UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

J&M MANUFACTURING CO., INC.,
Petitioner

v.

UNVERFERTH MANUFACTURING CO., INC.,
Patent Owner

U.S. Patent No. 6,176,504

J&M MANUFACTURING CO., INC.'S PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 6,176,504 UNDER 37 C.F.R. § 42.100 *et seq.*

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EXHIBIT LIST

Exhibit	Reference
1001	U.S. Patent No. 6,176,504 to Van Mill *et al.*
1002	U.S. Patent No. 1,741,873 to Nordine
1003	U.S. Patent No. 2,373,398 to Hoobler
1004	U.S. Patent No. 1,731,557 to Wright
1005	English Translation of German Patent Application Publication No. 3046054 to Gobel, Certification of Accuracy, and Original German Publication
1006	English Translation of Japanese Patent Application Publication No. S60-104468 to Kataue *et al.*, Certification of Accuracy, and Original Japanese Publication
1007	"The Brent Grain Train" Brochure, published in 1995 by Unverferth Manufacturing Company, Inc.
1008	"Gravity Wagons" Brochure, published in 1996 by Parker Industries
1009	"High-Value Grain Deserves A High-Quality Ride" Brochure, published in 1996 by Unverferth Manufacturing Company, Inc.
1010	"Model 555, Model 655: Grain Transport" Brochure, published in 1997 by Killbros
1011	"Model 390: Partitioned Gravity Grain Box" Brochure, published in 1997 by Killbros
1012	"Unverferth GB-335: The Bulk Material Handling Specialist" Brochure, published in 1997 by Unverferth Manufacturing Company, Inc.
1013	Prosecution History for U.S. Patent No. 6,176,504

1014	Declaration of Albert Karvelis Ph.D., P.E.

I. STATEMENT OF THE PRECISE RELIEF REQUESTED

Petitioner J&M Manufacturing Co., Inc. ("Petitioner" or "J&M") respectfully requests that the United States Patent and Trademark Office ("USPTO" or "Office") institute *inter partes* review under 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42.100 *et seq.*, and cancel claims 1, 2, and 5 of U.S. Patent No. 6,176,504 (Ex. 1001, "the '504 patent"), as being invalid under 35 U.S.C. §§ 102 and/or 103 (Pre-AIA) based on the grounds set forth in Section VI.C, *infra*.

II. INTRODUCTION

As noted in the '504 patent, "[w]agons are a traditionally and widely used form of transportation." (Ex. 1001 at col. 1, ll. 16-17). The '504 patent describes and shows many features of conventional wagon structures, admitting that these conventional wagons are in the prior art. The '504 patent explains that a disadvantage of conventional wagons is that steerable wheels are typically mounted close to the wagon frame, and "the proximity of the frame limits the ability of the steerable wheels to pivot, and thereby limits the turning radius of the wagon." (*Id.* at col. 1, ll. 51-55). Therefore, the turning ability of the wagon is limited. (*Id.* at col. 1, l. 55). As such, the objective of the '504 patent is to provide "a wagon having improved turning ability without positioning the steerable wheels farther from the wagon frame." (*Id.* at col. 1, ll. 57-59).

The '504 patent purportedly satisfies this objective by claiming a wagon with improved steering ability achieved by including in each longitudinal frame member, an "inwardly oriented indentation" that allows a corresponding steerable wheel to be turned without interference from the longitudinal frame member. (*See id.* at claim 1). This is the only alleged inventive concept of claim 1 of the '504 patent.[1] The '504 patent discloses all of the other elements of claim 1 as being present in the conventional prior art wagons.

For at least 70 years, vehicle designers have addressed this limited turning problem caused by straight longitudinal frame members by using "inwardly oriented indentations." In other words, the '504 patent states a problem that has been known and solved for decades. As will be discussed below, several prior art references, including references from the 1920's, expressly teach that such "inwardly oriented indentations" are provided for the precise purposes of providing extra space for steerable wheels to turn, allowing for a decreased turning radius, and permitting a sharper turning angle. Clearly, the '504 patent invented nothing. Challenged claims 1, 2, and 5 of the '504 patent are invalid as being anticipated and/or rendered obvious by several prior art references that not only teach each claim element, but also address the exact same problem Patent Owner attempted to address with the exact same solution claimed by the '504 patent. As such,

[1] Claim 1 is the only independent claim.

Petitioner respectfully submits that each of claims 1, 2, and 5 of the '504 patent is invalid based on each of Grounds 1-4 set forth below.

Accordingly, Petitioner requests that the USPTO grant this Petition for *inter partes* review pursuant to 35 U.S.C. § 314(a) because there is more than a "reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged."

III. GROUNDS FOR STANDING

Pursuant to 37 C.F.R. § 42.104(a), Petitioner hereby certifies that the '504 patent for which review is sought is available for *inter partes* review. Specifically: (1) Petitioner is not an owner of the '504 patent (*see* § 42.101); (2) before the date on which the petition for review was filed, Petitioner did not file a civil action challenging the validity of a claim of the '504 patent (*see* § 42.101(a)); (3) Petitioner filed this Petition less than one year after October 23, 2014, the date on which Petitioner was served with a complaint alleging infringement of the '504 patent (*see* § 42.101(b)); and (4) Petitioner is not estopped from challenging the claims on the grounds identified in this Petition (*see* § 42.101(c)).

IV. MANDATORY NOTICES

Pursuant to 37 C.F.R. § 42.8(a)(1), Petitioner provides the following mandatory disclosures.

A. Real Party-in-Interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioner certifies that J&M Manufacturing Co., Inc. is the real party-in-interest.

B. Related Matters

Pursuant to 37 C.F.R. § 42.8(b)(2), Petitioner states that the only known judicial or administrative matter that may affect, or be affected by, a decision in this proceeding is the litigation captioned *Unverferth Mfg. Co., Inc. v. J&M Manufacturing Inc.*, Case No. 3:14-cv-03062 (N.D. Iowa) (asserting infringement of the '504 patent).

C. Lead and Back-Up Counsel

Pursuant to 37 C.F.R. § 42.8(b)(3), Petitioner provides the following designation of counsel:

	Lead Counsel	**Back-Up Counsel**	**Back-Up Counsel**
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D. Service Information

Pursuant to 37 C.F.R. § 42.8(b)(4), papers concerning this matter should be served on J. Robert Chambers, P. Andrew Blatt, and/or Lisa M. A. Nolan to the email(s) and/or address provided above.

V. PAYMENT OF FEES

The fee required by 37 C.F.R. § 42.15(a) for this Petition for *inter partes* review is being submitted herewith. The undersigned further authorizes that any underpayment be charged, any overpayment credited, or payment for any additional fees that might be due in connection with this Petition to be charged to Deposit Account No. 23-3000.

VI. IDENTIFICATION OF CHALLENGES

A. Claims for Which *Inter Partes* Review Is Requested

Petitioner requests *inter partes* review and cancellation of each of claims 1, 2, and 5 of the '504 patent.

B. Identification of Prior Art

The following patents, upon which Petitioner's grounds of invalidity are based, are prior art under 35 U.S.C. § 102(b): U.S. Patent No. 1,741,873 to Nordine (Ex. 1002; "Nordine"), which issued on December 31, 1929; U.S. Patent No. 2,373,398 to Hoobler (Ex. 1003; "Hoobler"), which issued on April 10, 1945;

and the admitted background art disclosed in the '504 patent (Ex. 1001; "Admitted Prior Art Wagons"). *See, e.g., Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1570 (Fed. Cir. 1988) ("A statement in a patent that something is in the prior art is binding on the applicant and patentee for determinations of anticipation and obviousness."); *Tokyo Keiso Co., Ltd. v. SMC Corp.*, 307 Fed. Appx. 446, 451 (Fed. Cir. 2009).

In addition to the prior art upon which Petitioner's grounds of invalidity are based, the following prior art also discloses "inwardly oriented indentations" in longitudinal frame members and qualifies as prior art under 35 U.S.C. § 102(b): U.S. Patent No. 1,731,557 to Wright (Ex. 1004; "Wright"), which issued on January 23, 1926; German Patent Application Publication No. 3046054 to Gobel (Ex. 1005; "Gobel"), which published on June 9, 1982; and Japanese Patent Application Publication No. S60-104468 to Kataue *et al*. (Ex. 1006; "Kataue"), which published on June 8, 1985.

Further, the following prior art publications under 35 U.S.C. § 102(b) show wagons of the type described in the Admitted Prior Art of the '504 patent: Unverferth "The Brent Grain Train" Brochure (Ex. 1007), which published in 1995; Parker "Gravity Wagons" Brochure (Ex. 1008), which published in 1996; Unverferth "High-Value Grain Deserves A High-Quality Ride" Brochure (Ex. 1009), which published in 1996; Killbros "Model 555, Model 655: Grain

Transport" Brochure (Ex. 1010), which published in 1997; Killbros "Model 390: Partitioned Gravity Grain Box" Brochure (Ex. 1011), which published in 1997; and Unverferth "GB-335: The Bulk Material Handling Specialist" Brochure (Ex. 1012), which published in 1997.

C. Identification of Statutory Grounds

Petitioner asserts that the challenged claims are unpatentable based upon the following grounds:

1. Claims 1, 2, and 5 are anticipated under 35 U.S.C. § 102(b) by Nordine.

2. Claims 1, 2, and 5 are anticipated under 35 U.S.C. § 102(b) by Hoobler.

3. Claims 1, 2, and 5 are obvious under 35 U.S.C. § 103(a) over the Admitted Prior Art Wagons in view of Nordine.

4. Claims 1, 2, and 5 are obvious under 35 U.S.C. § 103(a) over the Admitted Prior Art Wagons in view of Hoobler.

D. How the Challenged Claims Are to Be Construed

For purposes of *inter partes* review, a claim is interpreted by applying its "broadest reasonable construction in light of the specification of the patent in which it appears." 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1430 (Fed. Cir. 2015); Office Patent Trial Practice Guide, 77 Fed. Reg.

48,756, 48,766 (Aug. 14, 2012). Claim terms are given their ordinary and customary meanings as understood by a person of ordinary skill in the art,[2] unless that meaning is inconsistent with the specification. *E.g.*, *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007); *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (In interpreting the claims, there is a "'heavy presumption'" that a claim term carries its ordinary and customary meaning.).

Solely for this proceeding,[3] Petitioner submits that the broadest reasonable interpretation of the term "inwardly oriented indentation" of claim 1 means "an inward displacement." (*See* Ex. 1001, Figs. 2, 4; Abstract; col. 2, ll. 10-11, 41-49;

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[2] At the time of the invention of the '504 patent, a person having ordinary skill in the art would have had a bachelor's degree in mechanical engineering or a similar technical field and a couple of years experience designing mechanical equipment, or 5-10 years of experience designing wagons. (Declaration of Albert Karvelis Ph.D, P.E., Ex. 1014 at ¶ 45).

[3] Claim terms are interpreted under different standards in district court proceedings. Accordingly, the claim constructions presented in this Petition or ultimately adopted in the *inter partes* review may differ from those presented or adopted in the litigation listed in Section IV.B. Petitioner reserves the right to assert claim constructions different from those of the present Petition and *inter partes* review in district court litigation.

col. 3, ll. 14-19; claims 1, 3, 5, 6). Petitioner submits that all other terms of the challenged claims should be given their ordinary meaning.

Petitioner has noted in footnotes in this Petition that several claim terms in the '504 patent are indefinite under 35 U.S.C. § 112. To the extent that those claim terms may be understood, each of those claim terms should also be given its ordinary meaning.

VII. SUMMARY OF THE '504 PATENT AND ITS PROSECUTION HISTORY

A. Background of the '504 Patent

The '504 patent is titled "Short Steer Wagon." (Ex. 1001). The Background of the Invention section ("Background") describes conventional wagons that were in the prior art at the time the '504 patent was filed. These conventional wagons described in the Background of the '504 patent are referred to as "Admitted Prior Art Wagons." The Background explains: "Wagons are a traditionally and widely used form of transportation. Wagons are used to carry a wide variety of goods, including grains, livestock, dry goods, persons, liquids, machinery, etc." (Ex. 1001 at col. 1, ll. 16-19). The Background of the '504 patent further explains:

> Wagons in their most basic form include a tongue, a frame, at least one pair of wheels, and a bed, box, or tank for hauling cargo. The tongue of the wagon may be connected to a vehicle, such as, for example, a tractor, truck, pickup harvester, or other self-propelled

machine. A variety of wheels may be used, depending on the intended use.

