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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the U.S. Patent Application of:

Applicant: Brian R. Brady, et al.
Title: Travel Trailer Having Improved Turning Radius
Serial No.: 12/315,894
Filing Date: December 8, 2008

Art Unit: 3611
Examiner: Michael R. Stabley

**REVOCAION OF POWER OF ATTORNEY AND APPOINTMENT OF NEW POWER
OF ATTORNEY UNDER 37 CFR §1.36**


Commissioner for Patents
P. O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

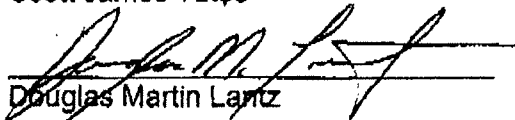
The undersigned applicants, each being a named inventor and applicant in the above-referenced patent application, hereby revoke all previous powers of attorney granted by them in connection with this application and appoint the following attorney to act on their behalf in transacting all business with the USPTO in connection with this application:

Ryan M. Fountain
420 Lincoln Way West
Mishawaka, Indiana 46544
Reg. No. 30751

May 11, 2009



Scott James Tuttle



Douglas Martin Lantz

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Title: Travel Trailer Having Improved Turning Radius
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Examiner: Michael R. Stabley

**PETITION FOR ACCEPTANCE OF REVOCATION OF POWER OF ATTORNEY AND
APPOINTMENT OF NEW POWER OF ATTORNEY UNDER 37 CFR §1.36,
INCLUDING REQUEST FOR PARTICIPATION IN PATENT PROSECUTION TO
AVOID A CONTINUING FRAUD UPON THE USPTO**

Commissioner for Patents
P. O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

Two of the named inventors in the above-referenced patent application, Scott James Tuttle and, Douglas Martin Lantz, herein petition the Commissioner to:

- a. accept the attached Revocation of Power of Attorney, and
- b. permit these inventors to participate in the prosecution of the patent application.

The purpose of this petition is to permit the inventors to comply with 37 CFR 1.56 and to prevent a continuing fraud upon the USPTO by the prior attorneys responsible for this patent application and US Patent 7,278,650 and its other US patent application serial no. 11/834,214, as explained in detail below.

Background Information:

This application is a continuation of the '214 application, which is itself a continuation of the '650 patent. Each of these inventors have duty under Rule 56 to disclose certain information to the USPTO. As a result of the failure of the prior attorneys to properly communicate with these inventors, these inventors have been prevented from complying with Rule 56. That has caused important information to be withheld from the USPTO and has caused the '650 patent to issue with and the '214 application to be prosecuted with the wrong claimed invention. These flaws came to light as a result of litigation between the owner of the '650 patent, Heartland, and a third party, Forest River, Inc., and particularly as a result of Mr. Lantz and Mr. Tuttle becoming aware of the testimony of the other three named inventors, Brian Brady, John Rhymer, and Tim Hoffman, during their depositions of June 15, 16, and 17, respectively. This petition is timely because the transcripts of those depositions are now published and available for public inspection and, in addition, because of the actions of the prior attorneys on June 24, 2009, in connection with those depositions, as discussed further below.

Detailed Discussion of Misconduct of Prior Attorneys:

1. At least three of the named inventors executed the Declaration of inventorship, (copy attached), under false pretenses - having not read the application sufficiently to understand its content and claims, having falsely asserted inventorship, and having not disclosed to the USPTO the information required under 37 CFR 1.56. This is shown by the Brady, Rhymer and Hoffman deposition transcripts. That falsity was known or should

have been known by the primary patent attorney they appointed to represent them before the USPTO, Gregory S. Cooper. Mr. Cooper was personally bound both under 37 CFR 10 et seq., and 37 CFR 1.56 to prevent the patent application from being prosecuted under those circumstances.

2. Mr. Cooper and the succeeding patent attorneys who were directly involved in prosecuting the patent application, Gerald Gallagher and Thomas Mauoh, either failed to communicate with the inventors sufficiently to gather the information known to the inventors or failed to pass on to the USPTO information obtained from the inventors with respect to:

a. the nature of the invention itself - the invention, in the minds of at least some of the inventors at least, lay in the spaced apart, mating curvatures of the trailer lower corner to the truck cap upper corner, rather than in any one or two particular frame designs to accomplish that invention. Frame design was instead recognized by at least some of the inventors as a mere matter of design choice, to be selected and dimensioned in the normal course of events from a wide variety of potential formats, as was well known in the industry.

b. the known scope and content of the prior art, including the fact that travel trailers, horse trailers, cargo trailers, park model homes, modular homes, and some boat trailers are all made by many of the same manufacturers and are structurally related to a high degree, especially as to chassis design and construction; also, that many of those trailers have common functions and are sold through the same channels of trade, including at common trade shows such that persons familiar with travel trailers and fifth wheels are likely to also be familiar with horse trailers and cargo trailers which have living quarters formed within; also, that trailer chassis

designs have been made with a wide range of variation and structural equivalence such that locating any particular side beam, end beam, or cross beam at any particular location according to a particular use or fit was widely known as a matter of design choice; also, that adapting fifth wheel trailer chassis to include as interchangeable features notched or angled front corners to support a particular cap configuration was well known, such as shown by Trial Exhibits 40 and 41 in the Heartland/Forest River litigation (copies attached hereto), especially so as to maximize "floor plan to footprint" ratios of larger trailers; also, that as pointed out in the Amended Answer, Defenses, and Counterclaims, one or more of the inventors were aware of the specific prior art illustrated therein and/or of prior art having a similar structures and/or purposes to those illustrated examples; also, that the RVIA and other trade organizations to which Heartland and/or the inventors belong cover a range of closely related products using similar trailer chassis (see attached RVIA publication showing the interrelationship of travel trailers and fifth wheel travel trailers); and also, that there was additional relevant and material prior art in existence and known to the inventors in the United States and foreign RV markets, such as, the travel trailers of Trial Exhibit 30 in the Heartland/Forest River litigation, having angled front corners, various V nose trailers, and cargo trailers with forward ramp doors or fifth wheel formats supported on trailer chassis, as well as the Space Craft fifth wheel travel trailer which preceded the invention of this patent application and was known to at least Mr. Tuttle, which had a turning radius feature from its front end shape which should have been disclosed to the USPTO but was not (see attached advertisement), and that the Holiday Rambler fifth wheel travel trailer

which Forest River disclosed in Answer to the Complaint filed by Heartland was actually known to at least Mr. Tuttle prior to the invention of this patent application.

c. the known level of ordinary skill of those persons who were involved in the design of some or all portions of travel trailers and fifth wheels, including the average years of experience and education of those persons, as well as the fact that many of the employees involved in the design and construction of such trailers will change jobs within that general industry, making travel trailers at one time, cargo trailers at another, modular homes at another, etc., such that they become familiar with the construction of a wide range of such products; also, that persons of ordinary skill in the design of some or all portions of travel trailers and fifth wheels would have been exposed to and aware of many of the features of such products from trade shows, dealer servicing, and living in RV oriented communities like Elkhart County, IN; and also, that travel trailers and fifth wheels are typically designed in whole or part by a team of persons, such that "a person of ordinary skill in the art" within the meaning of the patent laws would actually have attributed to him or her that collective level of skill and experience.

d. the differences and similarities between the claimed invention of the patent application and the prior art cited by the USPTO.

As a result, these patent attorneys obtained the issuance of a patent which was not directed to and did not claim the real "invention" of the named inventors. Further, the final, fully amended application for that patent was defective under 35 U.S.C. §112 for not "particularly pointing out and distinctly claiming the subject matter which the [named inventors] regards as [their] invention" and for not "enabling" one of ordinary skill in the art

to make and use that invention.

3. Neither Heartland, who was also bound by 37 CFR 1.56, nor any of the other named inventors corrected those mistakes of the patent attorneys even though they were, according to the fully executed Declaration of inventorship, knowingly bound to do so, upon pain of patent invalidity. This failure by Heartland was not inadvertent, but rather intentionally done to further its position in the lawsuit with Forest River.

4. Heartland's patent attorneys intentionally and repeatedly mislead the USPTO as to the scope and content of the prior art by refusing to admit in Information Disclosure Statements ("IDSs") filed with the USPTO that certain "prior art" was in fact "prior art." Those attorneys knew or should have known that the documents submitted with the IDSs really did disclose prior art.

5. Heartland's attorneys failed to bring to the attention of the USPTO prior art which was disclosed to them by Forest River during the pendency of the patent application for the '650 patent even when they were aware that Forest River considered that prior art to be so relevant and material that it created a defense to the patent infringement charge being made by Heartland against Forest River. Instead, Heartland waited until after the patent issued and a lawsuit was filed and brought that prior art to the USPTO in a "submarine" patent application (the '214 and present cases), but still doing so in a manner which mislead the USPTO as to the significance of that prior art. Further, even when required by the USPTO to provide a fuller disclosure in the record of the '214 patent application of the arguments about the prior art which were made in a non-public hearing on December 4, 2008 with the USPTO, Heartland failed to do so, intentionally keeping secret those arguments so as to not reveal their own failure to comply with 37 CFR 1.56 in the parent

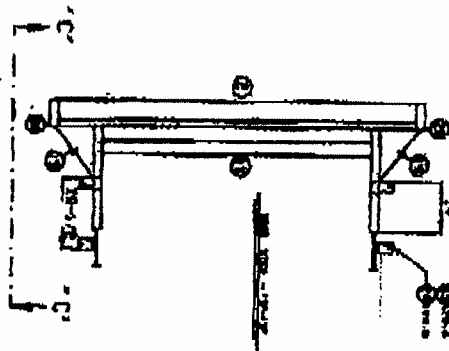
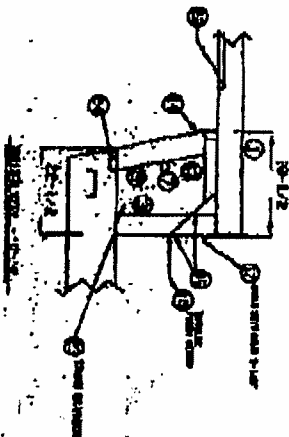
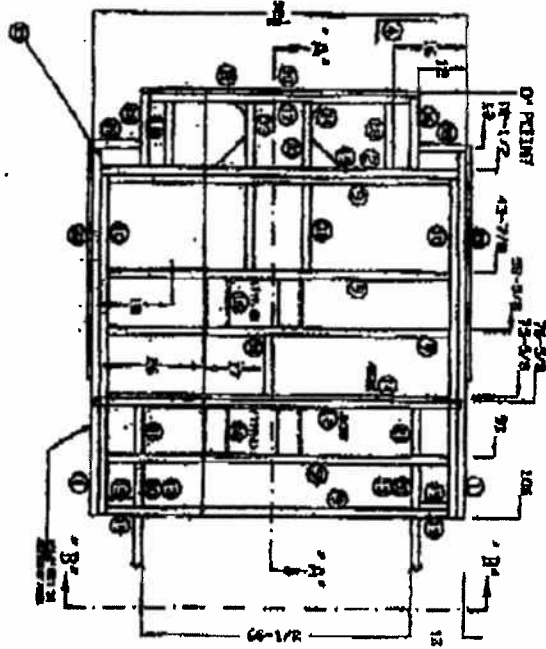
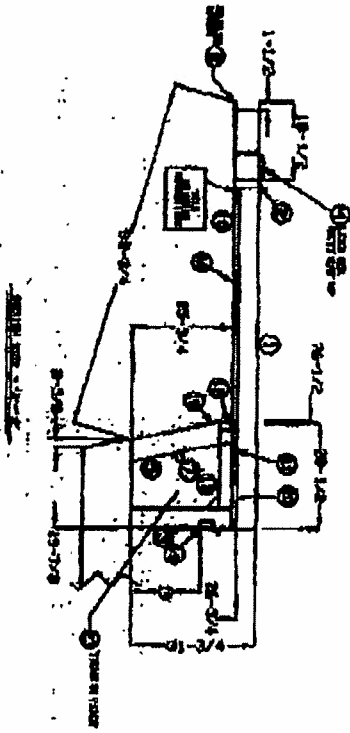
patent and/or to keep secret admissions against interest which could be used under the Doctrine of File Wrapper Estoppel to interpret the '650 patent claims more narrowly than Heartland was asserting against Forest River. Further, immediately after June 15 - 17, 2009, when the deposition testimony of Heartland's own employees under oath asserted that there was false inventorship in the parent patent application (which is also attributed to the '214 and present patent applications as a matter of law) Heartland's attorneys rushed to pay the issue fee in the '214 patent application on June 24, 2009 so as to close down prosecution of that patent application before the transcript of those depositions was created. This was done to deceive the USPTO into issuing the new patent quickly so that it could be used by Heartland to argue a "purge" of the inequitable conduct in not bringing the Forest River prior art to light in the parent patent. Specifically, Heartland thought to argue that the Forest River prior art was not relevant and material because the USPTO somehow issued the second patent anyway. However, in doing so, Heartland's attorneys compounded the fraud on the USPTO.

Conclusion:

Mr. Tuttle and Mr. Lantz need separate representation and participation before the USPTO in order to enable them to comply with 37 CFR 1.56.

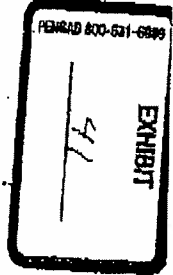
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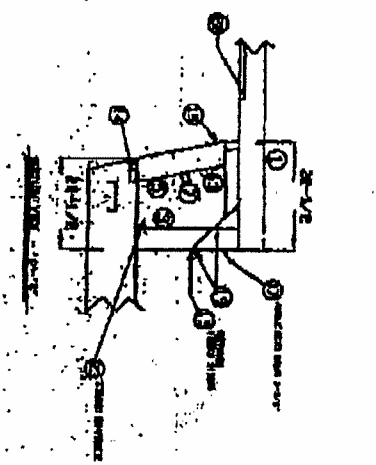
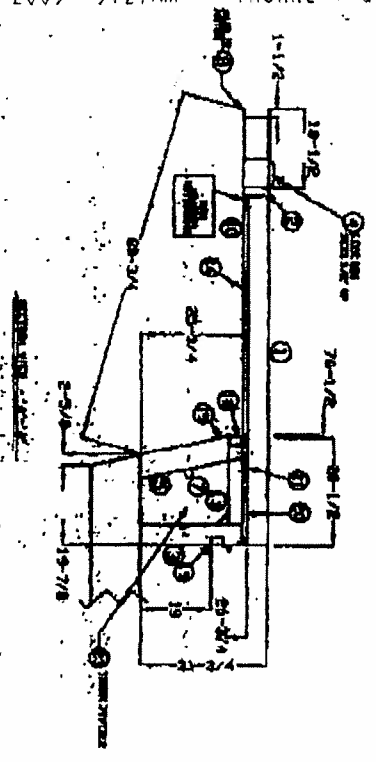
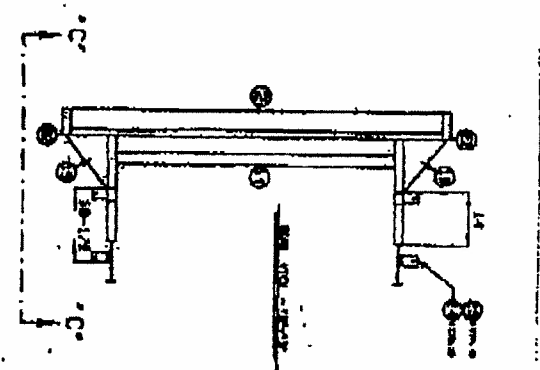
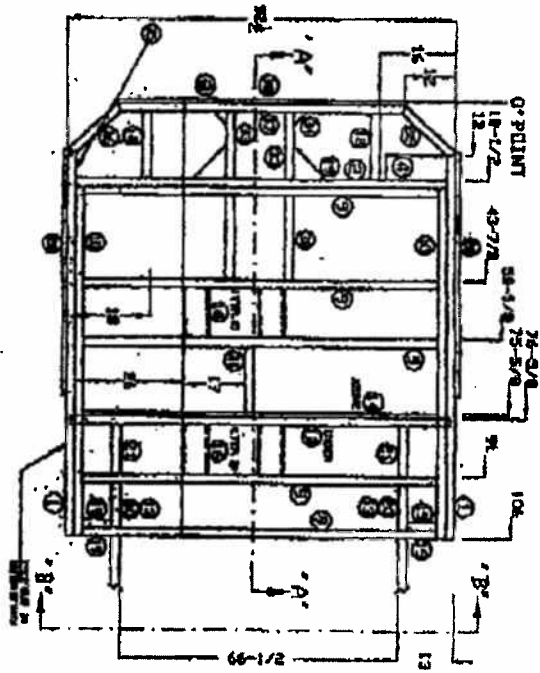
Ryan M. Fountain
Reg. No. 30751
Attorney for Mr. Tuttle and Mr. Lantz



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EXHIBIT
470



5th Wheel Photo Gallery

Floor Plans

Standard Equipment

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What is a Recreation Vehicle (RV)?

A motorized or towable vehicle that combines transportation and temporary living quarters for travel, recreation and camping. RVs do not include mobile homes, off-road vehicles, snowmobiles or conversion vehicles. RVs are sold by recreation vehicle dealers.

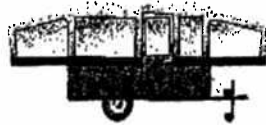
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The RV Family

Towable RVs

Designed to be towed by family car, van or pickup truck. Can be unhitched and left at the campsite while you explore in your auto.

Click on an RV for more information.



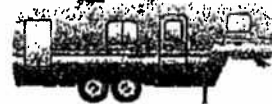
Folding Camping Trailers



Truck Campers



Conventional Travel Trailers



Fifth-Wheel Travel Trailers



Sport Utility RVs

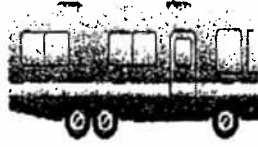


Travel Trailers with Expandable Ends

Motorhomes

Living quarters are accessible from the driver's area in one convenient unit.

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Type A Motorhomes



Type B Motorhomes



Type C Motorhomes

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EXPERT REPORT OF JAY G. TAYLOR

I. INTRODUCTION

1. I have been retained by and will provide expert testimony on behalf of plaintiff Heartland Recreational Vehicles, LLC ("Heartland") regarding the prosecution of U.S. Patent No. 7,278,650 ("the '650 patent"), and the issue of inequitable conduct allegedly committed by Heartland during that prosecution. Because discovery is ongoing, I reserve the right to render additional opinions and to supplement or amend my opinions based upon the production of further documents, deposition testimony, submissions of expert reports by experts for defendant Forest River, Inc. ("Forest River"), trial testimony or other events that may occur during the course of this action.

2. I am a retired patent attorney registered to practice before the United States Patent Office with over 40 years of experience in all aspects of patent prosecution and litigation. I have handled litigation and prosecution matters in such diverse mechanical, chemical and electrical fields as, for example, computer software, heart pacemakers, urological stents, ceramic products and processes, data recording and transmission equipment, electronic musical instruments, high voltage transmission equipment, food processing equipment and processes, vending equipment, electronic games, railroad equipment, welding equipment and processes, and particle board manufacturing processes.

3. I am being compensated for my work in connection with this matter at my standard billing rate of \$450 per hour. In the last four years, I have given testimony as an expert in the case of Stant Manufacturing Inc. v. Gerdes GmbH, United States District Court for the Southern District of Indiana. My resume setting forth my qualifications, my prior involvement as an expert witness and listing my publications is attached as Exhibit A.

II. DOCUMENTS AND MATERIALS RELIED UPON

4. In preparation of my opinions, I reviewed and considered the '650 patent, the '650 file history, each prior art reference cited in and exhibits attached to that file history. I also reviewed and considered the deposition testimony of Brian Brady, John Rhymer, Timothy Hoffman, Scott Tuttle, Douglas Lantz, Gregory Cooper, Gerard Gallagher and Jeff Babcock taken in this case. I have also considered the following documents and exhibits: Deposition Exhibits 1-34, 40-41, 43, 80, 81, 100-115 and 123-128, Cooper Dep. Exs. 1, 2 (B&T 001-636), and 3, and Gallagher Dep. Ex.1 (Heartland/FR 458-1049) the Amended Counter Claim and Exhibits thereto, Letter dated July11, 2005 from Liegl to Gallagher, and drawing entitled fifth Wheel Section, FE138.

III. PATENT PROCESS

5. The process of patenting inventions is contemplated by the U.S. Constitution. Over the years many regulations and much legal precedent have developed to balance the interests of the patent applicant and the public. The patent system involves the disclosure of inventions to the public to encourage progress of the useful arts. The reward for the inventor's patent disclosure is the grant of a limited right to exclude others from manufacturing, using, selling or offering to sell the invention for a limited period of time. More specifically, the Patent Act, 35 U.S.C. §§ 1 et seq. and particularly 35 U.S.C. § 271, permit an inventor, his or her assignee or exclusive licensee, to exclude others from making, using, selling or offering to sell the patented invention for a period of 20 years from the earliest original filing date of the patent application. In exchange for this "limited right," the inventor must disclose to the public how to make and use the invention, including the best way or "mode" of practicing the invention as contemplated by the inventor at the time of filing the application. In addition, the inventor must describe the

invention in terms specific enough so as to enable those skilled in the art to make and use the invention. The inventor must particularly point out and distinctly claim the invention so that others can determine whether or not they are practicing the invention.

