UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Sand Revolution II, LLC  
Petitioner

v.

Continental Intermodal Group–Trucking LLC  
Patent Owner

IPR2019-01393
U.S. Patent No. 8,944,740

MOBILE MATERIAL HANDLING AND METERING SYSTEM

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I. INTRODUCTION

Petitioner Sand Revolution II, LLC requests *inter partes* review ("IPR") of claims 1, 2, 4, 6-14, and 16-20 ("Challenged Claims") of U.S. Patent 8,944,740 (the ’740 patent, EX1001).

The ’740 patent claims a system for handling granular material, such as sand for fracturing. It includes two modules—a mobile storage module and a delivery module. The first stores the granular material onsite and dispenses it to the second, which carries the granular material to a desired location on the site. Each module, however, was known before the ’740 patent, as shown by Haskins (EX1006) and Forsyth (EX1005) respectively. It would have been obvious from the teachings of those two references to use both modules in the same system for handling granular material.

II. GROUNDS FOR STANDING

Petitioner certifies that the ’740 patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR challenging the Challenged Claims.

III. PRECISE RELIEF REQUESTED

A. Claims for which review is requested

Petitioner requests IPR and cancelation of claims 1, 2, 4, 6-14, and 16-20 of the ’740 patent as unpatentable based on the following Grounds.
B. Statutory grounds


Ground 2: Claim 10 is obvious over Forsyth, Haskins, and Blackman, further in view of U.S. Patent 4,621,972 to Grotte (“Grotte,” EX1008).

Forsyth, Haskins, Blackman, and Grotte qualify as prior art under §§ 102(a), (b), and (e).

IV. U.S. PATENT 8,944,740

A. Overview

The ’740 patent describes a “mobile material handling and metering system for storing and delivering granular material, and an associated method” for use in hydraulic fracture drilling, or “fracking.” EX1001, 1:6-15. Fracking is often “performed in a remote location” and requires “large amounts of granular material [be] readily available.” Id., 1:13-24. Thus, large quantities of granular material must be shipped to the drilling sites, “for example by road, rail or water.” Id.

The ’740 patent contends that “one or more storage modules” and “delivery module,” id., 3:44-64, improve “operational efficiency, set-up time, transportation requirements, [and] storage and asset tracking requirements,” id., 5:38-41. The mobile storage modules are containers for storing and dispensing granular material
onsite as needed. *Id.*, 4:50-54. The delivery module receives the dispensed material from the mobile storage modules and conveys it to a desired location. *Id.*, 3:47-50.

The modules can be brought onsite in a transportation configuration, in which they are “towed as semi-trailers” and “may be hauled to a work site by a separate truck.” *Id.*, 3:44-64, 13:28-37. Upon arrival, the modules may deploy into a second, operational configuration. *Id.*, 3:44-64, 13:28-31. The ’740 patent allegedly “provide[s] for a self-erecting, and substantially self-sufficient, system for storage and handling of proppant or other granular material.” *Id.*, 13:34-36. This supposedly “facilitat[es] mobility, and relatively quick set-up and tear-down when compared with at least some prior art solutions.” *Id.*, 5:38-43; see also *id.*, 13:28-32.

The ’740 patent explains that built-in components make the modules “self-erecting” or “self-deploying” into an operational configuration. *Id.*, 8:37-39, 13:34-36. FIG. 2, right, “illustrates a mobile storage module 200” as “a semi-trailer mounted on a road tractor 210.” *Id.*, 6:34-37, FIG. 2 (annotated). It has a “container portion 225” and a “frame 235.” *Id.*, 6:60-7:2, FIG. 3. To dispense its
contents, the “container portion 225” pivots upwards from the horizontal toward the vertical. *Id.*, 6:53-7:21.

A built-in hydraulic actuating system 350, highlighted in FIG. 3, right, raises one end of the container into this configuration. *See, e.g., id.*, 6:63-65. The actuating system attaches, via pins or other joints, at one end to the container portion and at the other end to the frame. *Id.*, 7:2-9. The actuating system resides within the mobile storage module in both its transportation and operational configurations. *Id.*, 7:30-63, FIG. 3.

Likewise, the delivery module has built-in components to self-deploy between configurations. For transportation, the module is “configured as a standard or over-
length trailer” towable by truck. *Id.*, 11:14-21. As shown in FIG. 11, right, its chassis has a wheeled portion 1130 that contacts the ground in the transportation configuration. *Id.*, 12:59-63. That wheeled portion also pivots upward/downward “via a pin joint or other pivotable coupling” through “actuation of one or more hydraulic cylinders.” *Id.*, 12:56-63; see also 11:54-65, FIG. 9.

**B. Prosecution**

1. **Overview**

During prosecution of the ’740 patent, the applicant amended the claims to overcome several prior art rejections in the first office action on the merits. See EX1002, 73-92. The amendments specified that the storage modules are configured to receive the granular material via a continuous loading system and that the delivery module is reconfigurable between the operational and transportation configurations. *See id.*, 75. The applicant argued that a prior art reference “does not disclose or suggest a continuous belt conveyor of the delivery module but rather relies on a spreader vehicle ….” *Id.*, 84. The applicant also argued that reference did not
disclose a “continuous belt loading system … for providing granular material to the mobile storage module ….” *Id.*; *see also id.*, 85-88 (arguing that three additional prior-art references did not disclose these same features).

The applicant also argued that another reference was not “reconfigurable” because it did not disclose “self-deploying” modules. *Id.*, 88. According to the applicant, “[s]elf-deploying in this sense is taken to mean that” the modules reconfigure through an integrated actuating system rather than using “external machinery which is not part of the [module].” *Id.*

The Examiner withdrew the first set of rejections and issued a final action rejecting the claims as anticipated over another reference. *See id.*, 40-46. The applicant then added to the independent claims dependent-claim features the Examiner had indicated to be allowable: the one or more storage modules each has (a) a frame, (b) the container portion pivotably coupled to the frame, and (c) the integrated actuating system configured to pivot the container. *Id.*, 28-32. The Examiner then allowed the claims. *Id.*, 13-19.

2. The petition presents prior art and arguments substantially different from those considered by the Office during prosecution

Forsyth and Haskins address the reasons the Examiner withdrew the rejections and allowed the claims. Specifically, as highlighted in FIG. 1 below, Forsyth discloses a material transport apparatus with a built-in, hydraulic crane 16
(highlighted below in blue) to self-deploy its conveyor 10. “Crane member 16 is operable to raise and lower elevating conveyor 10 by its suspension from cable 46” and “may be swung away from compartment assembly 4 thereby positioning elevating conveyor 10 where desired.” EX1005, 7:14-19; see also id., 2:21-54, 3:7-18, 3:61-65, 4:24-26, 4:51-54, 6:66-7:17, FIG. 1.

FIG. 1

Forsyth, FIG. 1*1

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1 Petitioner denotes modified (e.g., annotated or colorized) figures with an asterisk throughout.
Additionally, the portable storage bin of Haskins has a hydraulic actuation system 41-46 built into its frame 10 for moving its container between a horizontal transport position (red) and a vertical operational position (blue). See EX1006, 1:29-33, 2:1-3, 3:47-66, 5:17-44, FIG. 1.

Haskins, FIG. 1*

The bin of Haskins also has a continuous elevating conveyor, within shaft 24, to load material into the container. See, e.g., id., 2:69-3:39. Haskins also has the features the Examiner indicated to be allowable.

None of the prior art asserted in this Petition was cited or considered during prosecution. See EX1001, 1-2.
C. The level of ordinary skill in the art

A person of ordinary skill in the art (“POSITA”) of the ’740 Patent in October 2010 would have had a bachelor’s degree in an engineering or logistics discipline plus 1-2 years of experience in hydraulic fracturing and logistical support thereof, or 4-5 years of experience in hydraulic fracturing and logistical support thereof. EX1003, ¶30.

V. CLAIM CONSTRUCTION

A. The challenged claims do not recite means-plus-function terms

Although the challenged claims use “configured to” language in several instances, these recitations are not means-plus-function language under 35 U.S.C. § 112, ¶6. Claim language only invokes § 112, ¶6 if “expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof.” 35 U.S.C. § 112, ¶6 (emphasis added).

Each time the claims use “configured to,” however, the surrounding claim language provides sufficient corresponding structure for the recited function(s). For example, claim 1 recites that the delivery module is configured to perform its conveying function “via a continuous belt conveyor.” EX1001, 14:67. And a “module” having a continuous belt conveyor provides sufficient structure to “receive said granular material.” Id., 14:65-66.

Likewise, claim 1 recites that the one or more storage modules are configured to “receive said granular material for holding” and “dispense said granular material
downward to the delivery module.” *Id.*, 15:5-6. A “storage module” is sufficient structure to “hold” the material and claim 1 further recites that the storage module has a “container portion” for doing so. *Id.*, 15:15. Claim 1 also recites that the storage module performs the receiving function “via a continuous belt loading system operatively coupled to an input port.” *Id.*, 15:6-7. Finally, an “output port for dispensing said granular material” performs the dispensing function. *Id.*, 15:26-27.

B. **“Integrated actuating system” (claims 1, 12, 13, and 19)**

If construed, “integrated actuating system” means “a built-in, self-deployment system.” EX1003, ¶¶44-46. The claims require that the integrated actuating system be part of the mobile storage module, reciting that the mobile storage module “comprises” (1) a frame, (2) a container portion pivotably coupled to the frame, and (3) an integrated actuating system. *Id.* That is, these three components exist within, or are part of, the mobile storage module. *Id.*

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2 In the related litigation, the district court judge recently issued a Markman Order finding that the claim terms at issue should be given their plain and ordinary meaning under *Phillips v. AWH Corp.*, 415 F.3d 1303, 1321 (Fed. Cir 2005). EX1011. Petitioner submits that its proposed constructions reflect the plain and ordinary meanings of the terms.
The specification confirms that the integrated actuating system is built into the mobile storage module and provides self-deployment. 1d., ¶45. FIG. 3 shows the mobile storage module and its frame, container, and an actuating system “coupled to the container portion 225 and the frame.” EX1001, 6:65-67. Likewise, the specification explains the “hydraulic actuators may be attached, via pin joints or other pivotable joints, at one end to the container portion 225 and at the other end to the frame 235.” 1d., 7:2-9. Additionally, the specification explains that the system can include a “set of mobile self-deploying silos,” id., 8:35-39, and describes the system as “a self-erecting, and substantially self-sufficient, system for storage and handling of proppant or other granular material,” id., 13:34-37. See also id., 5:38-43 (self-deployment improves “operational efficiency [and] set-up time”), 6:63-67 (describing the frame, container, and actuating system as packaged together in a single module).