A common variation is the four-wheeled wagon, having pairs of wheels at either end of the wagon. The extra pair of wheels contribute [sic] to stability of the wagon and may also increase the load-carrying capacity. In a four-wheeled wagon, generally one pair of steerable wheels is capable of being pivoted in unison so that the wagon may be turned. The turning action is controlled by the tongue, which pivots the steerable wheels (i.e., the front wheels) by means of a steering rod or rods which connect the tongue to each steerable wheel. As the tongue is displaced to either side of a center position, both steerable wheels are therefore pivoted.

In a conventional wagon construction, a frame is employed upon which the pairs of wheels are mounted. The tongue is pivotally attached to the front of the frame and connected to the steerable wheels through a steering linkage. The wheels and corresponding axles extend beyond the frame, but are positioned relatively near to the frame. This is because if the wheels extended far beyond the frame, excessive bending loads would be imposed on the axles, with possible breakage occurring as a result of heavy loads or due to traveling over rough roads or rough ground. Conventional wagon designs therefore have a frame positioned generally within about one-half of the wheel diameter from the wheel.

(*Id.* at col. 1, ll. 20-50). Fig. 1 of the '504 patent depicts the undercarriage of an Admitted Prior Art Wagon. (*Id.* at col. 2, ll. 21-22, 34).

The trade publications attached as Exhibits 1007-1012 are examples of conventional wagons that were on sale before the priority date of the '504 patent.[4] (Ex. 1014 at ¶ 13). The wagons disclosed in Exhibits 1007-1012 are representative of the Admitted Prior Art Wagons described in the Background of the '504 patent. (*See id.* at ¶¶ 14-19).

The Background of the '504 patent explains that conventional wagons typically have "a frame positioned generally within about one-half of the wheel diameter from the wheel." (Ex. 1001 at col. 1, ll. 48-50). However, the '504 patent recognizes that a drawback of a steerable wheel mounted close to the wagon frame is that the turning radius is limited by contact between the steerable wheels and the longitudinal frame members. (*Id.* at col. 1, ll. 52-54 ("The proximity of the frame limits the ability of the steerable wheels to pivot, and thereby limits the turning radius of the wagon."); *see also* Ex. 1014 at ¶ 27). This interference point geometrically limits the maximum steering angle. (Ex. 1014 at ¶ 27).

B. The Alleged Invention of the '504 Patent

The '504 patent purportedly solves the problem of limited turning ability by providing indentations in the longitudinal frame members that allow corresponding

[4] All of these publications show wagons that were manufactured by Petitioner or companies that are now brands under the Unverferth family of products. *See* www.unverferth.com (last accessed Oct. 19, 2015).

steerable wheels to be turned without the turning radius being so limited. (*See* Ex. 1001 at Abstract; Summary of the Invention; claim 1). Claims 1, 2, and 5 of the '504 patent are set forth below:

> **Claim 1**. A wagon having two opposed ends and two opposed sides extending between the opposed ends, the wagon further comprising:
>
> a pair of wheels at each of said opposed ends;
>
> a frame having at least one longitudinal frame member
>
> a tongue having a rear portion connected to a frame[5] of said wagon and having a front portion adapted for connection to a vehicle;
>
> at least one said pair of wheels being steerable to right and left sides and connected to a rear portion of said tongue for steering with said tongue, with a wheel having a leading edge facing toward an end of said wagon and a trailing edge facing toward a central portion of said wagon;
>
> said wagon having a longitudinal frame member[6] on each side, each longitudinal frame member having an outer edge portion on an intermediate portion[7] of said longitudinal frame member;
>
> said steerable wheels being completely outside said longitudinal frame members when said steerable wheels are oriented in a straight running direction; and

[5] The second instance of the claim term "a frame" is indefinite.

[6] The recitation of the claim term "a longitudinal frame member" following the recitation of "at least one longitudinal frame member" is indefinite.

[7] The claim term "intermediate portion" is indefinite.

each longitudinal frame member including an inwardly oriented indentation adjacent said trailing edge of each corresponding steerable wheel, each said indentation allowing said corresponding steerable wheel to be turned so that said trailing edge of said corresponding steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.

Claim 2. The wagon of claim 1, wherein a lateral frame member extends across each end of said wagon, with said lateral frame member being positioned adjacent to said leading edge of said steerable wheel[8] wherein said steerable wheel can be turned so that said leading edge of said steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.

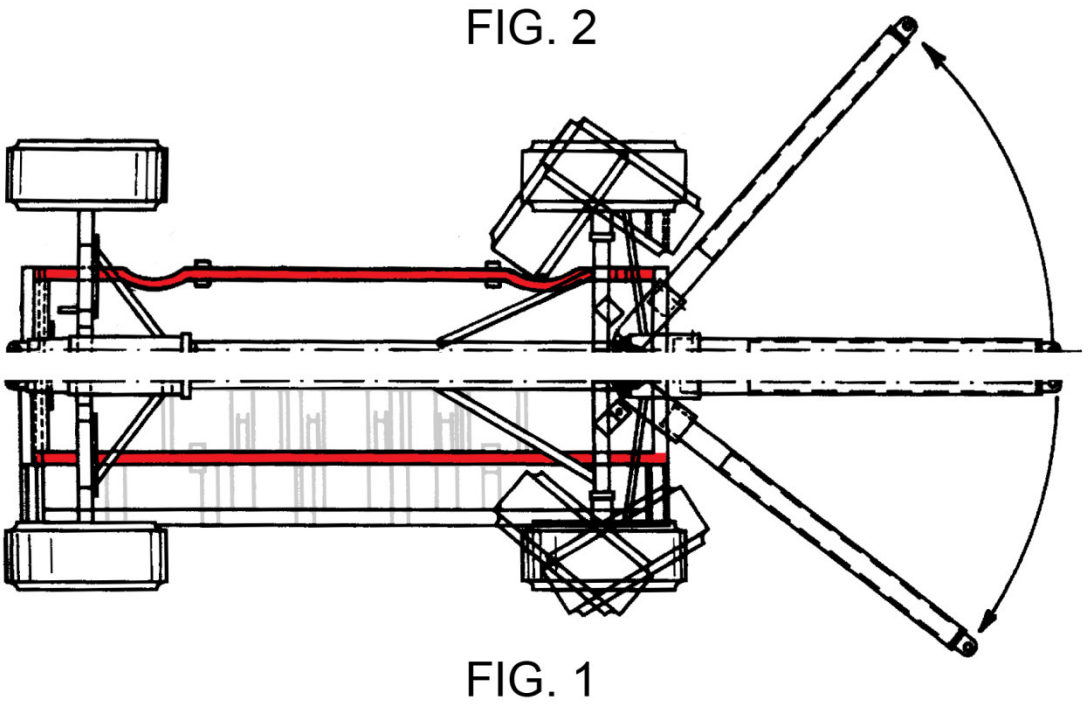
Claim 5. The wagon of claim 1, wherein said indentations permit a greater turning angle for said pair of wheels than would be obtainable without said indentations.

(Ex. 1001 at col. 3, l. 29 – col. 4, l. 34).

It is clear that the indentations in the longitudinal frame members are the sole inventive concept of claim 1 of the '504 patent. (Ex. 1014 at ¶ 28). This is evidenced by the below comparison of the lower half of Fig. 1, which shows an

[8] The claim terms "*a* lateral frame member extends across *each* end of said wagon, with *said* lateral frame member . . ." (emphasis added) are indefinite.

Admitted Prior Art Wagon (*id.* at col. 2, ll. 20-21, 34-37), to the upper half of Fig. 2, which shows an embodiment of the claimed invention (*id.* at col. 2, ll. 22-25). (Ex. 1014 at ¶ 28). The longitudinal frame member of each figure is highlighted in red.



(Ex. 1001 at Figs. 1 and 2 (modified for comparison)).[9]

While the Admitted Prior Art Wagon of Fig. 1 includes depictions of lateral cross members and Fig. 2 does not, it is strikingly apparent from the

[9] Figs. 1 and 2 were edited for this comparison. Fig. 1 was flipped 180° to the same orientation as Fig. 2. All reference numerals and leader lines were removed from both figures. A portion of the bed framing in Fig. 1 was grayed out. (Ex. 1014 at ¶ 28, n.7).

comparison of the two Figs. that the sole inventive aspect of the wagon structure claimed in the '504 patent is the indentations 209 shown in Fig. 2.[10] (Ex. 1014 at ¶ 28). In fact, a comparison of Figs. 1 and 2 to claim 1 reveals that both figures include all but the final element of claim 1. (*See* Ex. 1014 at ¶ 30). In other words, the only claim element that is missing from the Admitted Prior Art Wagon shown in Fig. 1 is:

> [E]ach longitudinal frame member including *an inwardly oriented indentation* adjacent said trailing edge of each corresponding steerable wheel, each said indentation allowing said corresponding steerable wheel to be turned so that said trailing edge of said corresponding steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.

(Ex. 1001 at col. 4, ll. 4-12 (emphasis added); *see also* Ex. 1014 at ¶ 30).

C. Prosecution History

Application Serial No. 09/399,099 ("the '099 application"), which issued as the '504 patent, was filed on September 20, 1999, claiming priority to Provisional

[10] While the '504 patent states that it is directed to wagons generally, the disclosure is actually limited to wagon undercarriages. (*See generally* Ex. 1001). For example, the claims and Detailed Description of the Preferred Embodiments do not discuss any container portion of the wagons. (*See generally id.*). Moreover, the figures only show the undercarriage. (*See id.* at Figs. 1-4).

Application No. 60/101,950, which was filed on September 25, 1998. (*See* Ex. 1001).

The Examiner allowed the '099 application without issuing an Office Action. (*See generally* Prosecution History for the '504 patent, Ex. 1013). A telephonic Examiner Interview was conducted on September 19, 2000, during which the Examiner and a representative for Applicant Unverferth discussed prior art reference British Patent No. 2,300,839 to Wheeler ("Wheeler") and suggested claim amendments that were then reflected in an Examiner Amendment. (*Id.* at 30). The Examiner Amendment to claim 1 consisted of the addition of the phrase "a frame having at least one longitudinal frame member," amending "connected to a rear portion of a corresponding tongue for steering" to "connected to a rear portion of said tongue for steering with said tongue," and amending "an intermediate portion of said longitudinal member" to "an intermediate portion of said longitudinal frame member." (*Id.* at 32; *see also id.* at 18 (emphasis added)). Following the Examiner Interview, the Examiner issued a Notice of Allowability. (*See id.* at 31). As his Statement of Reasons for Allowance, the Examiner stated: "The limitation of a [sic] << wheels…connected to a …tongue for steering with said tongue >> of lines 7 – 9, together with the remaining limitations in claim 1; has not been found in the art." (*Id.* at 32). The '504 patent issued on January 23, 2001. (*See* Ex. 1001).

None of the patents and publications upon which Petitioner's grounds of invalidity are based (nor any of the other prior art identified in Section VI.B, *supra*) were of record during prosecution of the '504 patent. All of the references cited by Petitioner are stronger than the Wheeler reference that was discussed during the Examiner Interview. (Ex. 1014 at ¶ 33).

VIII. UNPATENTABILITY ARGUMENTS

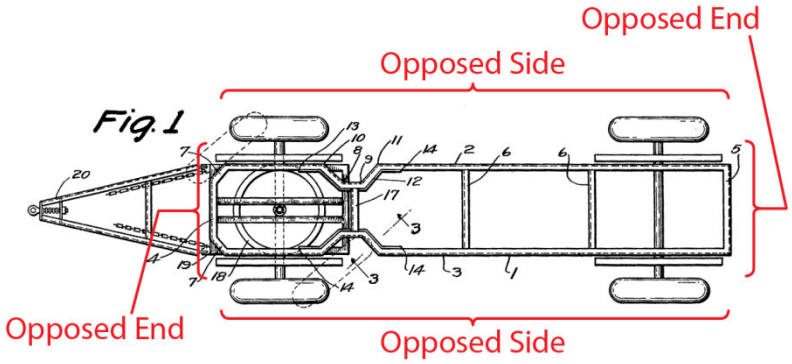
As explained above, the sole alleged inventive concept of the '504 patent is indented longitudinal frame members. (Ex. 1014 at ¶ 28). And as will be explained in greater detail below, it was known for at least 70 years before the priority date of the '504 patent that improved turning capability could be achieved by indenting the longitudinal frame members so that the original interference point is displaced inwardly, thus permitting a greater turning angle and, consequently, a comparatively smaller minimum turning radius. (*Id.* at ¶ 27). For the reasons set forth below, it is more than reasonably likely that each of claims 1, 2, and 5 is rendered invalid based on each of the asserted Grounds 1-4.