A. Patent Applications

6. When an inventor believes that he has come up with a new invention the inventor may file a patent application with the United States Patent and Trademark Office ("the Patent Office"). Since the patent process is procedurally and legally complex, an inventor almost always engages a registered patent attorney or patent agent to prepare and file a patent application with the Patent Office. The process is so technically challenging and procedurally and legally complex that only attorneys who meet certain minimal technical education requirements and who pass an examination administered by the Patent Office are admitted to and registered to practice before the Patent Office.

7. A patent application has four parts: an abstract, one or more drawings, a specification, and one or more claims. The abstract is a brief description of the invention, the drawings illustrate the invention where necessary or appropriate, the specification describes the preferred embodiments of the invention in detail, and the claims define the "metes and bounds" of what the inventor considers as his or her invention.

8. The Patent Act and the Patent Office Rules require each patent application to provide a sufficient description to enable those skilled in the art to make and use the invention as claimed. Further, if the inventor has contemplated a "best" or most preferred mode for the invention as claimed, the application must disclose enough to allow those skilled in the art to practice the preferred mode. Those requirements are known as the "written description"

"enablement" and "best mode" requirements and are set forth by statute in 35 U.S.C. § 112, adopted as Patent Office regulations 37 C.F.R. § 1.51 and § 1.71 among others, and set out in the Manual of Patent Examining Procedure ("MPEP") §§ 2161-2165.04¹

9. To fulfill the written description requirement, the original specification must provide written support for the claims being examined. In addition, the original specification must have sufficient detail to evidence that the inventor possessed the claimed invention at the time of filing. The enablement requirement requires the patent applicant to disclose adequate technical details to enable one of ordinary skill in the art to which the invention is directed to make and use the claimed invention. The best mode requirement requires that the specification disclose the best way of practicing the claimed invention, known to the application at the time of filing the application. MPEP § 608.01(h).

B. Duty of Disclosure

10. Patent applicants and their representatives, and all individuals associated with the filing or prosecution of a patent application, have a duty established by federal regulations and judicial decisions to deal in complete candor and good faith with the Patent Office. 37 CFR § 1.56, also known as Rule 56, governs the conduct of applicants and their representatives in respect to the patent application process. Under 37 CFR § 1.56, patent applicants and their representatives and all individuals associated with the filing or prosecution of a patent application are required to submit to the Patent Office all prior art and other information known

¹ The MPEP is a manual created by the Patent Office as a guide for patent examiners. It represents the Patent Office's view on how the patent law should be applied in the examination of patent applications. The MPEP also guides examiners on the various procedures for examining patents. The MPEP is a guide. It does not constitute the law.

with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

* * * *

(c) Individuals associated with the filing of prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.”

This disclosure requirement exists because, for the most part, patent prosecution is an *ex parte* proceeding involving only the patent applicant and the Patent Office. Patent applications are held in secret, at least until they are published. The public does not have an opportunity to comment or advise the Patent Office as to prior art or other circumstances which might render any given application unpatentable, except in limited circumstances such as a reexamination, or in the protest and public use proceedings provided for in 37 CFR §§ 1.291 and 1.292, and in those proceedings, participation by another party is restricted.

12. In general, the Patent Office has only two sources for prior art and other information. These sources are the art located in the Patent Office files and databases and whatever art or other information the patent applicant may bring to the attention of the Patent Office. Thus, applicants have a strict duty not to withhold or misrepresent material prior art, or

to them which is material to the prosecution of the application and which is not cumulative to information already of record in the application proceedings.

11. Rule 56 states in pertinent part:

(a) "...Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the office all information known to that individual to be material to patentability as defined in this section. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent

other information material to patentability. Rule 1.97 and 1.98 govern the form and content of Information Disclosure Statements filed in satisfaction of rule 1.56. In relevant part, Rule 1.97 specifies that:

(g) An information disclosure statement filed in accordance with this section shall not be construed to be a representation that a search has been made.

(h) The filing of an information disclosure statement shall not be construed to be an admission that the information cited in the statement is, or is considered to be, material to patentability as defined in § 1.56(b).

In relevant part, Rule 1.98 specifies that an information disclosure statement shall include:

(1) A list of all patents, publications, applications or other information for consideration by the office.

Rule 1.98 (a)(3)(i) does not require an explanation of relevance of any such listed patent, publication, application or other information except for "each patent, publication, or other information that is not in the English language."

C. Patent Examining Procedures

13. When a patent application is filed with the Patent Office it is assigned to a patent examiner who examines the application to determine whether the application complies with all the requirements for patentability. One of those requirements is "novelty," that is, whether anyone else has already invented the same exact invention as defined by the claims or whether the inventor or another has patented, published, sold or otherwise disclosed the invention to the public more than one year before filing the application. This is also known as "anticipation." (See, e.g., MPEP §§ 2126-2138.06).²

² For convenience I have cited to the current MPEP unless stated otherwise.

14. The patent examiner also determines whether the invention would have been "obvious" to those skilled in the art. In that regard, the examiner considers all relevant prior art references, typically prior patents and publications, and determines whether there is teaching, suggestion, motivation or other basis in the art to combine the teachings of the references, and whether in view of the suggestion and reference teachings, the claimed invention would have been obvious. (See, e.g., MPEP §§ 2141-2146).

15. Typically, an examiner will by written official action reject the application at the outset based on one or more of the prior art references. The patent attorney then responds by arguing that the references do not anticipate or render obvious the claimed invention, by amending the claims to distinguish the invention from the prior art, or both. In many instances, an interview with the examiner may be held either prior to or after an official action by the examiner in an effort to find grounds for allowance. The general procedures and policies for such interviews are set forth in Rule 1.133 and MPEP § 713.01-713.10. After two or more rejections, the application is either allowed or finally rejected. If claims are allowed, the application may be allowed to issue as a patent with those allowed claims. If not allowed, the inventor can appeal to the Patent Office Board of Appeals and request reversal of the examiner's decision. Alternatively, the applicant may file a Request for Continued Examination (RCE) with appropriate fee and present additional arguments and amendments including new claims to the examiner. (See, e.g., MPEP § 706.07 *et seq.* and § 1201 *et seq.*).

16. In addition to examining the application for novelty and non-obviousness, the examiner also reviews the application to ensure the written description and enablement requirements set forth above are satisfied. The examiner also reviews all amendments to the application, including the specification and drawings, to ensure that "new matter," i.e.,

information not contained in the application as originally filed, is not added during the application process. (See, e.g., MPEP §§ 706.03(O), 2163.06-07).

D. Inequitable Conduct

17. As set forth above, an inventor, his patent attorney, and those directly and meaningfully involved in the prosecution of a patent application have an "uncompromising duty" to prosecute patent applications in the Patent Office with candor and good faith. *Precision Instrument Mfg. Co. v. Automotive Maintenance Mach. Co.*, 324 U.S. 806 (1945). This duty extends to not only the inventor but to the applicant's representatives including the assignee owner, attorneys and individuals substantively involved in the prosecution of the application. *FMC Corp. v. Manitowoc Co.*, 835 F.2d 1411 (Fed. Cir. 1987). If the applicant fails to observe its duty of candor in its dealings with the Patent Office and commits inequitable conduct, all claims of the resulting patent may be rendered unenforceable. *LaBounty Mfg., Inc. v. U.S. Int'l Trade Comm'n.* 958 F.2d 1066, 1070 (Fed. Cir. 1992). If anyone meaningfully involved with the prosecution of a patent application breaches that duty of candor with intent to deceive, a patent may be held to be unenforceable. (See MPEP § 2001.01).

18. Inequitable conduct includes an affirmative misrepresentation of a material fact, failure to disclose material information, or submission of false material information, coupled with intent to deceive. *J.P. Stevens & Co. v. Lex Tex Ltd.* 747 F.2d 1553, 1559 (Fed. Cir. 1984), *cert. denied*, 747 U.S. 882 (1985). A party alleging inequitable conduct must offer clear and convincing proof of the materiality of the prior art, knowledge chargeable to the applicant of the prior art and its materiality, and the applicant's failure to disclose the prior art, coupled with an intent to deceive the examiner into issuing the patent. *Braun, Inc. v. Dynamics Corp. of America*, 975 F.2d 815, 822 (Fed. Cir. 1992). If the failure to disclose or misleading statements

regarding material information occurred through negligence, oversight, carelessness, or an error in judgment, even if it was grossly negligent, there is no intent to deceive and there is no inequitable conduct. *Kingsdown Med. Consultants v. Hollister, Inc.* 863 F.2d 867, 876 (Fed. Cir. 1988). Intent to deceive is rarely admitted or obvious, and must be inferred in most cases from all the evidence of surrounding circumstances. *Critikon, Inc. v. Becton Dickinson Vascular Access, Inc.*, 120 F.3d 1253, 1256 (Fed. Cir. 1997). However, specific intent to deceive must be proven by clear and convincing evidence, *Kingsdown Med. Consultant*, 863 F.2d at 876, and the inference must “be the single most reasonable inference to be drawn from the evidence to meet the clear and convincing standard.” *Star Scientific, Inc. v. R.J. Reynolds Tobacco Co.*, 537 F.3d 1357, 1366 (Fed.Cir.2008).

19. Material information in connection with an examination is defined by the Patent Office Rules, 37 CFR § 1.555(b), to be non-cumulative information that either (1) is a patent or printed publication that by itself or with other patents or printed publications, establishes a prima facie case of unpatentability of a claim, or (2) refutes or is inconsistent with a position taken by the patent owner in (i) opposing an argument of unpatentability relied upon by the Patent Office, or (ii) asserting an argument of patentability. Additionally, prior art or information may be material if a reasonable examiner would have considered it important in deciding whether to allow the application. *Digital Control, Inc. v. The Charles Machine Works*, 437 F.3d 1309, 1315 (Fed. Cir. 2006).

IV. THE ALLEGATIONS OF INEQUITABLE CONDUCT

20. In paragraph 47 of the Amended Answer and Counterclaim defendant alleges that certain statements made at column 1, line 45-62 and Figure 9A of the drawings of the '650 patent “were false and incomplete and were misleading at the time that they were made,” and

that Heartland was aware of prior art “V” and “bull nose” trailers with tapered front ends which was not disclosed to the Patent Office.

21. In paragraph 48 of the Amended Answer and Counterclaim defendant alleges that Heartland filed an improper information disclosure statement in that it failed to admit that the disclosed information was material to the patentability of any pending claim and it failed to identify any prior art frames actually made and sold within the industry of which the applicants allegedly had knowledge.

22. In paragraph 49 of the Amended Answer and Counterclaim defendant alleges that Heartland failed to disclose information about an “Eliminator” prior art trailer which was allegedly disclosed by a July 11, 2005 letter and which allegedly anticipated some of the claims of the application.

23. In paragraphs 50-52 of the Amended Answer and Counterclaim Forest River alleges that Heartland “secretly” disclosed the Eliminator reference to the USPTO in a continuing application SN 11/834,214, did not inform Forest River of or allow Forest River to attend an interview regarding the examination of that continuation, filed an improper information disclosure statement after the interview and did not adequately comply with Rule 1.133(b) in connection with the prosecution of that continuation.

24. While it is not clear in paragraphs 53 and 54 of the Amended Answer and Counterclaim what the exact legal theory is for the allegations of inequitable conduct with respect to the '650 patent, Forest River alleges that Heartland somehow improperly added claims to its continuing applications SN 11/834,214 and 12/315,894.

25. Forest River alleges in paragraph 55 of the Amended Answer and Counterclaim that certain named inventors are not "co-inventors" within the meaning of the patent act, that the error did not arise without deceptive intent and that its failure to inform the patent office of these alleged facts was material to the patentability of the claims, and thus, in violation of rule 1.56.

26. In addition to the allegations of the Amended Answer and Counterclaim, Forest River identifies in its response to Heartland's First Interrogatory No. 3 several additional alleged claims of inequitable conduct in addition to those discussed above. Forest River alleges that at least three of the inventors did not read the application sufficiently to understand its content and claims, falsely asserted inventorship and did not disclose information required under 37 C.F.R. 1.56 and this was known or should have been known by Mr. Cooper and Mr. Cooper should have, pursuant to 37 C.F.R. 10 and 1.56, prevented "the patent application from being prosecuted under those circumstances." Further, Forest River alleges that the prosecuting patent attorneys did not sufficiently gather and pass on information from the inventors with respect to: (a) the nature of the invention, (b) the known scope of the prior art within the industry, (c) the level of ordinary skill of those involved in the design of travel trailers and fifth wheel and (d) the differences and similarities between the claimed invention and the prior art. Finally, Forest River alleges in the response to Interrogatory 3 that the prosecuting attorneys failed to claim the real "invention" of the inventors, and did not comply with 35 U.S.C. §112 by not particularly pointing out and distinctly claiming the subject matter which the named inventors regarded as their invention and by not "enabling" one of ordinary skill in the art to make and use that invention.

27. Additionally, Forest River alleges that Heartland failed to inform the Patent Office of false inventorship in connection with a continuing application that was allegedly admitted in

a deposition of Brian Brady and paid an issue fee to “close down prosecution” before a transcript of that deposition could be created.

V. ANALYSIS AND CONCLUSIONS

28. There is no evidentiary support for Forest River’s allegations in paragraph 47 of the Amended Answer and Counterclaim that certain statements made at column 1, line 45-62 and Figure 9A of the drawings of the ‘650 patent “were false and incomplete and were misleading at the time that they were made,” and that Heartland failed to disclose prior art “V” and “bull nose” trailers with tapered front ends to the Patent Office. The prior art disclosed by Heartland to the Patent Office by its information disclosure statement completely refutes these allegations. For example, U.S. Patent Nos. 6,343,830; 6,860,545; 6,170,903 and 5,746,473 which were disclosed to the examiner in the IDS all disclose that it was conventional to have a fifth wheel trailer with an upper deck with “a rectangular or parallel-shape footprint whose forward corner edges form right angles.” (See, e.g., Figs. 1 & 2 of the ‘830 and ‘545 patents, Figs. 1, 2A & 2B of the ‘903 patent and Figs. 5 & 6 of the ‘473 patent). In context of a patent, “conventionally” merely means known in the art. Thus, that statement was neither false nor misleading. Moreover, the construction shown in Figure 9A of the ‘650 patent is very similar to the front edge construction shown in Figure 2 of U.S. Patent No. 6,860,545 and Figures 5 & 6 of U.S. Patent No. 5,746,473, thus showing that Figure 9A does depict prior art and was neither false nor misleading. Further, I am aware of no reported case that has ever found a statement made in the specification of a patent about the state of the prior art to be the basis for inequitable conduct.

29. There is no legal or evidentiary support for Forest River’s allegations in paragraph 48 of the Amended Answer and Counterclaim that Heartland (I) filed an improper information statement with the United States Patent Office in that it failed to “admit” that the disclosed

information was material to the patentability of any pending claim and (2) it failed to identify any prior art frames actually made and sold within the industry of which the applicants allegedly had knowledge. There is no requirement by either the Patent Act or the Patent Office Rules that an applicant “admit” that disclosed information is either prior art or that it is material. More specifically, Patent Office Rule 1.97 specifically states that:

(g) An information disclosure statement filed in accordance with this section shall not be construed to be a representation that a search has been made.

(h) The filing of an information disclosure statement shall not be construed to be an admission that the information cited in the statement is, or is considered to be, material to patentability as defined in § 1.56(b).

Moreover, Rule 1.98 provides that all the applicant need to provide is:

(1) A list of all patents, publications, applications or other information for consideration by the office.

There is no requirement under the rules that the listed items be either identified as prior art or material to patentability. Rule 1.98 (a)(3)(i) only requires an explanation of relevance of any such listed patent, publication, application or other information where the “patent, publication, or other information that is not in the English language.” (emphasis added) None of the cited references are in a foreign language so there is no requirement under the PTO Rules for any explanation of relevance. The IDS submitted by Heartland fully complies with Rules 1.97 and 1.98, and therefore, cannot be the basis for a claim of inequitable conduct. Rule 1.56 clearly states that “the duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. (Emphasis added)

30. Moreover, there is no clear and convincing evidence that the Heartland or its patent attorneys did not disclose all material non-cumulative information of which they had knowledge in the Information Disclosure Statement filed with the Patent Office. The supposed material prior art of which the inventors allegedly had knowledge identified by Forest River is the Eliminator fifth wheel trailer, the Cherokee fifth wheel trailer, the Holiday Rambler fifth wheel trailer, the Road Master fifth wheel trailer frame, the Cardinal fifth wheel trailer frame and the Space Craft fifth wheel trailer. However, there is no clear and convincing evidence that any of the inventors either knew of these trailers, recognized any of these trailers as material prior art to their invention and intentionally withheld any of these alleged prior art fifth wheels from either the attorneys or the Patent Office for deceptive purposes. Moreover, for the most part, as will be discussed in more detail below, these alleged prior art fifth wheel trailers are merely cumulative of information provided to the PTO by Heartland by its IDS or found by the examiner in his search. "When a reference was before the examiner, whether through the examiner's search or the applicant's disclosure, it cannot be deemed to have been withheld from the examiner." *Molins PLC v. Textron, Inc.*, 33 USPQ 2d 1823, 1832 (Fed.Cir.1995).

31. With respect to the allegations of paragraph 49 of the Amended Answer and Counterclaim that defendant Heartland failed to disclose information about an "Eliminator" prior art trailer which was allegedly disclosed by a July 11, 2005 letter, contrary to Forest River's allegations, there is nothing in the July 11, 2005 letter from Forest River's Mr. Liegl to Heartland's attorney, Mr. Gallagher, that either identifies the "Eliminator" by name or provides any information whatsoever about its identity or construction. All the July 11, 2005 letter merely states is that "[q]uite a few years ago there was a certain recreational vehicle product that had a similar design to the one in question." (Emphasis added) Mr. Liegl suggests that Mr.

Gallagher “do some historical checking” to see if he can find this alleged “certain recreational vehicle product.” This is not a sufficient disclosure of prior art to place any obligation on Mr. Gallagher to make a disclosure to the Patent Office. Further, to the extent to which this vague reference is referring to a trailer with a “V” or “Bull” nose, that concept is disclosed by U.S. Patent No. 4,767,132 – Avery. To the extent to which this vague reference is referring to a fifth wheel trailer with curved front corners, that concept is disclosed by U.S. Patent Application No. 2002/0003341 – Hall and foreign publication DE 3321306 uncovered by the examiner’s search and listed as a cited reference in the ‘650 patent.. Both the Avery and Hull references were cited by the examiner in rejecting certain of the claims. Thus, the examiner was fully aware of prior art showing “V” or “Bull” nosed and curved corner trailers and fifth wheels and the Eliminator and other prior art showing the same concepts are merely cumulative and non-material.

32. There does not appear to be any clear and convincing evidence that anyone substantively involved with the prosecution of the ‘650 patent, and particularly the prosecuting attorneys, had knowledge of the Cherokee fifth wheel trailer (EX. 104) before the ‘650 patent issued, believed it to be material and withheld that information with an intent to deceive the examiner. Moreover, the Cherokee has both a “V” nose and curved front corners both of which concepts are disclosed by the above cited Avery, Hall and foreign publication references.

33. There does not appear to be any clear and convincing evidence that anyone substantively involved with the prosecution of the ‘650 patent, and particularly the prosecuting attorneys, had knowledge of the Holiday Rambler fifth wheel trailer (EX. 104) before the ‘650 patent issued, believed it to be material and withheld that information with an intent to deceive the examiner. Moreover, the Holiday Rambler has slanted or rounded front corners which are

disclosed in the above cited Hall application and foreign publication DE 3321306. Thus, even if the Holiday Rambler fifth Wheel trailer had been known to someone with a duty to disclose at a time during prosecution of the '650 patent, it is merely cumulative of information already before the examiner and therefore not material.

34. There does not appear to be any clear and convincing evidence that anyone substantively involved with the prosecution of the '650 patent, and particularly the prosecuting attorneys, had knowledge of the Space Craft fifth wheel trailer (Ex. 100) before the '650 patent issued, believed it to be material and withheld that information with an intent to deceive the examiner. Moreover, the Space Craft fifth wheel trailer has a "V" nose front which concept is disclosed in the above cited Avery and Hall references. Thus, even if the Space Craft fifth Wheel trailer had been known to someone with a duty to disclose at a time during prosecution of the '650 patent, it is merely cumulative of information already before the examiner and therefore not material.

35. There does not appear to be any clear and convincing evidence that anyone substantively involved with the prosecution of the '650 patent, and particularly the prosecuting attorneys, had knowledge of either the Road Master fifth wheel frame (§21 Amend. Ans. and CC) or Cardinal fifth wheel trailer frame (Ex. 40-41) before the '650 patent issued, believed it to be material and withheld that information with an intent to deceive the examiner.

36. It is not clear from the pleadings and interrogatories whether Forest River is contending that the Shadow Cruiser fifth wheel (Ex. 120), the Catalina Coachman fifth wheel (Ex. 114) or the Trail Bay Hauler fifth wheel toy hauler (Ex. 111) are prior art that was known to someone with a duty to disclose at a time during prosecution of the '650 patent, but to the

extent that Forest River is so contending, there does not appear to be any clear and convincing evidence that anyone substantively involved with the prosecution of the '650 patent, and particularly the prosecuting attorneys, had knowledge of the Shadow Cruiser, Catalina Coachman or the Trail Bay Hauler fifth wheels before the '650 patent issued, believed it to be material and withheld that information with an intent to deceive the examiner. Further, those trailers are merely cumulative of prior art disclosed to and before the patent office. The Catalina and Trail Bay trailers have a lower portion of the front edge that is sloped or curved upwardly from a lower front edge that has square corners. Such construction is disclosed in U.S Patent Nos. 6,860,545 -- Ingram et al.; 6,343,830 -- Ingram et al.; 6,231,115 - Crean and 5,746,473 - Crean. The Shadow Cruiser has a V nose and sloped front surfaces which is shown in Avery and Ingram et al. Thus, even if the Shadow Cruiser, Catalina Coachman or Trail Bay Hauler trailers had been known to someone with a duty to disclose at a time during prosecution of the '650 patent, those trailers are merely cumulative of information already before the examiner and therefore not material.

