is necessarily present in the thing described in the reference. Inherency may not be established by probabilities or possibilities, and the mere fact that a certain thing may result from a given set of circumstances is insufficient.

31. A patent claim is unpatentable as being obvious in view of prior art if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the alleged invention was made to a PHOSITA to which said subject matter pertains. I further understand that an obviousness analysis takes into consideration factual

inquiries such as 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 patent claim.

32. A claim can be obvious in light of a single reference, without the need to combine references, if the elements of the claim that are not found explicitly or inherently in the reference can be supplied by the common sense of one of skill in the art. A claim may be obvious in view of a combination of two or more prior-art references.

33. The law had recognized several rationales for combining references and for modifying a reference as part of an obviousness analysis. These rationales include combining prior art elements according to known methods to yield predictable results, simple substitution of a known element for another to obtain predictable results, a predictable use of prior art elements in accordance with their established functions, applying a known technique to improve a known device (or process) and yield predictable results, and choosing from a finite number of known predictable solutions with a reasonable expectation of success. It is further my understanding that an obviousness analysis takes into consideration whether the prior art provides a teaching, suggestion, or motivation to combine teachings of multiple prior art references to arrive at the patent claim.

34. A prior art reference must be analogous art to be considered in the obviousness analysis. This asks (1) whether the prior art is from the same field of

endeavor, regardless of the problem addressed and (2) whether the reference is reasonably pertinent to the particular problem with which the inventor is involved.

35. Certain factors—often called “secondary considerations”—may support or rebut the obviousness of a claim. I understand that such secondary considerations include, among other things, commercial success of the alleged invention, skepticism of those having ordinary skill in the art at the time of the alleged invention, unexpected results of the alleged 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 further 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.

36. I understand that, in an IPR, anticipation or obviousness must be shown by the preponderance of the evidence. In other words, that the claims are more likely than not unpatentable.

VII. TECHNICAL BACKGROUND

37. The '080 patent generally relates to automated storage and retrieval systems (“AS/RS”). Humans historically stored and retrieved goods with forklifts

and other conveyor technology, which typically meant that inventory was stored wherever possible, with no demand-oriented control of material flow. This posed a host of inefficiencies, including increased labor and material costs.

38. Technological advancements facilitated the development of more efficient AS/RS. But AS/RS were known long before the '080 patent. Indeed, the '080 patent says that “[v]arious forms of both fully- and semi-automated order processing and fulfillment systems [were] known.” AS-1001, 1:21–23. In the 1990s, for example, AutoStore pioneered an AS/RS, where the bins containing stored items in a cubic configuration, as disclosed in its 1998 patent application: WO98/049075A (“the '075 application”). AS-1008. The '075 application is entitled a “[m]ethod for organi[z]ing the storage of different units.” AS-1008, Cover. It discloses an AS/RS with “computer-controlled lifting devices” with “a gripping device” that “move on a rail system” that is part of a “framework ... which separates the respective stacks of containers.” AS-1008, Abstract, 5:5–25. The “lifting devices” transport “containers” having “individual compartment[s] 4 in each container” within the system, including to a “packing station.” AS-1008, 2:2–5, 6:12–26. “When a container 1 is placed into the [system], either after replenishment of units which are added to the store or when the container is returned from a packing station 7, it may be placed anywhere in the store.” AS-1008, 6:32–34. “A computer system” is used “to keep track of the location of each container 1” within the system. AS-1008, 6:18–

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26. All of the foregoing features and concepts were therefore known more than a decade before the '080 patent.

39. The development of AS/RS led to other inventions. For example, U.S. Patent No. 9,334,081 (“the '081 patent”) filed before the '080 patent on Feb. 22, 2013, of which I am an inventor, disclosed a folding wall container with a nestable cardboard box for use in an AS/RS. AS-1013. Specifically, it discloses, for example, “containers 62, 66” that includes “a corrugated, semi-rigid cardboard-type box 88 (shown in FIG. 9) *nested within* the container 62, 66.” AS-1013, 7:31–34; *see also* AS-1013, 3:22–27 (“In another embodiment of the disclosure, the folding side wall container may also include a corrugated, semi-rigid cardboard-type box nested within the container, wherein the corrugated box has a front wall and top lid removed to facilitate removal and placement of goods within the corrugated, semi-rigid box.”). “[G]oods” are placed “within the corrugated, semi-rigid box 88.” AS-1013, 7:34–38. These containers are optimized to work “within an automated system [] for automated transfer by a robotic picker [] of goods [] from the wholesale container [] to the distribution container [].” AS-1013, Abstract, 4:11-19, 1:63–2:23. Therefore, the concept of nesting one container within another container in the context of AS/RS was known before the '080 patent.

40. Others in the prior art, like John Lert and Walter Winkler, came up with other inventions relating to AS/RS systems. Some of their work led to patents filed before the '080 patent, which are described in detail herein.

VIII. THE '080 PATENT

41. The '080 patent issued on October 24, 2017, from U.S. Patent Appl. No. 14/899,367 (the "'367 Application"), was filed on June 12, 2014, and claims priority to foreign application GB Patent Appl. 1310784.2, filed on June 17, 2013. AS-1001, Cover. For the purposes of my Declaration, I have been asked to assume that the earliest effective priority date of the alleged invention recited in the '080 patent is June 17, 2013.

A. Summary

42. The '080 patent, titled "[s]ystems and methods for order processing," explains that there is "room for improvement in the efficiency of order processing systems." AS-1001, 1:56–59. According to the '080 patent, conventional systems used "separate order sortation and handling systems," but one drawback of these conventional systems was that in "large systems ... this can become a bigger problem, requiring extensive conveyor systems for transport and sortation of Order Containers." AS-1001, 1:46–55.

43. Two purported solutions to this problem, according to the '080 patent, were recognizing that "efficiencies may be realized by [1] storing one or more

delivery containers within storage containers and [2] storing such combined container sets within the storage and retrieval grid, racking, or other ordered arrangement, along with storage containers containing items to be used in filling customer orders.” AS-1001, 2:47–53 (emphasis added). All claims of the ’080 patent are directed to these purported solutions.

B. Prosecution History

44. Patent Owner (“PO”) filed the application that led to the ’080 patent on December 17, 2015.

45. The only office action rejected the ’080 claims on U.S. Patent 9,187,244 (“Toebees”), and §103 based on Toebees in view of U.S. Patent 8,092,140 (“Baker”). AS-1002, pgs. 292–308. In response, PO amended the claims and argued for issuance of the amended claims. PO argued,

[a]ccording to Toebees, case units are defined as those items not stored in trays, on totes, or on pallets. That is, the case units represent the individual items that can be ordered by customers the case unit of Toebees are products that are either stored at a storage location on a pallet (storage container) or in a storage bay as individual units.... *Toebees discloses that the case units are individual uncontained items that are not stored in a container.* Thus, one of ordinary skill in the art would have understood that the case units [from Toebees] are pre-packaged items *that are not used to store items picked* from a pallet, *as is Applicant’s claimed delivery containers.* For at least these

reasons, one of ordinary skill in the art would have understood that Toebes does not disclose the use of *both a storage container and a delivery container* as recited in Applicant's claims. Withdrawal of this rejection, therefore, is warranted.

AS-1002, pgs. 323–324.

46. In other words, PO argued that having “a storage container and a delivery container” where goods are put into “a delivery container” was novel over Toebes.

47. In response, the Office issued a Notice of Allowance. AS-1002, pgs. 333–342. The application issued as the '080 patent on October 24, 2017. AS-1001, Cover.

IX. SUMMARY OF THE PRIOR ART

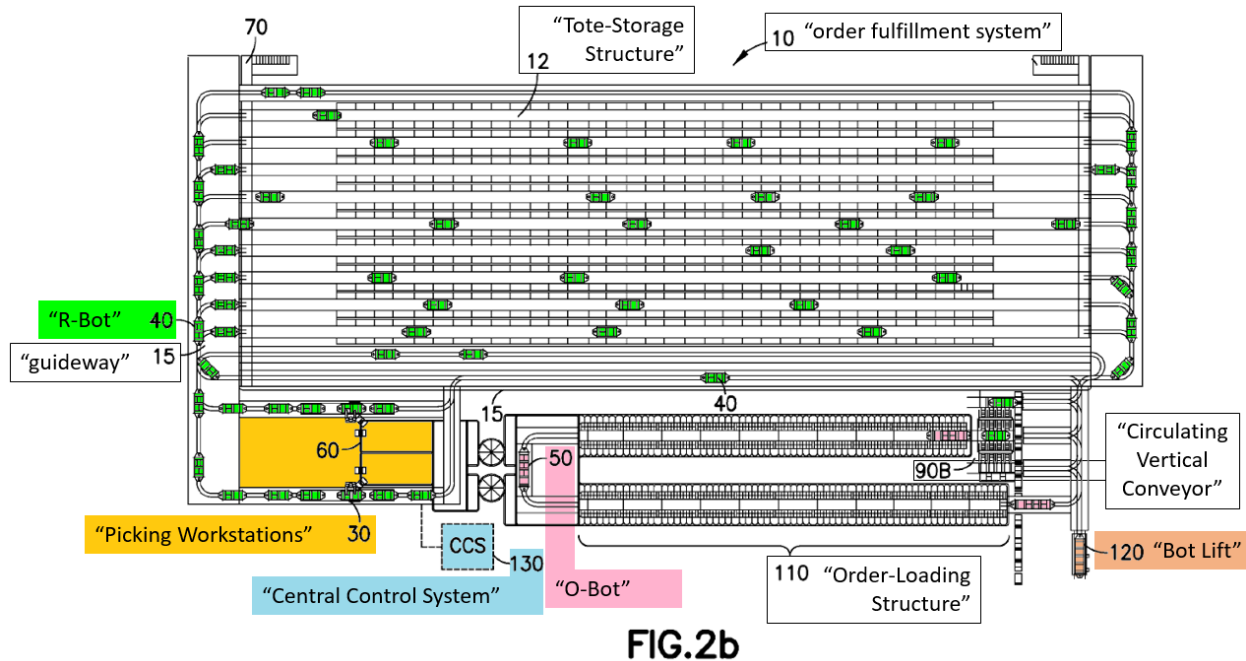
48. I have been asked to provide an opinion as to whether the Challenged Claims of the '080 patent are invalid in view of the prior art. Before providing a detailed analysis of the prior art with regard to the Challenged Claims, I provide a brief summary of the asserted prior art references.

A. Lert

49. U.S. Patent No. 9,139,363 (“Lert”), titled “Automated System for Transporting Payloads,” was filed on March 14, 2014, and was published on September 25, 2014 claiming priority to the March 15, 2013 U.S. Provisional

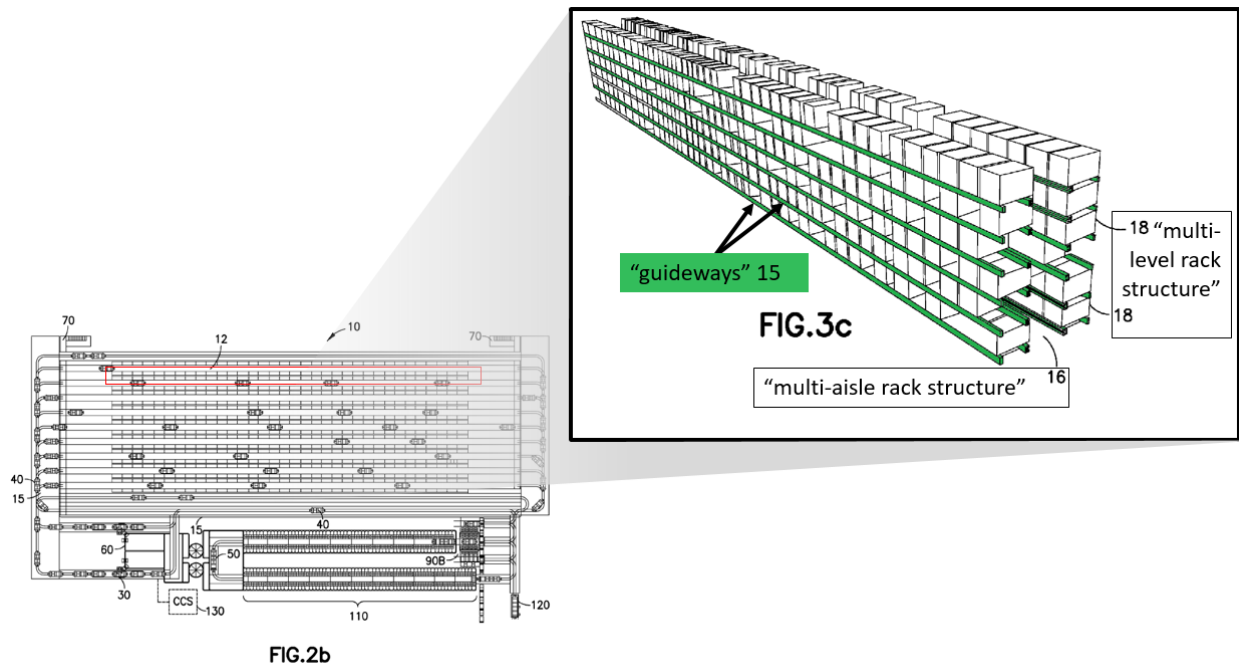
Application Number 61/794,023 (“Lert Provisional”). AS-1005, Cover. I understand that Lert is prior art to the ’080 patent.

50. Lert discloses an “order fulfillment system” 10 using “autonomous vehicles.” AS-1005, Abstract, 1:15–16. Lert describes that its system “achieve[s] a very high or even total level of automation, [and that] the disclosed embodiment implements a ‘goods-to-man’ (or ‘goods-to-robot’) process model in which autonomous robotic vehicles bring containers of eaches to workstations where stationary pickers (either human or robotic) pick” goods. AS-1005, 2:56–63. Figures 2b, which has been annotated below with many of Lert’s relevant features discussed herein, is shown below:



AS-1005, Fig. 2b.

51. Lert's system includes a "Tote-Storage Structure" ("TSS") 12. The TSS consists of "guideways 15" for robots, along with a "storage rack 14, which is a multi-aisle 16, multi-level 18 rack structure that holds the totes in storage." AS-1005, 5:13–25. Annotated Figures 2b and 3c below shows the multi-aisle and multi-level stacked configuration:



AS-1005, Figs. 2b, 3c.

52. Lert further discloses an "Order-Loading Structure" 110 ("OLS") that has a similar rack structure to the TSS and like holds certain totes before loading. AS-1005, 3:30–32, 18:24–26. Lert also describes a "Circulating Vertical Conveyor" 90b ("CVC") that moves both totes vertically between different levels of both the OLS and the TSS. AS-1005, 3:38–40.

53. Another feature in Lert is a “Central Control System” 130 (“CCS”) that consists of “software, computers, and network equipment, which manages all of the resources within the system (including all of the various robots), orchestrates the entire order-fulfillment process and all related processes, and provides status and control interfaces to human operators of the system.” AS-1005, 3:44–50. The CCS moreover, “consists of application software running on one or more “server” computers and communicating via wired and wireless network interfaces with all of the other active subsystems (R-Bots, E-Bots, TSS switch-controllers, Workstations, O-Bots, CVC controller, Bot Lift, etc.).” AS-1005, 21:55-60.