A. Ground 1 — Claims 1, 2, and 5 Are Anticipated by Nordine

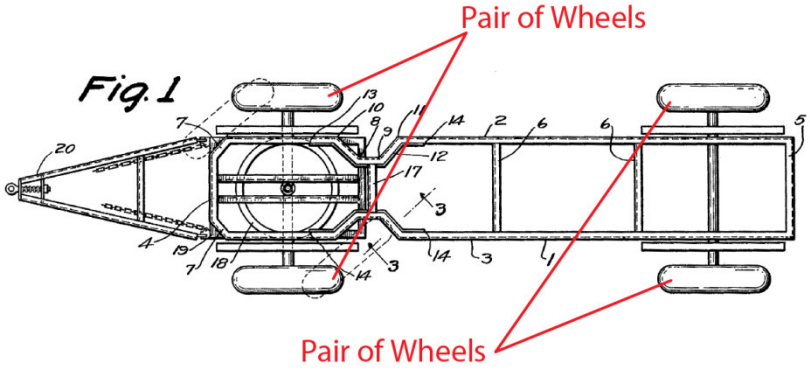
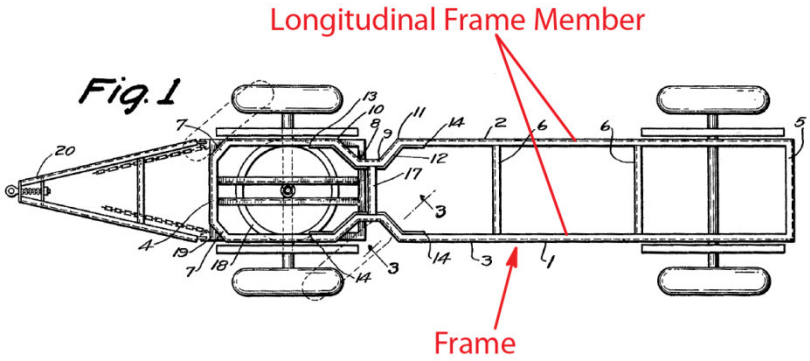
There is a reasonable likelihood that claims 1, 2, and 5 are anticipated and rendered invalid by Nordine for at least the reasons set forth below. Nordine issued December 31, 1929. (Ex. 1002). Nordine is directed to "a frame for trailers or the like which is provided with indentations in the sides thereof into which the

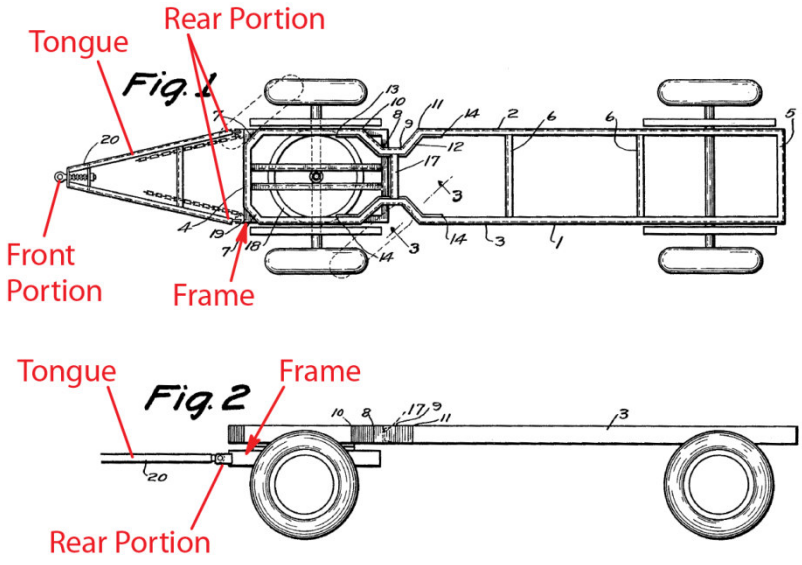
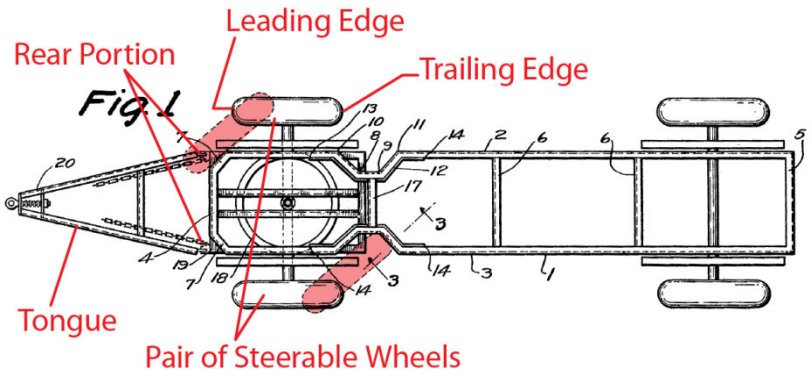
front wheels may extend when turning on a short radius."[11] (*Id.* at pg. 1, ll. 1-5; *see also* pg. 1, ll. 17-19). Due to the indentations in the side frame members of Nordine, the points where the wheels would interfere with the frame members are displaced inwardly. (Ex. 1014 at ¶ 51; *see* Ex. 1002 at pg. 1, ll. 74-80). The indentations permit a greater turning angle and produce a comparatively smaller minimum turning radius such that Nordine has an improved turning capability over conventional "trailers or the like." (Ex. 1014 at ¶ 51.)

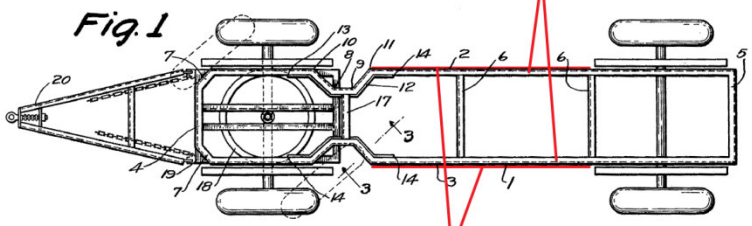
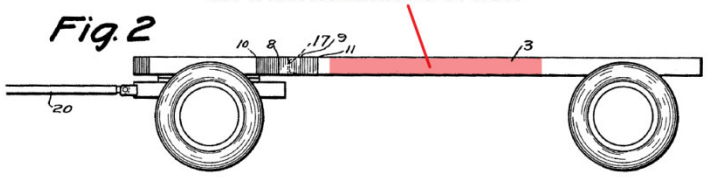
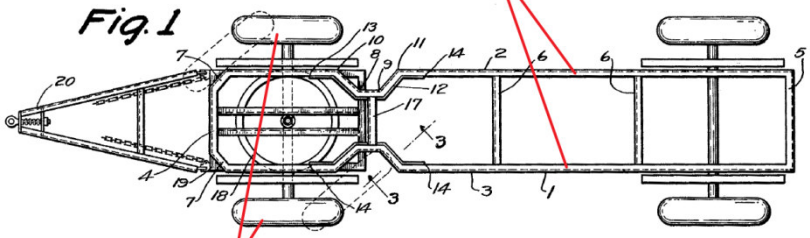
The following claim chart demonstrates that Nordine discloses each and every element of claim 1:

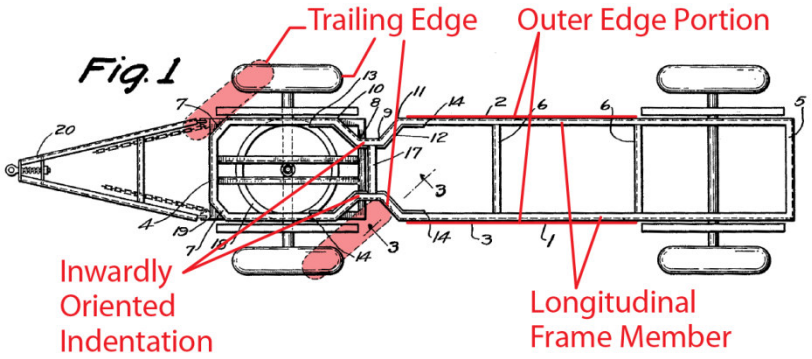
'504 Patent	**Nordine**
1. A wagon having two opposed ends and two opposed sides extending between the opposed ends, the wagon further comprising:	Ex. 1002 at Fig. 1; pg. 1, ll. 1-2, 58-60 ("In the design shown . . . side beams, 2 and 3, tied together at the ends by means 4 and 5 . . ."). 

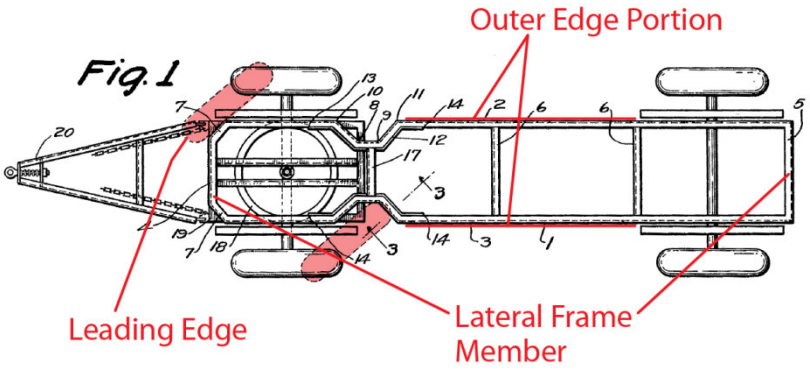
[11] Wagons and trailers are comparable products having similar uses and are within the same field of endeavor. (Ex. 1014 at ¶ 48, n.9).

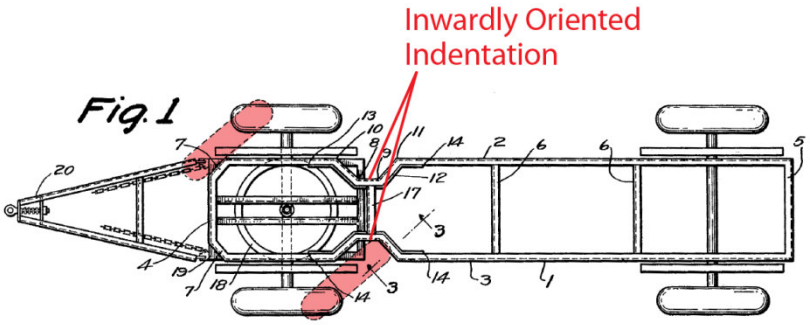
‘504 Patent	Nordine
a pair of wheels at each of said opposed ends;	Ex. 1002 at Fig. 1; pg. 1, ll. 36-37 (“Figure 1 is a plan view of a trailer frame of the four wheel type.”). 
a frame having at least one longitudinal frame member	Ex. 1002 at Fig. 1; pg. 1, ll. 55-59 (“. . . numeral 1 indicates a trailer frame which may be of any suitable type or design and constructed in any suitable manner. In the design shown it is made of channels with side beams, 2 and 3 . . .”). 

‘504 Patent	Nordine
a tongue having a rear portion connected to a frame of said wagon and having a front portion adapted for connection to a vehicle;	Ex. 1002 at Figs. 1 and 2; pg. 2, ll. 21-23 (“. . . the truck 19 may be attached to the rear of a motor truck or to another trailer by a frame 20 . . .”). 
at least one said pair of wheels being steerable to right and left sides and connected to a rear portion of said tongue for steering with said tongue, with a wheel having a leading edge facing toward an end of said wagon and a trailing edge facing toward a central portion of said wagon;	Ex. 1002 at Fig. 1; pg. 1, ll. 1-5 (“The invention is a frame for trailers or the like which is provided with indentations in the sides thereof into which the front wheels may extend when turning on a short radius.”); pg. 2, ll. 25-30. 