37. Forest River alleges in paragraph 52 of the Amended Answer and Counterclaim that Heartland "secretly" disclosed the Eliminator reference to the USPTO in a continuing application SN 11/834,214, did not inform Forest River of or allow Forest River to attend an interview regarding the examination of that continuation, filed an improper information disclosure statement after the interview and did not adequately comply with Rule 1.133(b) in connection with the prosecution of that continuation. These allegations fail to state a claim of inequitable conduct with respect to the '650 patent as the event occurred after the issuance of the '650 patent. Events occurring in connection with the prosecution of a continuation application after the issuance of the parent patent cannot, as a matter of law, render the parent

patent unenforceable due to inequitable conduct. *Star Scientific, Inc. v. R.J. Reynolds Tobacco Co.*, 537 F.3d 1357, 1370, fn. 10 (Fed. Cir. 2008).

38. Further, by law, patent applications are kept in confidence by the Patent Office, 35 U.S.C. §122, and “information concerning the filing, pendency, or subject matter of an application for patent, including status information, and access to the application will only be given to the public as set forth in §1.11 or in this section.” (PTO Rule §1.14). Rule 1.11 provides for access to a pending application only after publication of the application. Further, proceedings before the United States Patent Office on pending applications, whether published or not, are conducted *ex parte* which means that they are conducted only between the Patent Office and the applicant without the direct knowledge of or participation by any other party. The only participation permitted by third parties in pending published applications is a third party submission of prior art patents or printed publications as provided in Rule 1.99 which allows the submission of no more than ten such items of prior art. No explanation by the third party of the submitted information is permitted. This is the only participation by third parties permitted by the Patent Office in a pending patent application. Thus, Forest River could not have participated in the interview and Heartland’s alleged failure to permit such an intervention cannot form the basis for a claim of inequitable conduct.

39. In paragraphs 53 and 54 of the Amended Answer and Counterclaim, Forest River alleges that Heartland somehow improperly added claims to its continuing applications SN 11/834,214 and 12/315,894. The exact legal theory for these allegations of inequitable conduct with respect to the ‘650 patent is not apparent from the pleadings, and I know of no legal basis for such a claim. Moreover, these allegations fail to state a claim of inequitable conduct with respect to the ‘650 patent as these event occurred after the issuance of the ‘650 patent. Events

occurring in connection with the prosecution of a continuation application after the issuance of the parent patent cannot, as a matter of law, render the parent patent unenforceable due to inequitable conduct. *Star Scientific, Inc.*, 537 F.3d at 1370, fn. 10 (Fed. Cir. 2008).

40. Further, it is completely legally permissible under the Patent Act and Patent Office Rules for the applicant to file as many continuation applications from a pending parent application as the applicant chooses and is willing to pay for. Further, it is completely legally permissible to file as many new claims in those continuing application as the applicant wishes and is willing to pay for so long as those claims are supported by the written specification of the application. However, filing a claim not supported by the specification is only a basis for rejection of that claim by the examiner and not a basis for a claim of inequitable conduct. The examiner is fully capable of determining whether the claims are supported by the specification based upon the information contained in the specification. No additional information need be disclosed to the examiner, and thus, no material information can be claimed to have withheld from the examiner when making the determination of support.

41. In paragraph 55 of the Amended Answer and Counterclaim, Forest River alleges that certain named inventors are not “co-inventors” within the meaning of the patent act, that the error did not arise without deceptive intent and that Heartland’s failure to inform the patent office of these alleged facts was material to the patentability of the claims, and thus, in violation of rule 1.56. These allegations are not supported by either the law or the facts.

42. The Patent Act, 35 U.S.C. § 256 provides that “the error of naming persons who are not inventors shall not invalidate the patent in which the error occurred if it can be corrected as provided in this section.” Section 256 further states that “whenever through error a person is

named in an issued patent as the inventor. ..., and such error arose without deceptive intent on his part... the court before which such matter is called in question may order correction of the patent....” Thus, for Forest River to be able to sustain its allegations of inequitable conduct, it must prove by clear and convincing evidence that someone added their name as an inventor with deceptive intent to deceive the patent office, and that this information was known to someone with a duty to disclose and intentionally withheld from the patent office with the intent to deceive the patent office. There is no evidentiary support for the proposition that any of the named inventors added their name to the application as an inventor with deceptive intent or that such information was purposefully and intentional withheld from the patent office with deceptive intent.

43. At worst, it appears that the decision to add the names of all five owners of the company as inventors was the result of a misunderstanding on the part of those owners as to the meaning of invention, inventorship and the consequences of misnaming inventors. Mr. Rhymer testified that while he thought he was the inventor of the patent, he was the one that proposed all of the names because he didn't think it seemed "right for just my name to be on there. So when the question was asked to me, I answered 'well, I think we should all been on there.' ... It just didn't seem fair that just my name would be on there." Later, in response to the question "Do you know if Scott discussed the inventorship issue with an attorney when the application was pending?" he responded: "Meaning having multiple names on there? ... I don't know that was a problem."(Rhymer Dep. p. 327-8, 330). Mr. Tuttle testified that the reason all five owners were named as inventors was "we felt it was a team effort. ... We were all there for the discussions when we were trying to conceive this ... we felt like we all played a part." (Tuttle Dep. p. 106-70) Tuttle also testified that "there may have been some gray area in my understanding between

what ownership and what inventor, you know, rights and things are.” (Tuttle Dep. p. 85). Mr. Brady’s testimony is ambiguous at best. At page 245 of his deposition he testifies that he believes his “turning radius invention” is incorporated in all Heartland Fifth Wheel products, but at page 72 of his deposition he responded “no” to the question “have you ever invented anything?” However, in the context of the line of questioning at that point in the deposition, it appears that he was responding on the basis that the question was in the context of “apart from” the invention of the patent in suit has he ever invented anything? Apart from the ambiguity of whether Mr. Brady does or does not consider himself an inventor of the patent in suit, there is no testimony by Mr. Brady or other evidence to support a claim that he falsely caused his name to be added to the patent with any deceptive intent. Mr. Lantz testified that “as far as I was concerned, I was an inventor.” (Lantz Dep. p. 119). “My understanding is that I’m a named inventor and I have the right to know as an inventor what’s going on with the patent...” (Lantz Dep. p. 112). Mr. Lantz testified he didn’t know why the five inventors were named on the patent, and he has no “information that any of the inventors were named ... to deceive anyone.” (Lantz Dep. p.126). Mr. Lantz did concede that he doesn’t “know the legal definition of inventorship...” (Lantz Dep. p. 232), but that only indicates a basis for mistake but not a basis for deceptive intent. Finally, Mr. Lantz testified that he does not know if he is one of the three inventors who his attorney alleges “falsely asserted inventorship.” (Lantz Dep. p. 253). Interestingly, Mr. Lantz testified that it was not his recollection that John Rhymer “was the one that came up with the idea for how to improve the turning radius of the vehicle.” Rather, he testified that if he “had to make a decision, I think Tim Hoffman knew of the problem that was out there, the issue that we were trying to get around, and knew that there was a turning radius problem with fifth wheels.” (Lantz Dep. p. 76) Finally, Mr. Hoffman was not asked any

questions about his role in the development of the invention so there is no basis in his deposition to contend that he is or is not an inventor or that he caused his name to be added with deceptive intent.

44. While it is not clear from the deposition testimony exactly who the actual inventors of '650 patent are, it is clear that to the extent to which there is an error in inventorship, that error occurred as a result of mistake and without any deceptive intent on the part of any of the named inventors to add their names to the application. This conclusion is supported by the fact that all five of the named inventors immediately assigned their rights to Heartland upon execution of the application. There would be no motive whatsoever for any of the five named inventors to falsely and deceptively add their name to the patent application when they knew they were going to assign all their rights to the company. Thus, any error in inventorship that may exist was through mistake and can be corrected pursuant to 35 U.S.C. §256 and cannot be the basis for claiming either invalidity of the patent or inequitable conduct on the part of any of the named inventors.

45. As noted above Forest River also alleges that Heartland failed to inform the Patent Office of false inventorship in connection with a continuing application that was allegedly admitted in a deposition of Brian Brady and paid an issue fee to "close down prosecution" before a transcript of that deposition could be created. This claim is meritless in the present proceedings because it did not occur during the prosecution of the patent in suit, the only patent at issue at this time. Moreover, as pointed out above, the transcript of the Brady deposition does not support Forest River claim that Brady "admitted" not being an inventor of the patent in suit, and if it is ever established by clear and convincing evidence that Mr. Brady is not an inventor,

that error occurred by mistake and without deceptive intent on his part and can be corrected without invalidating the patent.

46. With respect to the claim that the inventors did not read the application sufficiently to understand its content and claims, and that Mr. Cooper or Mr. Gallagher knew or should have known this alleged fact and prevented the application from being prosecuted, there is no clear and convincing evidence to support this claim. Mr. Tuttle testified that he personally provided copies of the application to the inventors and that he saw them reading it. "I recall that as we sat in a room that different partners of mine were absolutely reviewing it and looking at it. . . . They had it in their hands, they saw it, they read it." (Tuttle Dep. p. 213)

47. Further, there is no evidence to support a claim that Mr. Cooper knew of any alleged failure on the part of the inventors to read the application. When Mr. Cooper sent the application to Heartland for execution he stated in his April 5, 2005 transmittal letter that "by signing the Declaration, you are declaring that you have reviewed and understood the contents of the application including the patent claims." (B&T 143) The Declaration was signed by the inventors and returned to him so he had every reason to believe that the inventors had in fact read and understood the application and its claims. Further, Mr. Gallagher who did not acquire the file until after the application had been filed would have no basis or reason to question whether the inventors had read and understood the application in light of the correspondence and signed declarations in the file. Further, at least one reported case has found that an inventor's failure to read an application before executing the Declaration is not a sufficient basis for a finding of either invalidity or inequitable conduct. *Regents of the Univ. of California v. Howmedica, Inc.*, 530 F. Supp. 846, 740-1 (D.N.J. 1981)

48. With respect to the claim in the response to Interrogatory 3 that the inventors falsely asserted inventorship, that claim is covered above and is without merit. As to Mr. Cooper, there is no evidence that he had any knowledge that any of the named inventors were not in fact inventors. In his March 11, 2004 letter transmitting the draft provisional application, he requested the "full name (including middle name) of each inventor." (B&T 043) In response to that request, Mr. Tuttle sent an email on March 29, 2004 listing the names and addresses of the five named inventors. (B&T 067) Those five names were listed in both the provisional and utility application as the inventors by Mr. Cooper based upon the information available to him. Mr. Cooper testified that "as par for the course, that -- those discussion [about inventorship] would take place" and there was "no change" in inventorship when the utility application was filed.(Cooper Dep. p. 33) Thus, there is no evidence to support a claim that Mr. Cooper knew that any one of the named inventors had falsely and deceptively asserted inventorship.

49. With respect to the claim in the response to Interrogatory 3 that the inventors or Mr. Cooper failed to disclose information required under 37 C.F. R. 1.56, this claim is covered below and there is no basis for this claim. There is no clear and convincing evidence that Mr. Cooper knew of any material information that was intentionally withheld from the Patent Office with deceptive intent.

50. With respect to the claim in the response to Interrogatory 3 that the prosecuting attorneys failed to gather and pass on information from the inventors with respect to the nature of the invention, this claim is without evidentiary support or merit. The Barnes & Thornburg file is replete with information, drawings and photographs provided by Heartland to Mr. Cooper regarding the scope of the invention. (See, e.g. B&T 02-040) Further, when Mr. Cooper forwarded a draft of the provisional patent application on March 11, 2004, he requested each

inventor “review this draft for completeness and accuracy, and provide us with comments or suggestions concerning any changes deemed necessary or desirable.” (B&T 043) Again when the utility application was prepared, Mr. Cooper sent a copy to Mr. Tuttle and requested it be reviewed for “errors and omissions.” (B&T 080) Thus, Mr. Cooper took appropriate steps to gather and accurately pass on information from the inventors regarding the nature of the invention.

51. With respect to the claim in the response to Interrogatory 3 that the prosecuting attorneys failed to gather and pass on information from the inventors regarding the known scope of the prior art within the industry, this claim is without evidentiary support or legal basis. Mr. Cooper did inform the inventors of the duty of disclosure and requested that they supply any known prior art information including “patents or literature ... earlier sales or public uses ... or items or processes related to the invention” in his letters of April 5 and 11, 2005. (B&T 141-145) Thus, there is no basis to contend that Mr. Cooper did not attempt to gather and pass on material information. Further, as discussed above, there is no evidence to support a claim that either the inventors or attorneys intentionally withheld any known material prior art. To the extent to which it is Forest River’s contention that the inventors should have disclosed their entire knowledge of the commercially available products in field of the invention, that contention has been found meritless by the Court of Appeals for the Federal Circuit. “To require the inventor to describe his entire personal knowledge in the field of the invention, however the knowledge was obtained, would be an unmanageable assignment. It is prior art that must be disclosed, prior art that is material to patentability.” *Upjohn Co. v. Mova Pharmaceutical Corp.*, 225 F.3d 1306, 1315 (Fed. Cir. 2000).

52. With respect to the claim in the response to Interrogatory 3 that the prosecuting attorneys failed to gather and pass on to the patent office information from the inventors regarding the level of ordinary skill of those involved in the design of travel trailers and fifth wheels, this claim is without legal basis. First, Rule 1.56 only requires disclosure of material prior art information. Rule 1.56 does not require any disclosure of the level of ordinary skill in the art to which the invention pertains. Further, nothing in the Patent Act requires disclosure to the Patent Office of the level of ordinary skill in the art. Section 112 of the Patent Act merely provides that the specification shall contain adequate description of the invention so as "to enable any person skilled in the art to which it pertains ... to make and use" the invention. This is merely a technical requirement for the content of the specification and not a disclosure requirement. Similarly, Section 103 of the Patent Act sets forth the test of whether prior art renders an invention unpatentable as obvious depending on whether "the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." Once again this is a test to determine obviousness of an invention and not a disclosure requirement. Thus, there is no legal basis for a claim that the failure on the part of the attorneys to gather and pass on to the patent office information from the inventors regarding the level of ordinary skill of those involved in the design of travel trailers and fifth wheels constitutes inequitable conduct. There is no reported case to my knowledge that has ever found the failure to disclose the level of ordinary skill in the art to be a basis for inequitable conduct.

53. With respect to the claim in the response to Interrogatory 3 that the prosecuting attorneys failed to gather and pass on to the patent office information from the inventors regarding the differences and similarities between the claimed invention and the prior art, this

claim is without evidentiary support or legal merit. As discussed above, there is no requirement in the Rules that the inventors or attorneys provide information regarding the “differences and similarities between the claimed invention and the prior art.” The only requirement is that any known material information be disclosed to the Patent Office in the manner specified in Rules 1.97 and 1.98, and there is no requirement for that information to be “admitted” to be prior art or that it be discussed, described or differentiated in any way except as provide in Rule 1.98 (a)(3)(i) for prior art that is not in the English language. Further, as discussed above, there is no evidence that the inventors did not pass on to the attorneys information they knew was material to the application or that attorney’s did not pass on all of the material prior information of which they had knowledge.

54. With respect to the claim in the response to Interrogatory 3 that the prosecuting attorneys failed to claim the real invention of the inventors, did not comply with 35 U.S.C. §112 by not particularly pointing out and distinctly claiming the subject matter which the named inventors regarded as their invention and for not enabling one of ordinary skill in the art to make and use that invention, this claim is without evidentiary and legal support. Forest River’s contention appears to be that the inventors didn’t considered the configuration of the frame of the trailer as claimed in the ‘650 patent to be their “invention.” However, the documentary evidence refutes that contention. In the disclosure materials provided to Mr. Cooper by Heartland are drawings of the various configuration of the frame that are incorporated into the patent. Also, in Heartland’s written disclosure, it is stated that “Heartland has engineered a unique new 5th wheel concept.... This revolutionary concept involves both rethinking how the steel frame of the 5th wheel is designed.... The first step was cutting off the corners of the upper front section of the frame instead of extending them all the way out at a 90° angle, as is the case

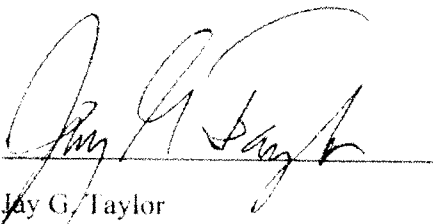
in a traditional 5th wheel frame design.” (B&T 009) Thus, it is quite clear that the inventors considered the frame design to be a significant aspect of the invention. The claims of the ‘650 patent presumptively do distinctly claim that invention because they were allowed by the examiner after his review of those claims. One of the patent examiner’s duties in examination of a patent application is to make a determination of whether the claims and specification meet the requirements of §112. Also, the specification is presumed to meet the enablement requirement of §112 as all of the formal §112 objections to the specification made by the examiner were corrected by the applicant during prosecution and the examiner allowed the patent to issue. Moreover, the written description and drawings adequately enable one of ordinary skill in the art to make and use the claimed invention. Further, I know of no reported case that has ever found a failure to comply with the enablement or claiming requirements of §112 to be inequitable conduct.

55. Finally, there is absolutely no clear and convincing evidence on the record that anyone substantively involved with the prosecution of the ‘650 patent withheld any material non-cumulative information from the Patent Office with the intent to deceive the Patent Office. Mr. Lantz testified that he did not “intentionally” withhold or misrepresent any prior art to the Patent Office, and if it did occur, it was done “inadvertently.” (Lantz Dep. p. 124). Mr. Tuttle, the person most involved in the prosecution of the patent application, testified that he did not “intentionally lie to the patent office,” did not “intentionally deceive the patent office in any way,” did not “intentionally withhold any references of any type from the patent office,” nor did any of the inventors “to his knowledge.” (Tuttle Dep. p. 92-93). Additionally, Mr. Tuttle did, in the invention disclosure, discuss the existence of a patent on a Glendale fifth wheel that attempted to solve the turning radius problem with a “very different” solution and design which

involved “going over the cab of the truck with their unit.” (B&T 009) This illustrates that Mr. Tuttle thought he should bring this information to Mr. Cooper’s attention although it was “very different” solution and design and not material to the Heartland invention. Mr. Brady had no involvement with the prosecution of the patent after signing the Declaration and there is no clear and convincing evidence that he was either aware of any of the allegedly withheld material prior art or that he withheld such prior art with deceptive intent. Mr. Hoffman was not specifically asked about his knowledge of prior art or whether or not he withheld any such knowledge from the Patent Office during his deposition. Thus, there is no evidence upon which to base a claim of inequitable conduct against Mr. Hoffman. Finally, Mr. Rhymer testified that it was Mr. Tuttle’s responsibility to “gather up all the prior art” and they “discussed it” and he told Mr. Tuttle “everything that I knew about prior art.” (Rhymer Dep. p. 213-214). Mr. Tuttle also asked him several times “do you see this as prior art?” (Rhymer Dep. p. 215). He also testified that he “did not consider any horse trailers or cargo trailers – travel trailers as Prior Art according to our fifth-wheel RV” and in his view “there is a big difference between the ‘turning radius issues for travel trailer’ and the ‘turning radius issues for fifth-wheels.’” (Rhymer Dep. pp. 328, 331) Thus, it appears from the record that Mr. Rhymer attempted in good faith to provide his knowledge of what he thought was relevant prior art and cannot be said to have withheld any information with intent to deceive. Thus, there is no clear and convincing evidence that any of the inventors either withheld from or misrepresented any material non-cumulative information to the Patent Office with intent to deceive the Patent Office. To the extent to which there was any failure to disclose known information by the inventors, that failure was inadvertent and without any deceptive intent.

56. Additionally, there is no evidence that either of the patent attorneys involved with the prosecution of the '650 patent application failed to disclose any material prior art of which they had knowledge during the prosecution of the '650 patent. Mr. Cooper transferred the application file to Mr. Gallagher after filing the application, but before the information disclosure statement was due. His duty to disclose terminated with that file transfer. In the transferred file was a list of (Cooper Dep. Ex 3) and copies of patents Mr. Cooper had apparently located although he does not recall exactly how those patents were found. He testified that those patents either came from the client or were found in a formal or informal search. (Cooper Dep. p. 40) Mr. Gallagher testified that he reviewed the file and disclosed all of the patents he found in the transferred file in the Information Disclosure Statement filed with the Patent Office. (Gallagher Dep. p. 30-31) There is no credible evidence that either of the attorneys had knowledge of and intentionally withheld any other material prior art.

57. In conclusion, I find no evidentiary and/or legal basis for the claims of inequitable conduct made by Forest River in this case.