54. Lert uses robotic vehicles that store and retrieve totes, including “Roam-to-Desired Destination Bots” 40 or “R-Bots.” R-Bots perform the functions of “(a) storing and retrieving P-Totes and O-Totes within the TSS, and (b) transporting these totes between the TSS 12, the Picking Workstations 30, and the CVC 60. AS-1005, 9:5–9. Lert discloses that R-Bots can access all locations within the TSS through the Bot Lift. AS-1005, 3:20–24, 41–43. Lert discloses other robotic vehicles called “Order-handling Bots” 50 or “O-Bots” for short, which move totes between the CVC to the shelves of the OLS. AS-1005, 3:33–37.

55. Individual product units, or “eaches” (AS-1005, 1:19–22) are generally stored in “totes.” AS-1005, 3:6–9. Lert discloses that a “tote” is a “container that hold materials being stored or handled.” AS-1005, 3:6–9. Lert’s “totes” include

“both product and order containers.” AS-1005, 3:6–9. Lert calls these “P-Totes” and “O-Totes.” AS-1005, 3:14-16. P-Totes contain “the picking stock of eaches used to fulfill orders.” AS-1005, 3:14-16. O-Totes contain “the eaches picked to fulfill orders.” AS-1005, 3:14-16. Lert notes that the exemplary “tote” disclosed “may serve either as a P-Tote, or O-Tote.” AS-1005, 3:59-61. Lert further discloses that “O-Totes have similar exterior dimensions as P-Totes. It may of course be possible to design the system such that O-Totes are different in size from P-Totes, or even variably sized.” AS-1005, 4:54-57.

56. Lert discloses that “P-Totes” and “O-Totes” can have “sub-totes” or “sub-containers,” nested within them in which “eaches” can be loaded. AS-1005, 4:40-5:13. For example, “tote design can be used advantageously with *variably-sized sub-containers*, such as cardboard boxes, that are the shipping containers in which the eaches are sent to the customers. In a different type of direct-to-consumer application, such as in an automated retail store in which customers come to the facility to pick up filled orders and take them home themselves, the O-Tote may be divided into multiple compartments by removable ‘liner bags’, which also serve as *sub-containers by which customers carry their eaches home*, and which are inserted into the O-Totes by manual or automated means.” AS-1005, 4:60-5:12. Lert is clear that these sub-totes or sub-containers are within the O-Tote. AS-1005, 18:10-11 (“O-Tote (or sub-tote therein)”).

57. Many of the abbreviations and terms used throughout Lert, which are used throughout this declaration, are identified in the chart below:

Abbreviation	Term	Description
Tote	“Container”	“a term of art commonly used in the field of materials handling to refer to a container that holds materials being stored or handled, is used herein after with reference to both product and order containers.” AS-1005, 3:6–10
P-Tote	“Product Totes”	“containing the picking stock of eaches used to fulfill orders.” AS-1005, 3:14–15
O-Tote	“Order Totes”	“Containing the eaches picked to fulfill orders.” AS-1005, 3:16–17
TSS	“Tote-Storage Structure”	“stores both P-Totes and O-Totes.” AS-1005, 3:18–19
OLS	“Order-Loading Structure”	“holds O-Totes for loading and provides a track network for E-bots.” AS-1005, 3:30–32
CVC	“Circulating Vertical Conveyor”	“moves both P-Totes and O-Totes vertically between different levels of both the OLS and the TSS.” AS-1005, 3:38–40
CCS	“Central Control System”	“consisting of software, computers, and network equipment, which manages all of the resources within the system (including all of the various robots), orchestrates the entire order-fulfillment process and all related processes, and provides status and control interfaces to human operators of the system.” AS-1005, 3:44–50
R-Bot	“Roam-to-Desired Destination Bots”	“Robotic vehicles that store and retrieve P-Totes and O-Totes within the TSS, which have random access to all locations within a section of the TSS.” AS-1005, 3:27–29

Abbreviation	Term	Description
O-Bot	“Order-handling Bots”	“basically an expanded version of R-Bots, which move empty O-Totes from the Circulating Vertical Conveyor to the shelves of the OLS, and move filled O-Totes from the shelves of the OLS back to the Circulating Vertical Conveyor.” AS-1005, 3:33–37
E-Bot	“Each Bots”	“vehicles that receive the picked eaches and transfer them into the target O-Totes.” AS-1005, 3:27–29

1. The Lert Provisional Contains the Relevant Subject Matter

58. I have not been asked to offer an opinion about whether Lert is prior art to the '080 patent. However, I have been asked to opine whether the Lert Provisional describes the subject matter relied upon in the petition, and whether the Lert Provisional provides a sufficient written description of claims from Lert in such full, clear, concise, and exact terms to enable an ordinarily skilled artisan to practice the invention claimed in the patent.

59. As detailed in the table below, all matter relied upon from the Lert Patent finds support in the Lert Provisional. The table below identifies the portions of Lert relied upon in this Petition and the corresponding support in the Lert Provisional:

Portions of Lert Relied Upon	Support in Lert Provisional
Abstract	Abstract
1:15–16	¶0001

Declaration of Dr. Stephen Derby Regarding U.S. Patent No. 9,796,080

Portions of Lert Relied Upon	Support in Lert Provisional
1:19–22	¶¶0001
1:65–2:4	¶¶0003
2:51–55	¶¶¶00011–00012
2:56–63	¶¶0004
3:6–9	¶¶0006
3:13–50	¶¶0007
3:59–64	¶¶¶00022–00023, 00027
4:3–5	¶¶00023
4:22–24	¶¶00024
4:40–5:35	¶¶¶00025–00029
6:37–52	¶¶00033
7:22–24	¶¶00036
9:5–25	¶¶00043
18:10–11	¶¶00071
18:24–52	¶¶¶00073–00074
19:36–41	¶¶00079
20:3–7	¶¶00081, Bullet 4
21:12–14	¶¶00087
21:53–22:1	¶¶00090
22:11–16	¶¶00090, Bullet 4
22:24–33	¶¶00090, Bullet 7
22:44–46	¶¶00090, Bullet 11
23:14–32	¶¶00092
23:44–24:15	¶¶00096
Figs. 1, 2a–2b, 3a–3g, 4, 4b–4c, 5	Figs. 1, 2a–2b, 3a–3g, 4, 4b–4c, 5

2. Lert’s Claims Are Supported by the Lert Provisional

60. It is also my opinion that at least one claim in Lert is supported by the Lert Provisional. The table below summarizes the portions of the Lert Provisional that support a claim in Lert:

Claims of Lert	Support in Lert Provisional
[L1A]: “An automated warehouse storage system comprising;”	“An automated warehouse storage system is provided.” Abstract; <i>see also</i> Fig. 2b.
[L1B]: “a multilevel storage array with storage distributed along multiple aisles, each aisle of which has a set of storage levels and each level has storage locations distributed along the aisle;”	The TSS has a “storage rack, which is a multi-aisle, multilevel rack structure that holds the totes in storage” ¶00029; <i>see also</i> Figs. 2b, 3c–3g “each aisle of which has a set of storage levels and each level has first storage locations distributed along the aisle for first containers” ¶00092; <i>see also</i> ¶¶00033–00039, Figs. 2b, 3c–3g
[L1C]: “a guideway network extending through the multilevel storage array and configured for autonomous vehicles to move along the guideway network within the multilevel storage array:”	“interconnect or inter-aisle guideways, including rail networks on which R-Bots are able to travel between the aisles of the storage rack.” ¶0029:3. “Each guideway consists of a floor on which an RBot rail network is mounted, and its function is to enable R-Bots to move freely throughout a tier carrying totes between the storage rack, Picking workstations.” ¶00039; <i>see also</i> ¶¶00033–00038, 0092; Figs. 3a–3g.
[L1D]: “the guideway network including an inter-aisle guideway spanning at least two of the multiple aisles and a set of guideway levels extending in an	“interconnect or inter-aisle guideways, including rail networks on which R-Bots are able to travel between the aisles of the storage rack;” ¶00029.

Declaration of Dr. Stephen Derby Regarding U.S. Patent No. 9,796,080

Claims of Lert	Support in Lert Provisional
aisle of the multiple aisles and disposed so that each guideway level is at a different one of the storage levels and the vehicles on the guideway level can access the storage locations distributed along the aisle; and”	“Each ramp and its associated segment switches enable R-Bots to enter and exit any of the attached bot-beams and thereby access any of those storage levels within that aisle.” ¶¶00035; <i>see also</i> ¶¶00033–00034, 00036–00039, 0092, Figs. 3a–3g, 4, 4b, 4c; Claim [L1E].
[L1E]: “a ramp guideway communicably connecting each of the set of guideway levels to the inter-aisle guideway forming a common ramp guideway path connecting the inter-aisle guideway and each guideway level so that a vehicle moving between inter-aisle guideway and each guideway level moves along the common ramp guideway path.”	“ramps that connect sets of levels together within an aisle to form zones so that R-Bots can travel to and from any storage level within a zone, the number and configuration of such zones being the same for each aisle;” ¶00029:2 “the first guideway network including a common guideway common to more than one of the multiple aisles” ¶¶00093; <i>see also</i> ¶¶00033–00039, 00092–00096; Figs. 3a–3g, 4, 4b, 4c; Claim [L1D].
[L5A] “An automated warehouse storage system comprising;”	<i>See</i> Claim [L1A].
[L5B] “a multilevel storage array with storage distributed along multiple aisles, each aisle of which has a set of storage levels and each level has storage locations distributed along the aisle;”	<i>See</i> Claim [L1B].
[L5C] “a guideway network extending through the multilevel storage array and configured for autonomous vehicles to move along the guideway network within the multilevel storage array;”	<i>See</i> Claim [L1C].
[L5D] “the guideway network including an inter-aisle guideway spanning at least two of the	<i>See</i> Claim [L1D].

Claims of Lert	Support in Lert Provisional
<p>multiple aisles and a set of guideway levels extending in an aisle of the multiple aisles and disposed so that each guideway level is at a different one of the storage levels and the vehicles on the guideway level can access the storage locations distributed along the aisle; and”</p>	
<p>[L5E] “a ramp guideway disposed within the aisle, a ramp portion of the ramp guideway being in communication, at one end, with one guideway level of the set of guideway levels and at an opposite end with another set of guideway levels at a different guideway level.”</p>	<p>“a ramp guideway communicably connecting each of the set of guideway levels to the inter-aisle guideway forming a common guideway path connecting the inter-aisle guideway and each guideway level so that a vehicle moving between inter-aisle guideway and each guideway level moves along the common guideway path.” ¶0092.</p> <p>“the first guideway network including a common guideway common to more than one of the multiple aisles, and guideway levels arranged so that each aisle of the multiple aisles has a set of guideway levels disposed so that each guideway level is at a different one of the storage levels and the first vehicles on the guideway level can access the storage locations distributed along the aisle.” ¶0096; <i>see also</i> ¶¶00033–00039; Figs. 3a–3g, 4, 4b, 4c; Claim [L1E].</p>

61. Based on this analysis, it is my understanding that Lert is therefore prior art as of the filing date of its Provisional which is March 15, 2013, and is thus prior art to the '080 patent.

B. Winkler

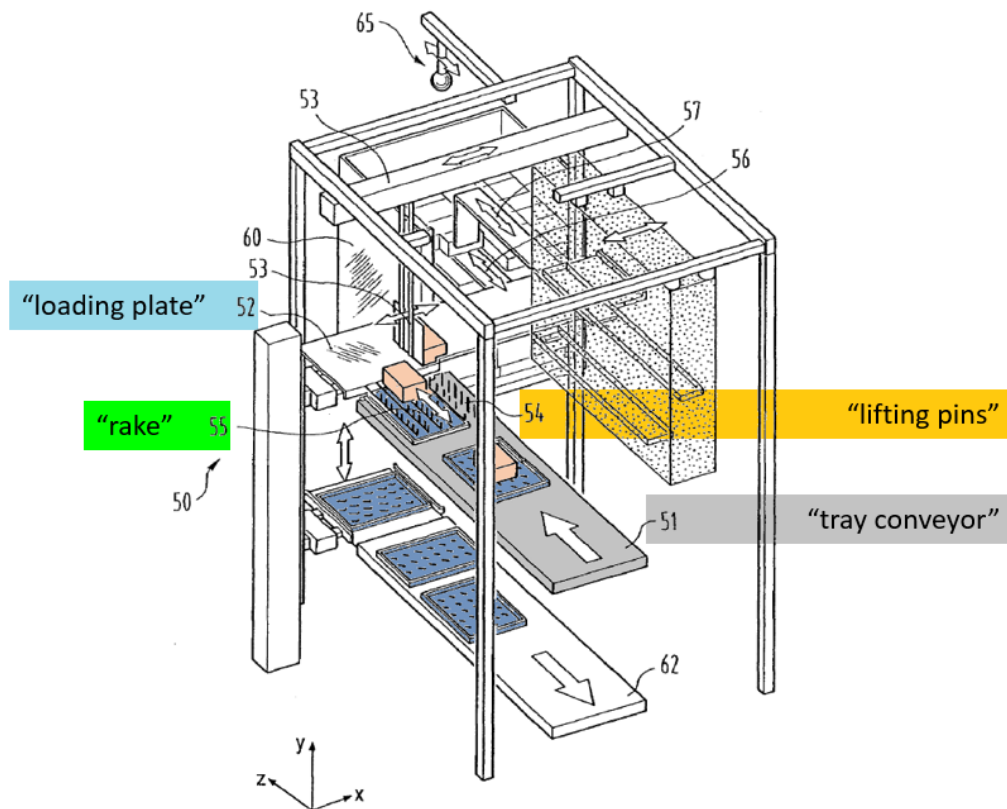
62. U.S. Patent No. 7,097,045 (“Winkler”), titled “Automated System and Method of Storing and Picking Articles,” was filed on June 20, 2003 and issued on August 26, 2006. I understand that Winkler is prior art to the ’080 patent

63. Winkler describes “an automated storage system for storing and picking articles.” AS-1007, Abstract. Incoming products are received and separated before being sent to “a tray storage facility for storing the packing units on trays.” AS-1007, 1:65-67. The “packing units” are stored in trays in a “tray storage facility” until a “pick order” requesting the specific item comes through. AS-1007, 2:38–50. The trays associated with each “pick order” are then retrieved from the “tray storage facility” and transferred towards a “loading apparatus” to be loaded onto a “load carrier” for delivery. AS-1007, 2:16–25; 2:38–50.