‘504 Patent	Nordine
said wagon having a longitudinal frame member on each side, each longitudinal frame member having an outer edge portion on an intermediate portion of said longitudinal frame member;	Ex. 1002 at Figs. 1 and 2; pg. 1, ll. 55-59 (“. . . numeral 1 indicates a trailer frame which may be of any suitable type or design and constructed in any suitable manner. In the design shown it is made of channels with side beams, 2 and 3 . . .”). Longitudinal Frame Member  Outer Edge Portion on an Intermediate Portion 
said steerable wheels being completely outside said longitudinal frame members when said steerable wheels are oriented in a straight running direction; and	Ex. 1002 at Fig. 1. The steerable wheels of Nordine are completely outside the longitudinal frame members when the steerable wheels are oriented in a straight running direction. Longitudinal Frame Member  Steerable Wheels

‘504 Patent	Nordine
each longitudinal frame member including an inwardly oriented indentation adjacent said trailing edge of each corresponding steerable wheel, each said indentation allowing said corresponding steerable wheel to be turned so that said trailing edge of said corresponding steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.	Ex. 1002 at Fig. 1; pg. 1, ll. 74-80 (“The members 2 and 3 are bent inward to the points 8 and 9 between the points 10 and 11. It is understood that these points may be positioned so that the frame will clear a wheel of any suitable design or size and the depth of the indentations may be greater or lesser as may be desired.”); pg. 2, ll. 44-46 (“. . . the said side members provided with indentations to clear the wheels when making a turn at the rear . . .”). 

‘504 Patent	Nordine
2. The wagon of claim 1, wherein a lateral frame member extends across each end of said wagon, with said lateral frame member being positioned adjacent to said leading edge of said steerable wheel wherein said steerable wheel can be turned so that said leading edge of said steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.	Ex. 1002 at Fig. 1; pg. 1, ll. 58-70 (“In the design shown it is made of channels with side beams, 2 and 3, tied together at the ends by means 4 and 5 . . . The side members 2 and 3 are connected to the cross beam 4 at the front by diagonal sections 7 . . . These sections are of sufficient size to clear the side of a wheel as shown in dotted lines in Figure 1.”). With reference to Fig. 1 of Nordine, the forward lateral frame member is positioned adjacent to the leading edge of the right steerable wheel wherein the right steerable wheel is turned so that the leading edge of the right steerable wheel is positioned inwardly with respect to the outer edge portion of the right longitudinal frame member. 

‘504 Patent	Nordine
5. The wagon of claim 1, wherein said indentations permit a greater turning angle for said pair of wheels than would be obtainable without said indentation.	Ex. 1002 at Fig. 1; pg. 1, ll. 6-9 (“The object of the invention is to provide a frame for trailers or the like which is so constructed that the trailer may be turned on a comparatively short radius.”); pg. 1, ll. 74-80 (“The members 2 and 3 are bent inward to the points 8 and 9 between the points 10 and 11. It is understood that these points may be positioned so that the frame will clear a wheel of any suitable design or size and the depth of the indentations may be greater or lesser as may be desired.”); pg. 2, ll. 44-46 (“. . . the said side members provided with indentations to clear the wheels when making a turn at the rear . . .”). 

(Ex. 1014, Appx. 2 at A2-1–A2-7; *see also id.* at ¶¶ 52-54).

As shown above, Nordine teaches each and every element of claims 1, 2, and 5. (*Id.* at ¶ 52). Accordingly, there is a very reasonable likelihood that each of claims 1, 2, and 5 is anticipated by Nordine.

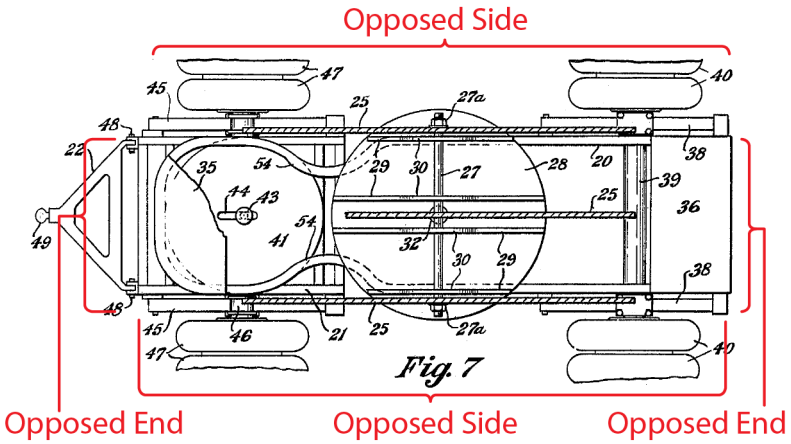
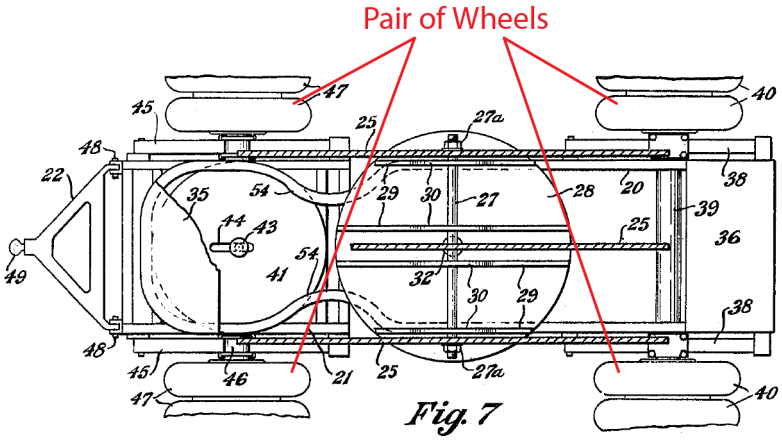
B. Ground 2 — Claims 1, 2, and 5 Are Anticipated by Hoobler

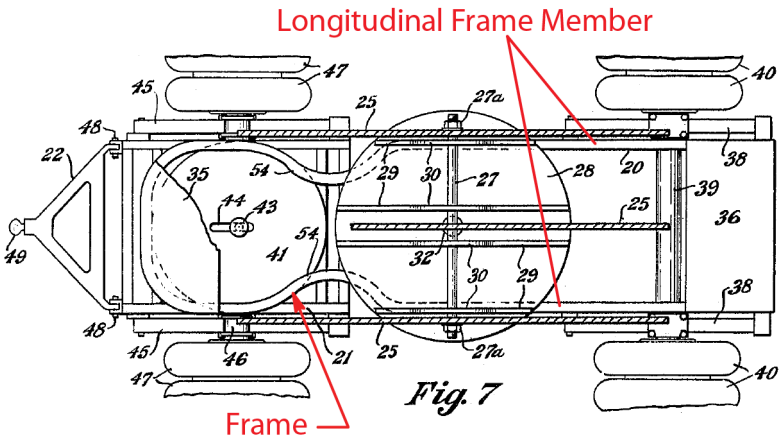
There is a reasonable likelihood that claims 1, 2, and 5 are anticipated by Hoobler for at least the reasons set forth below. Hoobler issued April 10, 1945.

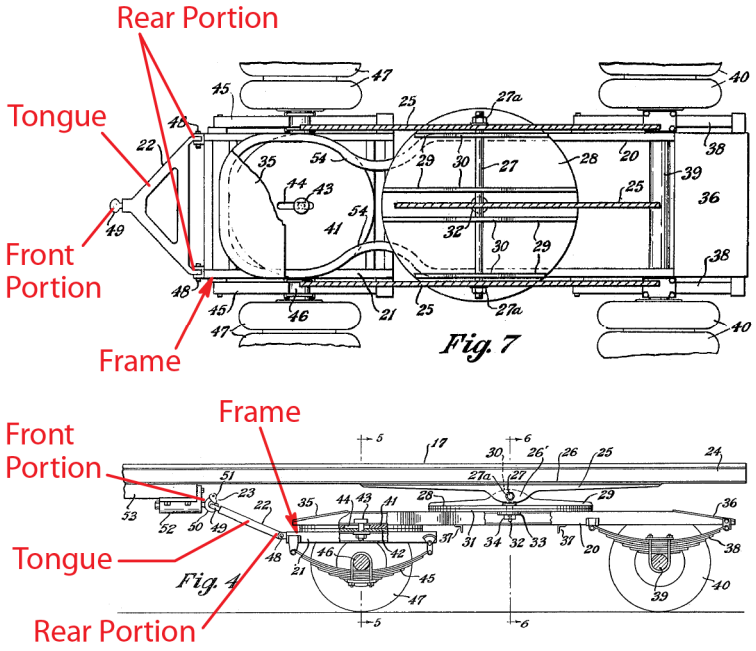
(Ex. 1003). Hoobler is directed, in part, to a trailer vehicle for highway transport.[12] (*Id.* at pg. 1, left col., ll. 1-2). Hoobler identifies steering problems with traditional trailers, especially those with tandem axles. (*Id.* at pg. 1, left col., ll. 38-51). Hoobler achieves steering improvements through a self-aligning mechanism that "provides for making turns on a much smaller radius." (*Id.* at pg. 3, left col., ll. 70-72). The self-aligning mechanism uses a frame that it is "preferably curved or bent inwardly at both sides between the pivot pins 32 and 43, as indicated at 54, to allow sufficient room for turning of the dual wheels." (*Id.* at pg. 3, left col., ll. 8-13; Figs. 7 and 8).

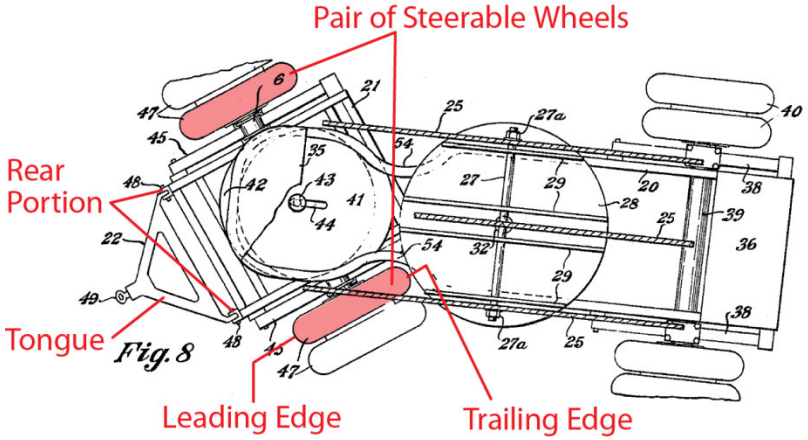
The following claim chart demonstrates that Hoobler discloses each and every element of claims 1, 2, and 5:

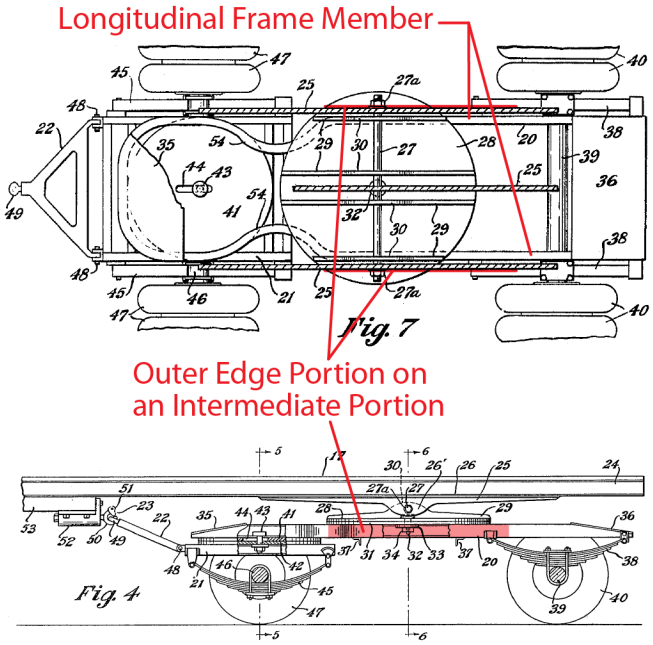
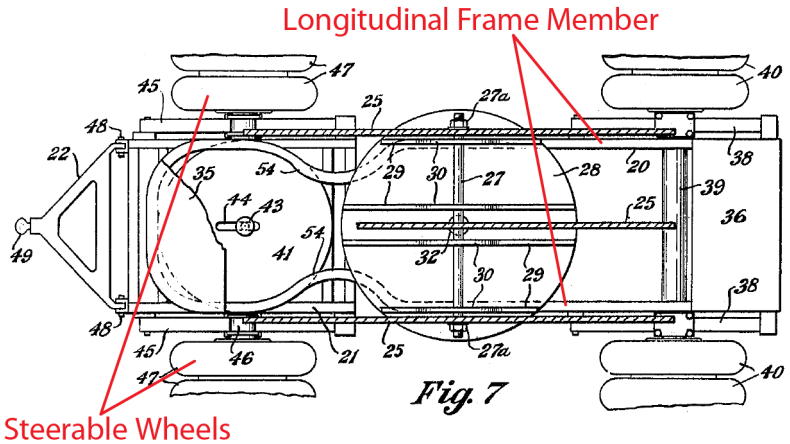
[12] As explained above with respect to Nordine, wagons and trailers are comparable products having similar uses and are within the same field of endeavor. (Ex. 1014 at ¶ 56, n.10).