Jay G. Taylor

EXHIBIT A

JAY G. TAYLOR
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Indianapolis, IN 46236
(O) 317-826-0152
(F) 317-826-0152
(C) 317-431-9034
(H) 317-823-8343
Email: jay@jaytaylor.biz

EXPERT
WITNESS:

Mr. Taylor has been an expert witness in connection with a number of litigated matters. In particular, he served as an expert and was deposed in connection with the evaluation of the intellectual property of Baldwin United Corporation in connection with Baldwin United Corporation's Bankruptcy. He was retained and deposed as a patent damages expert for Arachnid, Inc. in connection with patent litigation against London Distributing, Corp. and Merrit Industries, Inc. He was retained and deposed as a patent office practice expert for Uniden Corporation of America, Inc. against AOR Limited and Crum Development Corporation. He was deposed and testified at trial as a patent expert on design patent infringement and validity for ILCO Corporation in the case of Best Locks Corp. v. ILCO Corp. He was retained by Innotek Pet Products, Inc. as a patent expert in a case against Radio Systems, Inc. He was retained by Chubb Custom Insurance Co. as expert on reasonable compensation for patent defense. He was deposed and testified at trial as an expert witness on the issues of inequitable conduct and willful infringement for Gerdes GmbH in the case of Stant, Inc. v. Gerdes GmbH. He was retained by and deposed as an expert witness on the issue of inventorship for International Game Technology, Inc. in the case of Goff v. Harrah's Operating Co. Inc. et al.

EDUCATION:

B.S.M.E., University of Cincinnati, 1964
J.D. (magna cum laude), Indiana University, 1967

HONORS:

Pi Tau Sigma, Mechanical Engineering Honorary

Order of Coif, Law Honorary

Indiana University Law Journal, Editorial Board. Author of Use of An Arbitration Clause As A Defense To 8(a) Charge Resulting From The Employer's Refusal To Bargain When Acting Unilaterally With Respect To A Mandatory Subject of Collective Bargaining, Indiana Law Journal, Vol. 41, p. 455.

Author, Intellectual Property: A General Practitioner's Guide, Illinois Bar Journal, February 1990, Vol. 75, No. 3, p. 104, reprinted Res Gestae, April 1991, Vol. 34, No. 10, p. 452. Contributing Author, Reflections On The Practice of Patent Law, The Art and Science Of Patent Law, Aspatore Books, 2004

EMPLOYMENT

HISTORY:

1967 - June to October - Associate, Kirkland and Ellis

November 1967 - December 1969 - U.S. Army, First Lieutenant and Captain, Contract Administration Officer, Ammunition Procurement and Supply Agency

December 1969 - December 1977 - Kirkland and Ellis, Partner (1973-77)

January 1978 – December 1989 - Haight & Hofeldt, Partner

January 1990 – December 2008 - Ice Miller, Partner

BAR

ADMISSIONS:

Supreme Court of Indiana, Supreme Court of Illinois

U.S. District Courts for the Southern District of Indiana, Northern District of Indiana, Northern District of Illinois (including the Trial Bar) and Western District of Michigan.

United States Court of Appeals for the Federal, Second, Seventh Circuits

United States Patent and Trademark Office (Reg. No. 25,799)

LEGAL

EXPERIENCE:

Has been extensively involved in patent, copyright, trademark, unfair competition, antitrust, trade secret, and product liability consultation and litigation.

Has handled litigation and prosecution matters in such diverse mechanical and electrical fields as, for example, thermostatic mixing valves, children's car seats, dental methods and devices, hearing protection devices, soil aerating equipment, computer software, heart defibrillators and pacemakers, urological stents, ceramic products and processes, data recording and transmission equipment, electronic musical instruments, high voltage transmission equipment, food processing equipment and processes, vending equipment, electronic games, railroad equipment, welding equipment and processes, UV curable inks and coatings, plastic lamina, and RF curable particle board manufacturing processes

Also has had extensive experience in trademark, copyright and software litigation, prosecution, licensing and counseling.

PROFESSIONAL

ORGANIZATIONS:

Member of the American Bar Association, Indiana Bar Association, Intellectual Property Law Association of Chicago, American Intellectual

Property Law Association, Federal Circuit Bar Association and the Patent Office Society.

Past Chairman of the Intellectual Property Law Section of the Indiana Bar Association.

OTHER RECOGNITIONS:

Listed in Best Lawyers in America

Listed in Who's Who

Listed in Who's Who in American Law

Selected as an Indiana Super Lawyer, 2004, 2006, 2007, 2008

Martindale-Hubbell AV rated

Tab U

UNITED STATES DISTRICT COURT
Northern District of Indiana
South Bend Division

HEARTLAND RECREATIONAL)
VEHICLES, LLC.)
Plaintiff.)
)
)
v.)
)
FOREST RIVER, INC.,)
Defendant.)

CASE NO.: 3:08-cv-490 TLS-CAN

AFFIDAVIT OF JAY TAYLOR

I, Jay G. Taylor, upon my oath, declare and state as follows:

1. The attached Expert Report of Jay G. Taylor is a true and accurate copy of the Expert Report I prepared in the case of Heartland Recreational Vehicles, LLC v. Forest River, Inc.

2. All factual statements made therein are true and accurate either based upon my personal knowledge or based upon information and belief as a result of my review of the materials identified in paragraph 4 of that Report.

3. All statements of patent practice and law are believed to be correct statements of the law based upon information and belief, and all opinions expressed therein are my personal opinions based upon my professional experience and analysis.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on December 15, 2009


Jay G. Taylor

Tab V



US006343830B1

(12) **United States Patent**
Ingram et al.

(10) **Patent No.:** **US 6,343,830 B1**

(45) **Date of Patent:** **Feb. 5, 2002**

(54) **TRAVEL TRAILER**

(75) **Inventors:** **Anthony G. Ingram; Marion B. Johnson; Terry L. Harkins**, all of Casper, WY (US)

(73) **Assignee:** **B & B Homes Corp.**, Mills, WY (US)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **09/630,204**

(22) **Filed:** **Aug. 1, 2000**

(51) **Int. Cl.⁷** **B60P 3/335; B62D 63/06**

(52) **U.S. Cl.** **296/168; 296/37.1; 280/433**

(58) **Field of Search** **280/433, 789; 296/37.1, 156, 168, 181, 182**

(56) **References Cited**

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Teton Homes Sales Brochure, Titled "1994 Fifth Wheels, 102 Inch Wide Body," pp. 6-7 and front and back covers, dated: Dec. 1, 1993.

* cited by examiner

Primary Examiner—Joseph D. Pape

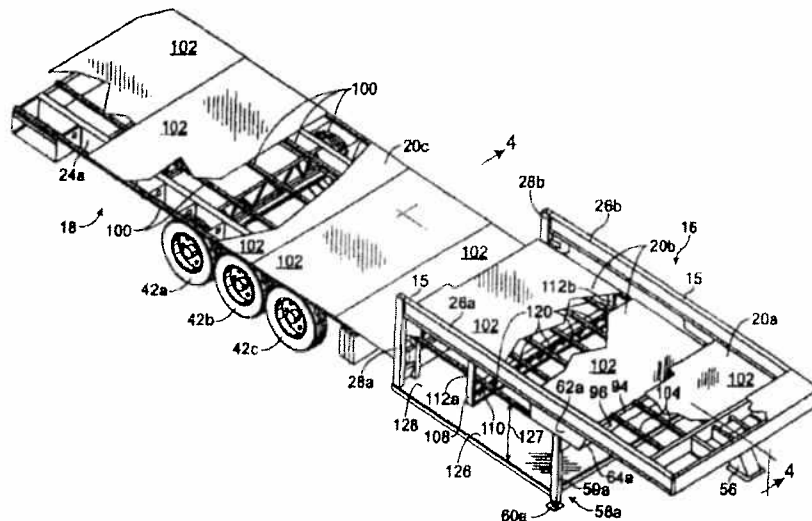
Assistant Examiner—Paul Chenevert

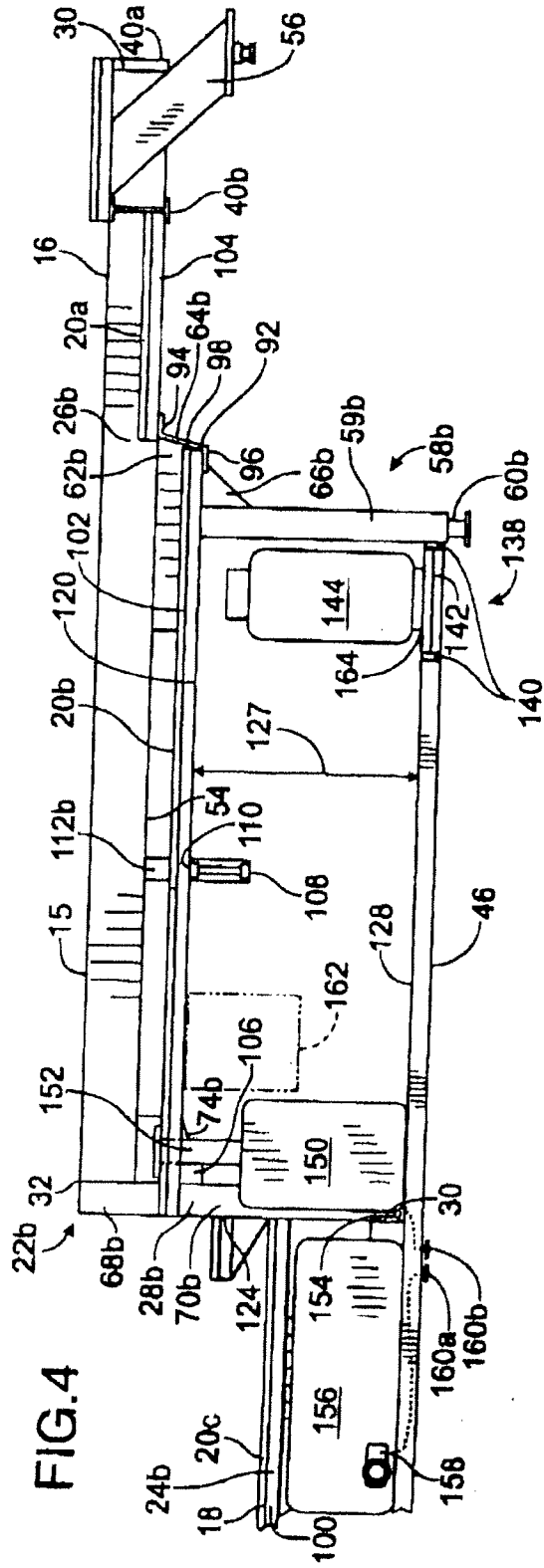
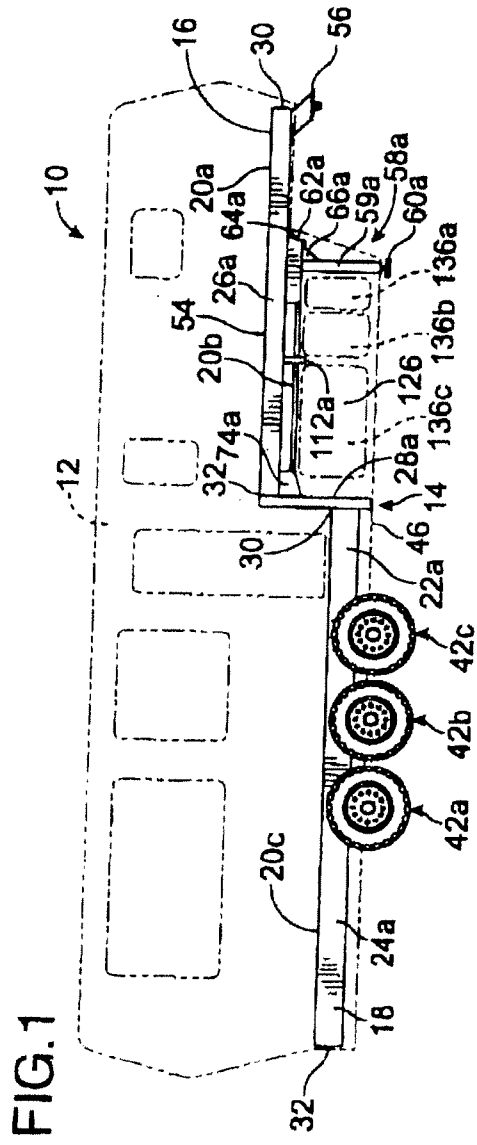
(74) *Attorney, Agent, or Firm*—Ipsolon llp

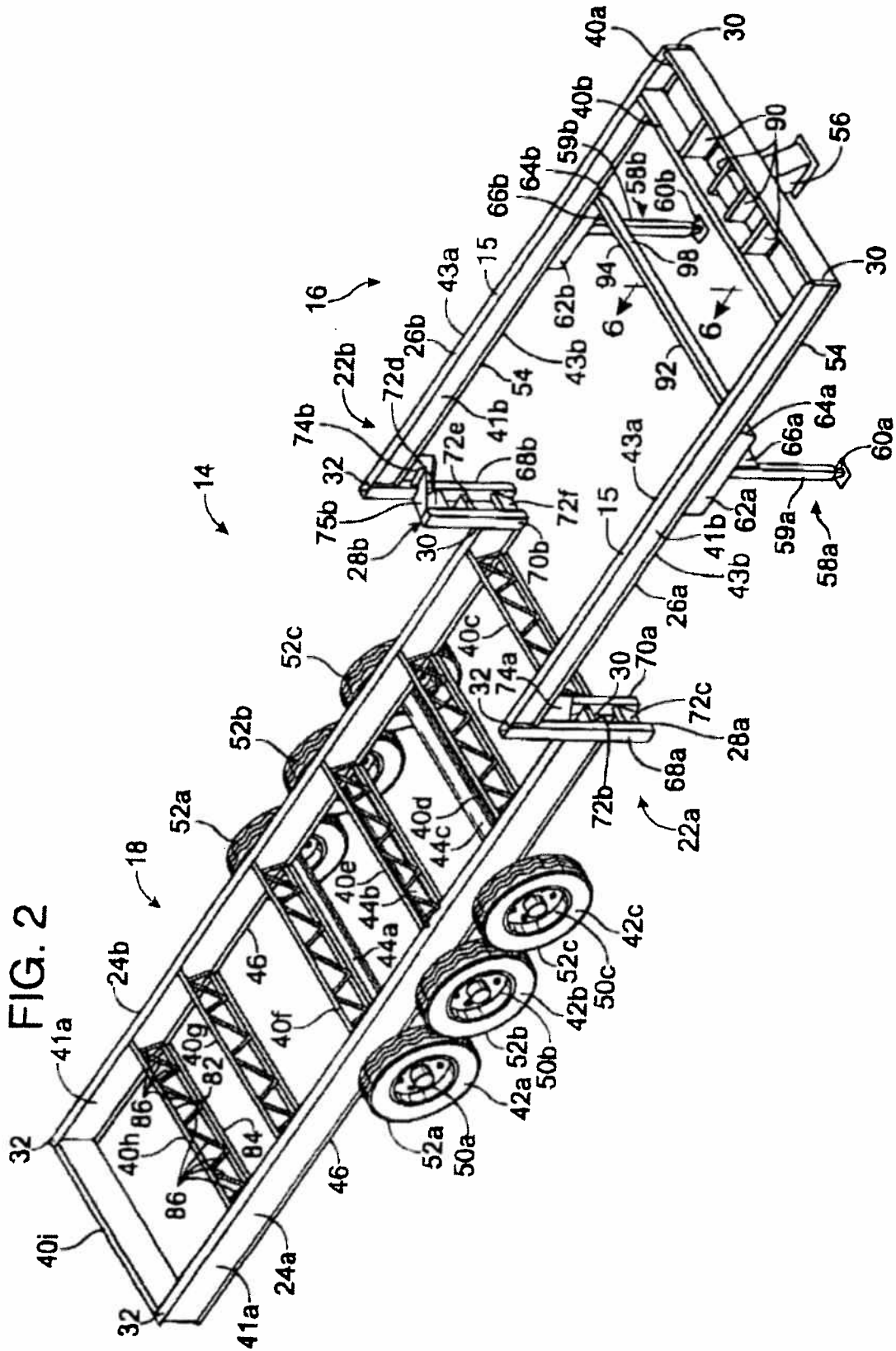
(57) **ABSTRACT**

A travel trailer having a two-level chassis supporting at least three discrete floor sections at three different heights above the ground with at least one of those floors being suspended from the chassis. In a preferred embodiment, the chassis has a substantially horizontal forward upper portion and a substantially horizontal rearward lower portion, and an upper floor is secured to the upper portion and a lower floor is secured to the lower portion with an intermediate floor suspended from the upper portion of the chassis to a height intermediate that of the upper and lower floors. The area underneath the intermediate section and above the bottom of the trailer defines a storage area that is not blocked or limited in size by the width of the chassis beams. In a more preferred embodiment, common fixed trailer accessories, such as gray and black water tanks, their related plumbing, trailer heaters and the like are clustered together within and near a limited section of the storage area, such as near the rear of the storage area, such that the majority of the storage area remains unoccupied. Accordingly, storage space within the storage area is optimized, and the full height of the storage area is available throughout the majority of the storage area to accommodate oversized objects.

18 Claims, 5 Drawing Sheets







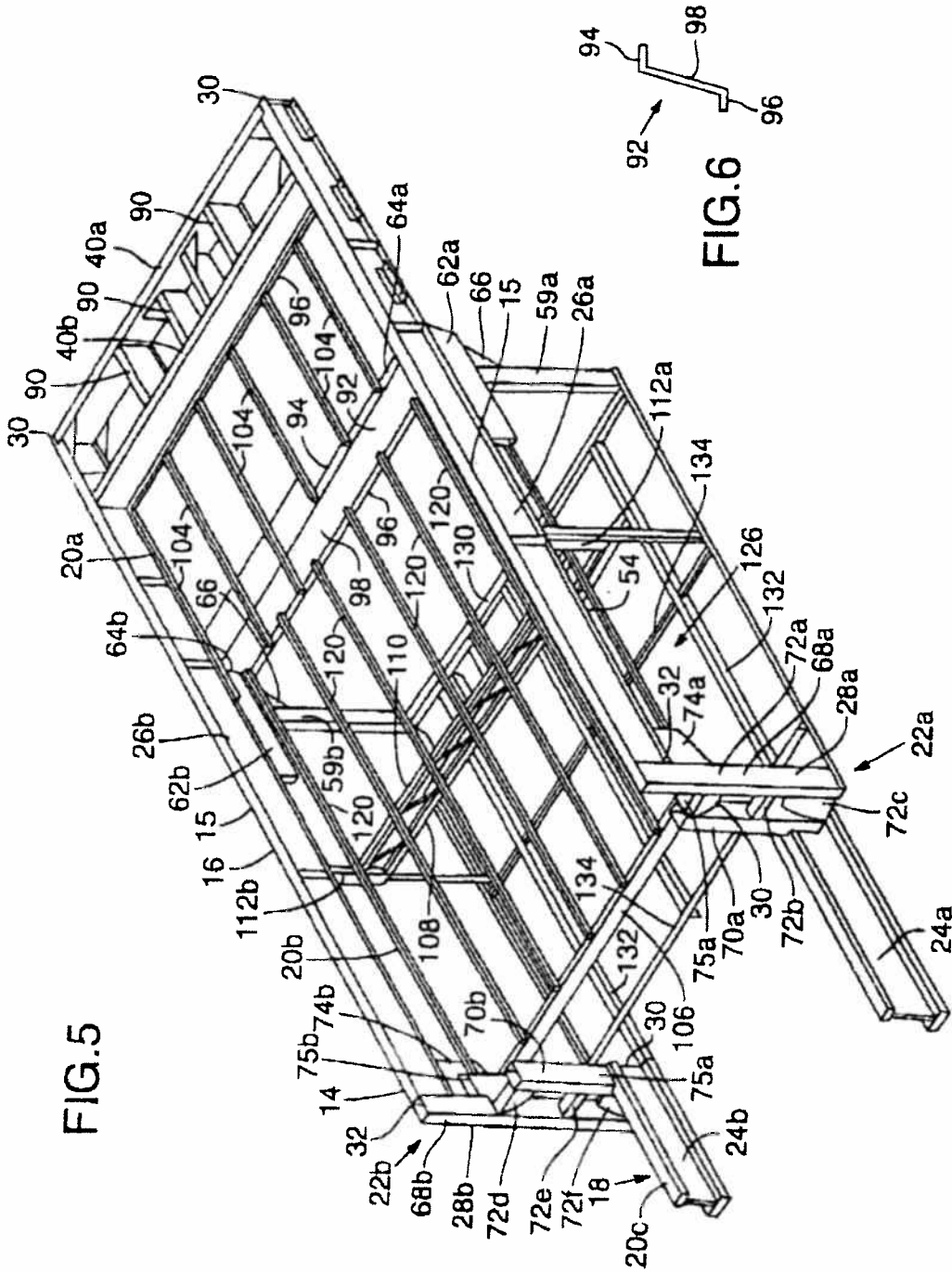
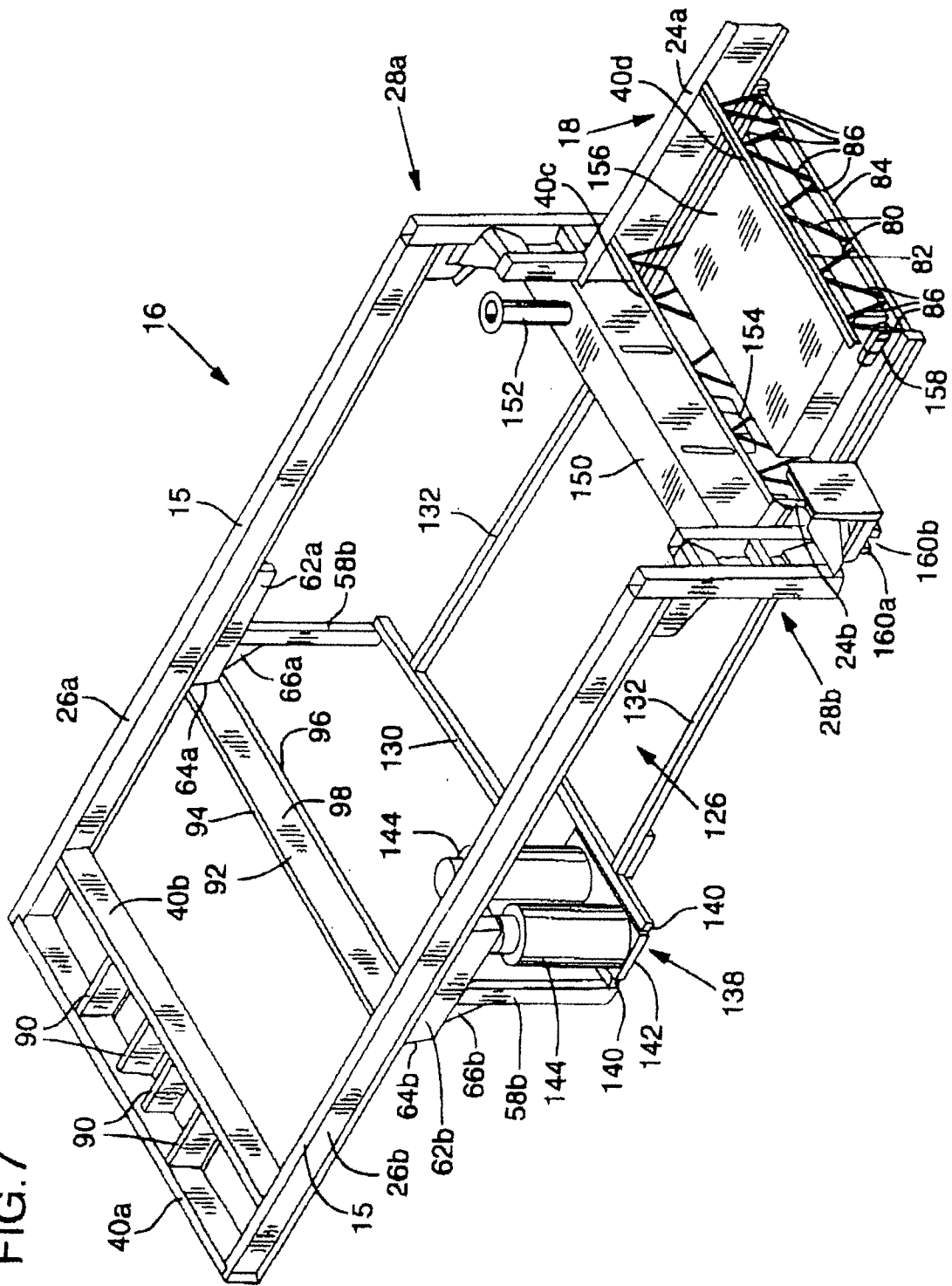