In prosecution, the applicant limited the claim term by adding “integrated.” See EX1002, 75, 76, 78-80. The applicant argued that an asserted prior art reference did not disclose a “self-deploying” module because that reference’s deployment “requires external machinery which is not part of the railway tank car, and hence self-deployment is impossible.” 1d., 88. Further, the notion of “built-in” is consistent with the definition of “integrated.” EX1009, 4 (“to form, coordinate, or blend into a functioning or unified whole,” “unite”).
C. “Reconfigurable” (claims 1, 13, and 19)

In the context of the claimed delivery module, “reconfigurable” means “self-deployable” based on applicants’ arguments during prosecution. Supra Section IV.B.1; EX1003, ¶47. The applicant explained that the claimed delivery module is “self-deploying into an operational configuration” and that “[s]elf-deploying in this sense is taken to mean that the delivery module is reconfigurable between [its two configurations]” without using “external machinery which is not part of the [module].” EX1002, 88. Likewise, the ’740 patent explains how the delivery module reconfigures using built-in components: “deployment of the conveyors” via “sliding tubes” that “deploy[] outward using one or more hydraulic actuators, for example.” EX1001, 11:52-65. Even if other passages of the specification can support a broader interpretation, the patentee’s disclaimer narrows the claim term. See, e.g., Hockerson-Halberstadt, Inc. v. Avia Group Int’l, 222 F.3d 951, 956 (Fed. Cir. 2000).

VI. GROUND 1: FORSYTH IN VIEW OF HASKINS, AND FURTHER IN VIEW OF BLACKMAN, RENDERS OBVIOUS CLAIMS 1, 2, 4, 6-9, 11-14, 16, 17, 19, AND 20.

A. Claim 1

1. [Preamble] “A system for handling granular material, the system comprising:”

Forsyth discloses a granular material transport apparatus and Haskins discloses a portable storage bin. The apparatus of Forsyth corresponds to the claimed delivery module, while the bin of Haskins corresponds to the claimed mobile storage
module. EX1003, ¶48. The below-described combination of Haskins’ bin and Forsyth’s apparatus renders obvious the claimed system for handling granular material. *Id.*

Forsyth describes “[a] bulk granular material transport system having multiple compartments with a detachable elevating conveyor to permit the conveyor to assist with unloading as well as loading of the transport device.” EX1005, Abstract; see also id., 4:41-44. In FIG. 1, Forsyth shows the apparatus 2, which corresponds to the claimed delivery module. EX1003, ¶49.

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**FIG. 1**

Forsyth, FIG. 1*
The Forsyth apparatus has “multiple compartments 6 for receiving granular materials such as feed, seed, or fertilizer … linearly arranged in compartment assembly 4, which is supported on frame 18.” EX1005, 4:41-45. It also has an elevating conveyor 10 “to assist with unloading as well as loading of the transport device.” *Id.*, Abstract.

For the second part of the claimed system, Haskins discloses a “portable storage bin” for “field use in the storage of grain, beans, or other crops” or “dry material such as fertilizer, seed or cement” that corresponds to the claimed mobile storage module. *See* EX1006, 1:7-21; FIG. 1 (below); *see also id.*, 1:15-16 (“grain, seed, fertilizer, peas, beans, or other dry flowable material”); EX1003, ¶51. These are also “granular material,” as claimed. EX1003, ¶51.
As shown in FIG. 1 of Haskins, the “bin is movable from a horizontal transport position on a mobile framework to a vertical storage position in which it is capable of storing a day’s supply of [granular material].” See EX1006, 1:12-16.

2. [1.1] “a. a delivery module configured, in a delivery module operational configuration, to receive said granular material”

The Forsyth apparatus (the claimed “delivery module”) has a few configurations. One is “an off loading position” in which “[c]rane 16 is suitably pivoted … such that it suspends elevating conveyor 10 over seed boxes 56” to fill the seed boxes with the granular material, such as seed. EX1005, 4:24-32; see also
id., 6:36-41 (discussing the offloading position). This configuration, shown in FIG. 1 of Forsyth, corresponds to the claimed “delivery module operational configuration” because the apparatus is configured not only to convey the granular material to a desired location but also to receive the granular material from above in its open compartments. EX1003, ¶54.

Specifically, the Forsyth apparatus has “multiple compartments 6 for receiving granular materials” that are “linearly arranged in compartment assembly 4, which is supported on frame 18.” EX1005, 4:41-44, FIG. 1. When the compartments are open, as shown in FIG. 1 of Forsyth, the apparatus is configured to receive granular material from above. See id., 3:53-56, 4:48-53, 6:53-60, 8:31-37 (describing the compartments receiving granular material from above); EX1003, ¶55.

The Forsyth apparatus has another configuration in which the compartments may receive granular material from the conveyor. Specifically, “[e]levating conveyor 10 has been manipulated to place its discharge spout 70 above a selected compartment 6 with the intake end 11 of elevating conveyor 10 resting on the ground surface.” EX1005, 4:48-51; see also id., 6:53-57. The granular material such as “[s]eed directed into intake hopper 76 can then be conveyed from ground level to a compartment 6 without substantial elevation of the bulk seed container.” Id., 6:57-60; see also id., 8:16-23. Although the compartments of Forsyth can receive granular
material from the conveyor in this configuration, the apparatus need not be in this configuration to do so. EX1003, ¶56. For example, the conveyor may remain in the offloading position (the claimed “delivery module operational configuration”) and the compartments may receive granular material from above, such as from the spout 21 of Haskins’ bin as discussed below. Id.

3. [1.2] “[the] delivery module configured, in a delivery module operational configuration, … to convey said granular material to a predetermined delivery location via a continuous belt conveyor”

When the Forsyth apparatus is in the offloading position (the claimed “delivery module operational configuration”) of FIG. 1, the conveyor 10 is configured to “convey granular material to a predetermined delivery location via a continuous belt conveyor,” as claimed. EX1003, ¶57. In Forsyth’s example, the claimed location is a seed box 56, highlighted in blue below:
“When seed is required for filling a seed box 56,” a first conveyor 8 “delivers seed to chute 12 which directs it into intake hopper 76 of intake end 11 of elevating conveyor 10.” EX1005, 4:26-32. At its discharge end, the conveyor has a “spout 70 of conventional type which is further provided with flexible chute 22” that “may be manipulated to direct granular material being discharged from elevating conveyor 10 into the receiving means.” Id., 7:33-37.
The conveyor of Forsyth is a “continuous belt conveyor,” as claimed. EX1003, ¶59. That is, as shown in FIG. 4, the conveyor comprises a continuous “[b]elt 74 … driven by hydraulic motor 75 mounted on discharge end 15 of elevating conveyor 10.” EX1005, 7:20-22.

\[ \text{Forsyth, FIG. 4*} \]

The belt can be driven clockwise or counterclockwise, either of which discharges granular material from the spout. \textit{Id.}, 7:78-37. The belt 74 is “continuous,” as claimed, because it has a continuous loop shape and the motor 75 continuously drives the belt around a pulley at the intake end 11 of the conveyor 10. EX1005, 7:18-37; EX1003, ¶59.
4. **[1.3]** “*b. one or more mobile storage modules adjacent to the delivery module, each of the one or more mobile storage modules configured, in a mobile storage module operational configuration, to hold and dispense said granular material downward to the delivery module*”

Forsyth does not disclose the claimed storage modules. As explained below, however, Haskins’ portable storage bin, however, discloses the claimed one or more storage modules. EX1003, ¶60. When vertical, the Haskins bin is configured to hold and dispense the granular material downward via a spout. *Id.* A POSITA would have found it obvious to position Haskins’ bin adjacent Forsyth’s apparatus so that its compartments could receive the granular material via Haskins’ spout. *Id.* This would eliminate the time-consuming and laborious steps of repositioning the conveyor with a crane, lifting the seed bag with a forklift, and opening the seed bag each time the compartments are loaded/unloaded. *Id.*

   **a. Haskins discloses element [1.3].**

Haskins discloses a “portable storage bin” (claimed mobile storage module) for “field use in the storage of grain, beans, or other crops, and also in the storage of dry material such as fertilizer, seed or cement.” EX1006, 1:7-21; EX1003, ¶¶61-65. Haskins shows the bin in FIG. 1:
Haskins' bin is mobile as claimed because, as shown in FIG. 1, it is supported by “a mobile framework [10], and is mounted on a pair of wheels 15 … so that as the framework 10 is pulled by a tractor (not shown) the weight of the framework 10 will be distributed between the forward hitch and the rear mounted wheels 15.” EX1006, 2:38-43.

The bin of Haskins has two configurations: (1) a “horizontal or transport position of the tank being illustrated in dashed lines” in FIG. 1 above, id., 1:49-50; and (2) “a vertical storage position in which it is capable of storing a day’s supply of grain, seed, fertilizer, peas, beans, or other dry flowable material,” id., 1:14-16.

“The bin is movable from [the] horizontal transport position on a mobile framework
to [the] vertical storage position,” as shown in FIG. 1, allowing the bin to “act as a grain elevator or storage bin in the field.” *Id.*, 1:10-15.