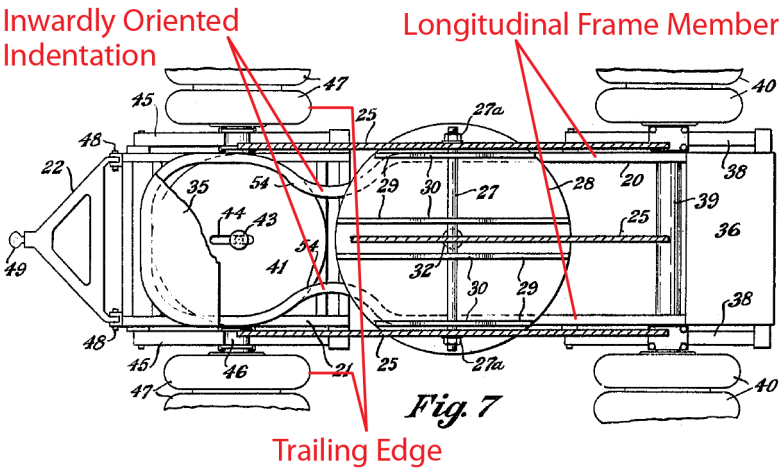
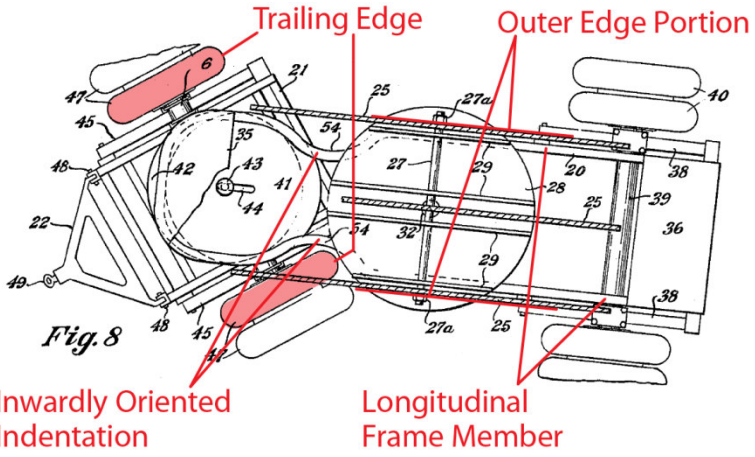
‘504 Patent	Hoobler
1. A wagon having two opposed ends and two opposed sides extending between the opposed ends, the wagon further comprising:	Ex. 1003 at Fig. 7.  Fig. 7
a pair of wheels at each of said opposed ends;	Ex. 1003 at Fig. 7; pg. 2, right col., ll. 34-37, 51-53 (“As shown the rear end of the subframe is . . . on top of an axle 39 mounting dual wheels 40 in a usual fashion.”) (“As shown the dolly frame is supported by leaf springs 45 on an axle 46 carrying dual wheels 47 in a usual fashion, . . .”).  Fig. 7

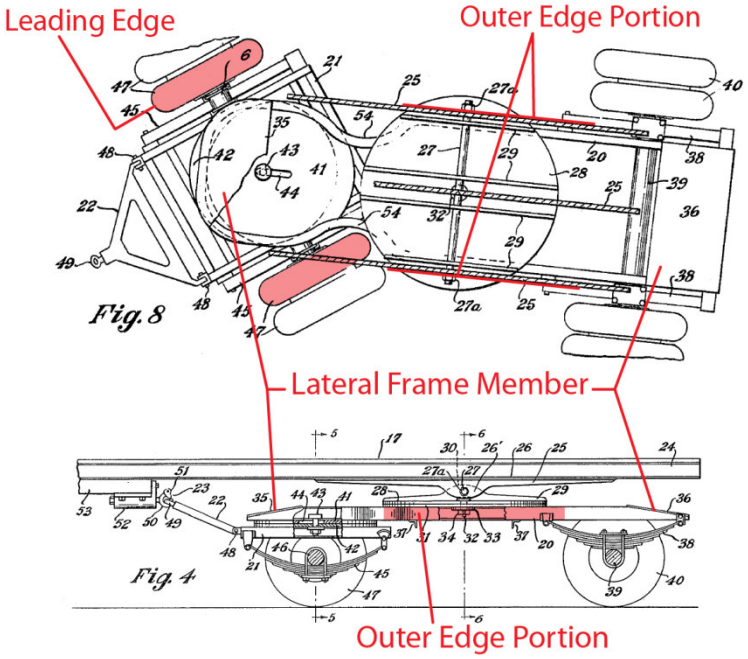
‘504 Patent	Hoobler
a frame having at least one longitudinal frame member	Ex. 1003 at Fig. 7; pg. 2, left col., ll. 49-50 (“The rear end portion of the semi-trailer platform is supported on a subframe indicated at 20 . . .”). 

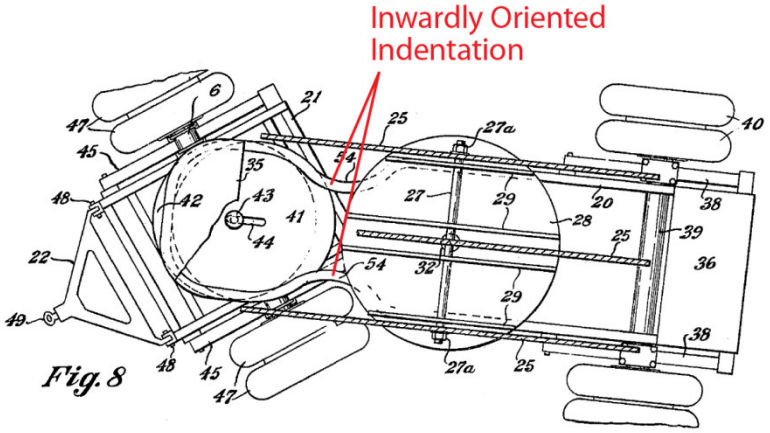
‘504 Patent	Hoobler
a tongue having a rear portion connected to a frame of said wagon and having a front portion adapted for connection to a vehicle;	Ex. 1003 at Figs. 4 and 7; pg. 2, left col., ll. 51-55 (“. . . the front end of the subframe is supported on a dolly frame 21 to the front end of which is pivotally connected a tongue 22 having a towing connection at 23 with the forward portion of the trailer . . .”); pg. 2, right col., ll. 60-63 (“The ring 49 of the tongue is preferably universally connected to the forward portion of the trailer by means of the usual towing connection indicated generally at 23 . . .”). 

‘504 Patent	Hoobler
at least one said pair of wheels being steerable to right and left sides and connected to a rear portion of said tongue for steering with said tongue, with a wheel having a leading edge facing toward an end of said wagon and a trailing edge facing toward a central portion of said wagon;	Ex. 1003 at Fig. 8; pg. 3, left col., ll. 62-69 (“. . . as shown in Figs. 3 and 8, the dolly frame swings about pivot 23, and the pin 43 slides in slot 44, and trailer swings about pivot 32 while the wheels 47 and 40 move into suitable alignment for substantially tracking wheels 13 of the tractor around a curve.”); pg. 4, right col., ll. 11-14 (“. . . rearward of the dolly connecting the sub-frame and frame for towing the sub-frame from the frame, means supporting the front of the subframe on the dolly forward of the said fifth wheel . . .”). 

‘504 Patent	Hoobler
said wagon having a longitudinal frame member on each side, each longitudinal frame member having an outer edge portion on an intermediate portion of said longitudinal frame member;	Ex. 1003 at Figs. 4 and 7; pg. 2, left col., ll. 49-50 (“The rear end portion of the semi-trailer platform is supported on a subframe indicated at 20 . . .”). 
said steerable wheels being completely outside said longitudinal frame members when said steerable wheels are oriented in a straight running direction; and	Ex. 1003 at Fig. 7. 

‘504 Patent	Hoobler
each longitudinal frame member including an inwardly oriented indentation adjacent said trailing edge of each corresponding steerable wheel, each said indentation allowing said corresponding steerable wheel to be turned so that said trailing edge of said corresponding steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.	Ex. 1003 at Figs. 7 and 8; pg. 3, left col., ll. 8-13 (“. . . the frame [20] is preferably curved or bent inwardly at both sides between the pivot pins 32 and 43, as indicated at 54, to allow sufficient room for turning of the dual wheels 47 . . .”).  Fig. 7  Fig. 8

‘504 Patent	Hoobler
2. The wagon of claim 1, wherein a lateral frame member extends across each end of said wagon, with said lateral frame member being positioned adjacent to said leading edge of said steerable wheel wherein said steerable wheel can be turned so that said leading edge of said steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.	Ex. 1003 at Figs. 4 and 8; pg. 2, right col., ll. 27-29 (“The subframe 20 may conveniently be constructed of channels as shown, with transverse plates 35 and 36 . . .”). With reference to Figs. 4, 7, and 8 of Hoobler, the forward lateral frame member is positioned adjacent to the leading edge of the right steerable wheel wherein the right steerable wheel is turned so that the leading edge of the right steerable wheel is positioned inwardly with respect to the outer edge portion of the right longitudinal frame member. 

‘504 Patent	Hoobler
5. The wagon of claim 1, wherein said indentations permit a greater turning angle for said pair of wheels than would be obtainable without said indentation.	Ex. 1003 at Fig. 8; pg. 3, left col., ll. 8-13 (“. . . the frame [20] is preferably curved or bent inwardly at both sides between the pivot pins 32 and 43, as indicated at 54, to allow sufficient room for turning of the dual wheels 47 . . .”). 

(Ex. 1014, Appx. 2 at A2-8–A2-16; *see also id.* at ¶¶ 57-59).

As shown above, Hoobler teaches each and every element of claims 1, 2, and 5. (*Id.* at ¶ 60). Accordingly, there is a very reasonable likelihood that each of claims 1, 2, and 5 is anticipated by Hoobler.

C. Ground 3 — Claims 1, 2, and 5 Are Obvious Over the Admitted Prior Art Wagons in View of Nordine

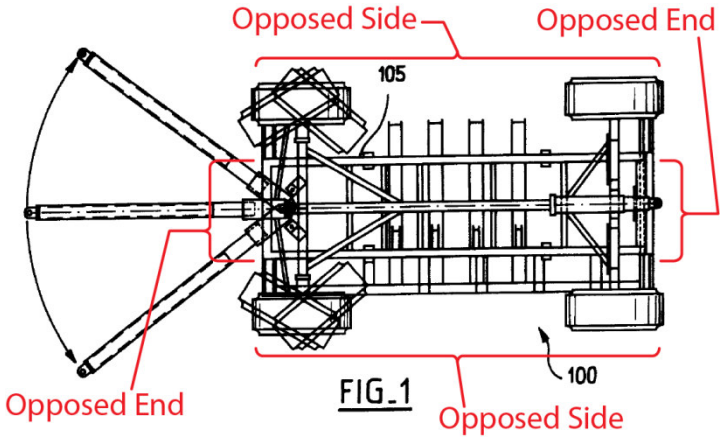
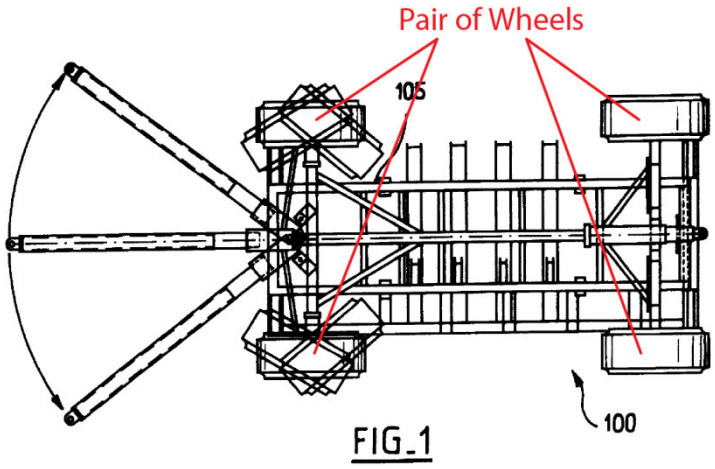
There is a reasonable likelihood that claims 1, 2, and 5 are rendered obvious over the Admitted Prior Art Wagons in view of Nordine for at least the reasons set forth below.