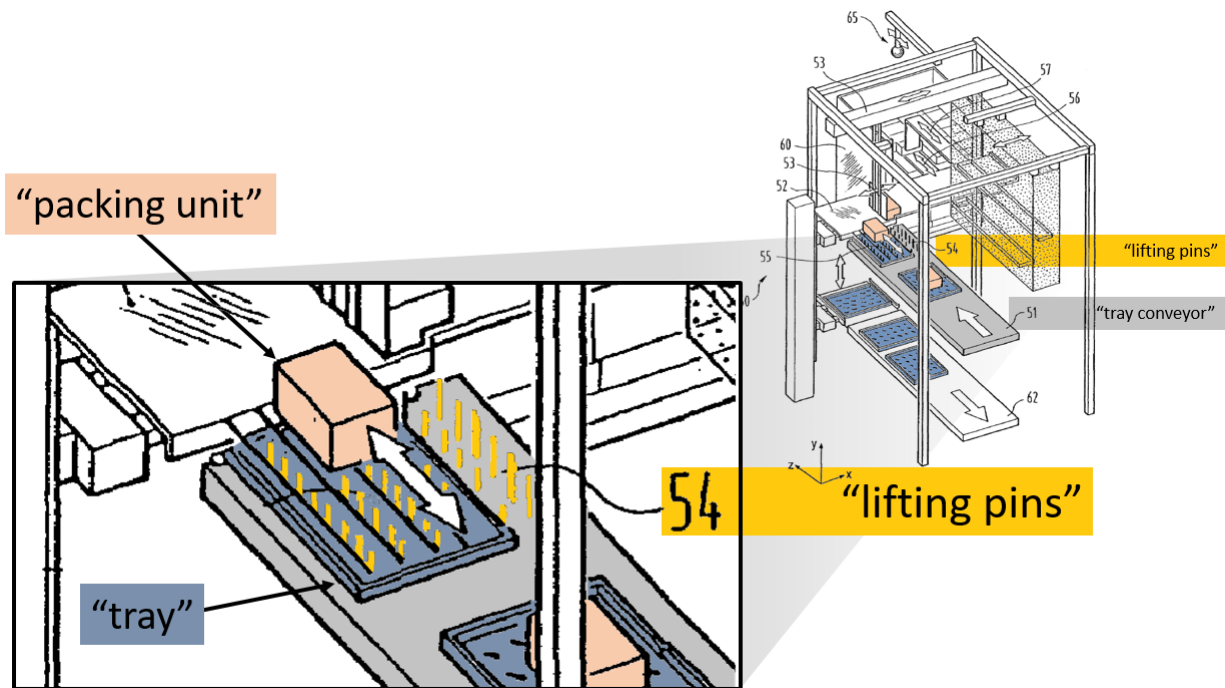
64. Winkler discloses a mechanism where “trays 10 each carrying a packing unit 15 are fed by a tray conveyor 51 to the loading apparatus 50.” AS-1007, 6:40–41. “At the end of the tray conveyor 51 *lifting pins 54 of a lifting device* act from below through the openings 11 in the tray upon the packing unit 15 and hence lift the latter out of the tray 10.” AS-1007, 6:41–44; 1:58-61 (“the trays have openings, through which lifting pins engage in order to lift a packing unit from the tray”).

65. Winkler further discloses that once lifted “[a] *rake 55* then acts upon the packing unit 15 and pushes it onto a horizontal loading plate 52. The lifting pins may then be dropped back under the tray conveyor 51 so that the empty tray 10 may be conveyed by a tray-returning conveyor 62 back into the tray storage facility.” AS-1007, 6:45–49.

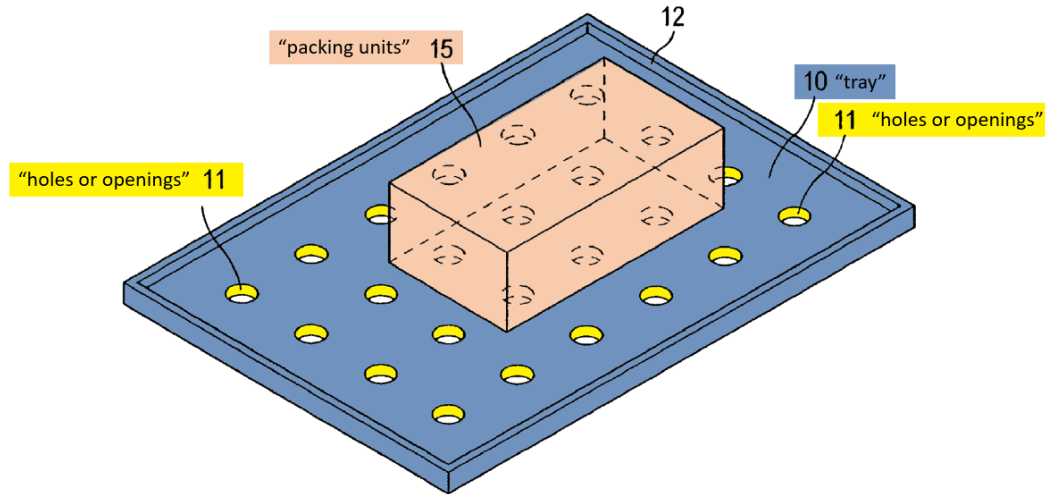
66. The annotated Figure 10 below from Winkler shows the “a lifting device” which includes “lifting pins 54” at the end of the “tray conveyor 51” and the “rake 55” which pushes it onto a “loading plate 52:”



67. The annotated Figure 10 below from Winkler further shows a close-up of Winkler’s lifting device with lifting pins 54 coming up through the “holes or openings” in the bottom of the tray from Winkler to lift the packing unit:



68. Winkler discloses that “trays 10 preferably have *holes or openings 11*, through which—as will be described in detail below—a lifting device for lifting an article stored on the tray may engage.” AS-1007, 3:65–4:1. Annotated Figure 4 below from Winkler shows the “holes or openings” in the bottom of the tray from Winkler:



C. Lert and Winkler Are Analogous Art to the '080 Patent

69. Lert and Winkler relate to the same field of endeavor as the '080 patent. The '080 patent purports to relate to “automated order fulfillment systems.” AS-1001, 1:12–13. Lert likewise discloses an “automated warehouse storage system,” that seeks “to achieve a very high or even total level of automation.” AS-1005, Abstract, 2:56. Similarly, Winkler discloses “[a]n automated Storage system for storing and picking articles” that “enables fully mechanized and automated Storage and picking of the articles.” AS-1007, Abstract. Lert and Winkler are therefore from the same field of endeavor of the '080 patent, and a PHOSITA utilizing common sense would look to Winkler in developing an automated storage system.

70. Moreover, both Lert and Winkler are reasonably pertinent to the particular problem with which the inventor of the '080 patent was involved. The '080 patent was concerned with “improvement in the efficiency of order processing

systems, and components thereof, including storage and retrieval systems and the handling of storage and delivery containers.” AS-1001,1:55–59. Lert too was concerned with improved efficiency and “[i]t [was] an object of [Lert’s] disclosed embodiment to be highly cost-efficient and effective in both domains of each-picking.” AS-1005, 1:65-2:4. As was Winkler, noting that “the efficiency and profitability of the logistics system may be increased and the logistics costs reduced” by using its disclosures. AS-1007, 2:51–55. In my opinion, a PHOSITA would have consulted Lert and Winkler references and applied their teachings in seeking a solution.

X. LEVEL OF ORDINARY SKILL IN THE ART

71. In rendering the opinions set forth in this declaration, I was asked to consider the patent claims and the prior art through the eyes of a PHOSITA. I placed myself back in time to approximately June 17, 2013 and considered the factors set-forth above to determine what level of skill a PHOSITA would have.

72. In my opinion, a PHOSITA has a Master’s degree in Mechanical Engineering or Robotics, and at least three to four years of experience working as an engineer in the field of AS/RS. Alternatively, in my opinion, a PHOSITA has at least a Bachelor’s degree in Mechanical Engineering, and at least four to five years of experience working as an engineer in the field of AS/RS.

73. I was a PHOSITA as of the earliest effective priority date of the '080 patent (June 17, 2013).

74. I have applied this level of skill in arriving at my opinions in this declaration.

XI. DETAILED INVALIDITY ANALYSIS FOR THE '080 PATENT

75. The discussion below provides my detailed invalidity analysis of how the prior art references invalidate the Challenged Claims.

A. Lert Anticipates or Renders Obvious Claims 1–8, 13–20, and 23

76. In my opinion, claims 1–8, 13–20, and 23 are anticipated or rendered obvious by Lert. As discussed above and further herein, Lert discloses an order fulfillment system that has a “Tote-Storage Structure” (“TSS”) and an “Order Loading Structure” (“OLS”), both of which have a structural framework defining a grid for storing totes. Lert further discloses robotic load handlers, which it calls “R-Bots” that store and retrieve totes from the TSS, and “O-Bots” that store and retrieve totes from the OLS. A “Central Control System” (“CCS”) has computers and network equipment to generate signals that control the movement of the R-Bots and O-Bots throughout the system. Lert discloses that the robotic load handlers transport “P-Totes” and “O-Totes,” which serve as “storage containers,” along with nested “sub-totes” or “sub-containers” that are sent to customers, which serve as “delivery containers.” Accordingly, Lert anticipates or renders obvious claims 1–8, 13–20, 23.

1. Independent Claim 1

a. “A system for managing shipment containers, the system comprising:” limitation [1A]

77. Lert discloses an “order fulfillment system for use in supply chains.” AS-1005, 1:15–16. Lert discloses in “FIGS. 2A-2B, there is shown schematic plan views of an exemplary order fulfillment system 10, and portions thereof for use in supply chains in accordance with the disclosed embodiments.” AS-1005, 2:52–55. Lert further discloses “the disclosed embodiment implements a ‘goods-to-man’ (or ‘goods-to-robot’) process model in which autonomous robotic vehicles bring containers of eaches to workstations where stationary pickers (either human or robotic) pick the required number of units of each SKU to fill specific order-lines.” AS-1005, 2:56-63.

78. In my opinion, Lert therefore discloses limitation [1A].

b. “a storage-and-retrieval system comprising:” limitation [1B]

79. Lert discloses a TSS. AS-1005, 5:13. The TSS “serves two functions: (1) it provides *storage* for totes of eaches in the system,” and “(2) it provides a closed operating environment for the R-bots that *store and retrieve* these totes and transport them between storage locations, Picking Workstations, and the CVC.” AS-1005, 5:16-23; 5:13–14; 5:23–35.

80. Lert separately discloses that the OLS provides both for “temporary *storage* of O-Totes” and retrieval of “filled O-Totes [are retrieved by O-Bots] from the shelves of the OLS [and moved] to the Circulating Vertical Conveyor” and then to other parts of the system. AS-1005, 3:30–37. The OLS that has a similar rack structure to the TSS. AS-1005, 18:24–37.

81. In my opinion, Lert therefore discloses limitation [1B].

- c. **“a structural framework defining a grid of storage locations configured for receiving a plurality of shipment containers including storage containers and delivery containers;” limitation [1C]**

82. Lert discloses “a structural framework defining a grid of storage locations.” The TSS in Lert is a “storage rack 14, which is a multi-aisle 16, multi-level 18 rack structure that holds the totes in storage and provides the wheel-support means for R-Bots to access the rack in order to store and retrieve the totes (see also FIGS. 3a-3g).” AS-1005, 5:24–27. The TSS, visible in a birds-eye perspective in Figures 2A–2B, discloses a “structural framework defining a grid of storage locations.” Moreover, Figures 3c–3g show that the “structural framework” of the TSS that has a “grid of storage locations.” Lert’s OLS has a similar rack structure to the TSS. AS-1005, 3:33–35, 18:24–37.

83. Lert discloses that the TSS is “configured for receiving a plurality of shipment containers.” Lert discloses that the TSS “provides storage for *totes of*

eaches in the system, both P-Totes containing the picking stock and filled O-Totes that are waiting to be delivered to customers.” AS-1005, 5:15–22. The “totes” are the “shipment containers,” and Lert notes that “tote” describes “a container that holds materials being stored or handled.” AS-1005, 3:6–9.

84. The TSS “is configured for receiving ... storage containers.” Lert discloses that the TSS “stores both P-Totes and O-Totes.” AS-1005, 3:18–19. The TSS “provides storage for totes of eaches in the system, both P-Totes containing the picking stock and filled O-Totes that are waiting to be delivered to customers.” AS-1005, 5:17–19. In my opinion, a PHOSITA would have understood that P-Totes and O-Totes are both “storage containers.” The TSS is therefore “configure[d] for receiving ... storage containers.”

85. TSS “is [also] configured for receiving ... delivery containers.” Lert discloses that O-Totes “can be used advantageously with variably-sized *sub-containers*, such as cardboard boxes, that are the shipping containers in which the eaches are sent to the customer.” AS-1005, 5:2–5. “[T]he O-Tote may be divided into multiple compartments by removable ‘liner bags,’ which also serve as sub-containers by which customers carry their eaches home.” AS-1005, 5:8–11. Moreover, Lert discloses that an O-Tote has a “sub-tote therein.” AS-1005, 18:10–11. In my opinion, a PHOSITA would have understood that these sub-totes or sub-containers are “delivery containers.” Because O-Totes are stored in the TSS (AS-

1005, 3:18-19, 5:16-18), O-Totes with sub-tote or sub-containers (i.e., “delivery containers”) would be stored in the TSS too. The TSS is therefore “configured for receiving ... delivery containers.”

86. Separate from the TSS, Lert discloses an OLS having structure “that resembles the rack structure of TSS in many respects,” including “two parallel pairs of rack modules, each with multiple storage levels.” AS-1005, 18:24–52. “The rack structure for temporary storage of O-Totes” (i.e., “storage containers.”) AS-1005, 18:26. The OLS is also “configured for receiving ... delivery containers” for the same reasons that the TSS is.

87. In my opinion, Lert therefore discloses limitation [1C].

d. **“a plurality of robotic load handlers for retrieving shipment containers from any one of the storage locations; and” limitation [1D]**

88. Lert discloses “[r]obotic vehicles ...that store and retrieve P-Totes and O-Totes within the TSS, which have random access to all locations within a section of the TSS.” AS-1005, 3:20–24. Lert calls these “R-Bots.” AS-1005, 3:20–24. “The R-Bots 40 (see FIG. 5) are the workhorses of the system, performing the functions of (a) storing and retrieving P-Totes and O-Totes within the TSS, and (b) transporting these totes between the TSS 12, the Picking Workstations 30, and the CVC 60.” AS-1005, 9:5–9. The “shipment containers” are “totes” that include P-

Totes and O-Totes. AS-1005, 3:6-9. Thus, at least “R-Bots” are the “plurality of robotic load handlers for retrieving shipment containers.”

89. Lert further discloses that R-Bots can “retrieve shipment containers from any one of the storage locations.” Lert discloses that R-Bots can “access ... all locations within a section of the TSS.” AS-1005, 3:20–22. R-Bots “generally operate[] within a single tier, although the Bot Lift enables them to move to different tiers as required to balance workloads. Within a tier, every R-Bot has access to any aisle (zone) and any storage level, so it can service every tote-storage position within the tier.” AS-1005, 9:9–14. R-Bots can therefore “retriev[e] shipment containers from any one of the storage locations” in the TSS.

90. Separate from R-Bots, Lert discloses O-Bots perform “the function of moving O-Totes in and out of the OLS, i.e., they receive empty O-Totes being inducted into the system via the CVC 90, place them on the rack to be filled, take them off the rack when filled, and put them back on the CVC to be either discharged from the system or moved into storage within the TSS by R-Bots.” AS-1005, 19:36–41. O-Bots are therefore a “plurality of robotic load handlers for retrieving” containers from any one of the storage locations in the OLS.