The “vertical storage position” in Haskins, shown in solid lines in FIG. 1 above, corresponds to the claimed “mobile storage module operational configuration” because the bin is “configured … to hold and dispense said granular material downward to the delivery module,” as claimed. EX1003, ¶63. Specifically, in the “vertical storage position [the bin] is capable of storing a day’s supply of grain, seed, fertilizer, peas, beans, or other dry flowable material.” *Id.*; EX1006, 1:14-16. It is also configured to dispense the granular material downward, as claimed, via spout 21. EX1003, ¶¶63-64.
Haskins, FIG. 1*

The spout has “open communication with the interior of the container” so “[granular] material … is directed toward and can only pass through the spout 21 for exit from the container.” EX1006, 2:53-69. The “spout 21 … direct[s] the stored material to a truck driven alongside the rear of the tank.” Id., 5:3-5. As shown, the spout aims downward, making it “configured to … dispense said granular material downward,” as claimed. EX1003, ¶64.

The spout of Haskins is also configured to dispense the granular material downward “to the delivery module,” as claimed. Id., ¶65. Indeed, the spout may direct the stored granular material downward to any container alongside the rear of the bin. Id. If the apparatus of Forsyth were placed alongside the rear of the bin as taught by Haskins, as in the proposed combination, the spout would direct the stored granular material downward to it. Id.

b. Rationale to combine Forsyth and Haskins

A POSITA would have found it obvious and been motivated to place the apparatus of Forsyth alongside one or more bins of Haskins so that they could fill the containers of the Forsyth apparatus. Id., ¶66. The teachings of both references would have led a POSITA to make this combination. Id. The combination would result in “one or more mobile storage modules adjacent to the delivery module, each of the one or more mobile storage modules configured, in a mobile storage module
operational configuration, to hold and dispense said granular material downward to the delivery module,” as claimed and shown below. *Id.*

![Diagram](image)

**Haskins, FIG. 1**

Haskins teaches a POSITA to position a truck alongside the rear of the bin to receive the stored granular material via the spout above. EX1006, 5:3-5. Haskins does not specify the type of truck, but a POSITA would have understood that various vehicles could be used. EX1003, ¶67. For example, a pickup truck, dump truck, or truck towing a trailer with a bin, like in Forsyth, could be positioned behind the storage bin of Haskins to receive the granular material from the spout. *Id.*

**Forsyth, FIG. 1**

Forsyth’s “material transport apparatus [can be] mounted to a suitably sized trailer 14.” EX1005, 4:65-66. “[The material transport apparatus 2] may be towed
by a pickup truck fixed with appropriate coupling means of well known type” so that it “may be transported from [a] seed storage facility to field and back.” *Id.*, 4:33-35, 4:64-5:8. A POSITA would have recognized that, because the material transport apparatus can be towed, it could be towed alongside Haskins’ bin using, for example, a pickup or field truck. EX1003, ¶ 68. Accordingly, a POSITA would have had a reasonable expectation of success in making the combination. *Id.*

Additionally, a POSITA would have been motivated to combine Forsyth and Haskins in this manner based on the teachings of these references. *Id.*, ¶ 69. Forsyth discloses a time-consuming, labor-intensive loading technique that would have made it difficult for workers to efficiently complete the tasks of loading the seed boxes and distributing the seed. *Id.* Forsyth teaches using the built-in crane to manipulate the conveyor to place its intake end on the ground and its discharge end above a compartment. EX1005, 4:48-53; FIG. 4. Then, a worker uses a forklift to lift a seed bag from the ground and opens the bag to release the seed onto the intake end of the conveyor, filling the compartment. *See id.*, 2:46-54, 3:53-57, 4:48-53, 6:53-60, 8:15-23, FIG. 2. The worker must then again use the crane to position the conveyor between the apparatus and the seed boxes carried by the tractor (the claimed operational configuration) allowing the conveyor to move the seed from the compartments to the seed boxes. *See, e.g.*, *id.*, 2:36-46; EX1003, ¶ 69.
A POSITA would have recognized that the labor required to load and unload the compartments of the Forsyth apparatus reduces the amount of time workers can spend on other work, such as distributing the seed. EX1003, ¶70. This problem would have been exacerbated by the relatively small capacity of Forsyth’s compartments. *Id.* Distributing a large amount of seed would require loading and unloading the Forsyth apparatus into the seed boxes many times. *Id.* This, in turn, would require manipulating the conveyor with the crane between different positions, manipulating seed bags with a forklift, and manually releasing the seed from the bags many times to load/unload the apparatus. *Id.* Or the apparatus could be towed to a “seed storage facility to field and back” many times to finish the job. *Id.*; EX1005, 4:33-35. A POSITA would have been motivated to decrease the downtime and effort required to load and unload Forsyth’s apparatus. EX1003, ¶70.

Haskins provides a suitable solution for increasing the efficiency of Forsyth. *Id.*, ¶71. Haskins’ large portable bin “is capable of storing a day’s supply of grain, seed, fertilizer, peas, beans, or other dry flowable material.” EX1006, 1:14-16. The bin has “the size necessary to handle a day’s harvest, but [it] … can be tilted to a horizontal position … [and] moved about the field as desired.” *Id.*, 1:24-28.

In contrast to the many trips or loading cycles required to complete a big job using Forsyth’s solution alone, Haskins’ bin is large enough “to store a day’s output from a combine or similar machine so that only one daily trip by a highway truck is
necessary, and this trip can be made directly to the final storage elevator. In this manner larger trucks can be utilized, and the farmer himself need only use field trucks between the harvesting equipment and the storage tank.” *Id.*, 2:20-29. Thus, once filled, Haskins’ bin could fill the compartments of Forsyth many times over, e.g., for an entire day’s work. EX1003, ¶72. A POSITA therefore would have sought to use Haskins’ bin with Forsyth’s apparatus to improve logistical efficiency. *Id.*

At least the following rationales identified by the Supreme Court in *KSR* support the above-described combination of Forsyth and Haskins:

1. Some teaching, suggestion, or motivation in the prior art;
2. Combining prior art elements according to known methods to yield predictable results;
3. Use of known technique to improve similar devices (methods, or products) in the same way; and
4. Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results.

*See KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007). Regarding the first rationale, as demonstrated above, the references provide teaching, suggestion, and motivation to combine the references in the way described.

Regarding the remaining rationales, the combined system uses Forsyth’s apparatus and Haskins’ bin as the references intend. EX1003, ¶74. Forsyth’s apparatus still receives granular material from above—but from a more efficient source—while Haskins’ bin still releases the granular material via its spout to an
adjacent vehicle—Forsyth’s apparatus. *Id.* The proposed combination simply combines Forsyth’s and Haskins’ respective apparatuses such that the resulting system works predictably and as the references describe. *Id.* Additionally, Haskins’ bin improves use of Forsyth’s apparatus in the same way taught by Haskins: eliminating the effort associated with handling granular material by storing a day’s worth of material in the bin. *Id.* Finally, Forsyth’s apparatus is ready for improvement by combining it with Haskins’ bin because it is already capable of receiving material from the bin’s spout. *Id.*

5.  

[1.4] the one or more storage modules “configured … to receive said granular material for holding via a continuous belt loading system operatively coupled to an input port”

As explained above for element [1.3], a POSITA would have found it obvious to use Haskins’ bin (the claimed storage modules) with Forsyth’s apparatus (the claimed delivery module). Haskins’ bin receives the granular material for holding in a container via a continuous chain conveyor (FIG. 5). *Id., ¶76.* The conveyor is operatively coupled to a receiving chute that corresponds to the claimed input port. *Id., ¶77* While the conveyor of Haskins uses a chain rather than a belt, Blackman discloses a similar elevating conveyor using a belt. *Id.* A POSITA would have recognized belts and chains as substitutes for one another in elevating conveyors and would have found it obvious to substitute Haskins’ chain for the belt of Blackman for a variety of reasons. *Id., ¶¶80-83.*
a. Haskins discloses that its portable storage bin is configured to receive the granular material for holding via a continuous loading system operatively coupled to an input port.

FIG. 5 of Haskins illustrates an elevating bucket conveyor (highlighted in blue) that corresponds to the claimed continuous loading system and that loads granular material into the bin. See EX1006, 3:8-10, 4:68-72, FIG. 5.

Haskins, FIG. 5*

Haskins teaches that the conveyor comprises a pair of chains 28 continuously connected between two sprockets 25, 27. *Id.*, 3:5-7. A hydraulic motor drives the upper sprocket to advance the conveyor. *Id.*, 3:1-5. The conveyor has “buckets 30
… designed to scoop materials at the lower end of the conveyor and dump them onto a receiving chute 31.” *Id.*, 3:8-10. The conveyor is continuous, as claimed, because the chains wrap around the rotating sprockets with no beginning or end, providing for “constantly moving buckets 30.” *Id.*, 4:67-72; EX1003, ¶76. Thus, Haskins’ bin (the claimed storage modules) is configured to receive the granular material via a continuous loading system, as claimed. EX1003, ¶76.

As highlighted in FIG. 9 of Haskins below, the elevating conveyor (blue) couples to a receiving chute 31 (red), which corresponds to the claimed input port. *Id.*, ¶77. “The constantly moving buckets 30 of the elevating conveyor … carry the material to the top of the tank and dump it onto the receiving chute 31, thereby filling the space [in the container].” EX1006, 4:68-72; see also *id.*, 3:8-10.
Thus, the bin of Haskins (storage modules) receives the granular material via the elevating conveyor (continuous loading system, blue), which is coupled to the receiving chute 31 (input port, red). Additionally, Haskins’ bin receives the granular material for holding in the storage modules.
material “for holding,” as claimed, because operation of the system “fill[s] the space [in the container] bounded by the cover 17 and the upper floor 23.” *Id.*, 4:67-72; see also *id.*, 1:16-23, 2:21-27, 2:60-62, 3:68-70, 4:3-23, 4:73-5:15, 5:39-52 (explaining the structure of the container and how it holds granular material); EX1003, ¶78.