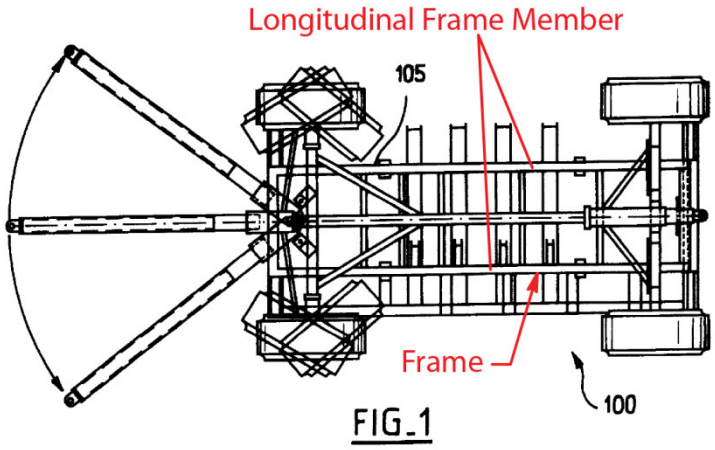
1. Admitted Prior Art Wagons

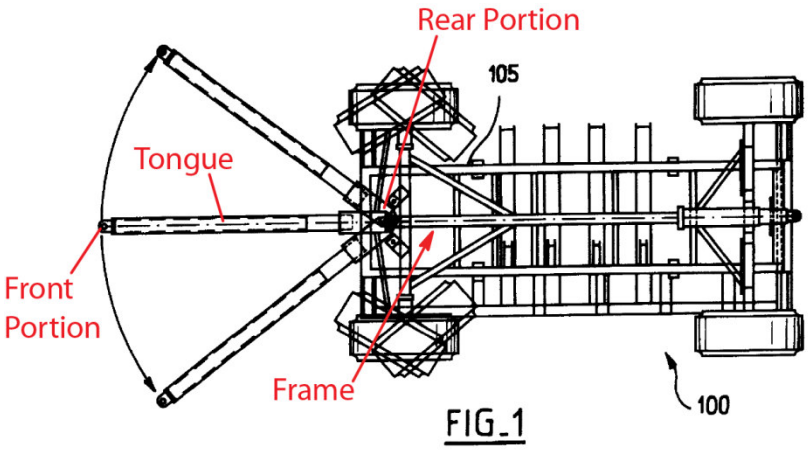
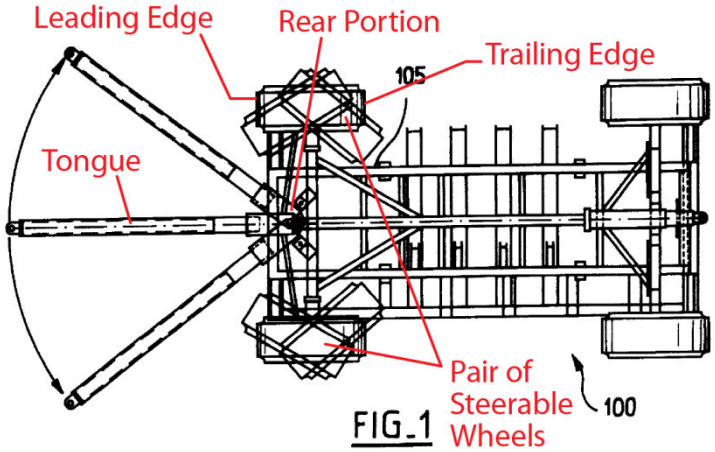
The '504 patent teaches the basic structure and function of the Admitted Prior Art Wagons. (Ex. 1001 at col. 1, ll. 16-55; col. 2, ll. 34-38; Fig. 1). The Admitted Prior Art Wagons have four wheels, which increases the load capacity and stability of the vehicle. (*Id.* at col. 1, ll. 26-29). The Admitted Prior Art Wagons generally have one pair of wheels that is steerable in unison through the pivoting action of a tongue, which is connected to the steerable wheels through a linkage. (*Id.* at col. 1, ll. 29-37). The Admitted Prior Art Wagons include a frame to which the wheels are mounted. (*Id.* at col. 1, ll. 38-39).

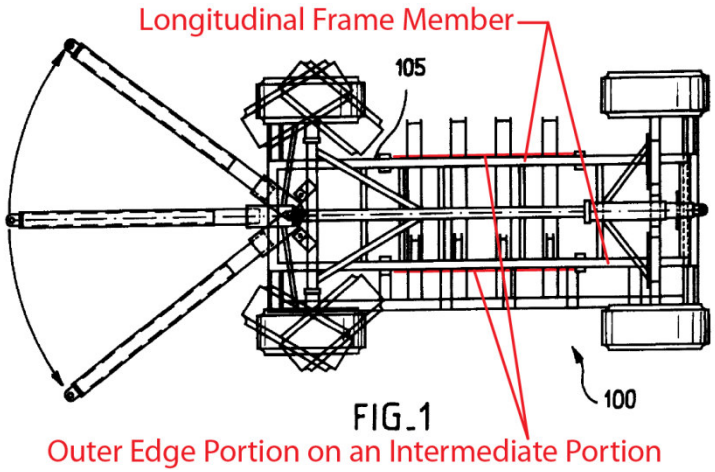
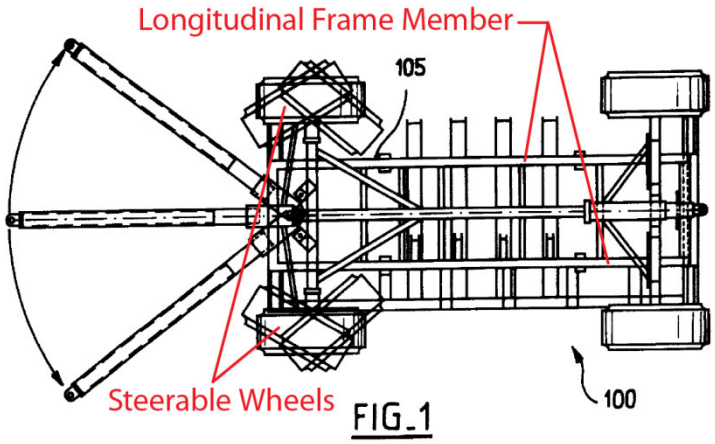
The Admitted Prior Art Wagons have the wheels positioned relatively close to the frame because if they are spaced too far from the frame, there will be "excessive" bending loads on the axles. (*Id.* at col. 1, ll. 42-45). With the wheels close to the frame, however, tight turning ability is limited by interference between the frame and the steerable wheels. (*Id.* at col. 1, ll. 51-55). The '504 patent identifies a turning problem with conventional wagons as one that cannot be solved by maintaining the width of the frame and increasing the wheel track (*i.e.*, the distance between the wheel and the frame measured from the wheel hub along the axle when in a straight-running direction). (*Id.* at col. 1, ll. 42-45).

As shown in the following claim chart, the Admitted Prior Art Wagons disclose almost all of the elements of claim 1:

‘504 Patent	Admitted Prior Art Wagons
1. A wagon having two opposed ends and two opposed sides extending between the opposed ends, the wagon further comprising:	Ex. 1001 at Fig. 1; col. 2, l. 34 (“FIG. 1 shows a wagon 100 configuration of the related art . . .”). 
a pair of wheels at each of said opposed ends;	Ex. 1001 at Fig. 1; col. 1, ll. 26-27 (“A common variation is the four-wheeled wagon, having pairs of wheels at either end of the wagon.”). 

‘504 Patent	Admitted Prior Art Wagons
a frame having at least one longitudinal frame member	Ex. 1001 at Fig. 1; col. 1, ll. 38-39 (“In a conventional wagon construction, a frame is employed upon which the pairs of wheels are mounted.”); col. 2, ll. 34-36 (“FIG. 1 shows a wagon 100 configuration of the related art, illustrating the turning limitation imposed on the related art wagon 100 by the frame member 105.”).  FIG_1

‘504 Patent	Admitted Prior Art Wagons
a tongue having a rear portion connected to a frame of said wagon and having a front portion adapted for connection to a vehicle;	Ex. 1001 at Fig. 1; col. 1, ll. 20-24 (“Wagons in their most basic form include a tongue, . . . The tongue of the wagon may be connected to a vehicle, such as, for example, a tractor, truck, pickup harvester, or other self-propelled machine.”); col. 1, ll. 39-40 (“The tongue is pivotally attached to the front of the frame . . .”).  FIG_1
at least one said pair of wheels being steerable to right and left sides and connected to a rear portion of said tongue for steering with said tongue, with a wheel having a leading edge facing toward an end of said wagon and a trailing edge facing toward a central portion of said wagon;	Ex. 1001 at Fig. 1; col. 1, ll. 39-41 (“The tongue is pivotally attached to the front of the frame and connected to the steerable wheels . . .”).  FIG_1

‘504 Patent	Admitted Prior Art Wagons
said wagon having a longitudinal frame member on each side, each longitudinal frame member having an outer edge portion on an intermediate portion of said longitudinal frame member;	Ex. 1001 at Fig. 1. 
said steerable wheels being completely outside said longitudinal frame members when said steerable wheels are oriented in a straight running direction; and	Ex. 1001 at Fig. 1; col. 1, ll. 42-43 (“The wheels and corresponding axles extend beyond the frame . . .”). The steerable wheels of the Admitted Prior Art Wagons are completely outside the longitudinal frame members when the steerable wheels are oriented in a straight running direction. 
. . .	

(Ex. 1014, Appx. 2 at A2-17–A2-24; *see also id.* at ¶ 63). In summary, the Admitted Prior Art Wagons include each and every element of claim 1, except for the claimed indentations in the longitudinal frame members. (*Id.* at ¶ 64).

2. Admitted Prior Art Wagons + Nordine

As discussed above, Nordine expressly teaches "…a frame for trailers or the like which is provided with indentations in the sides thereof into which the front wheels may extend when turning on a short radius." (Ex. 1002 at pg. 1, ll. 1-5). Therefore, with respect to claim 1, Nordine teaches the final claim element:

> [E]ach longitudinal frame member including an inwardly oriented indentation adjacent said trailing edge of each corresponding steerable wheel, each said indentation allowing said corresponding steerable wheel to be turned so that said trailing edge of said corresponding steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.

(Ex. 1002 at Fig. 1; pg. 1, ll. 74-80; pg. 2, ll. 44-46; Ex. 1014 at ¶¶ 65, 67; Appx. 2 at A2-22).

With respect to dependent claim 2, as explained above, Nordine teaches:

> [A] lateral frame member [that] extends across each end of said wagon, with said lateral frame member being positioned adjacent to said leading edge of said steerable wheel wherein said steerable wheel can be turned so that said leading edge of said steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.

(Ex. 1002 at Fig. 1; pg. 1, ll. 58-70; Ex. 1014 at ¶ 68; Appx. 2 at A2-23).

And with respect to dependent claim 5, also as explained above, Nordine teaches:

> [S]aid indentations in the longitudinal frame members permit a greater turning angle for said pair of wheels than would be obtainable without said indentation.