91. In my opinion, Lert therefore discloses limitation [1D].

- e. **“at least one rail arranged about the grid to enable access to each of the storage locations by at least one of the plurality of robotic load handlers” limitation [1E]**

92. Lert discloses the “TSS may be a large rack system with attached guideways 15 for robots.” AS-1005 5:15–16, Fig. 3a. The TSS also includes “ramps 20 that connect sets of levels together within an aisle to form zones so that R-Bots can travel to and from any storage level within a zone” along with “interconnect 22 or inter-aisle guideways, including rail networks on which R-Bots 40 are able to travel between the aisles of the storage rack.” AS-1005, 5:28–34; Figs. 3c–3g. In my opinion, a PHOSITA would have understood that Lert’s “guideways 15,” “ramps 20,” or “interconnect 22 or inter-aisle guideways” disclose limitation [1E].

93. Separate from the TSS, Lert discloses an OLS that has a structure “that resembles the rack structure of TSS in many respects,” including “two parallel pairs of rack modules, each with multiple storage levels.” AS-1005, 18:24–52. “[G]uideways [in the OLS] are comparable in both form and function to their counterparts in the TSS, allow the O-Bots to come out of one aisle, turn a half-circle on the guideway rails, and enter the adjacent aisle.” AS-1005, 18:47–50.

94. In my opinion, Lert therefore discloses limitation [1E].

- f. **“at least one processor configured to” limitation [1F]**

95. Lert discloses “a Central Control System (‘CCS’)” that consists of “software, computers, and network equipment, which manages all of the resources

within the system.” AS-1005, 21:53–55. The CCS “manages the overall operation of the system (including all of the various robots), orchestrates the entire order-fulfillment process and all related processes.” AS-1005, 3:44–50. The CCS communicates “via wired and wireless network interfaces with all of the other active subsystems (R-Bots, E-Bots, TSS switch-controllers, Workstations, O-Bots, CVC controller, Bot Lift, etc.).” AS-1005, 21:55–59, 21:60–63. In my opinion, Lert therefore discloses “at least one processor” that is configured to carry out the functional steps that follow, as explained herein.

96. To the extent a “processor” is not expressly disclosed by the foregoing, in my opinion a “processor,” it is inherently disclosed. A “processor” is necessarily disclosed by Lert’s disclosure of “computers” and/or “network equipment.”

97. In my opinion, Lert therefore discloses limitation [1F].

- g. **“generate signals for instructing or controlling at least one of the plurality of robotic load handlers to store, in the storage and retrieval system, the storage containers containing stored items” limitation [1G]**

98. In my opinion, Lert discloses that the CCS generates signals for instructing or controlling R-Bots to store, in the TSS, P-Totes and O-Totes containing stored items. Lert discloses that the CCS manages the system by “*communicating* via wired and wireless network interfaces with all of the other active subsystems” including “R-Bots.” AS-1005, 21:55–59. In my opinion, a

PHOSITA would have understood that “communicating via wired and wireless network interfaces,” constitutes “generat[ing] signals for instructing or controlling.” Lert further discloses R-Bots that “perfor[m] the functions of (a) *storing ... P-Totes and O-Totes within the TSS.*” AS-1005, 9:5–7.² “On most trips into the TSS, an *R-Bot* will return at least one *Product or O-Tote to storage* (called a ‘put away’).” AS-1005, 9:14–16. Lert discloses that the TSS “provides *storage for totes* of eaches in the system, *both P-Totes containing the picking stock and filled O-Totes* that are waiting to be delivered to customers.” AS-1005, 5:15–19. Lert discloses that the CCS manages both “[a]ssigning R-Bots to bring the specified *P-Totes* out of storage and carry them to/through the Picking Workstations, and then *to return them to storage*” and “the movement of *filled O-Totes into storage* within the TSS.” AS-1005, 22:11–13; 22:44–45. In my opinion, because the CCS “manages the overall operation of the system” by “communicating via wired and wireless network interface,” including “R-Bots,” and R-Bots store within the TSS both P-Totes and O-Totes containing eaches, Lert discloses or renders obvious limitation [1G].

99. Separate from controlling R-Bots, Lert discloses that the CCS “[c]ontrol[s] the activities of the O-Bot, assigning them the tasks of placing ...

² P-Totes and O-Totes “contain[] stored items” because Lert discloses that P-Totes “contain[] the picking stock of eaches used to fulfill orders” and O-Totes “contain[] the eaches picked to fulfill orders.” AS-1005, 3:14–17.

partially filled ... O-Tote on the storage racks [of the OLS] ... and controlling all their movements.” AS-1005, 22:29–33. In my opinion, because the CCS “manages the overall operation of the system” by “communicating via wired and wireless network interface,” including “O-Bots,” and O-Bots store within the OLS “partially filled” O-Totes, Lert discloses or renders obvious limitation [1G] for these additional reasons too.

100. In my opinion, Lert therefore discloses or renders obvious limitation [1G].

- h. **“generate signals for instructing or controlling at least one of the plurality of robotic load handlers to retrieve from the storage and retrieval system at least one storage container containing stored items for delivering the retrieved at least one storage container to an order picking station” limitation [1H]**

101. In my opinion, Lert discloses that the CCS generates signals for instructing or controlling R-Bots to retrieve, in the TSS, P-Totes and O-Totes containing stored items and delivers them to an order picking station. Lert discloses a CCS which “manages the overall operation of the system,” including by generating signals to instruct or control the “R-Bots.” *Supra* §§ XI.A.1.f. Lert discloses R-Bots “(a) ... *retriev[e] P-Totes and O-Totes* within the TSS, and (b) *transport[] these totes* between the TSS 12 [and] the *Picking Workstations 30...*” AS-1005, 9:5–7. In my opinion, a PHOSITA would have understood that Lert’s “Picking

Workstations” constitute the “order picking station.” Lert discloses that the CCS manages “[a]ssigning R-Bots to bring the specified *P-Totes out of storage and carry them to/through the Picking Workstations*” and “the movement of *filled O-Totes* into storage within the TSS *then out of storage for delivery to the customer.*” AS-1005, 22:11–13; 22:44–46. In my opinion, because the CCS “manages the overall operation of the system,” including “R-Bots,” and R-Bots retrieve from the TSS P-Totes and O-Totes containing eaches for delivery, and brings them to the Picking Workstations, Lert discloses or renders obvious limitation [1H].

102. Separate from controlling R-Bots, Lert discloses that the CCS “[c]ontrol[s] the activities of the O-Bot, placing empty (or partially filled) O-Tote on the storage racks.” AS-1005, 22:29–33. O-Totes, moreover, contain sub-totes or sub-containers containing at least one picked item for the reasons discussed above. Because the CCS “manages the overall operation of the system” by “communicating via wired and wireless network interface” including “O-Bots,” and O-Bots pick filled O-Totes with sub-totes or sub-containers from the OLS, Lert discloses or renders obvious limitation [1H] for these additional reasons too.

103. In my opinion, Lert therefore discloses or renders obvious limitation [1H].

- i. **“generate signals for instructing or controlling at least one of the plurality of robotic load handlers to store at least one delivery container in the storage and retrieval system, the at least one delivery container containing at least one picked item from the retrieved at least one storage container” limitation [1I]**

104. In my opinion, Lert discloses that the CCS generates signals for instructing or controlling R-Bots to store, in the TSS, O-Totes with sub-totes or sub-containers containing picked items from the retrieved at least one storage container. Lert discloses that the CCS which “manages the overall operation of the system,” including by generating signals to instruct or control the “R-Bots.” *Supra* § XI.A.1.f.

105. Lert discloses that R-Bots “store at least one delivery container in the storage and retrieval system.” Lert discloses that R-Bots store in the TSS, “filled O-Totes.” AS-1005, 3:18–19; 5:16–26; 22:44–45. Lert further discloses that “O-Totes” have sub-totes or sub-containers in which eaches are loaded. AS-1005, 5:2–12. These sub-totes or sub-containers are also “the shipping containers in which the eaches are sent to the customers” or “by which customers carry their eaches home.” AS-1005, 5:2–12. In my opinion, a PHOSITA would have understood that these sub-totes or sub-containers are “delivery containers.” In my opinion, moreover, PHOSITA further would have understood that, because “filled O-Totes” are stored in the TSS, these sub-totes or sub-containers within the O-Totes likewise would be stored in the TSS.

106. Lert discloses that “at least one delivery container contain[s] at least one picked item from the retrieved at least one storage container.” Lert discloses that O-Totes “hold eaches that have been picked from P-Totes to fill customer orders.” AS-1005, 4:51–52. Lert further discloses that eaches picked from retrieved P-Totes are deposited in O-Totes using E-Bots, and the movement of E-Bots is likewise controlled by the CSS. AS-1005, 22:24–28. Lert discloses that “O-Totes” have sub-totes or sub-containers in which eaches are loaded. AS-1005, 5:2–12, 18:10–11. In my opinion, a PHOSITA would have understood that Lert discloses that items picked from P-Totes are placed in sub-totes or sub-containers (i.e., “delivery containers”) within O-Totes, and therefore the sub-totes or sub-containers contain “at least one picked item from the retrieved at least one storage container.” Because the CCS “manages the overall operation of the system” including “R-Bots,” and R-Bots store in the TSS filled O-Totes that have sub-totes or sub-containers containing at least one picked item, Lert discloses or renders obvious limitation [II].

107. Separate from controlling R-Bots, Lert discloses that the CCS “[c]ontrol[s] the activities of the O-Bot, placing empty (or partially filled) O-Tote on the storage racks.” AS-1005, 22:29–33. O-Totes, moreover, contain sub-totes or sub-containers containing at least one picked item for the reasons discussed above. Because the CCS “manages the overall operation of the system” by “communicating via wired and wireless network interface,” including “O-Bots,” and O-Bots pick

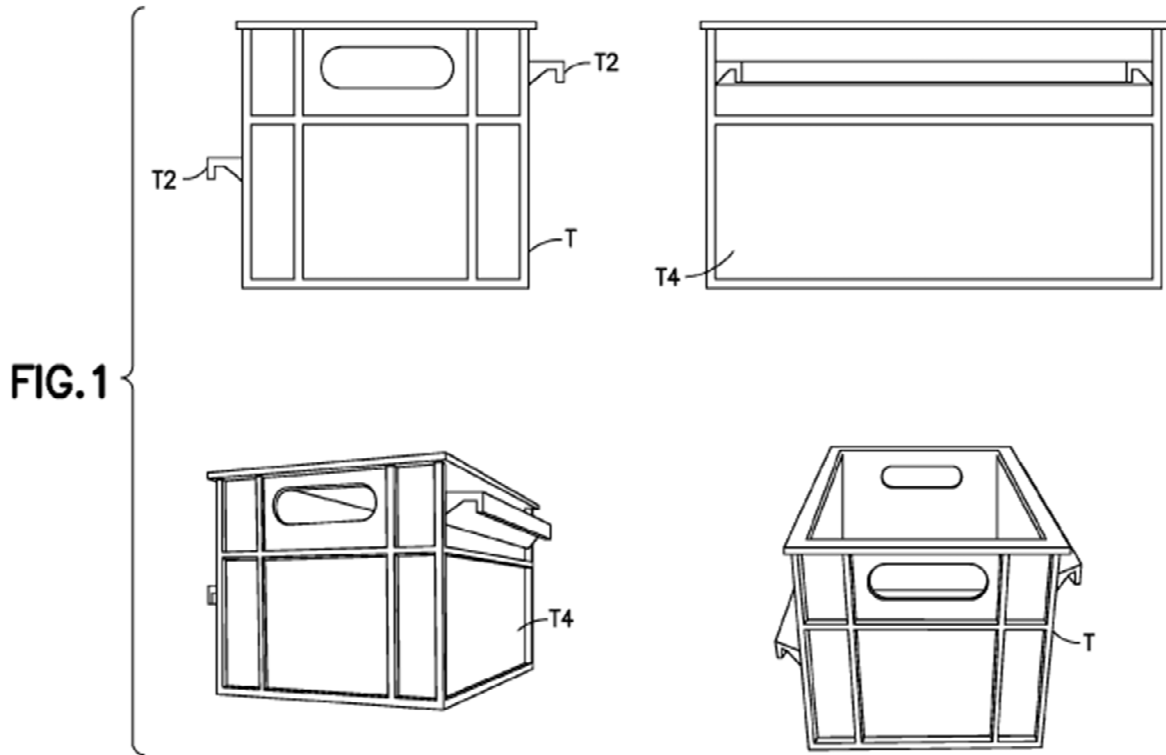
filled O-Totes with sub-totes or sub-containers from the OLS, Lert discloses or renders obvious limitation [1I] for these additional reasons too.

108. In my opinion, Lert therefore discloses or renders obvious limitation [1I].

- j. **“wherein the storage containers are of a first size and gauge for transport by at least one of the robotic handlers exclusively within the storage and retrieval system and the delivery containers are of a second size and gauge for transport outside of the storage and retrieval system for delivery and within the storage and retrieval system by at least one of the robotic handlers for storage prior to delivery” limitation [1J]**

109. Lert discloses “storage containers [that] are of a first size and gauge for transport by at least one of the robotic handlers exclusively within the storage and retrieval system.” P-Totes are “a six-sided container in the shape of a rectangular solid with an open top and a single interior storage compartment.” AS-1005, 4:3–5.

Figure 1 from Lert shows an example of a P-Tote having a first size and gauge:



Lert discloses that “O-Totes have similar exterior dimensions as P-Totes.” AS-1005, 4:54–55. P-Totes and O-Totes are exclusively handled by robotic handlers within the TSS or OLS (i.e., a “storage and retrieval system”), and there is no disclosure to the contrary.

110. Lert discloses “delivery containers [that] are of a second size and gauge.” Lert discloses that “O-Totes” have sub-totes or sub-containers “that are the shipping containers in which the eaches are sent to the customers” and “also serve as sub-containers by which customers carry their eaches home.” AS-1005, 5:2–12. Lert discloses that sub-containers can be “liner bags” or “cardboard boxes.” In my opinion, a PHOSITA would have understood that these sub-totes or sub-containers

are “delivery containers,” and given Lert’s disclosure about how they are “sent to” or used by “customers [to] carry their eaches home.” A PHOSITA would also have understood that they are of an appropriate size and gauge for transport outside of the storage and retrieval system.

111. Lert further discloses that the sub-tote or sub-container (i.e., the “delivery container”) is “transport[ed] ... within the storage and retrieval system by at least one of the robotic handlers for storage prior to delivery.” *Supra* ¶¶ 55–56. In my opinion, because these sub-totes or sub-containers are within the O-Totes, they accompany the O-Totes when they are transported within the TSS or OLS (i.e., a “storage and retrieval system”), including into storage, by the R-Bots (i.e., a “robotic handler”) before delivery.

112. In my opinion, Lert therefore discloses or renders obvious limitation [1J].

2. Claim 2

a. “The system according to claim 1”

113. Lert discloses or renders obvious claim 1. *Supra* § XI.A.1.

b. “wherein each of the at least one delivery container is stored in a storage container for storage in at least one of the storage locations” limitation [2A]

114. Lert discloses that O-Totes are “storage containers” and O-Totes have sub-totes or sub-containers which are “delivery containers.” AS-1005, 4:40–5:12.