FIG. 5

FIG. 6

FIG. 7



TRAVEL TRAILER TECHNICAL FIELD

The invention is an improved travel trailer. In particular, the invention concerns a travel trailer having an improved chassis that is strong, easy, and economical to manufacture, and has at least one floor suspended from the chassis, which preferably optimizes use of available storage space beneath that floor.

BACKGROUND OF THE INVENTION

Travel trailers, which are towed vehicles usually having many of the conveniences of a home, are widely known and popular. One known type of travel trailer is commonly referred to as a "fifth-wheel" trailer, which is particularly adapted to be towed by a traditional pick-up truck. Namely, the forward portion of the fifth-wheel trailer is elevated above the bed of the pick-up truck and includes a mounting portion extending from the bottom of the elevated forward portion to a trailer mount, or hitch, secured to the bed of the pick-up truck.

Because of height restrictions imposed on travel trailers operating on most highways and aerodynamic considerations associated with towing a travel trailer at high speeds, the total desirable height above the ground for a fifth-wheel trailer is limited. Accordingly, the elevated forward portion typically has limited headroom, and therefore is usually used as a bedroom. The remaining aft portion of the fifth-wheel trailer typically includes a bathroom portion and general living portion.

Plumbing in trailer bathrooms typically includes gray and black water storage tanks and related tubing and valves extending from one or more toilets, shower drains, sink drains, and the like within the bathroom, to these storage tanks. To take full advantage of gravity, these types of storage tanks are typically mounted somewhere below the drains and toilet such that water from these devices flows freely through this tubing to its respective storage tanks. Accordingly, it is desirable to elevate the floor of the bathroom portion of a trailer above the bottom of the trailer.

Because of the limited headroom, it is not desirable to elevate the bathroom portion of the floor to the height of the forward bedroom floor of the trailer. Accordingly, the typical fifth-wheel trailer will usually longitudinally position the bathroom portion between the bedroom and living portion, and vertically elevate the floor of the bathroom portion to an intermediate height between the heights of the bedroom and living portion floors. The end result is a fifth-wheel trailer having three floor heights above the ground. A first height toward the aft of the trailer supporting the living portion, a second height toward the center of the trailer supporting the bathroom portion, and a third height toward the front of the trailer supporting a bedroom.

The area below the second height and the bottom of the trailer is typically enclosed and used as a storage space for the storage tanks, valves, and plumbing. In addition, this area is typically large enough to be used as a general storage area, or trunk space, for gear and the like. Accordingly, one or more access doors may be provided along the exterior walls of this storage area to provide access to this space. It is desirable for this storage area to be large and easily accessible.

The chassis of a typical fifth-wheel trailer must be sufficiently strong to support the trailer, and durable enough to resist weakening over a lifetime of prolonged use. Since the

typical fifth-wheel trailer is regularly towed at high speeds and over rough or unimproved roads, the chassis must also withstand a tremendous amount of dynamic loads placed on it. Typical chassis materials are incredibly strong and durable. For example, a typical fifth-wheel chassis will be made of welded-together portions of elongate steel I-beam having an eight-inch to 12-inch vertical web. In general, the fewer parts and welds making up the primary load carrying chassis structure, the stronger and more durable the chassis.

A particularly strong chassis design is commonly known as a two level chassis. It's general design is shown and identified as prior art in FIG. 1A of U.S. Pat. No. 5,746,473 to Crean, the disclosure of which is hereby incorporated by reference. A two level chassis features an elongate horizontal lower beam (114, FIG. 1A of Crean), an elevated elongate horizontal tipper beam (116, FIG. 1A of Crean), and an interconnecting vertical section (115, FIG. 1A of Crean) joined to both the lower and upper beams as shown in FIG. 1A of Crean, usually by welding. The elevated bathroom portion (122, FIG. 1A of Crean) of the typical two level chassis is typically a platform structure constructed of elongate wood members, metal members, or the like, and is supported above and by the lower beam (114, FIG. 1A of Crean). A storage space (140, FIG. 1A of Crean) is defined as the area below the elevated bathroom floor, but above the lower beam.

While the typical two level chassis is particularly strong, the design also limits the amount of available storage in the storage area and access to that storage area. In particular, since the lower beam defines the lower portion of the storage area, the total volume of the storage area is narrowed by the vertical width of the webbing on that beam. For example, using typical chassis materials having an eight-inch to twelve-inch vertical web, the height of the storage area would be reduced by eight to twelve inches, thereby reducing the total volume of the storage area.

In practice, the height limitations imposed by positioning the chassis beam in this area prevents common oversized travel trailer-related items, such as traditional elongate, cylindrical 40 pound Liquid Petroleum Gas ("LPG") tanks, from being accommodated easily in the storage area. In particular, in order for these types of items to fit within such known storage areas, they must either 1) be stored on their sides, thereby taking up much desirable floor space in the storage area, or 2) in some models be stored upright within a limited outrigger area between the chassis beam and storage area door, thereby blocking access to the majority of the storage area.

Some inventors have attempted to improve access to and the overall amount of storage space available in the storage area of a traditional fifth-wheel trailer. However, such improvements typically compromise chassis integrity and significantly increase chassis construction costs. For example, U.S. Pat. No. 5,746,473 to Crean teaches using a three-level chassis structure, which is also commonly referring to as a three-step chassis. FIG. 2A of Crean shows the general layout of such a three level chassis. Basically, the bottom level, or step, is a horizontal elongate lower chassis beam (202, FIG. 2A of Crean) that supports the aft living portion of the fifth wheel trailer. The forward bedroom is supported by a horizontal elongate upper chassis beam (210, FIG. 2A of Crean), and the bathroom portion is supported by a horizontal elongate intermediate chassis beam (208, FIG. 2A of Crean). The forward end of the lower chassis beam is joined to the back end of the intermediate chassis beam at an aft vertical section, and the forward end of the intermediate chassis beam is joined to the back end of the upper chassis

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beam at a forward vertical section. Accordingly, the chassis structure forms three steps from the lower chassis beam to the intermediate chassis beam and then the upper chassis beam.

As a result, the thick lower beam does not block the lower entrance to the storage area, thereby, Crean suggests, the storage area is more easily accessible. Crean also teaches mounting the black and gray water tanks to the intermediate chassis beam, thereby elevating them within the storage area. Accordingly, Crean reports that heavy objects need not be lifted as high to place them in the storage area.

While the three-level chassis in Crean offers these limited benefits, the design essentially doubles the number of parts and welds comprising the load carrying chassis components over a traditional two-level chassis. Accordingly, a three-level chassis is more costly to manufacturer and less durable than a similarly sized two-level chassis structure. Moreover, because the upper edge of the storage area is defined by the intermediate beam, and the thickness of the intermediate beam is essentially as thick as a traditional lower beam on a two-level chassis, the height of the storage area, and accordingly its volume, is still limited by the chassis structure. For example, where the intermediate beam is made of typical chassis materials having an eight-inch vertical web, the height of the storage area would be reduced by eight inches, thereby reducing the total volume of the storage area. Accordingly, as with a traditional two-level chassis, the height limitations imposed by positioning the intermediate chassis beam in this area still prevents common oversized travel trailer-related items, such as 40 pound LPG tanks, from being accommodated easily in the storage area. Moreover, positioning the black and gray storage tanks adjacent to the intermediate beams, as taught by Crean, further reduces the height of the storage area, thereby further compromising the storage area's ability to accommodate common large objects. Because the intermediate chassis beam is a primary load carrying chassis element, any reduction in the thickness of this beam around the storage area of a three-level chassis to increase the height of the storage area would compromise the strength of the chassis.

Accordingly, despite the known improvements to fifth-wheel travel trailer chassis designs, there remains a need for a chassis that has the strength, durability, and economy of a traditional two-level chassis, but also optimizes the height of the storage area beneath the bathroom portion to easily accommodate common large objects used with travel trailers. In addition to other benefits that will become apparent in the

SUMMARY OF THE INVENTION

The present invention is a travel trailer having a two-level chassis supporting at least three discrete floor sections at three different heights above the ground. In particular, an aft floor section is positioned at a lower height, a fore floor section is positioned at an upper height, and an intermediate section is positioned at a height intermediate to the lower and upper heights. The area underneath the intermediate section and above the bottom of the trailer, defines a storage area.

The two-level chassis includes generally horizontal upper and lower chassis beams. The aft floor section is supported by the lower chassis beam, and the fore floor section is supported by the upper beam. The intermediate section is suspended from the upper chassis beams such that the height of, and general access to, the storage area is optimized because the chassis beams do not interfere with access to this area.

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In a preferred embodiment, common fixed trailer accessories, such as gray and black water tanks, their related plumbing, trailer heaters and the like are clustered together within a limited section of the storage area, such as near the rear of the storage area, whereby the majority of the storage area remains unoccupied. Accordingly, storage space within the storage area is optimized, and the full height of the storage area is available throughout the majority of the storage area to accommodate oversized objects.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view of a travel trailer in accordance with a preferred embodiment of the invention.

FIG. 2 is an isometric view of the chassis structure of the travel trailer of FIG. 1.

FIG. 3 is an isometric view of the chassis structure of FIG. 2 having floor portions mounted thereto with at least one floor portion suspended from the chassis in accordance with a preferred embodiment of the present invention.

FIG. 4 is a fragmentary side view taken along line 4—4 of FIG. 3.

FIG. 5 is a fragmentary isometric view of the chassis structure and floor portions mounted thereto of FIG. 3 with some elements removed to show underlying detail.

FIG. 6 is a cross-sectional view taken along lines 6—6 of FIG. 2.

FIG. 7 is a fragmentary isometric view of the chassis structure and floor portions mounted thereto of FIG. 3 with some elements removed to show underlying detail and a possible orientation of common trailer accessories in accordance with a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

An improved travel trailer 10 having an enclosed shelter 12 supported by a two-level chassis 14 defining a forward upper portion 16 and a rearward lower portion 18, wherein the chassis 14 supports at least three discrete floor sections 20a, 20b, 20c by suspending at least one floor section 20b from the forward upper portion 16 is disclosed in FIGS. 1-7. A. Chassis Assembly

As best shown in FIG. 2, the chassis 14 preferably includes a left and right chassis beam assembly 22a, 22b respectively, with each beam assembly 22a, 22b including an elongate lower chassis beam 24a, 24b and an elongate upper chassis beam 26a, 26b joined together at vertical riser assemblies 28a, 28b. Each upper chassis beam 26a, 26b and lower chassis beam 24a, 24b has a front end 30 and a back end 32, with the front end 30 of the lower chassis beams 24a, 24b secured to the back ends 32 of their respective upper chassis beams 26a, 26b at the vertical riser assemblies 28a, 28b such that the upper chassis beams 26a, 26b and lower chassis beams 24a, 24b are aligned parallel with each other and the upper chassis beams 26a, 26b are horizontally-aligned above the lower chassis beams 24a, 24b as shown.

The left and right beam assemblies 22a, 22b are spaced apart from each other and joined together with a plurality of chassis cross-members 40a-i positioned along the longitudinal length of the chassis 14, such that the lower chassis beams 24a, 24b and cross members 40c-i define the rearward lower portion 18 of the chassis 14 and the upper chassis beams 26a, 26b and cross-members 40a, 40b define the forward upper portion 16 of the chassis.

Preferably, the upper and lower chassis beams 26a, 26b, 24a, 24b are constructed with strong and durable materials,

such as steel I-beams. More preferably, the lower chassis beams 24a, 24b have a 12-inch vertical web 41a, and the upper beams have an 8-inch vertical web 41b.

The rearward lower portion 18 of the chassis 14 includes at least one perpendicularly aligned wheel assembly 42a, 42b, 42c, preferably including an axle tube 44a, 44b, 44c secured to the lower side 46 of the lower chassis beams 24a, 24b at suspension elements (not shown). An axle hub (not shown) is journaled to each axle tube 44a, 44b, 44c and secured to wheels 50a, 50b, 50c, preferably having tires 52a, 52b, 52c attached to them and aligned substantially parallel to the lower chassis beams 24a, 24b.

The underside 54 of the forward upper portion 16 of the chassis includes a mounting portion 56 for detachable securing the chassis 14 to a trailer mount (not shown), or hitch. Preferably, a pair of jack legs 58a, 58b, each having a support tube 59a, 59b and a retractable extension portion 60a, 60b, is secured to the underside 54 of the forward upper portion 16 as shown to support the forward upper portion 16 when the trailer 10 is detached from its towing vehicle (not shown). More preferably, the support tubes 59a, 59b are steel 4-inch by 2-inch tubes having a thickness of $\frac{3}{16}$ of an inch and include jack leg reinforcement members 62a, 62b having slightly angled front ends 64a, 64b and gussets 66a, 66b as best shown in FIGS. 2 & 4.

The vertical riser assemblies 28a, 28b each preferably include a generally vertically aligned perimeter chassis post 68a, 68b and an inner chassis post 70a, 70b joined together by transition members 72a-f. As best shown in FIG. 2, the front ends 30 of the lower chassis beams 24a, 24b are secured to the lower ends of the inner chassis posts 70a, 70b, and the back ends 32 of the upper chassis beams 26a, 26b are secured to the upper ends of the perimeter chassis posts 68a, 68b preferably by welding. More preferably, the chassis posts 68a, 68b, 70a, 70b are constructed of elongate steel tube, such as 5-inch by 3-inch tube having a thickness of $\frac{3}{16}$ of an inch. Each riser assembly 28a, 28b preferably includes reinforcing gussets 74a, 74b, 75a, 75b, and the upper and lower transition members 72a, 72c, 72d, 72f are angled as shown with respect to the chassis posts 68a, 68b, 70a, 70b to increase the strength and durability of the joints.

As best shown in FIG. 2, cross-members 40c-h in the rearward lower portion 18 of the chassis 14 each include upper and lower members 82, 84 secured together by extension members 86, which are preferably angled. More preferably, cross-member 40i is positioned at the back ends 32 of the lower chassis beams 24a, 24b and is a Z-beam having a vertical web.

Cross-members 40a, 40b in the forward upper portion 16 of the chassis 14 are preferably elongate steel 8-inch by 2-inch tubes having a $\frac{3}{16}$ -inch thickness with one cross-member 40a positioned at the front ends 30 of the upper chassis beam 26a, 26b. More preferably, supports 90 extend between cross members 40a, 40b as shown in FIG. 2.

An elongate chassis rail lateral tie 92 is secured to and suspended below the upper chassis beams 26a, 26b. Preferably, the lateral tie 92 has a generally Z-shaped cross-section, forming an upper lip 94 and a lower lip 96 separated by an angled web 98, with the upper lip 94 extending toward the front of the chassis 14 and the lower lip 96 extending toward the back of the chassis 14. More preferably, the ends of the lateral tie 92 are secured to the angled ends 64a, 64b of the jack-leg reinforcement members 62a, 62b as best shown in FIGS. 4 & 7.

B. Suspended Floor Assembly And Storage Area Details

As best shown in FIGS. 3 & 4, a lower floor 20c is supported by the lower portion 18 of the chassis 14, pref-

erably by extending spaced apart elongate lower floor joists 100 from the lower ends of the vertical riser assemblies 28a, 28b to the back ends 32 of the lower chassis beams 24a, 24b and securing planar floor members 102 thereon. Similarly, the upper floor 20a is supported by the upper portion 16 of the chassis 14, preferably by extending spaced apart elongate upper floor joists 104 from an area generally near the front of the chassis 14 to the upper lip 94 of the chassis rail lateral tie 92 and securing planar floor members 102 thereon.

The intermediate floor 20b is suspended below the upper portion 16 of the chassis in an area between the upper floor 20a and lower floor 20c. Preferably, the upper floor 20a defines a bedroom, the lower floor 20c defines a living area, and the intermediate floor 20b defines a bathroom section of the trailer 10.

One known apparatus for suspending the intermediate floor 20b includes extending an elongate generally horizontal aft intermediate floor support 106 between the vertical chassis riser posts 68a, 68b at a height generally horizontally-aligned with the lower lip 96 of the chassis rail lateral tie 92. In an area that is preferably equal distance between the lateral tie 92 and the aft intermediate floor support 106, a suspended girder 108 having an upper edge 110 is suspended from the upper chassis beams 26a, 26b such that tie upper edge 110 is on the same horizontal plane as the lower lip 96 of the lateral tie 92, preferably by extending suspension elements 112a, 112b from the upper chassis beams 26a, 26b and securing the girder 108 to the suspension elements 112a, 112b. Spaced apart intermediate floor joists 120 extend from the lower lip 96 of the lateral tie 92 to the aft intermediate floor support 106. The intermediate floor joists 120 are also supported at the upper edge 110 of the suspended girder 108 as shown. Planar floor members 102 are secured to the intermediate floor joists 120 thereby defining the intermediate floor 20b at a height between the upper and lower floors 20a, 20c, respectively. Preferably, a step 124 is provided between the lower floor 20c and intermediate floor 20b to facilitate access between these floors.

The area between the support tubes 59a, 59b and vertical riser assemblies 28a, 28b, above the bottom of the lower side 46 of the lower chassis beams 24a, 24b, and below the intermediate floor joists 120 defines a storage area 126, or trunk space, of the trailer 10. The intermediate floor 20b is suspended from the upper chassis beams 26a, 26b such that the height 127 of, and general access to, the storage area 126 is optimized because the chassis beams 24a, 24b, 26a, 26b do not interfere with access to this area.

Preferably, the floor 128 of the storage area 126 is supported by a storage area lateral tie 130 extending between the lower end portions of the support tubes 59a, 59b and spaced apart elongate extension members 132 extending from the storage area lateral tie 130 to the lower chassis beam 24a, 24b as best shown in FIG. 5. Spaced apart storage area floor joists 134, extending between the sides of the storage area 126, are secured to the elongate extension members 132. Planar floor members 102 are secured to the storage area floor joists 134, defining the floor 128 of the storage area 126. Accordingly, the distance between the floor 128 of the storage area 126 and the lower edge of the intermediate floor joists 120 defines the height 127 of the storage area.

The upper floor joists 104, lower floor joists 100, and intermediate floor joists 120, storage area lateral tie 130, and elongate extension members 132 do not carry that great of a load as that carried by the chassis 14. Accordingly, these components need not be as strong as the chassis

components, and accordingly can have smaller cross-sectional dimensions. For example, the upper, lower, and intermediate floor joists **104**, **100**, **120**, respectively, are preferably constructed with 1-inch by 1-inch **11** gauge steel tubes, and the storage area lateral tie **130** and elongate extension members **132** are preferably constructed with 2-inch by 2-inch steel tubes having a $\frac{1}{4}$ -inch thickness. Of course these components can be made with any other suitably sized, shaped, and strong materials, including wood, other metals, and synthetic or composite materials.