(Ex. 1002 at Fig. 1; pg. 1, ll. 6-9, 74-80; pg. 2, ll. 44-46; Ex. 1014 at ¶ 69; Appx. 2 at A2-24).

In view of the teachings of Nordine, it would have been obvious to the person of ordinary skill in the art to combine Nordine with the Admitted Prior Art Wagons to achieve a wagon having each of the elements of claims 1, 2, and 5. (Ex. 1014 at ¶ 65). There are several reasons why it would have been obvious to the person of ordinary skill in the art to combine Nordine's teaching of indented longitudinal frame members with the Admitted Prior Art Wagons. (*Id.* at ¶ 70). Inspired by the desire for tighter turning radius expressly disclosed in Nordine and other prior art disclosing indented longitudinal frame members, the person of ordinary skill in the art would have understood how to implement the teaching of Nordine to provide indented longitudinal frame members in the Admitted Prior Art Wagons. (*Id.* at ¶ 71).

First, Nordine provides explicit teachings to increase turning ability of

wagons and trailers through indentations in longitudinal frame members (*id.* at ¶ 72):

> The invention is a frame for trailers or the like which is provided with indentations in the sides thereof into which the front wheels may extend when turning on a short radius.
>
> The object of the invention is to provide a frame for trailers or the like which is so constructed that the trailer may be turned on a comparatively short radius.
>
> . . .
>
> A further object of the invention is to provide a means for reenforcing [sic] a frame for trailers or the like so that indentations may be provided in the sides to permit a short turning radius.
>
> . . .
>
> With these ends in view the invention embodies a trailer frame having indentations in the sides thereof to clear the wheels when turning on a short radius. . .
>
> . . .
>
> The members 2 and 3 are bent inward to the points 8 and 9 between the points 10 and 11. It is understood that these points may be positioned so that the frame will clear a wheel of any suitable design or size and the depth of the indentations may be greater or lesser as may be desired.

(Ex. 1002 at pg. 1, ll. 1-9, 15-19, 25-28, 74-80). The Nordine teachings would have led the person of ordinary skill in the art to combine prior art reference

teachings of the Admitted Prior Art Wagons and Nordine to arrive at the invention claimed in claims 1, 2, and 5 of the '504 patent. (Ex. 1014 at ¶ 73).

Second, the known indentations in the longitudinal frame members of Nordine could have been applied to the Admitted Prior Art Wagons in the same way as found in Nordine to achieve the identical, explicit turning goals of Nordine. (*Id.* at ¶ 74).

Third, the person of ordinary skill in the art would have combined the indentations in the longitudinal frame members of Nordine with the Admitted Prior Art Wagons because there were a limited number of predictable solutions to the limitation of turning angle created by interference of the wheel and a longitudinal frame member. (*Id.* at ¶ 75). There were (and are) two potential solutions to this problem: (1) moving the interfering wheel outwardly, or (2) indenting the interfering frame member inwardly. (*Id.*). The person of ordinary skill in the art would have recognized the first potential solution to be unattractive. (*Id.* at ¶ 76). Moving the interfering wheel outwardly necessarily incurs penalties in manufacturing cost and complexity. (*Id.*). In fact, the '504 patent acknowledges the disadvantages of the first potential solution (*id.*):

> The wheels and corresponding axles extend beyond the frame, but are positioned relatively near to the frame. This is because if the wheels extend far beyond the frame excessive bending loads would be imposed on the axles, with possible breakage

> occurring as a result of heavy loads or due to traveling over rough roads or rough ground.

(Ex. 1001 at col. 1, ll. 43-47). As to the second potential solution, moving a portion of the interfering longitudinal frame member inwardly does not require changes to the steering linkage, axle, or other existing turning mechanism(s) and avoids the expressed disadvantages of the first potential solution. (Ex. 1014 at ¶ 77).

In summary, the person of ordinary skill in the art would have recognized a finite number of identified, predictable solutions and a reasonable expectation of success with respect to the second potential solution. (*Id.* at ¶ 78). Thus, it would have been obvious to try combining the indentations in the longitudinal frame members of Nordine with the Admitted Prior Art Wagons to locally reduce interference between the wheels and longitudinal frame members, without increasing the wheel tracks of the Admitted Prior Art Wagons. (*Id.* at ¶ 79).

Fourth, it would have been a simple substitution of the known indented longitudinal frame members of Nordine for the straight longitudinal frame members of the Admitted Prior Art Wagons to obtain the predictable result of increased turning ability. (*Id.* at ¶ 80). The simplicity of this substitution resides in the fact that only the local area adjacent the trailing edge of the wheel needs to be inwardly indented or displaced. (*Id.*). Furthermore, the results of the

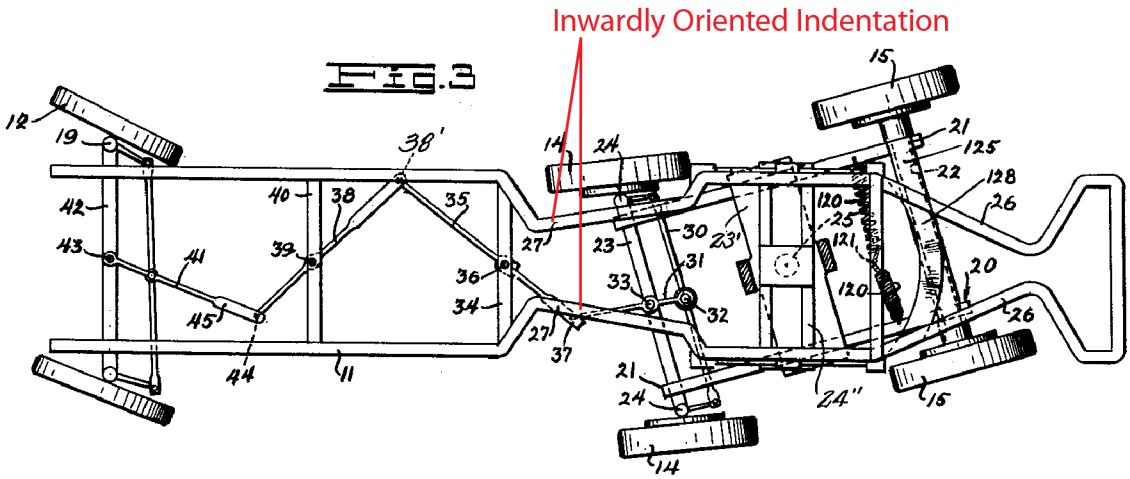
substitution were foreseeable and predictably result in increased wheel clearance and turning ability as a result of the change in frame geometry. (*Id.*). There is nothing unpredictable in the result of this particular substitution. (*Id.*).

Fifth, it would have been an obvious design choice to improve the Admitted Prior Art Wagons by including the known indentations in the longitudinal frame members of Nordine. (*Id.* at ¶ 81). Nordine implements indentations in longitudinal frame members on a vehicle that is pulled by another vehicle. (Ex. 1002 at pg. 2, ll. 18-23). Nordine expressly describes the frame for a "trailer or the like." (*Id.* at pg. 1, ll. 1-2). Therefore, Nordine discloses vehicles that are similar to the Admitted Prior Art Wagons. (Ex. 1014 at ¶ 81). For example, both are pulled by another vehicle, both have two sets of wheels, and both serve as the base for transporting materials over land. (*Compare* Ex. 1002 at pg. 2, ll. 18-23, 30-35; Fig. 1, *with* Ex. 1001 at col. 1, ll. 16-25; *see also* Ex. 1014 at ¶ 81). The known technique of Nordine explicitly addresses improved turning radius through indentations in longitudinal frame members. (Ex. 1002 at pg. 1, ll. 1-9, 15-19, 25-28, 74-80; Ex. 1014 at ¶ 81). As such, Nordine provides an obvious design choice to improve the turning ability of the Admitted Prior Art Wagons. (Ex. 1014 at ¶ 81).

Lastly, it would have been obvious to the person of ordinary skill in the art to combine Nordine with the Admitted Prior Art Wagons because the prior art at

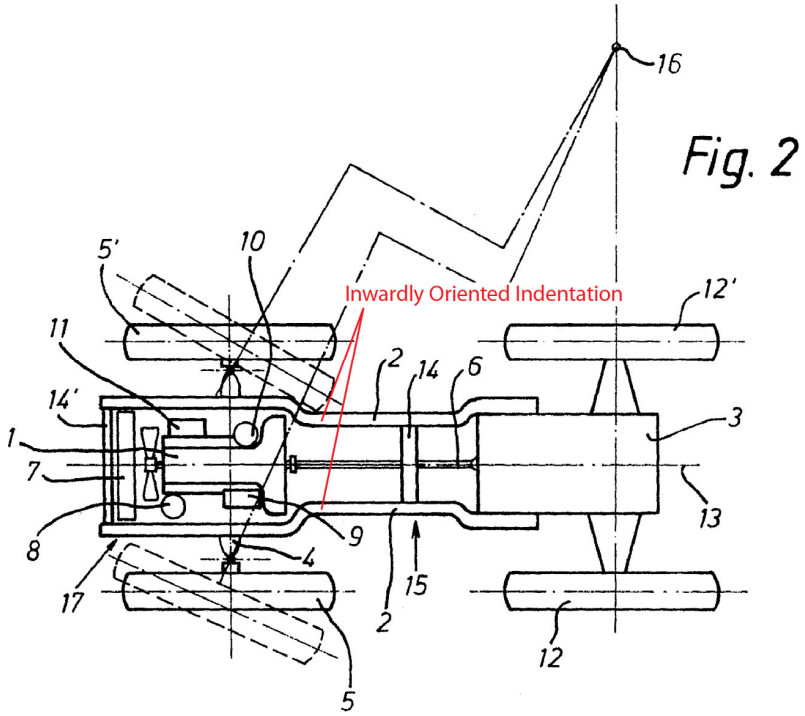
the time the '504 patent was filed also included several disclosures of vehicles, including towed vehicles, having longitudinal frame members with indentations that allowed for improved turning ability of the corresponding steerable wheels. (*Id.* at ¶ 20). Such prior art was part of the background knowledge and perspective of the person of ordinary skill in the art during the relevant time period. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

As a first example, Wright, which issued on January 23, 1926, is directed to a highway vehicle. (Ex. 1004 at Title). Wright discloses: "The frame of the truck is bent inwardly as at 26 and at 27 to accommodate the wheels 14 and 15 when the truck is turning relative to the frame 11." (*Id.* at pg. 1, ll. 90-93; *see also* claim 2). The frame members with inwardly oriented indentations of Wright are shown in Fig. 3, an annotated version of which is reproduced below.



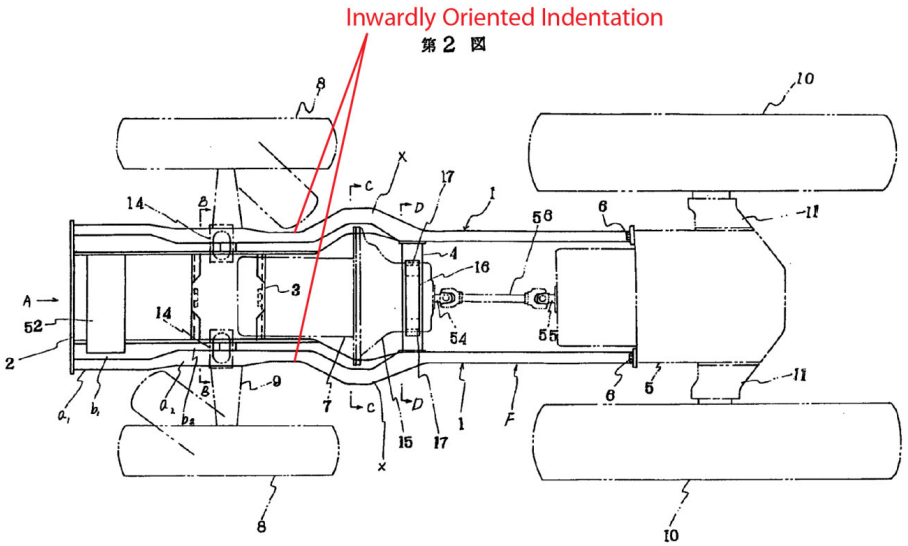
(*Id.* at Fig. 3 (annotated); *see also* Fig. 2; Ex. 1014 at ¶ 23).