Because the sub-totes or sub-containers are within the O-Totes, they accompany O-Totes into and out of the TSS. AS-1005, 4:40–5:12, 18:10–11; *supra* ¶¶ 55–56. Lert discloses that “filled O-Totes that are waiting to be delivered to customer” are stored in the TSS. AS-1005, 5:18–19. In my opinion, a PHOSITA would have understood that “filled O-Totes” include O-Totes that have sub-totes or sub-containers, and therefore sub-totes or sub-containers are stored in the TSS or OLS (i.e., a “storage and retrieval system”) in at least one of the storage locations.

115. In my opinion, Lert therefore discloses or renders obvious limitation [2A].

3. Claim 3

a. “The system according to claim 1”

116. Lert discloses or renders obvious claim 1. *Supra* § XI.A.1.

b. “wherein the at least one processor is configured to generate signals for instructing or controlling at least one of the plurality of robotic load handlers to store fully or partially-picked delivery containers in the storage and retrieval system” limitation [3A]

117. Limitation [3A] recites the same subject matter as limitation [1I]. For the reasons discussed for limitation [1I] (*supra* § XI.A.1.i), it is my opinion that Lert discloses or renders obvious limitation [3A].

4. Claim 4

a. “The system according to claim 1”

118. Lert discloses or renders obvious claim 1. *Supra* § XI.A.1.

b. “wherein the at least one processor is configured to generate signals for instructing or controlling at least one of the plurality of robotic load handlers to store empty delivery containers in the storage and retrieval system” limitation [4A]

119. Lert discloses that the CCS generates signals for instructing or controlling O-Bots to store empty O-Totes with sub-totes or sub-containers in the OLS, which is part of the storage and retrieval system. Lert discloses a “processor” through its disclosure of the CCS, which “manages the overall operation of the system,” including by generating signals to instruct or control the “R-Bots.” *Supra* § XI.A.1.f. Lert further discloses O-Bots “which *move empty O-Totes ... to the shelves of the OLS.*” AS-1005, 3:33–37. Lert explains that “the Order-Loading Structure 110, which includes a rack structure for temporary storage of O-Totes ... resembles the rack structure of TSS.” AS-1005, 18:25–37. In my opinion, a PHOSITA would have understood that the OLS is a storage and retrieval system because it serves as “temporary storage of O-Totes” and the “rack structure for temporary storage of O-Totes.” AS-1005, 18:24–37.

120. Lert discloses that O-Totes can have sub-totes or sub-containers which are “delivery containers.” AS-1005, 4:60-5:12; *supra* § XI.A.1.j, ¶ 56. In my

opinion, a PHOSITA would have understood that the O-Totes stored in the OLS would have sub-totes or sub-containers (i.e., “delivery containers”) within them, and these sub-totes or sub-containers accompany the O-Totes when they are transported within the OLS. Moreover, in my opinion, a PHOSITA would have understood that, because Lert expressly discloses that the system handles “empty O-Totes,” the system likewise handles empty sub-totes or sub-containers (i.e., “delivery containers”).

121. In my opinion, Lert therefore discloses or renders obvious limitation [4A].

5. Claim 5

a. “The system according to claim 1”

122. Lert discloses or renders obvious claim 1. *Supra* § XI.A.1.

b. “wherein the at least one processor is configured to generate signals for instructing or controlling at least one of the plurality of robotic load handlers to retrieve at least one of the delivery containers for delivering the retrieved at least one delivery container to an order picking station” limitation [5A]

123. Lert discloses that the CCS generates signals for instructing or controlling R-Bots to retrieve, in the TSS, O-Totes with sub-totes or sub-containers and transport them to an order picking station. Lert discloses that the CCS “manages the overall operation of the system,” including by generating signals to instruct or

control the “R-Bots.” *Supra* § XI.A.1.f. Lert discloses that R-Bots’ functions include “(a) ... *retrieving* ... *O-Totes* within the TSS, and (b) *transporting* these totes between the TSS 12 [and] the *Picking Workstations 30*....” AS-1005, 9:5–9. Lert further discloses that. “[o]n most trips into the TSS, an R-Bot will ... remove at least one ... O-Tote from storage (called a ‘pick’, though referring to a tote-pick rather than an each-pick).” AS-1005, 9:14–18.

124. Lert further discloses that O-Totes can have sub-totes or sub-containers (i.e., “delivery containers.”). AS-1005, 4:60-5:12; *supra* § XI.A.1.j, ¶ 56. In my opinion, a PHOSITA would have understood that, because these sub-totes or sub-containers are within the O-Totes, they accompany the O-Totes when they are transported within the TSS by the R-Bot to the Picking Workstations in the manner discussed above. AS-1005, 9:5–25. In my opinion, because the CCS “manages the overall operation of the system,” including “R-Bots,” and R-Bots retrieve from the TSS O-Totes having sub-totes or sub-containers and transports them to an order picking station, Lert discloses or renders obvious limitation [5A].

125. In my opinion, Lert therefore discloses or renders obvious limitation [5A].

6. Claim 6

a. “The system according to claim 1”

126. Lert discloses or renders obvious claim 1. *Supra* § XI.A.1.

- b. **“wherein the at least one processor is configured to generate signals for instructing or controlling at least one of the plurality of robotic load handlers to retrieve at least one of the delivery containers for dispatch” limitation [6A]**

127. Limitation [6A] recites the same subject matter as limitation [5A]. The only difference is that limitation [5A] recites that the robotic load handlers delivers the retrieved “delivery containers” to “an order picking station” while limitation [6A] recites the robotic load handlers retrieve the “delivery containers for dispatch.”

128. For the reasons discussed for limitation [5A] (*supra* § XI.A.5.b) it is my opinion that Lert discloses limitation [6A]. In addition, Lert discloses that a processor that instructs or controls “the plurality of robotic load handlers to retrieve at least one of the delivery containers for dispatch.” Lert discloses that the CCS manages “the movement of *filled O-Totes* into storage within the TSS *then out of storage for delivery to the customer.*” AS-1005, 22:44–46. Lert also discloses that the CCS manages “moving *filled O-Totes* from R-Bots and O-Bots *to an outbound conveyor for delivery to customers.*” AS-1005, 20:3–4.

129. Lert further discloses that O-Totes can have sub-totes or sub-containers which are “delivery containers.” AS-1005, 4:60-5:12; *supra* § XI.A.1.j, ¶ 56. The sub-totes or sub-containers are dispatched to customers because they serve as “the shipping containers in which the eaches are sent to the customers” or the means “by which customers carry their eaches home.” AS-1005, 5:4–12. In my opinion,

because the CCS “manages the overall operation of the system,” including “R-Bots,” and R-Bots retrieve from the TSS O-Totes with sub-totes or sub-containers containing eaches dispatched to customers, Lert discloses limitation [6A].

130. In my opinion, Lert therefore discloses or renders obvious limitation [6A].

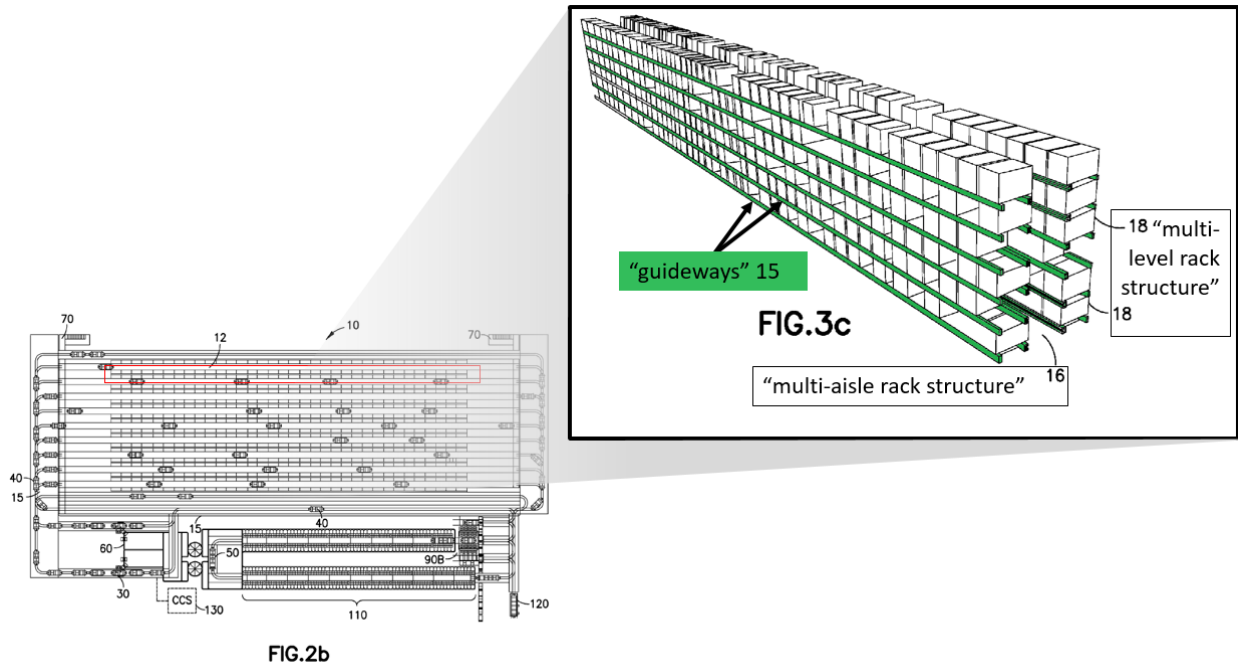
7. Claim 7

a. “The system according to claim 1”

131. Lert discloses or renders obvious claim 1. *Supra* § XI.A.1.

b. “wherein the grid of storage locations is configured for receiving a plurality of containers in one or more stacks” limitation [7A]

132. Lert discloses that the TSS has “the storage rack 14, which is a multi-aisle 16, multi-level 18 rack structure that *holds the totes in storage.*” AS-1005, 5:24–25. Lert discloses that “[e]ach ramp” of the TSS “interconnects six levels to create zones that are all about 9-feet high,” and that each aisle has “three zones *stacked* vertically.” AS-1005, 7:22–24, Figs. 3c–3g. In my opinion, a PHOSITA would have understood that each level of the rack stores containers and is stacked on the previous level to make a rack structure. AS-1005, 7:22–24, Figs. 3c–3g. Figures 3c–3g also show that the TSS has a plurality of containers in one or more stacks. AS-1005, Figs. 3c–3g. Annotated Figures 2b and 3c below show the multi-aisle and multi-level stacked configuration:



133. Separate from the TSS, Lert further discloses that the OLS has a similar rack structure to the TSS. AS-1005, 3:30–32, 18:36–37.

134. In my opinion, Lert therefore discloses or renders obvious limitation [7A].

8. Claim 8

a. “The system according to claim 1”

135. Lert discloses or renders obvious claim 1. *Supra* § XI.A.1.

b. “wherein at least one delivery container is nestable within a storage container” limitation [8A]

136. Lert discloses that O-Totes are “storage containers” and O-Totes have sub-totes or sub-containers which are “delivery containers.” AS-1005, 4:60-5:12; *supra* § XI.A.1.j, ¶ 56. Lert discloses that O-Totes have a “sub-tote *therein*.” AS-

1005, 18:10–11. In my opinion, a PHOSITA would have understood that these sub-totes or sub-containers (i.e., “delivery containers”) are “nestable” within the O-Totes (i.e., “storage container”).

137. In my opinion, Lert therefore discloses or renders obvious limitation [8A].

9. Independent Claim 13

138. Claims 13–22 of the '080 patent are “method” claims. Implementing Lert discloses or renders obvious claims 13–20 for the reasons discussed herein.

- a. **“A method of operating an order processing system including a goods storage and retrieval system, the method comprising” limitation [13A]**

139. To the extent the preamble is limiting, Lert discloses this limitation. Limitation [13A] recites the same subject matter as limitation [1A] in method form. For the reasons discussed for limitation [1A] (*supra* § XI.A.1.a), it is my opinion that implementing Lert discloses limitation [13A].

- b. **“storing, via at least one robotic load handler, in at least one of a plurality of storage locations in the storage and retrieval system a plurality of storage containers containing stored items” limitation [13B]**

140. Limitation [13B] recites the same subject matter as limitations [1F] and [1G] in method form. For the reasons discussed for limitations [1F] and [1G] (*supra*

§§ XI.A.1.f, XI.A.1.g), it is my opinion that implementing Lert discloses or renders obvious limitation [13B].

c. **“storing, via the at least one robotic load handler, in at least one of the plurality of adjacent stacks a plurality of delivery containers” limitation [13C]**

141. Limitation [13C] recites the same subject matter as limitations [1C], [1I], and [7A] in method form. For the reasons discussed for limitations [1C], [1I], and [7A], (*supra* §§ XI.A.1.c, XI.A.1.i, XI.A.7.b), it is my opinion that implementing Lert discloses or renders obvious limitation [13C].

142. To the extent not disclosed in connection with limitations [1C], [1I], and [7A] Lert discloses “storing ... in at least one of the plurality of adjacent stacks.” Lert discloses that the TSS (which stores “a plurality of delivery containers” (*see* limitation [1I])) is a “storage rack 14, which is a multi-aisle 16, multi-level 18 rack structure that holds the totes in storage.” AS-1005, 5:24–25, 6:37–52, 22:11–16, Fig. 3c. Each aisle is adjacent to another aisle, as shown in Figure 3C, for example, and Lert explains that the “storage rack” has “adjacent aisles.” AS-1005, 6:50–52.

143. Separate from TSS, Lert discloses that the OLS has a similar rack structure to the TSS. AS-1005, 3:30–32, 18:36–37.

144. In my opinion, implementing Lert therefore discloses or renders obvious limitation [13C].

- d. **“retrieving, via the at least one robotic load handler, from at least one of a plurality of storage locations a plurality of storage containers containing at least one of the delivery containers, and delivering the retrieved containers to an order picking station” limitation [13D]**

145. Limitation [13D] recites the same subject matter as limitation [1H] in method form. For the reasons discussed for limitation [1H] (*supra* § XI.A.1.h), it is my opinion that implementing Lert discloses or renders obvious limitation [13D].

- e. **“transporting the plurality of storage containers exclusively within storage and retrieval system via the at least one robotic load handler” limitation [13E]**

146. Limitation [13E] recites the same subject matter as limitations [1G], [1H], and [1J] in method form. For the reasons discussed for limitations [1G], [1H], and [1J] (*supra* §§ XI.A.1.g, XI.A.1.h, XI.A.1.i), it is my opinion that implementing Lert discloses or renders obvious limitation [13E].

- f. **“transporting the plurality of delivery containers outside of the storage and retrieval system for delivery and within the storage and retrieval system by at least one of the robotic handlers for storage prior to delivery” limitation [13F]**

147. Limitation [13F] recites the same subject matter as limitations [1I] and [1J] in method form. For the reasons discussed for limitations [1I] and [1J] (*supra* §§ XI.A.1.i, XI.A.1.j), it is my opinion that implementing Lert discloses or renders obvious limitation [13F].

10. Claim 14

a. **“The method according to claim 13, comprising:”**

148. Lert discloses or renders obvious claim 13. *Supra* § XI.A.9.

b. **“storing each of the plurality of delivery containers into a storage container for storage in at least one of the plurality of storage locations” limitation [14A]**

149. Limitation [14A] recites the same subject matter as limitation [2A] in method form. For the reasons discussed for limitation [2A] (*supra* § XI.A.2.b), it is my opinion that implementing Lert discloses or renders obvious limitation [14A].