**b. Haskins’ elevating conveyor uses chains, but Blackman discloses a belt-driven elevating conveyor.**

Although Haskins’ conveyor uses chains rather than a belt, belt-based elevating conveyors have long been known and used as an alternative to chain-based conveyors. *Id.*, ¶79. For example, Blackman describes a “conveyor [that] comprises generally a plurality of buckets of identical construction and shape.” EX1007, 2:16-17. It has a belt 1, highlighted in blue in FIG. 1 below, “formed of fabric but it might equally well be formed of leather or any material or mixture of composition of materials of sufficient strength and lasting quality to justify its use in a belt.” *Id.*, 1:61-65. Like Haskins’ chain, Blackman’s “belt is positioned about pulleys 4 which are carried by shafts 5 and may be conventional in design.” *Id.*, 1:68-71.
Blackman, FIG. 1*

Also, like Haskins’ chain, in Blackman, “[t]o the belt are fixed a number of bucket members,” *id.*, 1:54-55, and “[a]fter full buckets have passed over the upper pulley 5, they discharge into a receiving chute 7,” *id.*, 2:9-11. Accordingly, Blackman
discloses a continuous belt loading system, as claimed, that is similar to Haskins’ chain-based loading system. EX1003, ¶79.

c. A person of ordinary skill in the art would have had reason to modify Haskins to use a belt instead of a chain, as disclosed by Blackman.

A POSITA would have found it obvious to use Blackman’s conveyor belt instead of chains in the elevating conveyor of Haskins’ bin. Id., ¶80. Before the critical date of the ’740 patent, chains and belts served as substitutes for one another for transporting buckets in elevating conveyors. Id. Blackman reflects that interchangeability, explaining that “the buckets might, if desired, be carried by a chain rather than by a belt.” EX1007, 4:10-11 (emphasis added); see also id., 4:19, 28, 34, 50 (“belt or chain”). The KSR Court relied on the rationale that “the simple substitution of one known element for another” on “a piece of prior art ready for the improvement” is obvious. KSR, 127 S. Ct. at 1740. This rationale arises here because the proposed combination involves the mere simple substitution of Haskins’ chain for Blackman’s belt on a similar elevating conveyor ready for this improvement. EX1003, ¶80.

The Office has identified four factual determinations that support a finding that a prior art combination involves the simple substitution of one known element for another:

(1) a finding that the prior art contained a device (method, product, etc.) which differed from the claimed device by
the substitution of some components (step, element, etc.) with other components;

(2) a finding that the substituted components and their functions were known in the art;

(3) a finding that one of ordinary skill in the art could have substituted one known element for another, and the results of the substitution would have been predictable; and

(4) whatever additional findings based on the Graham factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

M.P.E.P. § 2143(B).

Regarding (1), Petitioner demonstrates above that Haskins contains an elevating conveyor differing from the claimed continuous belt loading system by substituting a chain for a belt. Although Haskins uses a chain, Blackman describes a similar elevating conveyor using a belt and teaches that belts and chains may substitute for one another in these devices. See, e.g., EX1007, 4:10-11, 19, 28, 34, 50; EX1003, ¶81.

Regarding (2), chains and belts, and their function of carrying buckets in elevating conveyors, was known in the art before the priority date of the ’740 patent. EX1003, ¶81. Haskins teaches that the “chains 28 … carry a series of conventional
lifting buckets 30” and “[c]onnect the sprockets 27, 28.” EX1006, 3:5-7. The belt in Blackman functions the same way: “To the belt are fixed a number of bucket members,” EX1007, 1:54-55, and “[t]he belt is positioned about pulleys 4 which are carried by shafts,” id., 1:68-70. See also id., 4:17-18 (“The conveyor comprises a chain or a belt and to this are secured a plurality of buckets.”). Thus, the chain and belt, and their functions of continuously carrying buckets between sprockets/pulleys in an elevating conveyor, were known in the art long before the ’740 patent as described by Haskins and Blackman. EX1003, ¶81.

Regarding (3), a POSITA could have substituted Blackman’s belt for Haskins’ chain with predictable results, e.g., because Blackman’s belt would operate in the same way as the chain in Haskins’ system and in the same way taught by Blackman. Id., ¶82. The belt would still continuously move buckets between two endpoints (sprockets/pulleys) to collect and unload granular material via a chute at the top of the conveyor. Id. Blackman teaches the conveyor suits handling granular material like “seeds, nutmeats, coffee beans, brittle pellets, and brittle articles of small size and generally frangible and friable materials.” EX1007, 1:27-29. Haskins handles the same types of materials: “grain, seed, fertilizer, peas, beans, or other dry flowable material.” EX1006, 1:15-16. Thus, a POSITA would have recognized that Blackman’s belt would suit the similar applications of Haskins and could have
predicted that the combined system would operate in the same way using a belt instead of a chain conveyor. EX1003, ¶82.

Regarding (4), additional reasons support swapping Haskins’ chain for Blackman’s belt. For example, belts can be more tightly fitted to sprockets/pulleys than a chain. Id., ¶83. A chain’s length only adjusts incrementally by adding or removing links, and the chain must have appropriate slack to operate properly. Id. A belt, on the other hand, can be cut to any desired length and thus tightly fitted to the sprockets/pulleys. Id. Thus, belt conveyors can typically operate at higher speeds than chain conveyors, while keeping their tension, which may allow movement of granular material at a higher rate. Id. Belt conveyors are typically cleaner than chain conveyors because they accumulate less debris. Id. As a result, the combined system may require less maintenance/cleaning and have a longer useful life. Id. Moreover, belts are more flexible and therefore more mechanically forgiving than chains, resulting in fewer breakdowns and/or maintenance. Id. Belts are also easier to customize than chains in some applications, making the attachment of buckets easier than on chains. Id. Accordingly, a POSITA would have found it obvious and been motivated to swap Haskins’ chain with Blackman’s belt. Id.
6. [1.5] “the continuous belt loading system being separated from the continuous belt conveyor by the mobile storage module”

The Forsyth-Haskins-Blackman combination described for elements [1.3] and [1.4] includes element [1.5]. Supra Sections VI.A.4-5. Petitioner illustrates the combination, with the claimed separation, below:

Haskins, FIG. 1*

In Haskins, “[m]ounted within the enclosed rectangular shaft 24, which extends the full height of container 9, is [the] conveyor mounted on upper sprockets 25 and lower sprockets 27.” EX1006, 2:80-72; see also id., 2:62-64, 4:3-7; FIG. 7.
In the combined system, the elevating conveyor of Haskins (the claimed continuous belt loading system, blue) housed within the shaft is separated from the conveyor 10 of Forsyth (the claimed continuous belt conveyor, red) by the bin of Haskins (the claimed mobile storage module, purple). EX1003, ¶85.

7.  [1.6] “wherein the delivery module is mobile and reconfigurable between said delivery module operational configuration and a delivery module transportation configuration”

As explained for elements [1.1] and [1.2], the apparatus of Forsyth discloses the claimed delivery module. Supra Sections VI.A.2-3. Forsyth’s apparatus is reconfigurable between a first configuration (claimed operational configuration), in which the conveyor is positioned to deliver the granular material to a desired location, and a second configuration (claimed transportation configuration), in which the conveyor is stowed for transportation and the apparatus is mobile and towable. EX1003, ¶86.

In the transportation configuration, the apparatus is mobile “for transport of seed grain.” EX1005, 4:15-16; EX1003, ¶87. The apparatus “mount[s] to suitable trailer 14 such that invention 2 may be transported from seed storage facility to field and back.” EX1005, 4:33-35; see also id., 4:65-5:2. To achieve this configuration, the crane self-deploys to place “the elevating conveyor at rest with its intake end secured to the frame of the [material transport apparatus],” as highlighted in FIG. 3
As discussed above, Forsyth’s apparatus also has an “off loading position” highlighted in FIG. 1 below, which corresponds to the claimed “delivery module operational configuration.” EX1005, 3:48-52, 4:15-32, 6:33-41; EX1003, ¶88. In this configuration, the “crane member” is “raised to suspend the elevating conveyor such that its discharge end is disposed above the seed boxes of the planters,” as shown in FIG. 1 above. EX1005, 8:31-33, FIGS. 1, 4; see also id., 8:37-44 (describing conveying to seed box).
Forsyth teaches that the apparatus is reconfigurable between these two positions (transportation and operational), as claimed. As explained in Section V.C, “reconfigurable” means “self-deployable.” Forsyth is self-deployable through the built-in crane 16, highlighted in FIG. 1 below, that moves the conveyor between the transportation and delivery configurations without requiring external machinery.

EX1003, ¶¶88-90; EX1005, 2:21-54, 3:7-18, 6:66-7:18, 7:47-8:8, FIGS. 1, 4, 8 (crane member/assembly 16, 116).
wherein each of the one or more mobile storage modules comprises an integrated actuating system for moving a container portion thereof between a lowered position and a raised position, the raised position corresponding to the mobile storage module operational configuration.”

The combination includes element [1.7] because Haskins’s bin has a hydraulic actuation system 41-46 for moving its tank (the claimed container portion) between horizontal and vertical positions. EX1003, ¶¶91.
Haskins, FIG. 1*

As explained above, “integrated actuating system” refers to a “built-in, self-deployment system.” Section V.B. Haskins’ hydraulic actuation system 41-46 is built into the storage module for self-deployment of the container from the horizontal position to vertical position, and vice versa. EX1003, ¶92. Specifically, as shown in FIG.1 above, “[t]he tank walls 16 are pivotally mounted on the framework 10 by rigid pivot supports 41 at each side of the framework 10 and fixed to the side members 11.” EX1006, 3:40-44. The tank moves “from the upright position used for storage to the transport position used for movement of the apparatus” using “a pair
of hydraulic cylinder assemblies 44, one mounted at each side of the framework 10. The cylinder assemblies 44 are pivotally connected at their respective ends [to] anchors 45 on the framework 10 and anchors 46 on the exterior of the tank walls 16.” Id., 3:47-55. The tank “move[s] [between the two positions] by contraction or expansion of cylinder assemblies 44.” Id., 3:55-57.

In Haskins, the tank’s horizontal “transport position used for movement of the apparatus” corresponds to the claimed lowered position. EX1003, ¶93. On the other hand, the tank’s “upright position used for storage” corresponds to the claimed raised position in element [1.7] and the mobile storage module operational configuration in element [1.3]. Id. As explained above for element [1.3], which introduces the claimed mobile storage module operational configuration, in the “vertical storage position” Haskins’ tank “is capable of storing a day’s supply of [granular] material,” EX1006, 1:10-16.
9. [1.8] “wherein each of the one or more mobile storage modules further comprises: a. a frame; b. the container portion supported by the frame and pivotably coupled thereto”

The combination of Forsyth and Haskins renders obvious element [1.8]. EX1003, ¶94. Specifically, the bin of Haskins (one or more mobile storage modules) has “a supporting framework generally denoted by the numeral 10” that corresponds to the claimed frame. Id.; EX1006, 2:30-32.