As another example of a vehicle having indented longitudinal frame members, Gobel, which was published on June 9, 1982, is directed to an agricultural vehicle (Ex. 1005 at pg. 2, ¶¶ 1, 2) with "longitudinal carriers 2 [that] are bent toward the vehicle center 13," such that "the wheel on the inside of the curve engages into the bent the [sic] area of the carrier frame 15." (*Id.* at pg. 3, ¶ 2). Gobel explicitly refers to the bent areas of the longitudinal carriers as "frame indent[s]" and explains that the frame indents "create[] additional space for the locked front wheels" (*id.* at pg. 2, ¶ 6), such that "a small turning radius can be achieved." (*Id.* at pg. 2, ¶ 4). The frame with inwardly oriented indentations of Gobel is shown in Fig. 2, an annotated version of which is reproduced below.



(*Id.* at Fig. 2 (annotated); Ex. 1014 at ¶ 24).

As a third example, Kataue was published on June 8, 1985 and is directed to a body frame for a tractor. (Ex. 1006 at Title). Kataue discloses that portions of the left and right frames (1) are "formed with a sufficiently narrow disposed spacing" therebetween so that "a steering turning angle of the front wheels (8)(8) that steer and turn near the narrow formed section can be sufficiently sharp." (*Id.* at pg. 2, ¶ 3; *see also* pg. 2, ¶ 1 ("[T]he left and right frames preferably have a small cross section . . . in order to reduce the turning radius, a disposed spacing between the left and right frames is preferably as narrow as possible, and it is particularly preferred to be narrower in the area where a front wheel turns.")). The narrowing of the left and frames results in inwardly oriented indentations in the frames, as shown in Fig. 2, an annotated version of which is reproduced below.



(*Id.* at Fig. 2 (annotated); Ex. 1014 at ¶ 25).

Finally, as explained above, Hoobler, which issued on April 10, 1945, is directed to a trailer vehicle for highway transport (Ex. 1003 at pg. 1, left col., ll. 1-2), in which "the channel frame 24 comprising the frame [20] is preferably curved or bent inwardly at both sides between the pivot pins 32 and 43, as indicated at 54, to allow sufficient room for turning of the dual wheels 47 carrying the dolly frame 21." (*Id.* at pg. 3, left col., ll. 8-13).

Each of these additional prior art references teaches that indented longitudinal frame members can be used to achieve an increase in turning ability. (Ex. 1014 at ¶ 82). These sources were all available the person of ordinary skill in the art during the relevant time period and "constitute important evidence of the state of the art and the context in which the [combination] should be evaluated." *Randall Mfg. v. Rea*, 733 F.3d 1355, 1363 (Fed. Cir. 2013) (finding that once it is established that the prior art included a prevalent solution, "it is hard to see why one of skill in the art would not have thought to modify [the primary reference] to include this feature."). Therefore, the Wright, Gobel, Kataue, and Hoobler references would have provided additional motivation to combine the indented longitudinal frame members of Nordine with the Accused Prior Art Wagons.

For at least these reasons, each of claims 1, 2, and 5 of the '504 patent would have been obvious to the person of ordinary skill in the art over the Admitted Prior Art Wagons in view of Nordine. (Ex. 1014 at ¶ 83).

D. Ground 4 — Claims 1, 2, and 5 Are Obvious over the Admitted Prior Art Wagons in View of Hoobler

There is a reasonable likelihood that claims 1, 2, and 5 are rendered obvious over the Admitted Prior Art Wagons in view of Hoobler for at least the reasons set forth below.

1. Admitted Prior Art Wagons

As discussed in Section VIII.C.1., *supra*, the Admitted Prior Art Wagons include each and every element of claim 1, except for the indentations in the longitudinal frame members. (*Id.* at ¶ 84).

2. Admitted Prior Art Wagons + Hoobler

Further, as discussed above, Hoobler expressly teaches that "…frame [20] is preferably curved or bent inwardly at both sides…to allow sufficient room for turning of the dual wheels…" (Ex. 1003 at pg. 3, left col., ll. 8-13; Figs. 7 and 8). Therefore, with respect to claim 1, Hoobler teaches that:

> [E]ach longitudinal frame member including an inwardly oriented indentation adjacent said trailing edge of each corresponding steerable wheel, each said indentation allowing said corresponding steerable wheel to be turned so that said trailing edge of said corresponding steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.

(Ex. 1003 at Figs. 7 and 8; pg. 3, left col., ll. 8-13; *see also* Ex. 1014 at ¶ 86; Appx. 2 at A2-30).

With respect to dependent claim 2, as explained above, Hoobler teaches:

> [A] lateral frame member [that] extends across each end of said wagon, with said lateral frame member being positioned adjacent to said leading edge of said steerable wheel wherein said steerable wheel can be turned so that said leading edge of said steerable wheel is positioned inwardly with respect to said outer edge portion of a corresponding longitudinal frame member.

(Ex. 1003 at Figs. 4 and 8; pg. 2, right col., ll. 27-29); *see also* Ex. 1014 at ¶ 87; Appx. 2 at A2-31–A2-32).

With respect to dependent claim 5, as explained above, Hoobler teaches:

> [S]aid indentations in the longitudinal frame members permit a greater turning angle for said pair of wheels than would be obtainable without said indentation.

(Ex. 1003 at Fig. 8; pg. 3, left col., ll. 8-13); *see also* Ex. 1014 at ¶ 88, Appx. 2 at A2-32).

In view of the teachings of Hoobler, it would have been obvious to the person of ordinary skill in the art to combine Hoobler with the Admitted Prior Art Wagons to achieve a wagon having each of the elements of claims 1, 2, and 5. (Ex. 1014 at ¶ 84). There are several reasons why it would have been obvious to the person of ordinary skill in the art to combine Hoobler's teaching of indentations in the longitudinal frame members with the Admitted Prior Art Wagons. (*Id.* at ¶ 89). Inspired by the desire for tighter turning radius expressly

disclosed in Hoobler and the other prior art described above disclosing indentations in longitudinal frame members, the person of ordinary skill in the art would have understood how to implement the teaching of Hoobler to provide indentations in the longitudinal frame members in the Admitted Prior Art Wagons. (*Id.* at ¶ 90).

First, Hoobler provides explicit teachings to increase turning ability of towed trailers through indentations in longitudinal frame members. (Ex. 1003 at pg. 3, left col., ll. 8-13; Figs. 7 and 8; Ex. 1014 at ¶ 91). These teachings would have led the person of ordinary skill to combine prior the Admitted Prior Art Wagons and Hoobler to arrive at the invention claimed in claims 1, 2, and 5 of the '504 patent. (Ex. 1014 at ¶ 91).

Second, the known indentations in the longitudinal frame members of Hoobler could have been applied to the Admitted Prior Art Wagons in the same way as found in Hoobler to achieve the identical, explicit turning goals of Hoobler. (*Id.* at ¶ 92).

Third, the person of ordinary skill in the art would have combined the indentations in the longitudinal frame members of Hoobler with the Admitted Prior Art Wagons because there were a limited number of predictable solutions to the limitation of turning angle created by interference of the wheel and a longitudinal frame member. (*Id.* at ¶ 93). There were (and are) two potential solutions to this problem: (1) moving the interfering wheel outwardly, or (2) indenting the

interfering frame member inwardly. (*Id.*). The person of ordinary skill in the art would have recognized the first potential solution to be unattractive. (*Id.* at ¶ 94). Moving the interfering wheel outwardly necessarily incurs penalties in manufacturing cost and complexity. (*Id.*). In fact, the '504 patent acknowledges the disadvantages of the first potential solution (*id.*):

> The wheels and corresponding axles extend beyond the frame, but are positioned relatively near to the frame. This is because if the wheels extend far beyond the frame excessive bending loads would be imposed on the axles, with possible breakage occurring as a result of heavy loads or due to traveling over rough roads or rough ground.

(Ex. 1001 at col. 1, ll. 43-47). As to the second potential solution, moving a portion of the interfering longitudinal frame member inwardly does not require changes to the steering linkage, axle, or other existing turning mechanism(s) and avoids the expressed disadvantages of the first potential solution. (Ex. 1014 at ¶ 95).

In summary, the person of ordinary skill in the art would have recognized a finite number of identified, predictable solutions and a reasonable expectation of success with respect to the second potential solution. (*Id.* at ¶ 96). Thus, it would have been obvious to try combining the indentations in the longitudinal frame members of Hoobler with the Admitted Prior Art Wagons to locally reduce

interference between the wheels and longitudinal frame members without increasing the wheel tracks of the Admitted Prior Art Wagons. (*Id.* at ¶ 97).

Fourth, it would have been a simple substitution of the known indented longitudinal frame members of Hoobler for the straight longitudinal frame members of the Admitted Prior Art Wagons to obtain the predictable result of increased turning ability. (*Id.* at ¶ 98). The simplicity of this substitution resides in the fact that only the local area adjacent the trailing edge of the wheel needs to be inwardly indented or displaced. (*Id.*). Furthermore, the results of the substitution were foreseeable and predictably resulted in increased wheel clearance and turning ability as a result of the change in frame geometry. (*Id.*). There is nothing unpredictable in the result of this particular substitution. (*Id.*).

Fifth, it would have been an obvious design choice to improve the Admitted Prior Art Wagons by including the known longitudinal frame members with indentations of Hoobler. (*Id.* at ¶ 99). Hoobler implements indented longitudinal frame members on a vehicle that is pulled by another vehicle. (Ex. 1003 at pg. 1, left col., ll. 1-2; pg. 2, left col., ll. 49-57; Figs. 3 and 8). Therefore, Hoobler discloses vehicles that are similar to the Admitted Prior Art Wagons. (Ex. 1014 at ¶ 99). For example, both are pulled by another vehicle, both have two sets of wheels, and both serve as the base for transporting materials over land. (*Compare* Ex. 1003 at pg. 1, left col., ll. 1-2; pg. 2, left col., ll. 49-57; Figs. 3 and 8, *with* Ex.

1001 at col. 1, ll. 16-25; *see also* Ex. 1014 at ¶ 99). The known technique of Hoobler explicitly addresses improved turning radius through indentations in longitudinal frame members. (Ex. 1003 at pg. 3, left col., ll. 8-13; Figs. 7 and 8; Ex. 1014 at ¶ 99). As such, Hoobler provides an obvious design choice to improve the turning ability of the Admitted Prior Art Wagons. (Ex. 1014 at ¶ 99).

Lastly, it would have been obvious to the person of ordinary skill in the art to combine Nordine with the Admitted Prior Art Wagons because, as explained above, the prior art at the time the '504 patent was filed also included several disclosures of vehicles, including towed vehicles, having longitudinal frame members with indentations that allowed for improved turning ability of the corresponding steerable wheels. (*Id.* at ¶ 20). Each of the Wright, Gobel, Kataue, and Nordine prior art references teaches that indented longitudinal frame members can be used to achieve an increase in turning ability. (*Id.* at ¶ 100). These sources were all available the person of ordinary skill in the art during the relevant time period and "constitute important evidence of the state of the art and the context in which the [combination] should be evaluated." *Randall Mfg.*, 733 F.3d at 1363 (finding that once it is established that the prior art included a prevalent solution, "it is hard to see why one of skill in the art would not have thought to modify [the primary reference] to include this feature."). Therefore, the Wright, Gobel, Kataue, and Nordine references would have provided additional motivation to

combine the indented longitudinal frame members of Hoobler with the Accused Prior Art Wagons.

For at least these reasons, each of claims 1, 2, and 5 of the '504 patent would have been obvious to the person of ordinary skill in the art over the Admitted Prior Art Wagons in view of Hoobler. (Ex. 1014 at ¶ 101).

IX. CONCLUSION

For at least the reasons discussed above, there is a reasonable likelihood that each of claims 1, 2, and 5 of the '504 patent challenged in this Petition is unpatentable, and, thus, this Petition for *inter partes* review should be granted.

Dated: October 22, 2015

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CERTIFICATE OF SERVICE

The undersigned certifies service pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(b) on Patent Owner by Express Mail of a copy of J&M Manufacturing Co., Inc.'s Petition for *Inter Partes* Review of U.S. Patent No. 6,176,504 under 37 C.F.R. § 42.100 *et seq.* at the correspondence address of the Patent Owner:

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