As best shown in FIG. 1, the enclosed shelter **12** encloses the storage area and includes a plurality of access doors **136**. Preferably, the access doors **136a-c** open outward and the height of the access doors **136** is substantially equivalent to the height of the storage area **126**, thereby not becoming a limiting factor in the size of objects that may be placed in the storage area **126**.

More preferably, and as best shown in FIGS. 4 and 7, a planar sliding mechanism **138** having a pair of rail sliders **140** secured to the storage area floor **128**, and a platform **142** sized to support a conventional 40 pound LPG removable bottle **144** is slidably secured to the rail sliders **140**. An appropriately sized access door **136a** is aligned with the sliding mechanism to permit easy access.

C. Plumbing and Related Hardware Details

Optimal storage space is provided by clustering the common fixed trailer accessories, such as gray and black water tanks, their related plumbing, trailer heaters and the like within the same area in or near the storage area. As best shown in FIG. 4 & 7, an elongate black water tank **150** having a substantially rectangular cross-section preferably rests on the storage area floor **128** in the back of the storage area **126** with a drain **152** extending upward from the black tank **150** through the bathroom intermediate floor **20b**. A remotely-actuated valve, such as a cable actuated black water tank dump valve **154** is positioned adjacent to and in fluid communication with the black water tank **150**, and associated plumbing (not shown) is preferably installed to the valve **154** to accommodate easy emptying of the tank **150**.

An elongate gray water tank **156** having a substantially rectangular cross section is preferably secured within an area below the lower floor joists **100**, above the bottom of the trailer **46**, and between the lower chassis beams **24a**, **24b** and lower cross-members **40c**, **40d**. A remotely-actuated valve, such as a cable actuated gray water tank dump valve **158** is positioned adjacent to and in fluid communication with the gray water tank **156** and associated plumbing (not shown) is preferably installed to accommodate easy emptying of the gray water tank **156**. Preferably the cable actuation control handles **160a**, **160b** for the black and gray water dump valves **154**, **158** are positioned together, adjacent to the outside of the trailer, and outside of the storage area for easy actuation, even if the storage area **126** is full.

If desired, a traditional trailer furnace (**162**, FIG. 4) may be secured to the intermediate floor joists **120** near the black water tank **150**.

D. Use and Operation

The travel trailer **10** accordingly to the present invention is used like any other fifth-wheel trailer. Appropriate home furnishings and conveniences are placed in the living, bathroom, and bedroom portions of the trailer, which has the strength and durability of any trailer having a conventional two-level chassis.

However, volume of the storage area **126**, and access to that area, is optimized. For example, thick chassis beams do not limit the height of the storage area, or require a user to

lift items to be stored above any bottom chassis beam. Moreover, by clustering the common fixed trailer accessories within the same area in or near the storage area, the remaining useful area within the storage area is optimized. Accordingly, oversized objects can be easily accommodated in the storage area with minimal lifting. For example, a conventional 40 pound LPB removable bottle **144** typically is an elongate canister of about 29 $\frac{1}{4}$ inches having a flat bottom end **164** on which it rests, defining its standing position. The height **127** of the storage area can be high enough to easily accommodate this type of bottle in its standing position. Moreover, in trailers so equipped, the sliding platform **142** and special access door **136a** further facilitate loading and storage of these types of bottles.

In view of the wide variety of embodiments to which the principles of the invention can be applied, it should be apparent that the detailed description of a preferred embodiment is illustrative only and should not be taken as limiting the scope of the invention. For example, although the preferred chassis beams **24a**, **24b**, **26a**, **26b** are I-beams, any suitably strong shape or material could be used without departing from the scope of the invention. Moreover, although preferred sizes and materials for the various beams, tubes, posts and the like have been disclosed, any suitably strong materials, shapes, and dimensions may be used depending on the specific design needs of a particular trailer. Also, although three wheel assemblies **42a**, **42b**, **42c** are shown in the figures, one, two, or even more such assemblies could be used depending on the load to be incurred by the chassis. Accordingly, the claimed invention includes all such modifications as may come within the scope of the following claims and equivalents thereto.

What is claimed is:

1. A travel trailer for being towed by a vehicle including:
 - a multi-level chassis having an upper portion toward a front end and a lower portion toward a back end and at least one elongate beam;
 - a wheel assembly secured toward the back end of the chassis;
 - a mounting portion secured toward the front end of the chassis for detachably securing said chassis to the vehicle;
 - a shelter secured to the chassis; and
 - a generally horizontal floor suspended from and positioned below the at least one beam.
2. The travel trailer of claim 1, wherein said chassis is a two-level chassis.
3. The travel trailer of claim 2, wherein said at least one beam includes said upper portion of said chassis, and said floor is suspended from said upper portion of said chassis.
4. The travel trailer of claim 2, wherein the trailer has a lower edge, and further including an enclosed storage area below the suspended floor and above the lower edge of the trailer.
5. The travel trailer of claim 2, further including a generally horizontal upper floor positioned vertically above said generally horizontal floor, and a generally horizontal lower floor positioned vertically below said generally horizontal floor.
6. The travel trailer of claim 5, wherein said upper floor is secured to said upper portion of said chassis and said lower floor is secured to said lower portion of said chassis.
7. The travel trailer of claim 6, wherein:
 - said trailer has a lower edge;
 - said chassis includes an upper chassis beam secured to a lower chassis beam at a vertical riser;

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said horizontal floor is suspended from said upper chassis beam; and further including an enclosed storage area below the horizontal floor, forward of the vertical riser and above the lower edge of the trailer.

8. The travel trailer of claim 7, wherein said storage area has a storage area floor and further including:

a first liquid storage tank secured to the storage area floor adjacent to the vertical riser;

plumbing extending from the liquid storage tank to said floor;

a remotely-actuated dump valve having an actuation handle, said valve in fluid communication with said tank; and

said actuation handle secured outside of said storage area to facilitate easy actuation of the valve when the storage area is full.

9. The travel trailer of claim 8, wherein said lower beam has a vertical thickness and further including:

a second liquid storage tank secured below the lower floor, above the lower edge of the trailer, and within the area occupied by the vertical thickness of the lower beam;

a second remotely-actuated dump valve having a second actuation handle, said valve in fluid communication with said second tank; and

said second actuation handle secured outside of said storage area to facilitate easy actuation of said second valve when the storage area is full.

10. The travel trailer of claim 9, wherein said upper floor defines a bedroom area of the trailer, said floor defines a bathroom area of the trailer, and said lower floor defines a living area of the trailer.

11. The travel trailer of claim 9, further including a heater secured adjacent to said floor within and toward the rear of the storage area.

12. A two-level chassis for use on a fifth-wheel travel trailer having three floor areas supported at three different heights above the ground defining upper, intermediate, and lower floors, said chassis including:

a pair of parallel aligned spaced apart substantially horizontal lower chassis beams;

a pair of parallel aligned spaced apart substantially horizontal upper chassis beams;

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a pair of vertical riser assemblies, each riser assembly securing one upper chassis beam to one lower chassis beam such that said upper beam is vertically above and parallelly-aligned with said lower beam;

the upper floor secured to said upper beam;

the lower floor secured to said lower beam;

the intermediate floor suspended from said upper beam to a vertical height intermediate to the heights above the ground of the upper and lower floors.

13. The two-level chassis of claim 12, wherein the lower beam has a lower edge that defines the bottom of the chassis, and the area below the intermediate floor, forward of the vertical riser assemblies and above the bottom of the chassis is enclosed and defines a storage area having a storage area floor.

14. The two-level chassis of claim 13, wherein the storage area has a height, and said height is high enough to accommodate at least one conventional 40 pound LPG removable bottle in its standing position within the storage area.

15. The two-level chassis of claim 14, further including a sliding planar member secured to the storage area floor for easily loading and unloading said 40 pound LPG removable bottle within said storage area.

16. The two-level chassis of claim 12, wherein said upper and lower chassis beams are steel I-beams.

17. The two-level chassis of claim 16, wherein the intermediate floor is suspended from said upper beam by at least one Z-shaped lateral tic extending between said upper chassis beams.

18. The two-level chassis of claim 17, wherein said riser assemblies each include:

an inner vertical chassis riser post having a lower end with one of said lower chassis beams secured at said lower end;

a vertical perimeter chassis post having an upper end with one of said upper chassis beams secured at said upper end; and,

said inner vertical chassis riser post and said vertical perimeter chassis post secured together by a plurality of transition members.

* * * * *

Tab W



US006860545B1

(12) **United States Patent**
Ingram et al.

(10) **Patent No.:** **US 6,860,545 B1**
(45) **Date of Patent:** ***Mar. 1, 2005**

(54) **TRAVEL TRAILER**

(75) Inventors: **Anthony G. Ingram**, Casper, WY (US); **Marion B. Johnson**, Casper, WY (US); **Terry L. Harkins**, Casper, WY (US)

(73) Assignee: **B & B Homes Corp.**, Mills, WY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/336,232**

(22) Filed: **Jan. 3, 2003**

Related U.S. Application Data

(63) Continuation of application No. 09/753,406, filed on Jan. 3, 2001, now Pat. No. 6,502,894, which is a continuation-in-part of application No. 09/630,204, filed on Aug. 1, 2000, now Pat. No. 6,343,830.

(51) **Int. Cl.⁷** **B62D 25/20**
(52) **U.S. Cl.** **296/184.1; 296/168; 296/164**
(58) **Field of Search** **296/184.1, 168, 296/181, 156, 24.2, 24.1, 37.1; 280/433, 789**

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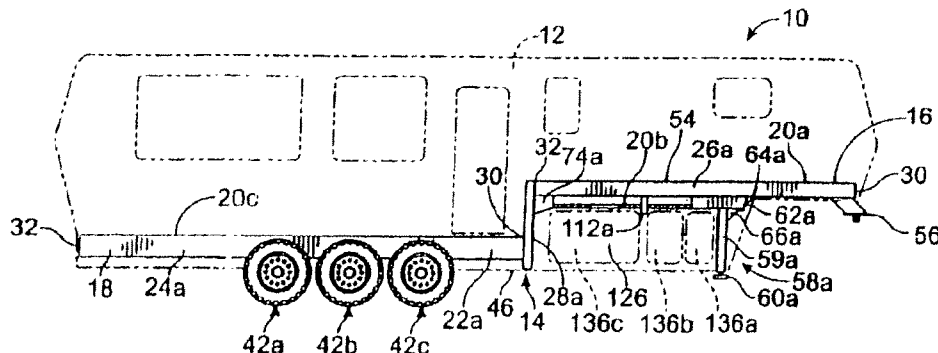
Primary Examiner—Kiran Patel

(74) *Attorney, Agent, or Firm*—Ipsolon LLP

(57) **ABSTRACT**

A travel trailer having a two-level chassis supporting at least two discrete floor sections at at least two different heights above the ground with at least one of those floors having a bathroom portion being supported by an upper chassis beam is disclosed. In a preferred embodiment, the chassis has a substantially horizontal forward upper portion and a substantially horizontal rearward lower portion, and an upper floor is secured to the upper portion and a lower floor is secured to the lower portion with an intermediate floor positioned below the upper edge of the upper portion of the chassis to a height intermediate that of the upper and lower floors. In an alternative preferred embodiment, the intermediate floor is suspended below the upper chassis portion. The area underneath the intermediate section and above the bottom of the trailer defines a storage area that is not blocked or limited in size by the width of the chassis beams. In a more preferred embodiment, common fixed trailer accessories, such as gray and black water tanks, their related plumbing, trailer heaters and the like are clustered together within and near a limited section of the storage area, such as near the rear of the storage area, such that the majority of the storage area remains unoccupied. Accordingly, storage space within the storage area is optimized, and the full height of the storage area is available throughout the majority of the storage area to accommodate oversized objects.

9 Claims, 6 Drawing Sheets



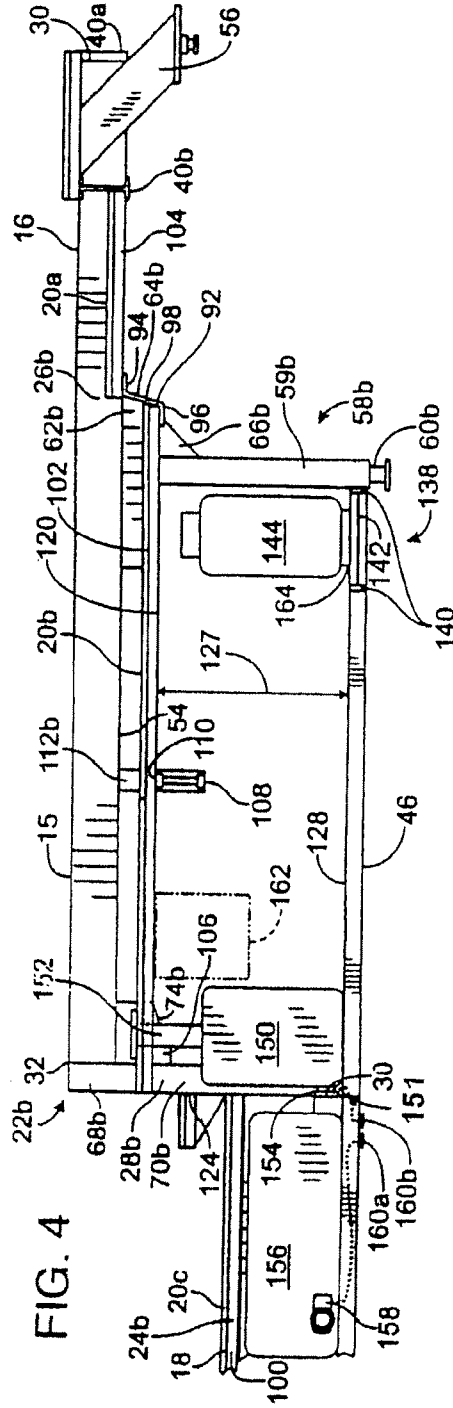
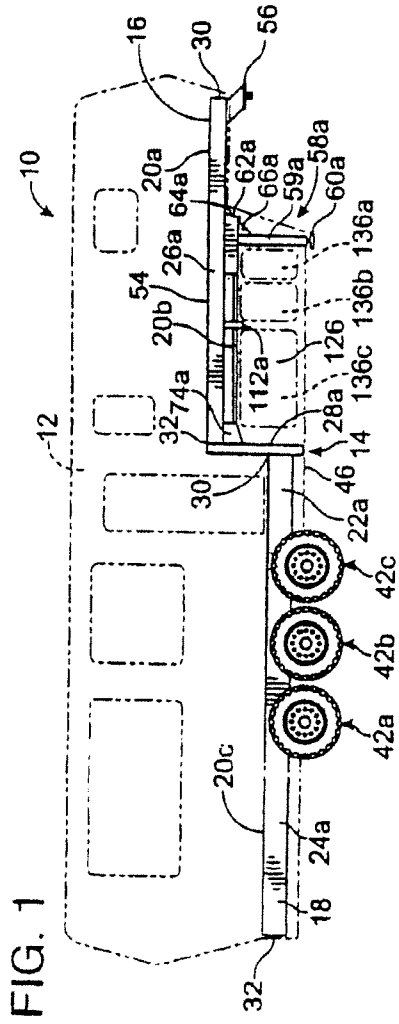
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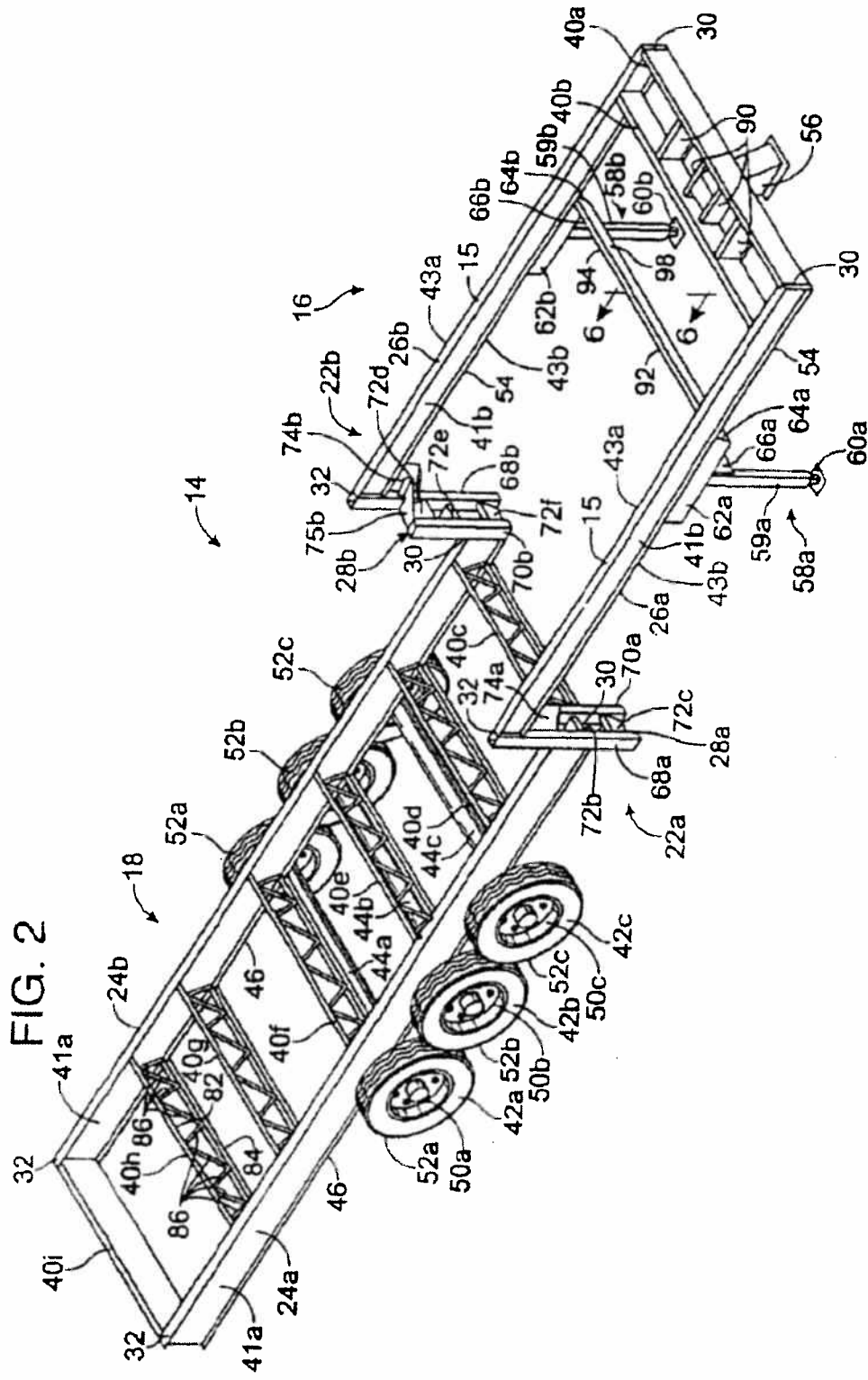
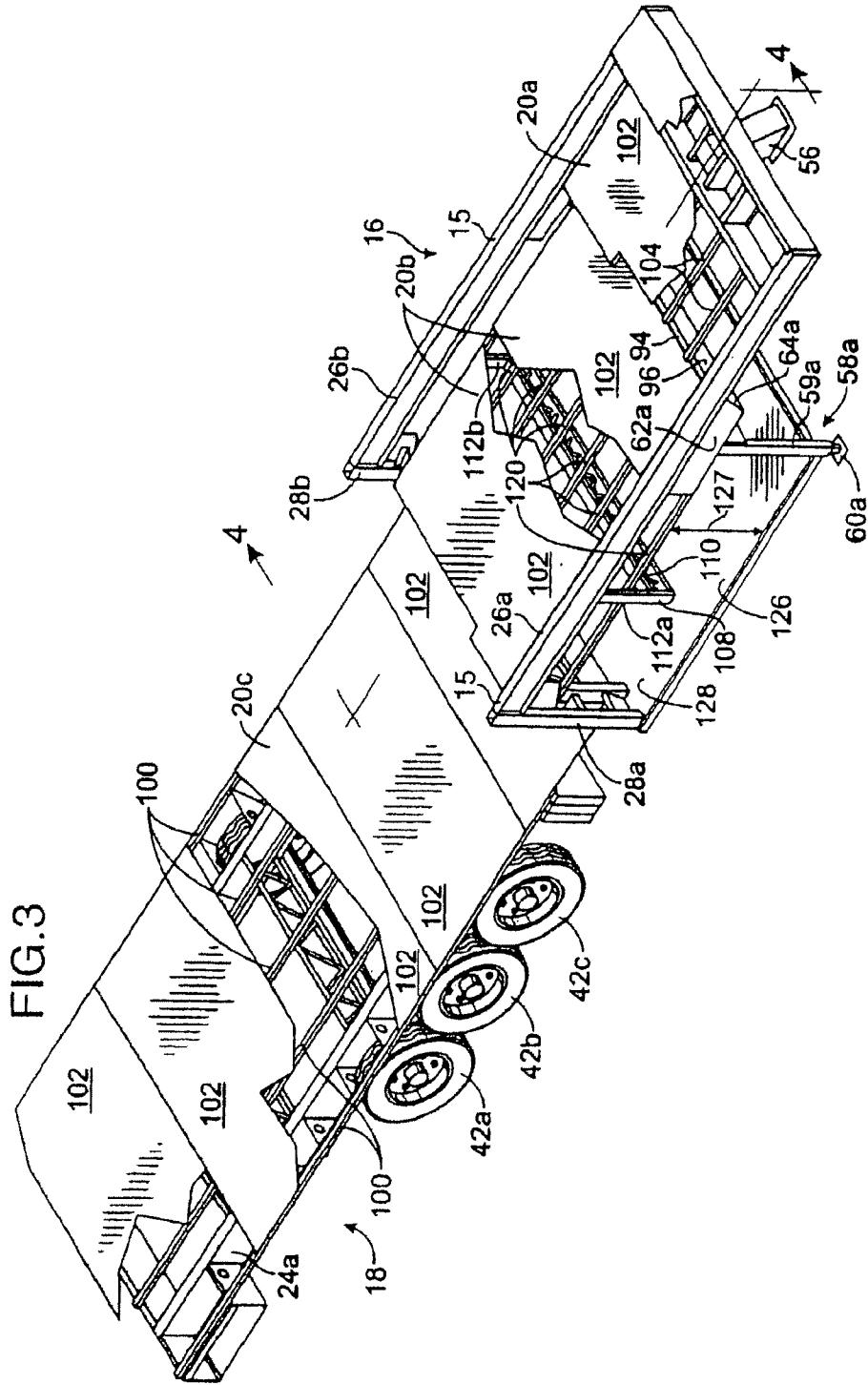