Haskins, FIG. 1*
“The framework 10 is comprised of rear side members 11 that extend longitudinally along the length of the framework 10 and which join forward members 12 that lead to a raised section 13 for a conventional fifth wheel trailer hitch. Transverse beams 14 … provide the necessary lateral connections between the members 11 and 12. The framework 10 is a mobile framework, and is mounted on a pair of wheels 15 in a conventional manner, so that as the framework 10 is pulled by a tractor (not shown) ….” EX1006, 2:32-43. Haskins further teaches that “the container portion [is] supported by the frame,” as claimed, because “the apparatus [the bin] is carried on [the] supporting framework generally denoted by the numeral 10.” Id., 2:30-21; see also id., 6:28-29 (“an enclosed tank carried upon said framework”); FIG. 1; EX1003, ¶96.
Haskins’ tank is pivotally coupled to the framework 10, as claimed, because “[t]he tank walls 16 are pivotally mounted on the framework 10 by rigid pivot supports 41 at each side of the framework 10 and fixed to the side members 11. A pivot shaft 42 on each support 41 is connected to a tangential extension 43 fixed to the tank walls 16.” EX1006, 3:40-44; see also id., 3:51-57, 4:44-56, 5:63-6:9; EX1003, ¶97.

10. [1.9] “*the container portion configured to store said granular material*”

In the Forsyth-Haskins combination, the tank (claimed container portion) is configured to store the granular material, as claimed. Ex 1003, ¶98. The “tank … [is] adapted to store a day’s output from a combine or similar machine so that only one daily trip by a highway truck is necessary.” EX1006, 2:21-27, 4:3-20. The tank has two storage compartments for storing granular material. *Id.*, 4:22-23.
As shown in FIG. 9, right, the tank’s floor 23 “defines the lower limit of the upper storage compartment within the tank walls 16.” *Id.*, 2:60-62. The tank also has a lower storage compartment for storing excess granular material from the upper compartment. *See id.*, 1:16-23, 4:73-5:15, 5:39-52. “The lower floor 57 defines the bottom of the lower storage compartment adapted to hold the overflow from the upper compartment.” *Id.*, 3:68-70.

11. [1.10] the container portion “comprising the input port for receiving said granular material and an output port for dispensing said granular material”

As highlighted in FIG. 9 of Haskins in the discussion of element [1.12] below, the tank comprises both the receiving chute 31 (input port, red) and a spout 21 (output port, purple). EX1003, ¶100; *infra* Section VI.A.13.
12.  [1.11] “c. the integrated actuating system configured to pivot the container portion between the lowered position and [] the raised position”

As explained above for element [1.8], the actuation system 41-46 of Haskins (the claimed integrated actuating system) moves the tank between the horizontal (“lowered”) and vertical (“raised”) positions. *Supra* Section VI.A.9. “The tank walls 16 are pivotally mounted on the framework 10 by rigid pivot supports 41 at each side of the framework 10 and fixed to the side members 11. A pivot shaft 42 on each support 41 is connected to a tangential extension 43 fixed to the tank walls 16.” EX1006, 3:40-44. The tank of Haskins moves “from the upright position used for storage to the transport position used for movement of the apparatus” using “a pair of hydraulic cylinder assemblies 44 …. The cylinder assemblies 44 are pivotally connected at their respective ends connected to anchors 45 on the framework 10 and anchors 46 on the exterior of the tank walls 16.” *Id.*, 3:47-55; *see also id.*, 3:54-57.

13.  [1.12] “wherein, in the raised position, the input port is located above the output port.”

As highlighted in FIG. 9 of Haskins, below, the bin has a spout 21 (purple) corresponding to the claimed output port. EX1003, ¶103. The spout is “[m]ounted intermediate the height of the container 9, and at the exterior thereof” and “is in open communication with the interior of the container 9.” EX1006, 2:53-55. It has “a closable cover 22,” *id.*, 2:56-58, and to empty the upper compartment, one “mov[es] the cover 22 on spout 21 to thereby direct the stored material to” Forsyth’s apparatus
alongside the rear of the tank. *Id.*, 5:3-5; EX1003, ¶103. Moreover, as shown in the figure below, when the tank is upright, the receiving chute 31 (the claimed input port) is located above the spout 21 (the claimed output port), as claimed. EX1003, ¶103.
B. Claims 2 and 4

Claim 2 depends from claim 1 and recites that “[2.1] each of the one or more mobile storage modules are reconfigurable between said mobile storage module...”
operational configuration and a mobile storage module transportation configuration,” and “[2.2] the one or more mobile storage modules towable as separately transportable trailers in the mobile storage module transportation configuration.” Claim 4 similarly depends from claim 1 and recites that “the delivery module is towable as a separately transportable trailer in the delivery module transportation configuration.” The Forsyth-Haskins-Blackman combination renders obvious claims 2 and 4 because Forsyth’s and Haskins’ apparatuses are towable by trailer in their transportation configurations, as explained below. EX1003, ¶104; EX1005, 2:3-6, 4:33-35; EX1006, 2:30-43, 5:11-16.

FIG. 1 of Haskins shows that the “vertical storage position” (blue) corresponds to the claimed mobile storage module operational configuration and the “horizontal transport position” (red) corresponds to the claimed mobile storage module transportation configuration in element [2.1]. Id., ¶105; see EX1006, 1:14-16, 1:49-50 (discussing horizontal and vertical positions of the bin).
Haskins’ bin is “reconfigurable,” or self-deployable, between the two configurations by the built-in actuating system 41-45. EX1003, ¶106. Specifically, “[t]he bin is movable from [the] horizontal transport position on a mobile framework to [the] vertical storage position” through actuation of “a pair of hydraulic cylinder assemblies 44” coupled to the framework and tank. EX1006, 1:10-15, 3:47-55. The reconfiguration is “effected by expanding the cylinder assemblies 44, thereby shifting the container 9 about the pivot shafts 41.” Id., 4:41-46. Likewise, the bin can return to the horizontal by contraction of the cylinder assemblies 44. See id.
Additionally, Haskins’ bin is “towable as separately transportable trailers” in the horizontal position, as recited in element [2.2]. EX1003, ¶106; see, e.g., EX1006, 5:12-16 (bin can be pulled “by [a] tractor which is to propel it to a new position”), 2:30-43 (“The framework 10 is a mobile framework, and is mounted on a pair of wheels 15 in a conventional manner, so that as the framework 10 is pulled by a tractor (not shown) ….”).

Regarding claim 4, Forsyth’s apparatus is also towable by trailer when in the transportation configuration with the crane stowed. EX1005, 4:33-35 (“Invention 2 has been mounted to suitable trailer 14” and “may be transported from seed storage facility to field and back”), 4:65-5:8, 8:12-14, 2:3-6; EX1003, ¶107.

C. Claim 6

Claim 6 depends from claim 1 and recites that “the one or more storage modules includes two or more mobile storage modules stationed along one or more sides of the delivery module in the mobile storage module operational configurations.” The Forsyth-Haskins-Blackman combination renders obvious claim 6. EX1003, ¶108.

For element [1.3] discussed above, Petitioner explained that a POSITA would have positioned Haskins’ bin alongside Forsyth’s transport apparatus when in the vertical position (the claimed mobile storage module operational configuration) to reduce the manual labor, time, and other resources needed to manipulate Forsyth’s
conveyor, forklift, and seed bags to load/unload its transport apparatus. *Supra* Section VI.A.4. As explained, the process of filling Forsyth’s apparatus directly from Haskins’ bin greatly increases efficiency over the methods disclosed by Forsyth alone. EX1003, ¶109. But efficiency could be improved even further by simply adding more Haskins’ bin(s) alongside Forsyth’s transport apparatus. *Id.*

Specifically, a POSITA would have been motivated and found it obvious to place more than one of Haskins’ bin alongside Forsyth’s system (as shown below) to further increase the efficiencies of the Forsyth-Haskins combination. EX1003, ¶110; *see supra* Section VI.A.4. This addition allows (1) loading multiple Forsyth compartments simultaneously, (2) loading different granular materials (stored in different Haskins bins) simultaneously or without emptying and refilling the bin, and (3) holding more granular material on the worksite than one bin alone can hold, all while avoiding the time- and labor-intensive techniques of Forsyth alone. EX1003, ¶110.
Haskins teaches that the bin’s spout 21 has “a closable cover 22 which is adapted to selectively open the outlet of the spout 21 or close it as desired.” EX1006, 2:56-58. Although the spout opens and closes, its orientation appears fixed and Haskins does not teach that it can be aimed, such as to fill different compartments of Forsyth, without moving the entire apparatus. EX1003, ¶111. Thus, only the “truck driven alongside the rear of the tank,” EX1006, 5:5, controls the relative position of the bin and container being loaded. EX1003, ¶111. After filling one
compartment, the truck must be moved to reposition the apparatus and load another compartment. *Id.* In contrast, placing a second Haskins bin alongside Forsyth allows filling two compartments at the same time without repositioning the truck, as illustrated above. *Id.* Compared to only one bin, two bins reduce the time and labor required to reposition the truck to fill additional compartments on Forsyth’s apparatus. *Id.*

As another benefit, the added bin allows for holding more granular material on the worksite than one bin alone. *Id.*, ¶112 This, in turn, means fewer trips to the “seed storage facility to field and back” during a given work session. *Id.*; EX1005, 4:33-35. The second bin effectively doubles the rate at which the compartments can be filled by using two spouts instead of one. EX1003, ¶112.