11. Claim 15

a. **“The method according to claim 13, comprising:”**

150. Lert discloses or renders obvious claim 13. *Supra* § XI.A.9.

b. **“storing, via the at least one robotic load handler, in at least one of the plurality of adjacent stacks at least one delivery containers containing at least one picked item” limitation [15A]**

151. Limitation [15A] recites the same subject matter as limitation [1I] in method form. Lert, moreover, discloses “storing ... in at least one of the plurality of adjacent stacks,” for the reasons discussed for limitation [13C]. For the reasons discussed for limitations [1I] and [13C] (*supra* §§ XI.A.1.i, XI.A.9.c), it is my opinion that implementing Lert discloses or renders obvious limitation [15A].

12. Claim 16

a. **“The method according to claim 13, comprising:”**

152. Lert discloses or renders obvious claim 13. *Supra* § XI.A.9.

b. **“placing an empty delivery container in a storage container after a delivery container containing items has been removed from the storage container” limitation [16A]**

153. Limitation [16A] recites the same subject matter as limitations [2A] and [4A] in method form. Lert further discloses that the “O-Tote may be divided into multiple compartments by removable ‘liner bags’ ... which are *inserted into the O-Totes by* manual or automated means.” AS-1005, 5:8–5:12. In addition to the reasons discussed for limitations [2A] and [4A], Lert’s disclosure of “sub-containers” that “are inserted into the O-Totes by manual or automated means” discloses or renders obvious limitation 16[A]. AS-1005, 5:8–5:12.

154. To the extent “placing an empty delivery container in a storage container” is not expressly disclosed by the foregoing, it is inherently disclosed. A method for “placing an empty delivery container in a storage container” is necessarily disclosed by Lert’s disclosure of O-Totes that have a “sub-tote therein” and Lert’s disclosure that O-Totes “can be used advantageously with variably-sized *sub-containers*, such as cardboard boxes, that are the shipping containers in which the eaches are sent to the customer.” AS-1005, 5:2–12; 18:10–11. It is my opinion

that a PHOSITA would have understood that a method must exist for the described sub-containers to be placed into the O-Totes.

155. In my opinion, implementing Lert discloses or renders obvious limitation [16A].

13. Claim 17

a. **“The method according to claim 13,”**

156. Lert discloses or renders obvious claim 13. *Supra* § XI.A.9.

b. **“wherein at least one of the plurality of delivery containers is nestable with at least one other delivery container” limitation [17A]**

157. Limitation [17A] recites the same subject matter as limitation [8A] in method form. For the reasons discussed for limitation [8A] (*supra* § XI.A.8.b), it is my opinion that implementing Lert discloses or renders obvious limitation [17A].

14. Claim 18

a. **“The method according to claim 13,”**

158. Lert discloses or renders obvious claim 13. *Supra* § XI.A.9.

b. **“wherein the plurality of storage containers have a first size and the plurality of delivery containers have a second size, the method comprising” limitation [18A]**

159. Limitation [18A] recites the same subject matter as limitation [1J] in method form. For the reasons discussed for limitation [1J] (*supra* § XI.A.1.j), it is my opinion that implementing Lert discloses or renders obvious limitation [18A].

- c. **“placing at least one delivery container within one of the plurality of storage containers for storage in at least one of the plurality of storage locations” limitation [18B]**

160. Limitation [18B] recites the same subject matter in limitations [1I] and [2A] in method form. Furthermore, limitation [16A] recites a method for placing a delivery container within a storage container. For the reasons discussed for limitations [1I], [2A], and [16A] (*supra* §§ XI.A.1.i, XI.A.2.b, XI.A.12.b), implementing Lert discloses or renders obvious limitation [18B].

15. Claim 19

- a. **“The method according to claim 13, comprising:”**

161. Lert discloses or renders obvious claim 13. *Supra* § XI.A.9.

- b. **“storing, via the at least one robotic load handler, in at least one of the plurality of adjacent stacks at least one partially or fully-picked delivery containers” limitation [19A]**

162. Limitation [19A] recites the same subject matter as limitation [3A] in method form. Lert, moreover, discloses “storing ... in at least one of the plurality of adjacent stacks,” as discussed for limitation [13C]. For the reasons discussed for limitations [3A] and [13C] (*supra* §§ XI.A.3.b, XI.A.9.c), it is my opinion that implementing Lert discloses or renders obvious limitation [19A].

16. Claim 20

a. **“The method according to claim 19, comprising:”**

163. Lert discloses or renders obvious claim 13. *Supra* § XI.A.9.

b. **“retrieving, via the at least one robotic load handler, from at least one of a plurality of storage locations at least one of the delivery containers for dispatch” limitation [20A]**

164. Limitation [20A] recites the same subject matter as limitation [6A] in method form. For the reasons discussed for limitation [6A] (*supra* § XI.A.6.b), it is my opinion that implementing Lert discloses or renders obvious limitation [20A].

17. Independent Claim 23

a. **“A system for managing storage and retrieval of containers, comprising:” limitation [23A]**

165. Limitation [23A] recites the same subject matter as limitation [1A]. For the reasons discussed for limitation [1A] (*supra* § XI.A.1.a), it is my opinion that Lert discloses limitation [23A].

b. **“a storage and retrieval system including:” limitation [23B]**

166. Limitation [23A] recites the same subject matter as limitation [1B]. For the reasons discussed for limitation [1B] (*supra* § XI.A.1.b), it is my opinion that Lert’s TSS discloses limitation [23B].

- c. **“a structural framework defining a grid of storage locations for receiving a plurality of containers” limitation [23C]**

167. Limitation [23C] recites the same subject matter as limitation [1C]. For the reasons discussed for limitation [1C] (*supra* § XI.A.1.c), it is my opinion that Lert’s TSS and its associated features disclose limitation [23C].

- d. **“a plurality of robotic load handlers each configured to access any one of the storage locations in the grid of the structural framework” limitation [23D]**

168. Limitation [23D] recites the same subject matter as limitation [1D]. Lert discloses R-Bots each configured to go to any location within the TSS. AS-1005, 3:20–22, 9:9–14. For the reasons discussed for limitation [1D], (*supra* § XI.A.1.d), it is my opinion that Lert’s R-Bots therefore disclose or renders obvious limitation [23D].

- e. **“a controller configured to control at least one robotic hander in transporting at least one of the plurality of containers to/from any one of the storage locations in the grid” limitation [23E]**

169. Limitation [23E] recites the same subject matter as limitations [1D], [1F], [1G], [1H], and [1I].

170. It is my opinion that Lert’s disclosure of the CCS in connection with limitations [1F] (“at least one processor configured to”), (*supra* § XI.A.1.f) applies equally to “a controller.” Lert’s CCS discloses or renders obvious “a controller.”

171. Lert's CCS is "configured to control at least one robotic hander" for the reasons discussed for limitation [1D]. *Supra* § XI.A.1.d. Lert discloses that the "CCS 130 subsystem manages the overall operation of the system ... communicating via wired and wireless network interfaces with all of the other active subsystems," including "R-Bots." AS-1005, 21:54–59. In my opinion, a PHOSITA would have understood that this discloses "a controller configured to control at least one robotic hander."

172. Lert's R-Bots transport "containers to/from any one of the storage locations in the grid" for the reasons discussed for limitations [1G], [1H], and [1I]. *Supra* §§ XI.A.1.g, XI.A.1.h, XI.A.1.i. R-Bots "store and retrieve P-Totes and O-Totes within the TSS, which have random access to *all locations* within a section of the TSS." AS-1005, 3:20–22. R-Bots "generally operate[]" within a single tier, although the Bot Lift *enables them to move to different tiers* as required to balance workloads. Within a tier, every R-Bot has access to any aisle (zone) and any storage level, so it can service every tote-storage position within the tier." AS-1005, 9:9–14. R-Bots can therefore transport containers "to/from any one of the storage locations in the grid."

173. In my opinion, because the CCS "manages the overall operation of the system," including R-Bots, which transport containers to/from any one of the storage

locations in the grid of the TSS respectively, Lert discloses or renders obvious limitation [23E].

- f. **“wherein the plurality of containers includes storage containers configured to store products to be ordered, delivery containers configured to store products at least partially fulfilling an order, and combined containers including at least one delivery container nested within a storage container” limitation [23F]**

174. Lert discloses “the plurality of containers includes storage containers configured to store products to be ordered.” Lert discloses P-Totes “containing the picking stock of eaches used to fulfill orders.” AS-1005, 3:14–15. “The function of the P-Tote is to hold eaches that comprise the picking stock in the system available for use in filling customer orders.” AS-1005, 3:61–64. “P-Totes containing the picking stock” can be stored in the TSS. AS-1005, 5:17–18. In my opinion, a PHOSITA would have understood that P-Totes are one of “the plurality of containers includ[ing] storage containers configured to store products to be ordered.”

175. Lert discloses “delivery containers configured to store products at least partially fulfilling an order.” O-Totes “can be used advantageously with variably-sized *sub-containers*, such as cardboard boxes, that are the shipping containers *in which the eaches are sent to the customer.*” AS-1005, 5:2–5. Lert further discloses that “the O-Tote may be divided into multiple compartments by removable ‘liner bags,’ which also serve as *sub-containers by which customers*

carry their eaches home.” AS-1005, 5:8–11. Moreover, Lert discloses that an O-Tote can have a “sub-tote therein.” AS-1005, 18:10–11. In my opinion, a PHOSITA would have understood that sub-totes or sub-containers (i.e., “delivery containers”) are one of the “delivery containers configured to store products at least partially fulfilling an order.”

176. Lert discloses “combined containers including at least one delivery container nested within a storage container.” In my opinion, a PHOSITA would have understood that O-Totes are also “storage containers.” *Supra* ¶¶ 55, 84. For example, Lert discloses that TSS “*provides storage* for totes of eaches in the system, [for] *filled O-Totes* that are waiting to be delivered to customers.” AS-1005, 5:15–22. Lert also says that the CCS manages “the movement of *filled O-Totes into storage* within the TSS.” AS-1005, 20:5–7, 22:44–45, 22:29–31; *see also* AS-1005, 21:66–22:1 (the CCS manages the “induction of O-Totes to replenish the available picking stock within the TSS, which includes determining the storage location for these totes”).

177. O-Totes also have sub-totes or sub-containers (i.e., “delivery containers”). *Supra* ¶¶ 56, 85. Lert discloses that O-Totes have a “sub-tote *therein.*” AS-1005, 18:10–11. In my opinion, a PHOSITA would have understood that these sub-totes or sub-containers (i.e., “delivery containers”) are “nested” within the O-Totes (i.e., “storage container”).

178. I observe that limitation 23F does not require that “delivery container” be “nested within a storage container [that is] configured to store products to be ordered.” The claim merely requires that the “delivery container” be “nested within *a* storage container.” As discussed above, Lert discloses that P-Totes and O-Totes are both “storage containers” and that sub-totes or sub-containers (“delivery container”) are nested within O-Totes.

179. In my opinion, Lert therefore discloses or renders obvious limitation [23F].

* * *

180. In my opinion, Lert anticipates or renders obvious claims 1–8, 13–20, and 23 of the '080 patent.

B. Lert in Combination with Winkler Renders Obvious Claims 9–12 and 21–22

181. In my opinion, claims 9–12 and 21–22 are obvious over Lert in combination with Winkler.

1. A PHOSITA Would Have Been Motivated to Combine Lert with Winkler

182. Lert discloses that filled O-totes with sub-totes or sub-containers are sent “to an out-bound conveyor for delivery to customers.” AS-1005, 20:3–4.

183. In my opinion, a PHOSITA would have understood that Lert does not provide a mechanism to remove sub-totes or sub-containers from an O-Tote before

sending to customers. It is my opinion that a PHOSITA would have been motivated to modify Lert in this manner for at least the following reasons:

184. **First**, this modification would save costs and conserve resources. This modification obviates having to send redundant containers, i.e., sending both O-Totes and sub-totes/sub-container to customers. Removing sub-totes or sub-containers from O-Totes before shipping to customers allows O-Totes to be recycled in the system, thereby saving the costs of replacement O-Totes.

185. **Second**, this modification would improve efficiency. It would automate the removal of delivery containers from within O-Totes, allowing for rapid reuse of the O-Totes and reducing the need for new totes to be delivered to the facility. Rapid reuse of O-Totes would improve the overall efficiency.

186. **Third**, the modification would improve overall safety. It removes the need for a human to engage in repetitive lifting, which is one of the most frequent causes of lost or restricted work time. AS-1010 (“MSD cases accounted for 33% of all worker injury and illness cases.”). A PHOSITA would have recognized that lifting the containers is a potential safety concern and automating it would reduce the incidence of workplace injuries.

187. In my opinion, a PHOSITA would have been motivated to combine Lert with Winkler. Winkler explains that by using its disclosures “the efficiency and profitability of the logistics system may be increased and the logistics costs

reduced.” AS-1007, 2:53–55. Winkler further discloses the missing link in Lert: a mechanism for removing a “packing unit” from a “tray” using “act from below through the openings 11 in the tray upon the packing unit 15 and hence lift the latter out of the tray 10.” AS-1007, 6:40–44. “A rake 55 then acts upon the packing unit 15 and pushes it onto a horizontal loading plate 52.” AS-1007, 66:45–49. A PHOSITA would have recognized that Winkler’s “lifting device,” “rake” and “holes or “openings” provides Lert with an efficient way to remove a delivery container from a storage container.

2. A PHOSITA Would Have Had a Reasonable Expectation of Success Combining Lert and Winkler

188. In my opinion, incorporating the teaching of Winkler’s “lifting device,” “rake” and “holes or openings” into Lert would have required routine modifications that were within the skills of a PHOSITA. Lert discloses an “output conveyor” that “take[s] totes out of the system.” AS-1005, 21:12–14. Winkler describes a “tray conveyor lifting pins of a lifting device act from below through the openings in the tray upon the packing unit and hence lift the latter out of the tray.” AS-1007, 6:40–44. In my opinion, a PHOSITA would have understood that a “lifting device” and “rake” like the one disclosed in Winkler’s could be added to “output conveyor” disclosed in Lert with minor modification to the rest of Lert’s overall system. Such

a modification would have been a straightforward modification to Lert, particularly given the details provided by Winkler's disclosures.

189. In my opinion, a PHOSITA likewise would have had a reasonable expectation of success adding holes or openings in the bottom of the tote that would allow a lifting device like the one in Winkler to lift a sub-container from within the tote. Such a modification would have been straightforward to a PHOSITA and is akin to adding holes to the bottom of a container.