FIG. 2



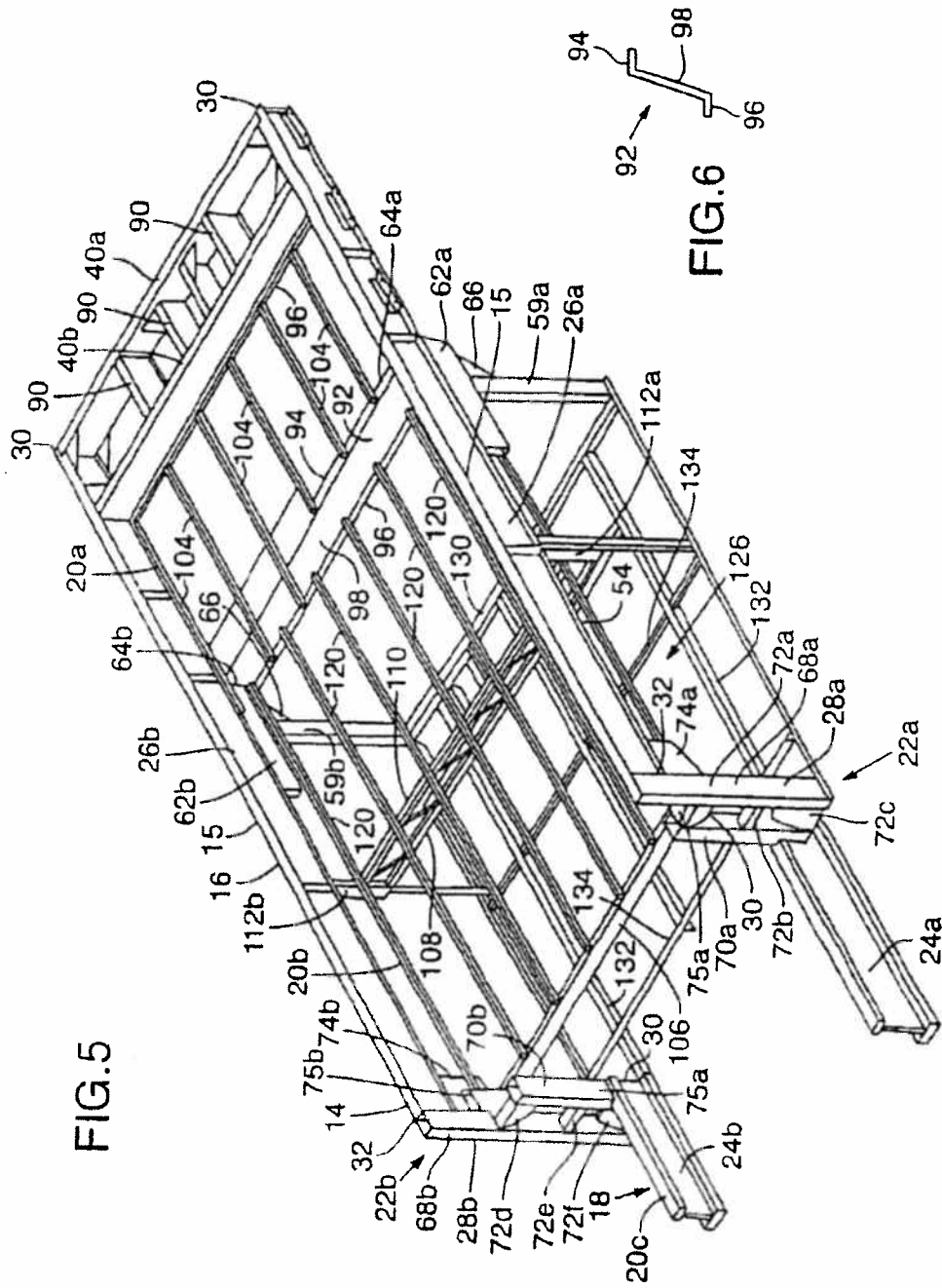


FIG. 5

FIG. 6

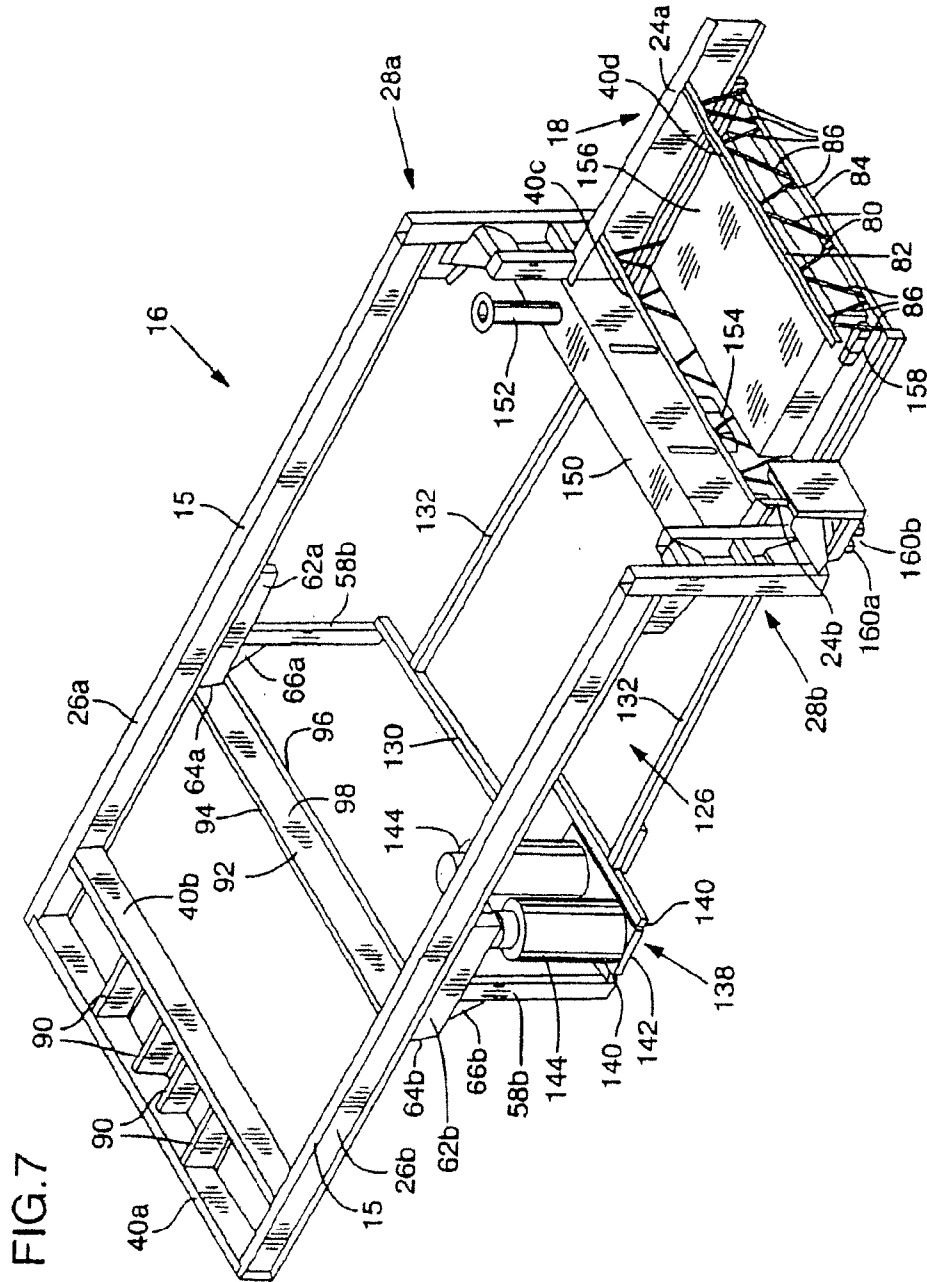
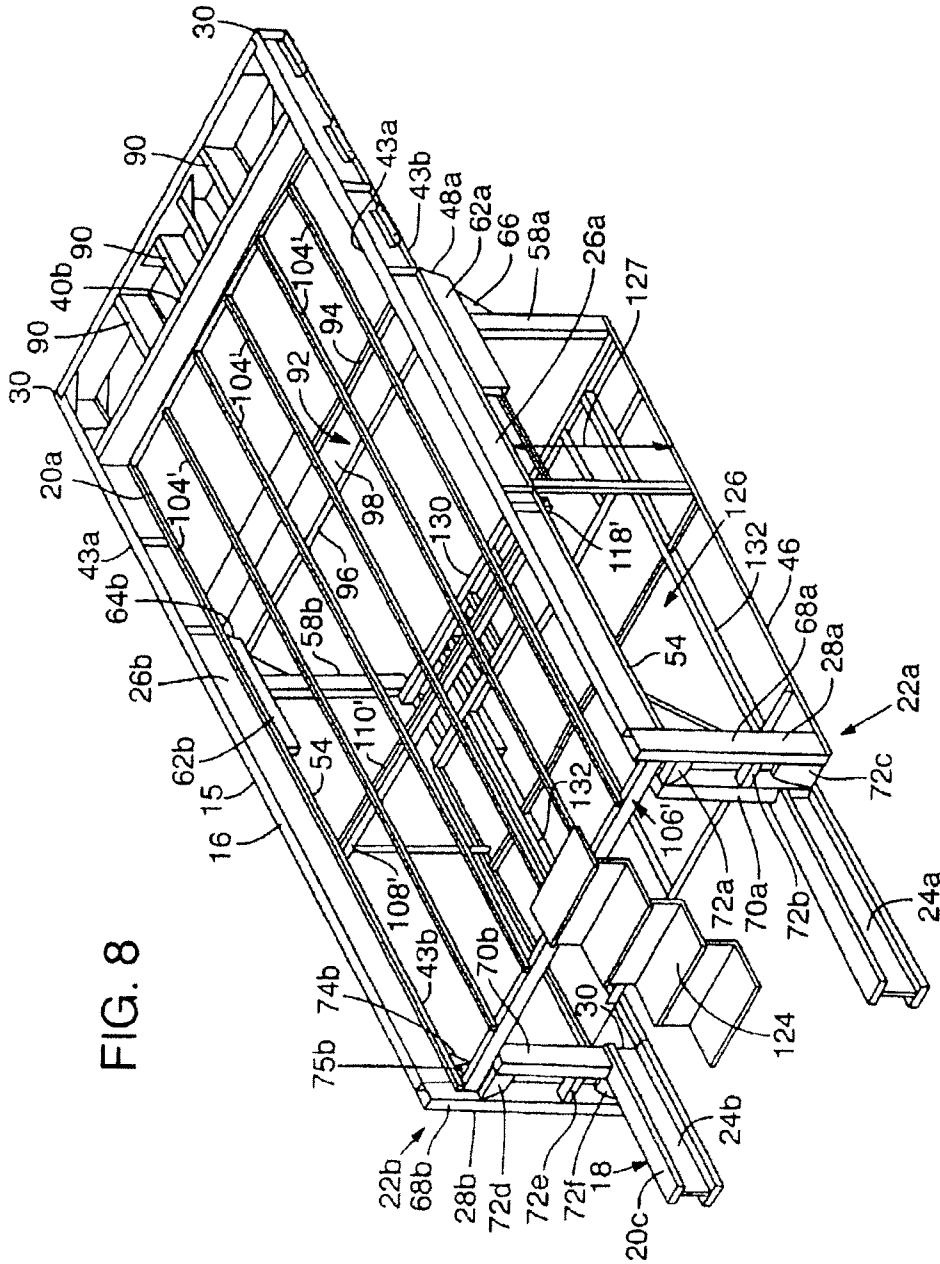


FIG. 7



TRAVEL TRAILER

REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent applica-
tion Ser. No. 09/753,406 filed on Jan. 3, 2001 and issued as
U.S. Pat. No. 6,502,894 on Jan. 7, 2003, and a continuation-
in-part of U.S. patent application Ser. No. 09/630,204 filed
on Aug. 1, 2000 and issued as U.S. Pat. No. 6,343,830 on
Feb. 5, 2002.

TECHNICAL FIELD

The invention is an improved travel trailer. In particular,
the invention concerns a travel trailer having an improved
chassis that is strong, and easy and economical to manufac-
ture, and has at least one floor suspended from the chassis,
which preferably optimizes use of available storage space
beneath that floor.

BACKGROUND OF THE INVENTION

Travel trailers, which are towed vehicles usually having
many of the conveniences of a home, are widely known and
popular. One known type of travel trailer is commonly
referred to as a "fifth-wheel" trailer, which is particularly
adapted to be towed by a traditional pick-up truck. Namely,
the forward portion of the fifth-wheel trailer is elevated
above the bed of the pick-up truck and includes a mounting
portion extending from the bottom of the elevated forward
portion to a trailer mount, or hitch, secured to the bed of the
pick-up truck.

Because of height restrictions imposed on travel trailers
operating on most highways and aerodynamic consider-
ations associated with towing a travel trailer at high speeds,
the total desirable height above the ground for a fifth-wheel
trailer is limited. Accordingly, the elevated forward portion
typically has limited headroom, and therefore is usually used
as a bedroom. The remaining aft portion of the fifth-wheel
trailer typically includes a bathroom portion and general
living portion.

Plumbing in trailer bathrooms typically includes gray and
black water storage tanks and related tubing and valves
extending from one or more toilets, shower drains, sink
drains, and the like within the bathroom, to these storage
tanks. To take full advantage of gravity, these types of
storage tanks are typically mounted somewhere below the
drains and toilet such that water from these devices flows
freely through this tubing to its respective storage tanks.
Accordingly, it is desirable to elevate the floor of the
bathroom portion of a trailer above the bottom of the trailer.

Because of the limited headroom, it is not desirable to
elevate the bathroom portion of the floor to the height of the
forward bedroom floor of the trailer. Accordingly, the typical
fifth-wheel trailer will usually longitudinally position the
bathroom portion between the bedroom and living portion,
and vertically elevate the floor of the bathroom portion to an
intermediate height between the heights of the bedroom and
living portion floors. The end result is a fifth-wheel trailer
having three floor heights above the ground. A first height
toward the aft of the trailer supporting the living portion, a
second height toward the center of the trailer supporting the
bathroom portion, and a third height toward the front of the
trailer supporting a bedroom.

The area below the second height and the bottom of the
trailer is typically enclosed and used as a storage space for
the storage tanks, valves, and plumbing. In addition, this
area is typically large enough to be used as a general storage

area, or trunk space, for travel gear and the like.
Accordingly, one or more access doors may be provided
along the exterior walls of this storage area to provide access
to this space. It is desirable for this storage area to be large
and easily accessible.

The chassis of a typical fifth-wheel trailer must be suffi-
ciently strong to support the trailer, and durable enough to
resist weakening over a lifetime of prolonged use. Since the
typical fifth-wheel trailer is regularly towed at high speeds
and over rough or unimproved roads, the chassis must also
withstand a tremendous amount of dynamic loads placed on
it. Typical chassis materials are incredibly strong and
durable. For example, a typical fifth-wheel chassis will be
made of welded together portions of elongate steel I-beam
having an eight-inch to 12-inch vertical web. In general, the
fewer parts and welds making up the primary load carrying
chassis structure, the stronger and more durable the chassis.

A particularly strong chassis design is commonly known
as a two level chassis. It's general design is shown and
identified as prior art in FIG. 1A of U.S. Pat. No. 5,746,473
to Crean, the disclosure of which is hereby incorporated by
reference. A two level chassis features an elongate horizontal
lower beam (114, FIG. 1A of Crean), an elevated elongate
horizontal upper beam (116, FIG. 1A of Crean), and an
interconnecting vertical section (115, FIG. 1A of Crean)
joined to both the lower and upper beams as shown in FIG.
1A of Crean, usually by welding. The elevated bathroom
portion (122, FIG. 1A of Crean) of the typical two level
chassis is typically a platform structure constructed of
elongate wood members, metal members, or the like, and is
supported above and by the lower beam (114, FIG. 1A of
Crean). A storage space (140, FIG. 1A of Crean) is defined
as the area below the elevated bathroom floor, but above the
lower beam.

While the typical two level chassis is particular strong, the
design also limits the amount of available storage in the
storage area and access to that storage area. In particular,
since the lower beam defines the lower portion of the storage
area, the total volume of the storage area is narrowed by the
vertical width of the webbing on that beam. For example,
using typical chassis materials having an eight-inch to
twelve-inch vertical web, the height of the storage area
would be reduced by eight to twelve inches, thereby reduc-
ing the total volume of the storage area.

In practice, the height limitations imposed by positioning
the chassis beam in this area prevents common oversized
travel trailer-related items, such as traditional elongate,
cylindrical 40 pound Liquid Petroleum Gas ("LPG") tanks,
from being accommodated easily in the storage area. In
particular, in order for these types of items to fit within such
known storage areas, they must either 1) be stored on their
sides, thereby taking up much desirable floor space in the
storage area, or 2) in some models be stored upright within
a limited outrigger area between the chassis beam and
storage area door, thereby blocking access to the majority of
the storage area.

Some inventors have attempted to improve access to and
the overall amount of storage space available in the storage
area of a traditional fifth-wheel trailer. However, such
improvements typically compromise chassis integrity and
significantly increase chassis construction costs. For
example, U.S. Pat. No. 5,746,473 to Crean teaches using a
three-level chassis structure, which is also commonly
referred to as a three-step chassis. FIG. 2A of Crean shows
the general layout of such a three level chassis. Basically, the
bottom level, or step, is a horizontal elongate lower chassis

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beam (202, FIG. 2A of Crean) that supports the aft living portion of the fifth wheel trailer. The forward bedroom is supported by a horizontal elongate upper chassis beam (210, FIG. 2A of Crean), and the bathroom portion is supported by a horizontal elongate intermediate chassis beam (208, FIG. 2A of Crean). The forward end of the lower chassis beam is joined to the back end of the intermediate chassis beam at an aft vertical section, and the forward end of the intermediate chassis beam is joined to the back end of the upper chassis beam at a forward vertical section. Accordingly, the chassis structure forms three steps from the lower chassis beam to the intermediate chassis beam and then the upper chassis beam.

As a result, the thick lower beam does not block the lower entrance to the storage area, thereby, Crean suggests, the storage area is more easily accessible. Crean also teaches mounting the black and gray water tanks to the intermediate chassis beam, thereby elevating them within the storage area. Accordingly, Crean reports that heavy objects need not be lifted as high to place them in the storage area.

While the three-level chassis in Crean offers these limited benefits, the design essentially doubles the number of parts and welds comprising the load carrying chassis components over a traditional two-level chassis. Accordingly, a three-level chassis is more costly to manufacturer and less durable than a similarly sized two-level chassis structure. Moreover, because the upper edge of the storage area is defined by the intermediate beam, and the thickness of the intermediate beam is essentially as thick as a traditional lower beam on a two-level chassis, the height of the storage area, and accordingly its volume, is still limited by the chassis structure. For example, where the intermediate beam is made of typical chassis materials having an eight-inch vertical web, the height of the storage area would be reduced by eight inches, thereby reducing the total volume of the storage area. Accordingly, as with a traditional top-level chassis, the height limitations imposed by positioning the intermediate chassis beam in this area still prevents common oversized travel trailer-related items, such as 40 pound LPG tanks, from being accommodated easily in the storage area. Moreover, positioning the black and gray storage tanks adjacent to the intermediate beams, as taught by Crean, further reduces the height of the storage area, thereby further compromising the storage area's ability to accommodate common large objects. Because the intermediate chassis beam is a primary load carrying chassis element, any reduction in the thickness of this beam around the storage area of a three-level chassis to increase the height of the storage area would compromise the strength of the chassis.

Accordingly, despite the known improvements to fifth-wheel travel trailer chassis designs, there remains a need for a chassis that has the strength, durability, and economy of a traditional two-level chassis, but also optimizes the height of the storage area beneath the bathroom portion to easily accommodate common large objects used with travel trailers. In addition to other benefits that will become apparent in the following disclosure, the present invention fulfills these needs.