Two bins also enable loading different granular materials simultaneously and/or without emptying the bin and refilling it with a new granular material. *Id.*, ¶113. For example, one bin might hold fertilizer while another holds seed, both of which need to be distributed to a field. *See id.*; EX1005, 4:41-43; *see also* EX1006, 1:15-16 (“grain, seed, fertilizer, peas, beans, or other dry flowable material”). Forsyth provides motivation for this combination by teaching that the separate compartments advantageously allow transporting different granular materials at the same time. EX1005, 5:12-18, 3:23-25.
The proposed combination involves mere duplication of Haskins’ bin. “It is well settled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced.” In re Harza, 274 F.2d 669, 671 (CCPA 1960). Here, the duplication of Haskins’ bin produces no new or unexpected result—the second bin would operate in the same way Haskins describes and in the same way the first bin operates in the Haskins-Forsyth combination. EX1003, ¶114. At the same time, because the bins would operate as expected, using two bins rather than one involves merely combining prior-art elements according to known methods to yield predictable results. Id., see also, KSR, 127 S. Ct. at 1739. For the same reasons, a POSITA would have had a reasonable expectation of success in using two Haskins bins instead of one. EX1003, ¶114.

Thus, a POSITA would have found it obvious to provide two or more mobile storage modules (Haskins’ bins) along one or more sides of the delivery module (Forsyth’s apparatus) in the mobile storage mobile operational configuration (vertical position), as claimed. EX1003, ¶115.

D. Claim 7

Claim 7 depends from claim 1 and recites that “the one or more mobile storage modules includes two or more mobile storage modules which comprise interchangeable components.” As explained above for claim 6, it would have been obvious to duplicate Haskins’ storage bin within this combination, providing “two
or more mobile storage modules stationed along one or more sides of the delivery module in the mobile storage module operational configurations.” *Supra* Section VI.C. The same rationale renders obvious “the one or more mobile storage modules includes two or more mobile storage modules,” of claim 7. EX1003, ¶116.

The combination further renders obvious the notion that the claimed mobile storage modules “comprise interchangeable components,” as recited in claim 7. *Id.*, ¶¶117. Two identical Haskins storage bins include two sets of interchangeable components in the sense that the two sets of components are identical. *Id.* The two sets of components are also interchangeable in the sense that any of the components on one storage bin could be removed and replaced with the corresponding component(s) from the set on the other storage bin, if desired. *Id.*
For example, as shown in FIG. 3 of Haskins, reproduced right, the bin of Haskins includes a ladder 53 “provided ... along the outside of the tank wall 16 so that a person desiring to work on the elevating conveyor or desiring to clean the upper storage tank can have full access to the top of the tank.” EX1006, 4:26-30. The reference does not indicate that the ladder 53 is permanently affixed to the tank. *Id.* Even if it was, the ladder could be removed from one bin and affixed to another. EX1003, ¶118. For example, if one ladder included a broken step, but the associated bin needed to be cleaned or inspected, the ladder could be removed and replaced with the ladder from another bin. *Id.*

Each of the cylinder assemblies 44 of the bin could similarly be removed and interchanged with those of another bin. *Id.*, ¶119. The cylinder assemblies 44 of Haskins are “pivotally connected at their respective ends[,] connected to anchors 45 on the framework 10 and anchors 46 on the exterior of the tank walls 16.” EX1006, 3:51-54. If a cylinder assembly 44 of a first bin requires removal, e.g., due to damage, that assembly 44 could be removed and replaced with a cylinder assembly
E. Claim 8

Claim 8 depends from claim 1 and recites that “at least one of the delivery module and the one or more mobile storage modules comprises a chassis, the chassis reconfigurable between a semi-trailer chassis for transportation and a bearing surface for support against ground during operation.” The Forsyth-Haskins-Blackman combination further renders obvious claim 8 because Haskins’s bin includes the additional features recited in claim 8.

1. [8.1] “wherein at least one of the delivery module and the one or more mobile storage modules comprises a chassis”

The bin of Haskins (the claimed one or more mobile storage modules) includes a “framework 10” upon which the container is mounted. EX1006, 2:32-40. The framework, highlighted in blue below, discloses the claimed chassis because it comprises structure supporting the bin. EX1003, ¶121.
Haskins, FIG. 1*
As shown in FIG. 2, the framework 10 (the claimed chassis) includes the following structural components:

- **Rear side members 11** “that extend longitudinally along the length of the framework 10.” EX1006, 2:32-34.
- **Forward members 12** joined to the rear side members. *Id.*, 2:34-35.
- **Raised section 13** “for a conventional fifth wheel trailer hitch.” *Id.*, 2:35-36
- **Transverse beams 14** that “complete the rigid framework 10 and provide the necessary lateral connections between the members 11 and 12.” *Id.*, 2:36-38.
- **Diagonal members 12** “in the framework 10 which form a substantially complete supporting surface directly under the walls 16 [of the storage bin].” *Id.*, 2:50-52.
- **Arch supports 48** “that position the tank walls 16 when in their horizontal position.” *Id.*, 3:58-60.
2. [8.2] “the chassis reconfigurable between a semi-trailer chassis for transportation and a bearing surface for support against ground during operation”

The framework of Haskins’ bin can be reconfigured between a semi-trailer chassis for transportation and a bearing surface for support against the ground during operation, as recited in claim 8. EX1003, ¶123. Specifically, the framework has a “horizontal transport position,” shown in FIG. 1, in which it functions as a semi-trailer chassis. See, e.g., EX1006, 1:12-14, 1:26-28, 1:48-50, 3:60-65, 5:12-15 (discussing the horizontal transport position). The framework is a semi-trailer chassis (i.e., a fifth-wheel trailer chassis) because it has wheels 15 at one end and a “raised section 13 for a conventional fifth wheel trailer hitch” at the other end, supported by a towing vehicle. Id., 2:30-36; EX1003, ¶123. Haskins therefore discloses a chassis configurable as a semi-trailer chassis, as claimed.

Additionally, as shown in FIG. 3 below, the framework of Haskins reconfigures to a bearing surface for support against the ground during operation, as claimed. EX1003, ¶124.

In operation, the framework 10 is drawn to the desired location for the setting up of the tank walls 16, and the
ground is dug slightly as can be seen in FIGURE 3, so as to provide a recess for the reception of the wheels 15 and the lower end of the boot 32, which protrudes below the intended ground line of the apparatus when the tank is erected. The wheels 15 are driven into the trench, which is generally designated by the numeral 59, and when the removal of the tank is desired, the wheels 50 are merely drawn out of this trench 59.

EX1006, 4:31-40.

In this operational configuration, “lower surfaces of the side members 10 and 11 are resting on a flat ground surface” as shown in FIG. 3. EX1006, 4:41-43. Thus, the side members 10, 11 serve as a bearing surface for support against ground during operation, as claimed. EX1003, ¶125.

F. Claim 9

Claim 9 depends from claim 8 and recites that “reconfiguration of the chassis comprises lowering of a front portion of the chassis to contact the ground.” The Forsyth-Haskins-Blackman combination further renders obvious claim 9 because, when Haskins’ storage bin is reconfigured to the vertical operation position, the
wheels sit in a trench and the part of the framework 10 on the same side as the spout (i.e., the front portion) sits on the ground. EX1003, ¶126.

In Haskins, during the reconfiguration to the vertical position, “the framework 10 is drawn to the desired location for the setting up of tank walls 16, and the ground is dug slightly as can be seen in FIGURE 3, so as to provide a recess for the reception of the wheels 15 and the lower end of the boot 32, which protrudes below the intended ground line of the apparatus when the tank is erected.” EX1006, 4:31-37, FIG. 3. Then, the “wheels 15 are driven into the trench, which is generally designated by the numeral 59” in FIG. 3. Id., 4:37-38, FIG. 3. “When the framework 10 has been released from the tractor (not shown) and the lower surfaces of the side members 10 and 11 are resting on a flat ground surface, the apparatus is ready to be erected for storage use.” Id., 4:41-43, FIG. 3 (emphasis added).

Thus, when the “lower surfaces of the side members 10 and 11 are resting on a flat ground surface,” id., 4:41-43, at least a “front portion” of the framework 10 (the claimed chassis) contacts the ground, as shown in the modified version of FIG. 3, Haskins, FIG. 3*.
above/right. EX1003, ¶128. The framework contacts the ground when the wheels enter the trench. Id.; EX1006, 4:37-43. As shown in FIG. 3 and the modified FIG. 1 below, the trench can remain narrow enough such that the entire framework, including the front portion, contacts the ground.
G. Claim 11

Regarding dependent claim 11, as shown in FIG. 9 of Haskins below, the granular material flows continuously downward from the input port (receiving chute 31, red) to the output port (spout 21, purple), as claimed. This is because the chute is above the spout and the floor slopes downward. EX1003, ¶129; see EX1006, 2:54-69, 4:17-18, 4:71-72.
Regarding the second “wherein” clause of claim 11 about the reconfigurability of the storage module, see Section VI.A.8 above.

Moreover, Haskins discloses, or at least suggests, that reconfiguring the bin from the horizontal to the vertical position does not elevate the spout 21 (the claimed output port). In the operational configuration, the “spout … is 14 feet above the ground line.” EX1006, 5:44-46. And semi-trailers, or fifth-wheel trailers, like Haskins’ are required to be 13.5—14 feet high by DOT regulations. See id., 3:35-36 (“conventional fifth wheel trailer”); EX1010, 5 (“from 13 feet, 6 inches (4.11 meters) to 14 feet (4.27 meters)”); EX1003, ¶131. Haskins supports this finding by disclosing that the tank is 10.5 feet in diameter (EX1006, 5:40-42), resting upon supports 48 that are likely about 6-8 inches tall (id., FIG. 1; EX1003, ¶132), all of which sit above the wheels (EX1006, FIG. 1), which on a conventional fifth wheel trailer are approximately three feet tall (EX1003, ¶132). The spout then extends vertically even further above the tank in the horizontal position. EX1006, FIG. 1. Thus, Haskins discloses or suggests that the spout is at approximately the same height from the ground (14 feet) in both configurations, and thus “reconfiguration of the mobile storage module from the transportation configuration to the operational configuration refrains from elevation of the output port” as claimed. EX1003, ¶132.
H. Claim 12

Claim 12 depends from claim 1 and recites that “the integrated actuating system comprises a hydraulic cylinder coupled at a first end to the frame and at a second end to the container portion at a location distal from the frame, thereby orienting the hydraulic cylinder at an angle away from horizontal in both the lowered position and the raised position of the container portion.” The Forsyth-Haskins-Blackman combination renders obvious claim 12 because the hydraulic cylinder assemblies of Haskins have the additional characteristics recited in claim 12. EX1003, ¶133.