3. Claim 9

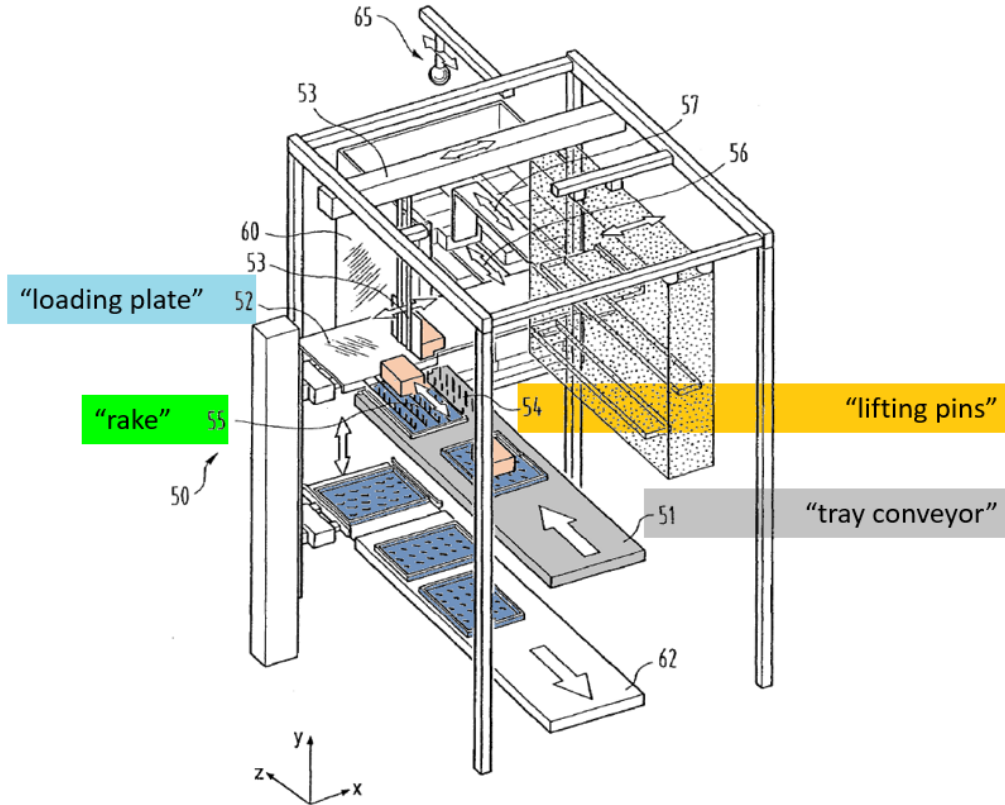
a. **“The system according to claim 1, comprising:”**

190. Lert discloses or renders obvious claim 1. *Supra* § XI.A.1.

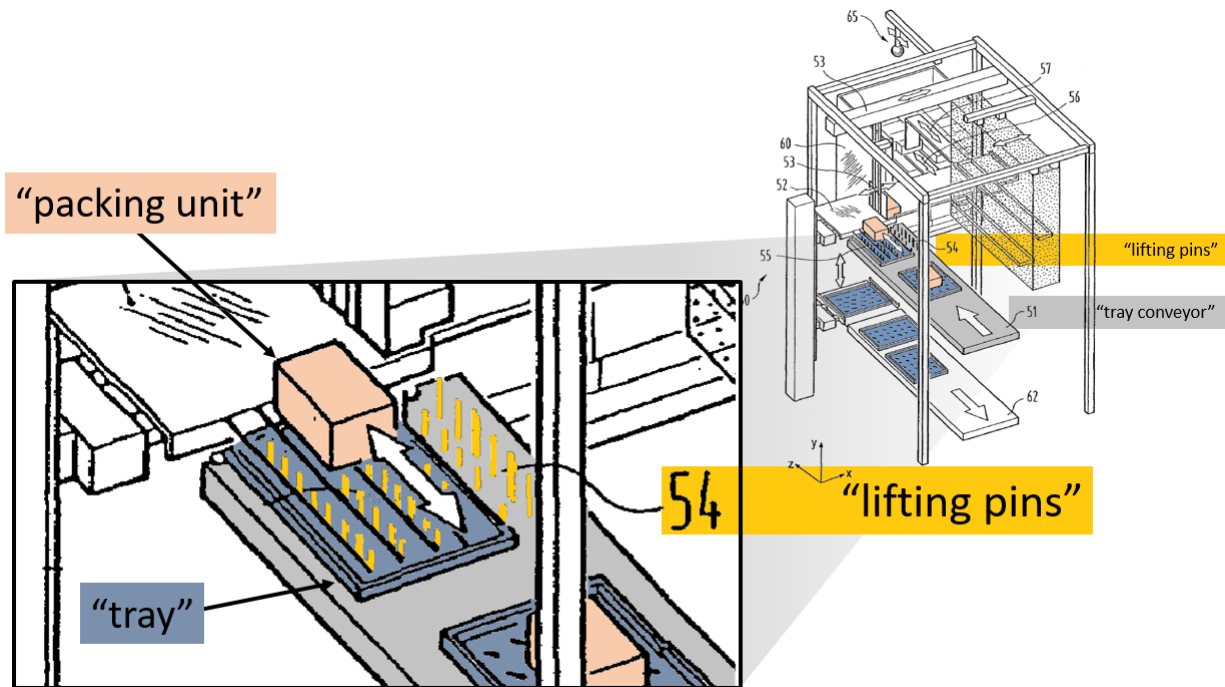
b. **“at least one mechanism for removing a delivery container from a storage container” limitation [9A]**

191. In my opinion, Lert in combination with Winkler renders obvious limitation [9A]. Winkler discloses that **“*lifting pins 54 of a lifting device* act from below through the openings 11 in the tray upon the packing unit 15 and *hence lift the latter* out of the tray 10.”** AS-1007, 6:41–44; 1:58–61 (“the trays have openings, through which lifting pins engage in order to lift a packing unit from the tray.”) Winkler further discloses that once lifted “[a] ***rake 55*** then acts upon the packing unit 15 and pushes it onto a horizontal loading plate 52.” AS-1007, 6:45–49. The annotated Figure 10 from Winkler below shows the “lifting device” which includes

“lifting pins” at the end of the “tray conveyor 51” and the “rake 55” which pushes it onto a “loading plate 52”:



192. The annotated Figure 10 below, moreover, shows Winkler’s lifting device with lifting pins 54 lifting the packing unit from the tray:



193. In Winkler, the packing units are separated from the trays by “a lifting device” that includes “lifting pins 54” (i.e., “at least one mechanism”), which “engage” through “holes or openings” 11 in the bottom of the “tray” 10 to “lift a packing unit 15 from the tray.” AS-1007, 6:41–44; 3:55, 1:58–61.

194. It would have been obvious for a PHOSITA to combine Winkler’s disclosures about “a lifting device” into Lert for removing a sub-tote or sub-container (i.e., “delivery container”) from an O-Tote (“storage container”). In my opinion, a PHOSITA would have been motivated to make this modification and would have had a reasonable expectation of success doing so for the reasons discussed above. *Supra* §§ XI.B.1–XI.B.2.

195. In my opinion, Lert in combination with Winkler renders obvious limitation [9A].

4. Claim 10

- a. **“The system according to claim 9, wherein the at least one mechanism includes:”**

196. Lert in combination with Winkler renders obvious claim 9. *Supra* § XI.A.1.

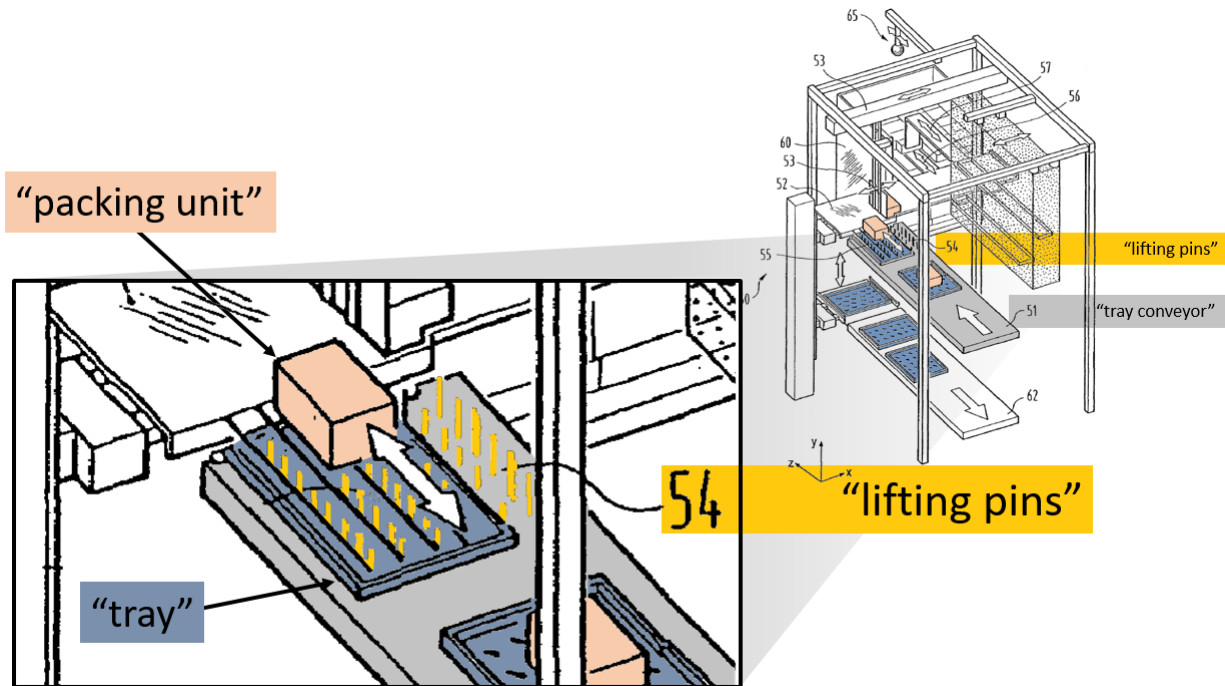
- b. **“at least one lifter mechanism configured to extend through one or more apertures in the bottom of the storage containers to engage and apply an upward force to the bottom of the delivery container” limitation [10A]**

197. In my opinion, Lert in combination with Winkler renders obvious limitation [10A]. For the reasons discussed for limitation [9A], it is my opinion that Lert in combination with Winkler renders obvious “at least one lifter mechanism.” *Supra* § XI.B.3.b.

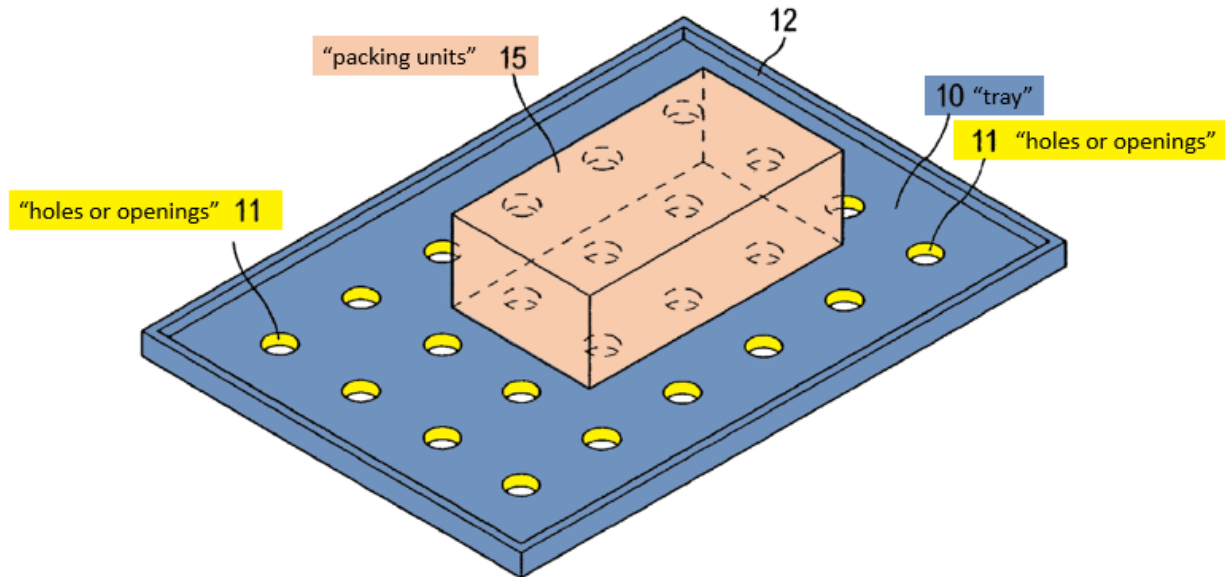
198. Winkler discloses that the “storage trays” have “holes or openings” in “their base” through which a “lifting device” acts to lift “article[s] stored on the tray[s].” AS-1007, 3:66–4:1, Fig. 4. Winkler further discloses “[a]t the end of the tray conveyor 51 lifting pins 54 of a lifting device act from below through the openings 11 in the tray upon the packing unit 15 and hence *lift the latter* out of the tray 10.” AS-1007, 6:41–44. Winkler therefore discloses how the mechanism is

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configured to extend through an aperture in the bottom of the tray (i.e., “holes or openings”) to engage and apply an upward force (i.e., “lift”) to the bottom (i.e., “base”) of the packing unit. The annotated Figure 10 below shows Winkler’s lifting device with lifting pins 54 lifting the packing unit from the tray:



199. The annotated Figure 4 below shows Winkler’s storage trays that have holes or openings in their base for engaging the “packing units”:



200. In my opinion, it would have been obvious for a PHOSITA to combine Winkler’s disclosures about “holes or openings” in the “base” of a container (i.e., “one or more apertures in the bottom of the storage container”) into Lert so that the “lifting device” would engage and apply an upward force to the bottom of the delivery container. A PHOSITA would have been motivated to make this modification and would have had a reasonable expectation of success doing so for the reasons discussed above. *Supra* §§ XI.B.1–XI.B.2.

201. In my opinion, Lert in combination with Winkler renders obvious limitation [10A].

5. Claim 11

- a. **“The system according to claim 9, wherein the at least one mechanism includes:”**

202. Lert in combination with Winkler renders obvious claim 9. *Supra* § XI.B.3.

- b. **“at least one lifter mechanism configured for engaging and lifting the delivery container from the stackable container using at least one of a lip, a handle, and an aperture of the delivery container”³ limitation [11A]**

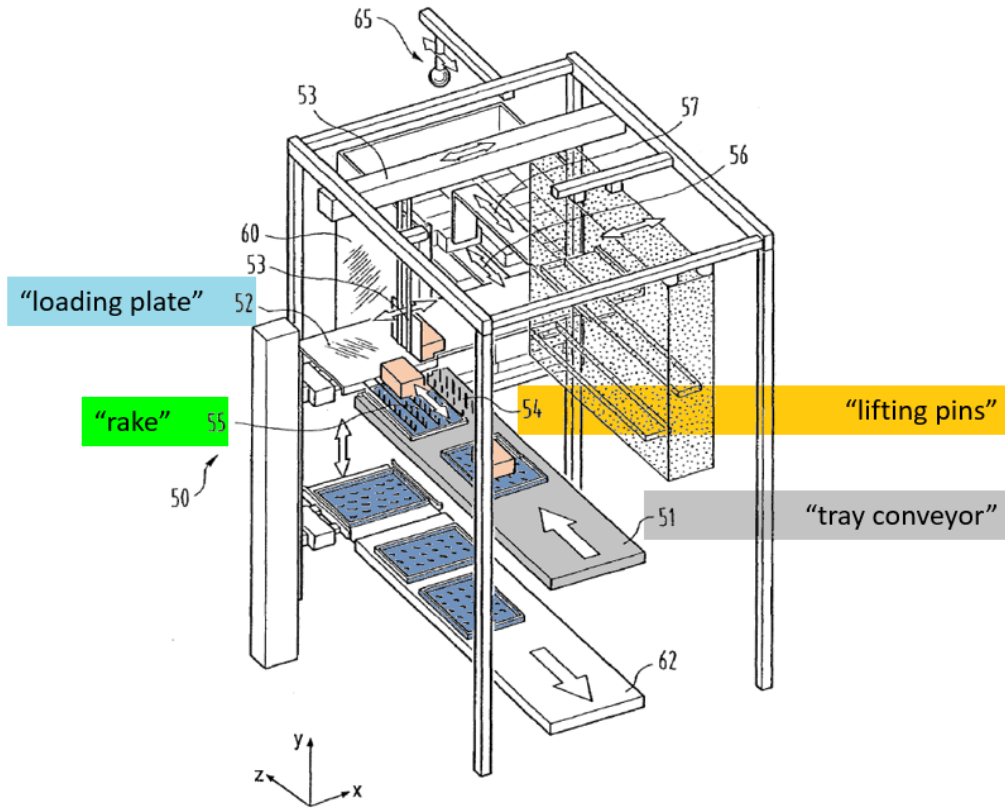
203. In my opinion, Lert in combination with Winkler renders obvious limitation [11A]. For the reasons discussed for limitations [9A] and [10A] (*supra* §§ XI.B.3.b, XI.B.4.b), it is my opinion that Lert in combination with Winkler renders obvious a “lifter mechanism configured for engaging and lifting the delivery container.”