SUMMARY OF THE INVENTION

The present invention is a travel trailer having a two-level chassis supporting at least two discrete floor sections at two or more different heights above the ground. In particular, an aft floor section is positioned at a lower height, a fore floor section is positioned at an upper height, and an intermediate section is positioned either at the upper height or at a height

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intermediate to the lower and upper heights. The area underneath the intermediate section and above the bottom of the trailer, defines a storage area.

The two-level chassis includes generally horizontal upper and lower chassis beams. The aft floor section is supported by the lower chassis beam, and the fore floor section is supported by the upper beam. The intermediate floor section is supported by the upper beams and in preferred embodiments is positioned below the upper edge of the upper chassis beams such that the height of, and general access to, the storage area is optimized because the chassis beams do not interfere with access to this area.

In a preferred embodiment, the upper beam has a lower flange, and the intermediate floor section is supported by this lower flange. In an alternative preferred embodiment the intermediate floor is suspended fully below the upper beams.

Common fixed trailer accessories, such as gray and black water tanks, their related plumbing, trailer heaters and the like are clustered together within a limited section of the storage area, such as near the rear of the storage area, whereby the majority of the storage area remains unoccupied. Accordingly, storage space within the storage area is optimized, and the full height of the storage area is available throughout the majority of the storage area to accommodate oversized objects.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view of a travel trailer in accordance with a first preferred embodiment of the invention.

FIG. 2 is an isometric view of the chassis structure of the travel trailer of FIG. 1.

FIG. 3 is an isometric view of the chassis structure of FIG. 2 having floor portions mounted thereto with at least one floor portion suspended from the chassis in accordance with a preferred embodiment of the present invention.

FIG. 4 is a fragmentary side view taken along line 4—4 of FIG. 3.

FIG. 5 is a fragmentary isometric view of the chassis structure and floor portions mounted thereto of FIG. 3 with some elements removed to show underlying detail.

FIG. 6 is a cross-sectional view taken along lines 6—6 of FIG. 2.

FIG. 7 is a fragmentary isometric view of the chassis structure and floor portions mounted thereto of FIG. 3 with some elements removed to show underlying detail and a possible orientation of common trailer accessories in accordance with a preferred embodiment of the present invention.

FIG. 8 is a fragmentary isometric view of the chassis structure and floor portions mounted in accordance with an alternative preferred embodiment showing a possible orientation wherein the intermediate floor is supported by the upper chassis beams and positioned below the upper edge of the upper chassis beams.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Two embodiments of an improved two-level travel trailer chassis having at least one floor section supported by an upper chassis beam and preferably positioned below the upper edge of that beam are disclosed in FIGS. 1–8.

I. First Preferred Embodiment

An improved travel trailer 10 having an enclosed shelter 12 supported by a two-level chassis 14 defining a forward

upper portion 16 and a rearward lower portion 18, wherein the chassis 14 supports at least three discrete floors 20a, 20b, 20c by suspending at least one floor 20b below the upper edge 15 of the forward upper portion 16 is disclosed in FIGS. 1-7.

A. Chassis Assembly

As best shown in FIG. 2, the chassis 14 preferably includes a left and right chassis beam assembly 22a, 22b respectively, with each beam assembly 22a, 22b including an elongate lower chassis beam 24a, 24b and an elongate upper chassis beam 26a, 26b joined together at vertical riser assemblies 28a, 28b. Each upper chassis beam 26a, 26b and lower chassis beam 24a, 24b has a front end 30 and a back end 32, with the front end 30 of the lower chassis beams 24a, 24b secured to the back ends 32 of their respective upper chassis beams 26a, 26b at the vertical riser assemblies 28a, 28b such that the upper chassis beams 26a, 26b and lower chassis beams 24a, 24b are aligned parallel with each other and the upper chassis beams 26a, 26b are horizontally-aligned above the lower chassis beams 24a, 24b as shown.

The left and right beam assemblies 22a, 22b are spaced apart from each other and joined together with a plurality of chassis cross-members 40a-i positioned along the longitudinal length of the chassis 14, such that the lower chassis beams 24a, 24b and cross members 40c-i define the rearward lower portion 18 of the chassis 14 and the upper chassis beams 26a, 26b and cross-members 40a, 40b define the forward upper portion 16 of the chassis.

Preferably, the upper and lower chassis beams 26a, 26b, 24a, 24b are constructed with strong and durable materials, such as steel I-beams. More preferably, the lower chassis beams 24a, 24b have a 12-inch vertical web 41a, and the upper beams have an 8-inch vertical web 41b with an upper and lower flange 43a, 43b, respectively, extending therefrom. The upper flange 43a defines the upper edge 15 of the upper beams 26a, 26b.

The rearward lower portion 18 of the chassis 14 includes at least one perpendicularly aligned wheel assembly 42a, 42b, 42c, preferably including an axle tube 44a, 44b, 44c secured to the lower side 46 of the lower chassis beams 24a, 24b at suspension elements (not shown). An axle hub (not shown) is journaled to each axle tube 44a, 44b, 44c and secured to wheels 50a, 50b, 50c, preferably having tires 52a, 52b, 52c attached to them and aligned substantially parallel to the lower chassis beams 24a, 24b.

The underside 54 of the forward upper portion 16 of the chassis includes a mounting portion 56 for detachable securing the chassis 14 to a trailer mount (not shown), or hitch. Preferably, a pair of jack legs 58a, 58b, each having a support tube 59a, 59b and a retractable extension portion 60a, 60b, is secured to the underside 54 of the forward upper portion 16 as shown to support the forward upper portion 16 when the trailer 10 is detached from its towing vehicle (not shown). More preferably, the support tubes 59a, 59b are steel 4-inch by 2-inch tubes having a thickness of $\frac{3}{16}$ of an inch and include jack leg reinforcement members 62a, 62b having slightly angled front ends 64a, 64b and gussets 66a, 66b as best shown in FIGS. 2 & 4.

The vertical riser assemblies 28a, 28b each preferably include a generally vertically aligned perimeter chassis post 68a, 68b and an inner chassis post 70a, 70b joined together by transition members 72a-f. As best shown in FIG. 2, the front ends 30 of the lower chassis beams 24a, 24b are secured to the lower ends of the inner chassis posts 70a, 70b, and the back ends 32 of the upper chassis beams 26a, 26b are secured to the upper ends of the perimeter chassis posts 68a, 68b preferably by welding. More preferably, the chassis

posts 68a, 68b, 70a, 70b are constructed of elongate steel tube, such as 5-inch by 3-inch tube having a thickness of $\frac{3}{16}$ of an inch. Each riser assembly 28a, 28b preferably includes reinforcing gussets 74a, 74b, 75a, 75b (not shown), and the upper and lower transition members 72a, 72c, 72d, 72f are angled as shown with respect to the chassis posts 68a, 68b, 70a, 70b to increase the strength and durability of the joints.

As best shown in FIG. 2, cross-members 40c-h in the rearward lower portion 18 of the chassis 14 each include upper and lower members 82, 84 secured together by extension members 86, which are preferably angled. More preferably, cross-member 40i is positioned at the back ends 32 of the lower chassis beams 24a, 24b and is a Z-beam having a vertical web.

Cross-members 40a, 40b in the forward upper portion 16 of the chassis 14 are preferably elongate steel 8-inch by 2-inch tubes having a $\frac{3}{16}$ -inch thickness with one cross-member 40a positioned at the front ends 30 of the upper chassis beam 26a, 26b. More preferably, supports 90 extend between cross members 40a, 40b as shown in FIG. 2.

An elongate chassis rail lateral tie 92 is secured to and suspended below the upper chassis beams 26a, 26b. Preferably, the lateral tie 92 has a generally Z-shaped cross-section, forming an upper lip 94 and a lower lip 96 separated by an angled web 98, with the upper lip 94 extending toward the front of the chassis 14 and the lower lip 96 extending toward the back of the chassis 14. More preferably, the ends of the lateral tie 92 are secured to the angled ends 64a, 64b of the jack-leg reinforcement members 62a, 62b as best shown in FIGS. 4 & 7.

B. Suspended Floor Assembly and Storage Area Details

As best shown in FIGS. 3 & 4, a lower floor 20c is supported by the lower portion 18 of the chassis 14, preferably by extending spaced apart elongate lower floor joists 100 from the lower ends of the vertical riser assemblies 28a, 28b to the back ends 32 of the lower chassis beams 24a, 24b and securing planar floor members 102 thereon. Similarly, the upper floor 20a is supported by the upper portion 16 of the chassis 14, preferably by extending spaced apart elongate upper floor joists 104 from an area generally near the front of the chassis 14 to the upper lip 94 of the chassis rail lateral tie 92 and securing planar floor members 102 thereon.

The intermediate floor 20b is positioned below the upper edge 15 of the upper portion 16 of the chassis and suspended below the upper chassis beam 26a, 26b, in an area between the upper floor 20a and lower floor 20c. Preferably, the upper floor 20a defines a bedroom, the lower floor 20c defines a living area, and the intermediate floor 20b defines a bathroom section of the trailer 10.

One known apparatus for suspending the intermediate floor 20b includes extending an elongate generally horizontal aft intermediate floor support 106 between the chassis posts 68a, 68b at a height generally horizontally-aligned with the lower lip 96 of the chassis rail lateral tie 92. In an area that is preferably equal distance between the lateral tie 92 and the aft intermediate floor support 106, a suspended girder 108 having an upper edge 110 is suspended from the upper chassis beams 26a, 26b such that the upper edge 110 is on the same horizontal plane as the lower lip 96 of the lateral tie 92, preferably by extending suspension elements 112a, 112b from the upper chassis beams 26a, 26b and securing the girder 108 to the suspension elements 112a, 112b. Spaced apart intermediate floor joists 120 extend from the lower lip 96 of the lateral tie 92 to the aft intermediate floor support 106. The intermediate floor joists 120 are also supported at the upper edge 110 of the suspended girder 108 as shown. Planar floor members 102 are secured to the

intermediate floor joists 120 thereby defining the intermediate floor 20b at a height between the upper and lower floors 20a, 20c, respectively. Preferably, a step 124 is provided between the lower floor 20c and intermediate floor 20b to facilitate access between these floors.

The suspended girder 108 is preferably an elongate cross-rod beam as best shown in FIG. 3. Alternatively, the suspended girder 108 can include a traditional steel tube, such as tubes having a rectangular or square cross-section. Of course alternative suitably strong elongate support structures can be used for this purpose.

The area between the support tubes 59a, 59b and vertical riser assemblies 28a, 28b, above the lower side 46 of the trailer 10, and below the intermediate floor joists 120 defines a storage area 126, or trunk space, of the trailer 10. The intermediate floor 20b is suspended from the upper chassis beams 26a, 26b such that the height 127 of, and general access to, the storage area 126 is optimized because the chassis beams 24a, 24b, 26a, 26b do not interfere with access to this area.

Preferably, the floor 128 of the storage area 126 is supported by a storage area lateral tie 130 extending between the lower end portions of the support tubes 59a, 59b and spaced apart elongate extension members 132 extending from the storage area lateral tie 130 to the lower chassis beam 24a, 24b as best shown in FIG. 5. Spaced apart storage area floor joists 134, extending between the sides of the storage area 126, are secured the elongate extension members 132. Planar floor members 102 are secured to the storage area floor joists 134, defining the floor 128 of the storage area 126. Accordingly, the distance between the floor 128 of the storage area 126 and the lower edge of the intermediate floor joists 120 defines the height of the storage area.

The upper floor joists 104, lower floor joists 100, and intermediate floor joists 120, storage area lateral tie 130, and elongate extension members 132 do not carry as great of a load as that carried by the chassis 14. Accordingly, these components need not be as strong as the chassis components, and accordingly can have smaller cross-sectional dimensions. For example, the upper, lower, and intermediate floor joists 104, 100, 120, respectively, are preferably constructed with 1-inch by 1-inch 11 gage steel tubes, and the storage area lateral tie 130 and elongate extension members 132 are preferably constructed with 2-inch by 2-inch steel tubes having a ¼-inch thickness. Of course these components can be made with any other suitably sized, shaped, and strong materials, including wood, other metals, and synthetic or composite materials.

As best shown in FIG. 1, the enclosed shelter 12 encloses the storage area and includes a plurality of access doors 136. Preferably, the access doors 136a-c open outward and the height of the access doors 136 is substantially equivalent to the height of the storage area 126, thereby not becoming a limiting factor in the size of objects that may be placed in the storage area 126.

More preferably, and as best shown in FIGS. 4 and 7, a planar sliding mechanism 138 having a pair of rail sliders 140 secured to the storage area floor 128, and a platform 142 sized to support a conventional 40 pound LPG removable bottle 144 is slidably secured to the rail sliders 140. An appropriately sized access door 136a is aligned with the sliding mechanism to permit easy access.

C. Plumbing and Related Hardware Details

Optimal storage space is provided by clustering the common fixed trailer accessories, such as gray and black water tanks, their related plumbing, trailer heaters and the like

within the same area in or near the storage area. As best shown in FIGS. 4 & 7, an elongate black water tank 150 having a substantially rectangular cross-section preferably rests on the storage area floor 128 in the back of the storage area 126 with a drain 152 extending upward from the black tank 150 through the bathroom intermediate floor 20b. A remotely-actuated valve, such as a cable actuated black water tank dump valve 154 is positioned adjacent to and in fluid communication with the black water tank 150, and associated plumbing 151 is preferably installed to the valve 154 to accommodate easy emptying of the tank 150. An elongate gray water tank 156 having a substantially rectangular cross section is preferably secured within an area below the lower floor joists 100, above the lower side 46 of the trailer 10, and between the lower chassis beams 24a, 24b and lower cross-members 40c, 40d. A remotely-actuated valve, such as a cable actuated gray water tank dump valve 158 is positioned adjacent to and in fluid communication with the gray water tank 156 and associated plumbing 151 is preferably installed to accommodate easy emptying of the gray water tank 156. Preferably the cable actuation control handles 160a, 160b for the black and gray water dump valves 154, 158 are positioned together, adjacent to the outside of the trailer, and outside of the storage area for easy actuation, even if the storage area 126 is full.

If desired, a traditional trailer furnace (162, FIG. 4) may be secured to the intermediate floor joists 120 near the black water tank 150.

D. Use and Operation

The travel trailer 10 accordingly to the present invention is used like any other fifth-wheel trailer. Appropriate home furnishings and conveniences are placed in the living, bathroom, and bedroom portions of the trailer, which has the strength and durability of any trailer having a conventional two-level chassis.

However, volume of the storage area 126, and access to that area, is optimized. For example, thick chassis beams do not limit the height of the storage area, or require a user to lift items to be stored above any bottom chassis beam. Moreover, by clustering the common fixed trailer accessories within the same area in or near the storage area, the remaining useful area within the storage area is optimized. Accordingly, oversized objects can be easily accommodated in the storage area with minimal lifting. For example, a conventional 40 pound LPG removable bottle 144 typically is an elongate canister of about 29 ¼ inches having a flat bottom end 164 on which it rests, defining its standing position. The height 127 of the storage area can be high enough to easily accommodate this type of bottle in its standing position. Moreover, in trailers so equipped, the sliding platform 142 and special access door 136a further facilitate loading and storage of these types of bottles.

II. Second Preferred Embodiment

An alternative preferred embodiment for supporting the intermediate floor 20b is shown in FIG. 8. This embodiment has substantially the same basic elements and construction of the first preferred embodiment. Accordingly, in order to avoid undue repetition, unless specifically identified otherwise below, reference numerals refer to like numbered elements having a like orientation and configuration as those elements identified in the discussion of the first preferred embodiment.

In this embodiment the intermediate floor 20b is positioned below the upper edge 15 of the upper beams 26a, 26b, and preferably supported by the lower flange 43b of the upper beams 26a, 26b, intermediate floor support 106', suspended beam 108', and the upper lip 94 of the chassis rail lateral tie 92.

In particular, and referring specifically to FIG. 8, the intermediate floor 20b includes extending the elongate generally horizontal aft intermediate floor support 106' between the chassis posts 68a, 68b at a height generally horizontally-aligned with the upper lip 94 of the chassis rail lateral tie 92. In an area that is preferably equal distance between the lateral tie 92 and the aft intermediate floor support 106', the suspended beam 108' having an upper edge 110' is suspended from the upper chassis beams 26a, 26b such that the upper edge 110' is substantially on the same horizontal plane as the upper lip 94 of the lateral tie 92, preferably by securing the suspended beam 108' directly to the lower side of the upper chassis beams 26a, 26b.

Spaced apart intermediate floor joists 104' extend from the aft intermediate floor support 106' to the upper lip 94 of the lateral tie 92 to the aft intermediate floor support 106'. The intermediate floor joists 104' are also supported at the upper edge 110' of the suspended beam 108' as shown. Planar floor members (not shown) are secured to the intermediate floor joists 120 thereby defining the intermediate floor 20b at a height below the upper edge 15 of the upper chassis rails 26a, 26b.

More preferably, the intermediate floor joists 104' also extend from the upper lip 94 of lateral tie 94 forward to cross-member 40b, and covered by planar floor member (not shown) thereby defining the upper floor being substantially parallel to the intermediate floor. Stairs 124 extend from the lower floor to the intermediate floor, facilitating access between the floors.

The area between the support tubes 59a, 59b and vertical riser assemblies 28a, 28b, above the lower side 46 of the trailer 10, and below the intermediate floor joists 104' defines a storage area 126, or trunk space, of the trailer 10. As with the first embodiment, the intermediate floor 20b is positioned below the upper edge 15 of the upper chassis beams 26a, 26b such that the height 127 of, and general access to, the storage area 126 is optimized because the chassis beams 24a, 24b, 26a, 26b do not interfere with access to this area.

Since the intermediate floor of the second preferred embodiment is positioned higher than the intermediate floor of the first preferred embodiment, the overall storage area in the storage space of the second preferred embodiment is increased over that provided by the first preferred embodiment. Moreover, positioning the intermediate floor at the same level as the upper floor eliminates steps between these floors, thereby facilitating user movement between them.

As with the first embodiment, the lower floor joists 100, intermediate floor joists 104', suspended beam 108', storage area lateral tie 130, and elongate extension members 132 do not carry as great of a load as that carried by the chassis 14. Accordingly, these components need not be as strong as the chassis components, and accordingly can have smaller cross-sectional dimensions. For example, the lower and intermediate floor joists 100, 104' respectively, are preferably constructed with 1-inch by 1-inch 11 gage steel tubes, and the storage area lateral tie 130 and elongate extension members 132 are preferably constructed with 2-inch by 2-inch steel tubes having a ¼-inch thickness. Of course these components can be made with any other suitably sized, shaped, and strong materials, including wood, other metals, and synthetic or composite materials.

In view of the wide variety of embodiments to which the principles of the invention can be applied, it should be apparent that the detailed description of a preferred embodiment is illustrative only and should not be taken as limiting the scope of the invention. For example, although the preferred chassis beams 24a, 24b, 26a, 26b are I-beams, any suitably strong shape or material could be used without departing from the scope of the invention. Moreover, although preferred sizes and materials for the various beams,

tubes, posts and the like have been disclosed, any suitably strong materials, shapes, and dimensions may be used depending on the specific design needs of a particular trailer. Also, although three wheel assemblies 42a, 42b, 42c are shown in the figures, one, two, or even more such assemblies could be used depending on the load to be incurred by the chassis. In addition, to optimize headroom and storage area room for a particular configuration, the height of the intermediate floor can be positioned at any position below the upper edge of the upper chassis beams including at the same height as the upper floor as shown and described in the second preferred embodiment or at any height between the upper and lower floors as shown and described in the first preferred embodiment of the present invention.

Accordingly, the claimed invention includes all such modifications as may come within the scope of the following claims and equivalents thereto.

What is claimed is:

1. A two-level chassis for use on a fifth-wheel travel trailer having at least two floor areas supported at at least two different heights above the ground defining at least an intermediate and lower floors, said chassis including:

a pair of parallel aligned spaced apart substantially horizontal lower chassis beams;

a pair of parallel aligned spaced apart substantially horizontal upper chassis beams, each having an upper edge;

a pair of vertical riser assemblies, each riser assembly securing one upper chassis beam to one lower chassis beam such that said upper beam is vertically above and parallelly-aligned with said lower beam;

the lower floor supported by said lower beam;

the intermediate floor defining a bathroom portion and a bedroom portion; said bathroom portion and said bedroom portion having floors aligned substantially at the same horizontal height without a step therebetween, at least a portion of said bathroom portion supported by said upper chassis beams at a vertical height above said lower floor.

2. The two-level chassis of claim 1, wherein the lower beam has a lower edge that defines the bottom of the chassis, and the area below the intermediate floor, forward of the vertical riser assemblies and above the bottom of the chassis is enclosed and defines a storage area having a storage area floor.

3. The two-level chassis of claim 2, wherein the storage area has a height, and said height is high enough to accommodate at least one conventional 40 pound LPG removable bottle in its standing position within the storage area.

4. The two-level chassis of claim 3, further including a sliding planar member secured to the storage area floor for easily loading and unloading said 40 pound LPG removable bottles within said storage area.

5. The two-level chassis of claim 1, wherein said upper and lower chassis beams are steel I-beams.

6. The two-level chassis of claim 1, wherein the intermediate floor is suspended completely below said upper chassis beams.

7. The two-level chassis of claim 5, wherein said upper chassis beams have a vertical web, upper and lower flanges, and a lower edge, and said intermediate floor is supported by said lower flanges.

8. The two-level chassis of claim 1, wherein the intermediate floor is positioned below said upper edge of said upper chassis beams.

9. The two-level chassis of claim 1, wherein said bathroom portion is positioned over said upper chassis beams without extending over said lower chassis beam.