As shown in FIG. 1 below, the bin of Haskins includes “a pair of hydraulic cylinder assemblies 44” that “are pivotally connected at their respective ends[,] connected to anchors 45 on the framework 10 and anchors 46 on the exterior of the tank walls 16.” EX1006, 3:47-54.
Thus, as shown above, Haskins’ cylinder assemblies are “coupled at a first end to the frame and at a second end to the container portion at a location distal from the frame,” as claimed. EX1003, ¶134. Moreover, also highlighted below, in both the “vertical storage position” and “horizontal transport position,” the hydraulic cylinder assemblies 44 are “orient[ed] … at an angle away from horizontal,” as claimed. Id.

I. Claims 13, 14, 16, 17, 19, and 20

While independent claim 1 is directed to a system including both the delivery module and the mobile storage module, independent claim 13 focuses on the mobile storage module alone and its relationship to the adjacent delivery module. Claim 13, however, recites elements substantively identical to elements [preamble]—[1.5] and
[1.7]—[1.12] addressed above. Accordingly, the Forsyth-Haskins-Blackman combination renders obvious claim 13 for at least the reasons discussed above for these elements. Supra Sections VI.A.1-6, 8-13.

Claims 14, 16, and 17 depend from independent claim 13 and respectively recite elements substantially identical to those discussed above for claims 2, 8, and 9. Accordingly, the Forsyth-Haskins-Blackman combination renders obvious claims 14, 16, and 17 for the reasons discussed above in Sections VI.B, E, F.

Independent claim 19 corresponds to independent system claim 1 rewritten as a method claim—changing “system” to “method” and adding “providing” before the delivery module and the one or more storage modules. Claim 19 includes the same substantive features as claim 1. Accordingly, claim 19 is obvious for the reasons discussed above in Section VI.A.

J. Claim 20

Claim 20 depends from independent claim 19 and recites a “wherein” clause after the preamble substantively identical to the subject matter of dependent claim 2. The claim further includes:

a. transporting the one or more mobile storage modules to positions adjacent to the delivery module in the mobile storage module transportation configuration; and
b. reconfiguring the one or more mobile storage modules to the mobile storage module operational configurations.
The Forsyth-Haskins-Blackman combination renders obvious the wherein clause for the reasons discussed above in Section VI.B. The combination also renders obvious elements a and b of claim 20. EX1003, ¶138.

Regarding element a, Petitioner explained why it was obvious to position the bin of Haskins alongside to the apparatus of Forsyth in Section VI.A.4. Haskins teaches using a tractor to transport the bin when it is in the horizontal transport position (the claimed mobile storage module transportation configuration). See, e.g., EX1006, 2:38-44; EX1003, ¶139. Regarding element b, as explained above, Haskins teaches reconfiguring the bin to the vertical position (the claimed mobile storage module operational configuration) to release granular material via the spout. See, e.g., Sections VI.A.2-4, 11, 13; VI.C, F, G. Thus, for reasons already discussed, elements a and b of claim 20 would have been obvious over Forsyth, Haskins, and Blackman.

VII. GROUND 2: FORSYTH, HASKINS, AND BLACKMAN, FURTHER IN VIEW OF GROTTE, RENDER OBVIOUS CLAIM 10.

A. Claim 10

Claim 10 depends from claim 8 and recites that “the chassis comprises a wheeled portion movable relative to a bearing surface portion between a first position and a second position, the wheeled portion configured to engage the ground in the first position for transportation, the wheeled portion configured to retract from
the ground in the second position to facilitate engagement of the ground by the bearing surface portion.” Although the Forsyth-Haskins-Blackman combination lacks the features of claim 10, Grotte discloses a system with a height-adjustable wheel assembly having claim 10’s features. Additionally, it would have been obvious to combine Grotte with Forsyth/Haskins/Blackman with respect to the subject matter of claim 10. EX1003, ¶140.

1. [10.1] “wherein the chassis comprises a wheeled portion movable relative to a bearing surface portion between a first position and a second position”

a. Grotte discloses element [10.1].

Grotte discloses a “siro mover for upright silos or similar tall structures.” EX1008, 1:58-63. Grotte, like Haskins, includes: a towable trailer, a silo that mounts on the trailer, and an integrated actuating system that pivots the silo from a horizontal position to a vertical position. Id., 3:24-37, 4:1-8, 10:14-34, FIG. 1.
As shown in FIG. 1, Grotte has a semi-framework similar to Haskins’ semi-framework. Specifically, it includes a “semitrailer that has a main frame 21, and a forward support frame 22, that is pivoted to the main frame 21 as at 23, and includes a gooseneck 24 that can be supported onto the frame 15 of a semitrailer tractor (truck) 26.” Id., 3:24-29. The silo mover also includes a similar framework and actuation system: a “subframe [(80)] for supporting a silo” with “pins 82 pivotally mount[ing] this subframe to the main frame (see FIG. 7 also).” Id., 6:25-29, FIG. 1. The silo mounts to the subframe 80 for lowering or raising the silo. Id., 10:14-34.
“The pivoting of the subframe assembly 80 about the pivot pin 82 from its lowered position to its raise position, as shown in FIGS. 1 and 2, is done with a multi stage large hydraulic cylinder 125 on each side of the machine.” *Id.*, 8:35-39.

Coupled to the framework of Grotte are multiple “wheel assemblies 40” that control the height of the main frame. *Id.*, 3:52-59, FIGS. 9, 10.

“[E]ach wheel assembly 40 is supported to its respective tube 36 or 37 through a support arm indicated generally at 41.” *Id.*, 3:53-59. Further, “[t]he rotational position of the tubes or sleeves 36 and 37 relative to the cross members 35, and thus the height of the main frame, will be controlled by a control arm 43, one of which is welded to each of the tubes 36 and 37.” *Id.*, 3:60-64. Each control arm 43 “is
controlled in its rotational position with a separate hydraulic cylinder assembly 45.”

*Id.*, 3:65-68.

Each “cylinder assembly 45 has an internal piston that controls an extendable

![Diagram](image)

**Grotte, FIG. 9**

and retractable rod 47 which in turn is pivotally mounted as at 48 to the outer end of the respective arm 43.” *Id.*, 4:4-8. By “extending and retracting the cylinder rod 47 through the use of a suitable valve . . . the control of the height of that wheel assembly 40 connected to the respective rod 47 is achieved.” *Id.*, 4:9-14.

a. **Rationale to combine Haskins and Grotte.**

Since Haskins and Grotte both use an otherwise conventional semi-trailer framework to carry a tank/silo, Grotte’s wheel assembly 40 of FIG. 9 could replace Haskins’ wheel assembly 15. *Compare* EX1006, 2:35-36 (“conventional fifth-wheel
trailer”), 2:38-43 with EX1008, 2:7-8 (“The frame is adapted to be towed by a semitrailer tractor”), 3:24-25, 3:39-40, 10 (“semitrailer” framework); EX1003, ¶¶145-146. For example, Haskins’ explains that its semi-framework “is mounted on a pair of wheels 15 in a conventional manner.” EX1006, 2:38-43. Likewise, Grotte explains that “the wheel support assemblies 40 can be conventionally made, and the individual wheels 49 … are mounted onto a suitable axle with bearings in a conventional manner, and include internal brake drums.” Id., 4:28-33; see also id., 3:65-68, 4:34-42 (discussing connection of wheel assemblies 40 to the semi-framework).

The combination of Haskins and Grotte would modify Haskins’ bin so its framework included a wheeled portion movable relative to the bearing surface portion between a first position and a second position, as claimed. EX1003, ¶146. This results from Grotte’s height-adjustable wheeled assembly 40 coupled to the Haskins chassis and replacing its original wheel assembly 15. Id. Because the wheel assembly of Grotte alters the “height of the main frame,” EX1008, 3:60-63, it would alter the height of the bearing surface portion(s) of that frame relative to the wheels in the combination. EX1003, ¶146. Regardless of which of the wheels or chassis contacts the ground, the distance between the two would change by actuation of the hydraulic cylinder assembly 45 disclosed by Grotte. Id.
A POSITA would have added Grotte’s height-adjustable wheel assembly to Haskins. Id., ¶147. The chassis/framework of Haskins includes a wheeled portion, but Haskins does not disclose that the wheeled portion moves relative to the framework. Id. Instead, Haskins discloses that the ground must be “dug slightly” to “provide a recess for the reception of the wheels 15 and the lower end of the boot 32.” EX1006, 4:31-37, FIG. 3. The portable storage unit must then be “driven into the trench,” until the “lower surfaces of the side members 10 and 11 are resting on a flat ground surface.” Id., 4:37-43.

It would have been obvious to a POSITA to utilize the height-adjustable wheel assembly of Grotte to provide a mechanism for resting the vertical Haskins bin on the ground while alleviating the problems associated with using a trench. EX1003, ¶148. Digging a trench to accommodate the wheels of Haskins’ bin is laborious and time-consuming. Id. Workers would need to either dig the trench by hand using shovels or bring a separate machine like a backhoe or excavator. Id. Time and resources would be needed to transport the tools and/or excavating machine onsite and to dig the trench. Id.