204. Winkler discloses that “*lifting pins 54 of a lifting device* act from below through the openings 11 in the tray upon the packing unit 15 and hence lift the latter out of the tray 10.” AS-1007, 6:41–44; 1:58–61 (“the trays have openings, through which lifting pins engage in order to lift a packing unit from the tray”).

205. Winkler further discloses that once lifted “[a] *rake 55* then acts upon the packing unit 15 and pushes it onto a horizontal loading plate 52.” AS-1007, 6:45–

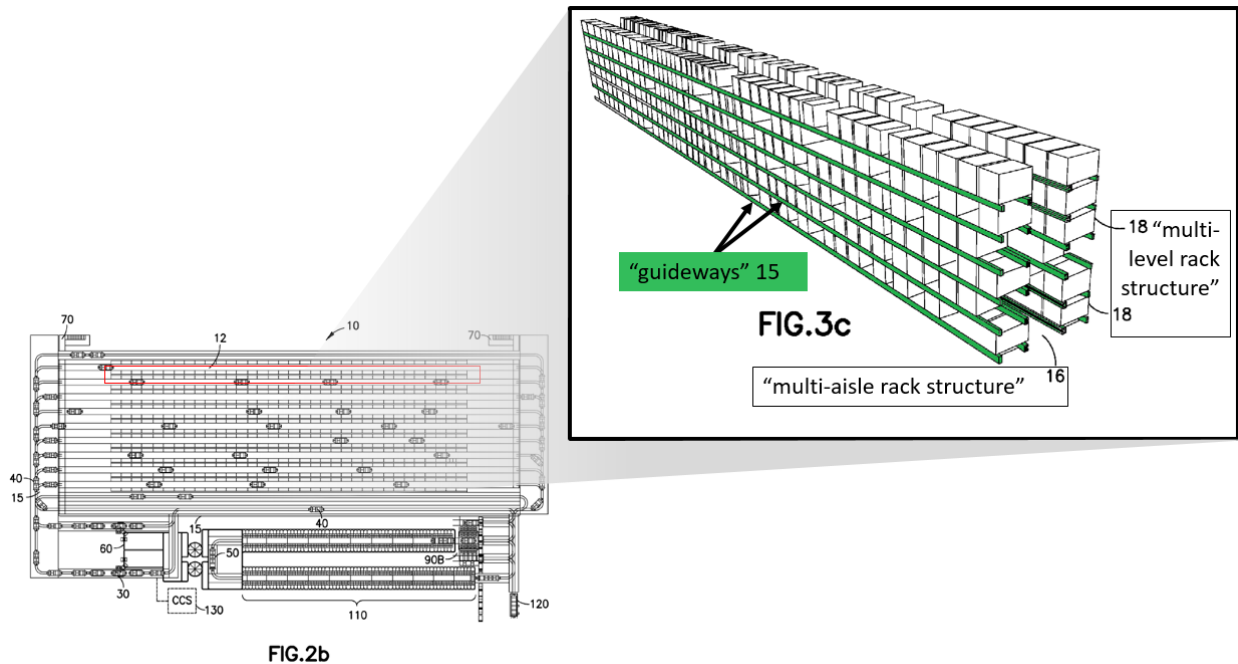
³ Neither claim 1 nor 9 recites a “stackable container.”

49. The annotated Figure 10 below from Winkler shows the “lifting device,” which includes “lifting pins” at the end of the “tray conveyor 51” and the “rake 55” which pushes it onto a “loading plate 52”:



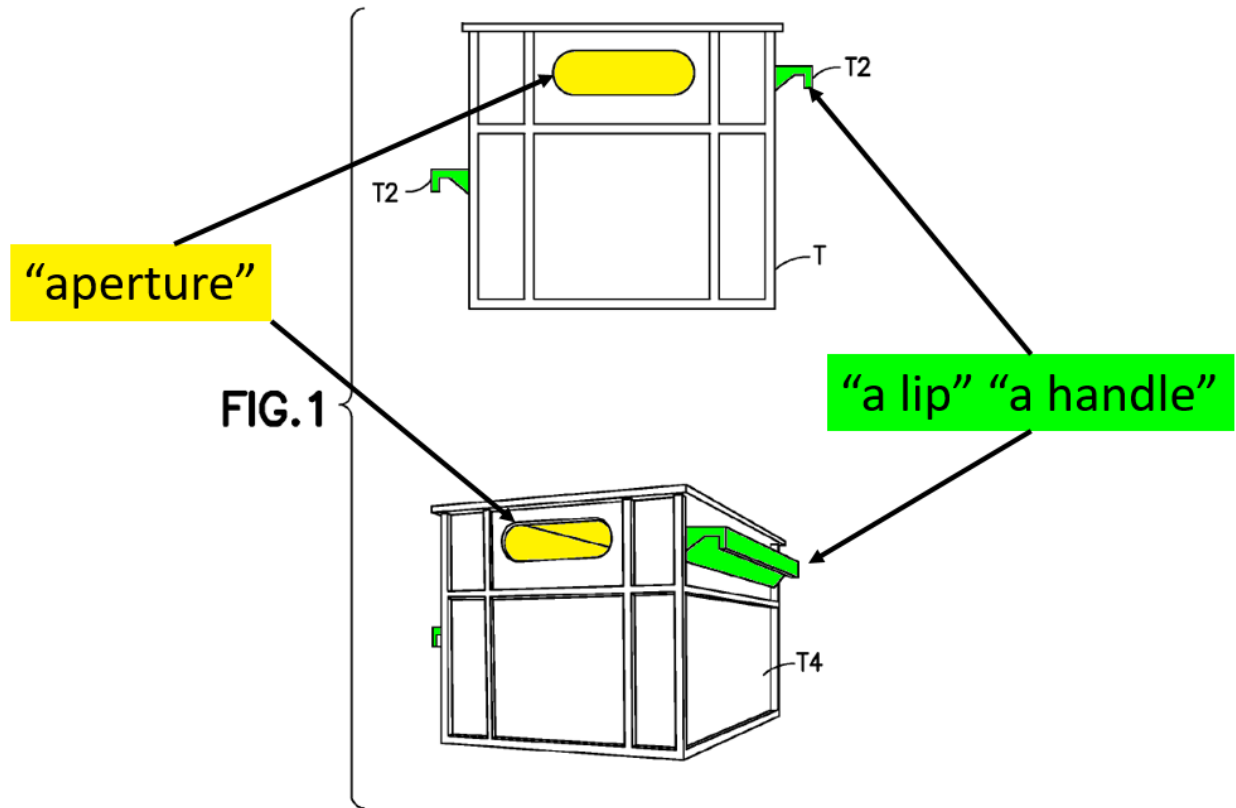
Winkler discloses that the “lifting pins 54” of the “lifting device” work together with the “rake 55” to act upon the “packing unit 15” and remove it from the tray. In my opinion, a PHOSITA would have understood that, when combined, Winkler’s “lifting device” and “rake” are a lifter mechanism configured for engaging and lifting the delivery container.

206. Lert further discloses that delivery containers are lifted using “the stackable container.” Lert discloses that totes are “stackable” in a multi-level stacked configuration as shown for example in the annotated Figures 2b and 3c below:



207. In my opinion, a PHOSITA would have understood that Lert’s containers are lifted “using at least one of a lip, a handle, and an aperture of the delivery container.” Lert discloses that its totes have “handles” T2 on each (long) side T4 of the tote for improved handling by robots. AS-1005, 4:23–24. In my opinion, a PHOSITA also would have understood that the “handle” labeled feature “T2” in Figure 1 from Lert creates a “lip.” Figure 1, moreover, shows that the tote has other openings on the side of the container that a PHOSITA would consider an

“aperture.” The “a lip, a handle, and an aperture” from Lert’s containers are further identified in the annotated figure below:



208. In my opinion, a PHOSITA also would have been motivated to make these modifications and would have had a reasonable expectation of success doing so for the reasons discussed above. *Supra* §§ XI.B.1–XI.B.2. Moreover, it is also my opinion that a PHOSITA would have been motivated to incorporate Lert’s disclosures about a lip, a handle, and an aperture, and apply it to a delivery container for improved handling of the container. In my opinion, a PHOSITA would have recognized that including Lert’s disclosures about a lip, a handle, and an aperture

would have been a straightforward modification and therefore a PHOSITA would have had a reasonable expectation of success with the combination.

209. It would have been obvious for a PHOSITA to combine Winkler's disclosures about "a rake," "holes or openings," and a "lifting device" into Lert so that the combined mechanism of the "rake" and "lifting device" work together to engage and lift the delivery from another container. When combined, Winkler's "lifting device" and "rake" are a lifter mechanism configured for engaging and lifting the delivery container.

210. A PHOSITA would have been motivated to make this modification and would have had a reasonable expectation of success doing so for the reasons discussed above. *Supra* §§ XI.B.1–XI.B.2.

211. To the extent not expressly disclosed, it is my opinion that a PHOSITA would have been motivated to incorporate Lert's disclosures about a lip, a handle, and an aperture, into a delivery container. Lert expressly describes the advantages of using the handle/lip for the storage container and a PHOSITA equally would appreciate that these teachings could apply to the disclosed aperture, and applied this understanding to the context of delivery containers. Including Lert's disclosures about a lip, a handle, and an aperture would have been a straightforward modification and therefore a PHOSITA would have had a reasonable expectation of success with the combination.

212. In my opinion, Lert in combination with Winkler renders obvious limitation [11A].

6. Claim 12

a. “The system according to claim 1”

213. Lert discloses or renders obvious claim 1. *Supra* § XI.A.1.

b. “wherein the at least one lifter mechanism includes a suction device”⁴ limitation [12A]

214. In my opinion, Lert in combination with Winkler renders obvious limitation [12A]. Winkler discloses “gripping and suction means,” which are “known per se” in the art to “automatically separat[e] the incoming pallet stacks into the packing units.” AS-1007, 4:5–9. As Winkler discloses, mechanical lifting devices that utilize suction are “known per se” in the industry and a PHOSITA would be well aware of such suction devices that would be appropriate to use in the Lert and the benefits of using such a device. In my opinion, a PHOSITA would have been aware of the benefits of using a suction device on a lifting mechanism, and would be motivated to use one to improve Lert. Including a suction device in Lert would have been a straightforward modification and a PHOSITA would have had a reasonable expectation of success with the combination.

⁴ Claim 1 does not recite a “lifter mechanism.”

215. In my opinion, Lert in combination with Winkler renders obvious limitation [12A].

7. Claim 21

a. “The method according to claim 20 comprising:”

216. Lert discloses or renders obvious claim 20. *Supra* § XI.A.16.

b. “removing, with at least one lifter mechanism, the at least one delivery container received for dispatch from at least one storage container” limitation [21A]

217. Limitation [21A] recites the same subject matter as limitation [9A] in method form. For the reasons discussed for limitation [9A] (*supra* § XI.B.3.b), it is my opinion that implementing Lert in combination with Winkler renders obvious limitation [21A].

8. Claim 22

a. “The method according to claim 21”

218. Lert in combination with Winkler renders obvious claim 21. *Supra* § XI.B.7.

b. “wherein the at least one storage container from which the delivery container is removed includes one or more apertures or cutouts, and removing the delivery container comprises:” limitation [22A]

219. Limitation [22A] recites the same subject matter as limitation [10A] in method form. For the reasons discussed for limitation [10A] (*supra* § XI.B.4.b), it is

my opinion that implementing Lert in combination with Winkler renders obvious limitation [22A].

- c. **“at least initiating removal, via the apertures or cutouts, the respective at least one delivery container” limitation [22B]**

220. Limitation [22B] recites the same subject matter as limitations [10A] and [11A] in method form. For the reasons discussed for limitations [10A] and [11A] (*supra* §§ XI.B.4.b, XI.B.5.b) implementing Lert in combination with Winkler renders obvious limitation [22B].

* * *

221. In my opinion, Lert in combination with Winkler renders obvious claims 9–12 and 21–22 of the '080 patent.

C. Secondary Considerations

222. I am unaware of any secondary considerations that have a nexus to the claimed invention in the '080 patent that would overcome the showing of obviousness set forth above. If PO identifies any evidence of secondary considerations, I reserve the right to respond.

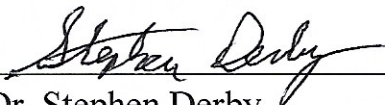
XII. CONCLUSION

223. For the foregoing reasons, it is my opinion that claims 1–23 of the '080 patent are not patentable.

I, Stephen Derby, hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. 18 U.S.C. § 1001.

Date: April 2, 2021

Respectfully submitted,



Dr. Stephen Derby

**Materials Considered by Dr. Stephen Derby In Connection with the
Declaration Regarding U.S. Patent No. 9,796,080**

1. AS-1001 - US Patent No 9,796,080
2. AS-1002 - US Patent No 9,796,080 File History
3. AS-1005 - US Patent No. 9,139,363 (Lert)
4. AS-1006 - US Provisional Application 61/794023 (Lert)
5. AS-1007 - US Patent No 7,097,045 (Winkler)
6. AS-1008 - International Publication WO 1998/049075
7. AS-1009 - International Publication WO 2013/167907
8. AS-1010 - US Department of Labor - Ergonomics
9. AS-1011 - Civil Docket in *Marine Polymer Technologies, Inc. v. HemCon, Inc.*, 1:06-cv-00100 (D.N.H.)
10. AS-1012 - Civil Docket in *National Pasteurized Eggs, LLC v. Davidson.*, 1:07-cv-00103 (D.N.H.)
11. AS-1013 - US Patent No. 9,334,081
12. US Publication 2014/0288696
13. US Publication 2009/0185884
14. US Publication 2012/0101627
15. US Patent No. 8,276,739
16. International Publication WO 2014/090684
17. US Patent No. 6,688,451
18. US Patent No. 9,399,529
19. US Patent No. 7,712,598
20. US Patent No. 6,565,308