Furthermore, the trench of Haskins must be dug in a precise location so the bin rests in the desired location. Id., ¶149. The trench must be large enough to fully accommodate the wheels so the framework rests on the ground. Id. The trench must also be even so both sides of the framework contact the ground at the same time.
when lowered (i.e., the same height) and the bin does not tilt, tip over, or get stuck. *Id.* The trench depth would need to account for the compression of the ground under the load of the bin. *Id.* Such considerations would require additional time, expertise, and/or labor on the part of the workers, decreasing efficiency and increasing costs of the operation. *Id.*

A POSITA would have recognized that many of the drawbacks of the trench technique could be alleviated by using a known height-adjustable wheel assembly for a semi-trailer in place of Haskins’s fixed wheel assembly. *Id., ¶150.* A height-adjustable wheel assembly would improve Haskins in several ways, including: (1) reducing or eliminating the requirement for digging a trench, (2) when a trench is needed, reducing the precision, depth, and evenness required, and (3) providing finer control for positioning the bin in the desired location. *Id.*

Regarding the first benefit, a height-adjustable wheel assembly would enable a worker to lower the framework of Haskins’ bin to the ground without needing to dig a large trench. *Id., ¶151.* Haskins explains that the trench “provide[s] a recess for the reception of the wheels 15 and the lower end of the boot 32, which protrudes below the intended ground line of the apparatus when the tank is erected.” *Id., EX1006, 4:31-37.* With adjustable wheel height, the framework could be brought to the ground with only a small recess for the lower end of the boot. EX1003, ¶151.
This recess could be much smaller than a recess accommodating both the boot and
the wheels, reducing setup time. Id.

Adjustable wheels would also avoid the need for a precise, even trench. Id., ¶152. With fixed wheels, the depth and contour of the trench dictates when and
where the framework touches the ground. Id. Thus, the trench must be deep and even
enough that the wheels contact the ground at the same height. Otherwise, the bin
would tilt, or even tip over, when raised. Id. By contrast, with adjustable wheels, the
recess for the boot need not be so even since the boot does not support the bin. Id.

Finally, height-adjustable wheels would provide finer control when placing
the bin. Id., ¶153. In Haskins, a worker wishing to raise the bin in a specific location
first needs to prepare the ground and back the bin into the trench. Id. If the recess
does not have the right depth and location, the worker would then need to pull the
bin out of the trench, readjust the ground, and then push the bin back into the trench.
Id. Getting it right may take several attempts. Id. But with a height-adjustable wheel
assembly, the worker could position the bin first and then lower it while checking to
ensure proper positioning. Id. If the framework did not rest flat, the worker could
raise the framework and adjust the ground height at the points the framework
contacted the ground, using blocks of wood for example. Id.

At least some of the benefits described above can be visualized in a modified
version of FIG. 3 of Haskins, provided below. Id., ¶154. In this modified drawing,
the wheels have been partially retracted to reflect the operation of the incorporated height-adjustable wheel assembly. *Id.* Additionally, Haskins’ trench has been replaced with uneven ground that nonetheless accommodates the boot 32. *Id.* Without height-adjustable wheels, such ground would be unusable without further modification. *Id.* But with height-adjustable wheels, the framework portions 11 contact the ground despite an uneven recess for the boot, all without the need for Haskins’ trench. *Id.*

![Haskins, FIG. 3* (modified with height-adjustable wheels)](image)

Accordingly, a POSITA would have been motivated to add Grotte’s wheel assembly to Haskins’ bin to address the various drawbacks associated with Haskins’ trench technique. *Id.*
The Supreme Court’s KSR factors also support that this combination would have been obvious. Regarding the first factor—teaching, suggestion, or motivation—Grotte explains that the height-adjustable wheel assemblies provide various benefits for positioning a storage module on “irregular” ground. *Id.*, ¶155. For example, “the cylinders 45 on each side of the frame” can be “independently controlled from a separate valve so that the frame assembly can be leveled from side to side,” EX1008, 4:15-24, but those valves can be “closed to hold the machine stable when raising or lowering a silo,” *id.*, 4:25-27. *See also id.*, 4:54-5:8 (explaining the leveling operation). After explaining the operation of the adjustable-height wheel assemblies, Grotte concludes that “each of the sets of wheels 40 is capable of accommodating irregularities of the ground” as well as providing steering functionality. *Id.*, 6:19-24. These benefits would provide a direct motivation for a POSITA to modify Haskins to incorporate Grotte’s wheel assembly. EX1003, ¶155

Regarding the remaining factors, the combination would entail substituting one prior-art element for another, using conventional parts, between similar devices that operate in the same way. EX1003, ¶156. Grotte explains, for example, that its “wheel support assemblies 40 can be conventionally made, and the individual wheels 49 … are mounted onto a suitable axle with bearings in a conventional manner, and include internal brake drums.” EX1008, 4:28-33 (emphases added). Further, the “wheels are commercially available.” *Id.*, 4:33. A POSITA would have had no
trouble sourcing and assembling such conventional mechanical components.

EX1003, ¶156.

Installing Grotte’s wheel assembly to the framework of Haskins would entail known techniques applied to known, similar devices that operate in the same way. EX1003, ¶157. Grotte and Haskins disclose similar towable frameworks that move a large storage tank from a horizontal position to a vertical position using built-in hydraulic actuators. *Id.*; EX1006, 3:40-57, FIG. 1; EX1008, 3:24-37, 4:1-8, 10:14-34, FIG. 1; EX1003, ¶157. Additionally, Grotte’s wheel assembly is configured to bear similar weights and forces to those borne by the bin of Haskins. EX1003, ¶157. Grotte explains how the weight of the silo mover machine is supported by the wheel assembly and its associated components, EX1008, 4:49-58, just as Haskins’ framework supports the tank, EX1006, 2:30-69. Additionally, Grotte’s wheel assembly is configured to be used with a conventional semi-trailer just like Haskins’ wheel assembly 15. Compare EX1006, 2:35-36 with EX1008, 2:7-8, 3:24-25, 3:39-40.

Given the similarity between the machines and applications disclosed by Haskins and Grotte, a POSITA would have recognized that Haskins’ wheel assembly could be substituted with Grotte’s wheel assembly with a reasonable expectation of success, and that the resulting system would work as expected. EX1003, ¶157. That is, the wheel assembly itself would raise and lower in the same manner described by
Grotte, at least because the relevant components responsible for such movement could be installed on the framework of Haskins using only ordinary skill. *Id.* With the wheel assembly of Grotte installed, Haskins’ bin would provide control over “the height of the main frame,” as disclosed by Grotte. *Id.*; EX1008, 3:60-64.

2. [10.2] “the wheeled portion configured to engage the ground in the first position for transportation, the wheeled portion configured to retract from the ground in the second position to facilitate engagement of the ground by the bearing surface portion”

The combination described with respect to element [10.1] would have a wheeled portion configured to engage the ground in the first position for transportation, and retract from the ground in the second position, to facilitate engagement of the ground by the bearing surface portion, as claimed. EX1003, ¶158.

The wheel assembly of Grotte engages the ground in a first position for transportation. *Id.* Grotte shows this in FIG. 2, where the wheels 40 contact the ground and the silo mover is attached to a semitrailer tractor:

![Fig. 2](image-url)
This configuration matches the “horizontal transport position” of Haskins, in which the bin’s framework is “mounted on a pair of wheels” such that the bin may be “pulled by a tractor” with the weight of the framework “distributed between the forward hitch and the rear mounted wheels 15.” *Id.*; EX1006, 2:30-43.

The wheeled portion of Grotte, applied to Haskins, would retract from the ground in a second position. EX1003, ¶159. As explained with respect to element [8.2], the bin of Haskins includes a bearing surface for support against the ground during operation. *Id.*; EX1006, 4:31-40; *supra* Section VI.E.2. With the bearing surface contacting the ground, further actuation of the height-adjustable wheels would necessarily retract them from the ground. EX1003, ¶159. This is because the wheel assembly of Grotte controls “the height of the main frame,” EX1008, 3:60-64, which alters the distance between the wheels and the frame. *Id.* For example, lowering the frame reduces the distance between the wheels and frame. *Id.* Applying this same operation to Haskins, with the bearing surface(s) resting on the ground, would retract the wheels from the ground. *Id.* With the wheels retracted from the ground, additional weight would be placed on the bearing surface(s) in contact with the ground, facilitating engagement of the ground by the bearing surface, as claimed. *Id.*
VIII. MANDATORY NOTICES

A. Real party-in-interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioner Sand Revolution II, LLC certifies that Sand Revolution LLC and Sand Revolution II, LLC are the real parties-in-interest in this proceeding.

B. Related matters

C. Lead and back-up counsel and service information

Petitioner identifies the following lead and back-up counsel:

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<td><a href="mailto:james.stein@leehayes.com">james.stein@leehayes.com</a></td>
<td>Atlanta, GA 30338</td>
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<td></td>
<td>Phone: 404.353.1628</td>
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<td><a href="mailto:armon@cmblaw.com">armon@cmblaw.com</a></td>
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<td><a href="mailto:brannon@cmblaw.com">brannon@cmblaw.com</a></td>
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<td></td>
<td><a href="mailto:leonard@cmblaw.com">leonard@cmblaw.com</a></td>
</tr>
</tbody>
</table>

Petitioner consents to e-mail service at the email addresses listed above.

IX. CONCLUSION

For the foregoing reasons, Petitioner request cancellation of the challenged claims as unpatentable.

Date: July 25, 2019

Respectfully Submitted,

/James D. Stein/
James D. Stein (Reg. No. 63,872)
CERTIFICATION OF WORD COUNT

This undersigned certifies, pursuant to 37 C.F.R. § 42.24, that the foregoing Petition for Inter Partes Review, excluding any table of contents, mandatory notices under 37 C.F.R. § 42.8, certificates of service or word count, or appendix of exhibits, contains 13,990 words according to the word-processing program used to prepare this document (Microsoft Word).

Date: July 25, 2019

Respectfully Submitted,

/James D. Stein/
James D. Stein (Reg. No. 63,872)
CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing Petition for Inter Partes Review, the associated Power of Attorney, and Exhibits 1001-1011 are being served on July 25, 2019 by Express Mail at the following address of record for the subject patent.

A. Justin Poplin
LATHROP GAGE LLP
10851 Mastin Boulevard
Building 82, Suite 1000
Overland Park, KS 66210-1669

A courtesy copy of the same documents is also being served on July 25, 2019 by Express Mail at the following addresses of record for litigation counsel of the Patent Owner in the related matter:

Andrew Harper Estes
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Midland, TX 79701

/James D. Stein/
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