

The  
United  
States  
of  
America



**The Director of the United States  
Patent and Trademark Office**

*Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

*Therefore, this*

**United States Patent**

*Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.*

*Leea Staret Lee*

*Acting Director of the United States Patent and Trademark Office*



US008505780B2

(12) **United States Patent**  
**Oren**

(10) **Patent No.:** **US 8,505,780 B2**  
(45) **Date of Patent:** **Aug. 13, 2013**

(54) **PROPPANT STORAGE VESSEL AND ASSEMBLY THEREOF**

(71) Applicant: **John Oren**, Houston, TX (US)

(72) Inventor: **John Oren**, Houston, TX (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.: **13/660,840**

(22) Filed: **Oct. 25, 2012**

(65) **Prior Publication Data**

US 2013/0161354 A1 Jun. 27, 2013

**Related U.S. Application Data**

(63) Continuation of application No. 13/332,937, filed on Dec. 21, 2011.

(51) **Int. Cl.**  
**B65D 88/30** (2006.01)

(52) **U.S. Cl.**  
USPC ..... 222/185.1; 222/462; 222/143; 220/601; 220/646

(58) **Field of Classification Search**  
USPC ..... 222/185.1, 145.1, 143, 145.2, 145.5, 222/462; 220/601, 646  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

2,894,666 A \* 7/1959 Campbell, Jr. .... 222/528  
3,281,006 A \* 10/1966 Wei ..... 220/4.27

3,294,306 A *	12/1966	Areddy .....	206/596
3,318,473 A *	5/1967	Jones et al. ....	414/608
3,602,400 A *	8/1971	Cooke .....	222/143
4,848,605 A *	7/1989	Wise .....	222/608
5,224,635 A *	7/1993	Wise .....	222/608
5,441,321 A *	8/1995	Karpisek .....	294/68.21
5,927,558 A *	7/1999	Bruce .....	222/185.1
5,971,219 A *	10/1999	Karpisek .....	222/185.1
6,247,594 B1 *	6/2001	Garton .....	206/512
6,772,912 B1 *	8/2004	Schall et al. ....	222/143
6,902,061 B1 *	6/2005	Elstone .....	206/600
6,968,946 B2 *	11/2005	Shuert .....	206/386
7,284,579 B2 *	10/2007	Elgan et al. ....	141/316
7,475,796 B2 *	1/2009	Garton .....	222/185.1
8,201,520 B2 *	6/2012	Meritt .....	119/53
2008/0029546 A1 *	2/2008	Schuld .....	222/185.1
2011/0011893 A1 *	1/2011	Cerny .....	222/185.1

\* cited by examiner

*Primary Examiner* — Paul R Durand

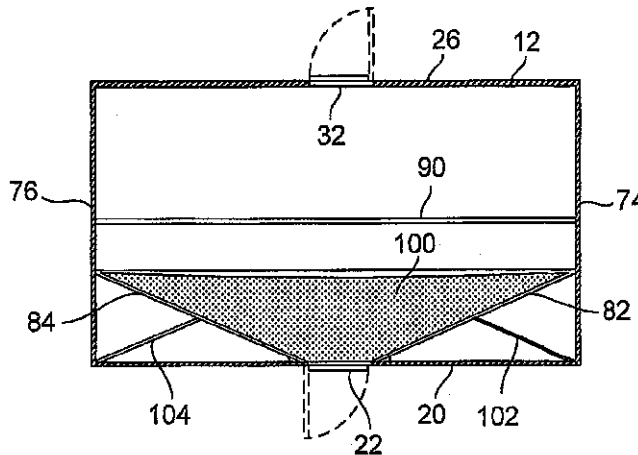
*Assistant Examiner* — Donnell Long

(74) *Attorney, Agent, or Firm* — Egbert Law Offices, PLLC

(57) **ABSTRACT**

A proppant storage vessel has a first container with an interior volume, and a second container supported in spaced relation above the first container. The first container has a bottom hatch affixed to a bottom wall thereof. The bottom hatch is movable between an open position and a closed position. The first container has an opening at a top wall thereof. The second container has bottom hatch formed on a bottom wall thereof. The bottom hatch of the second container is aligned with the opening of the first container such that a proppant in the second container can flow through the hatch thereof into the interior volume of the first container. Each of the containers includes first, second, third and fourth inclined surfaces positioned in the interior volume and extending from the respective side walls and end walls thereof toward the bottom hatch.

**4 Claims, 4 Drawing Sheets**



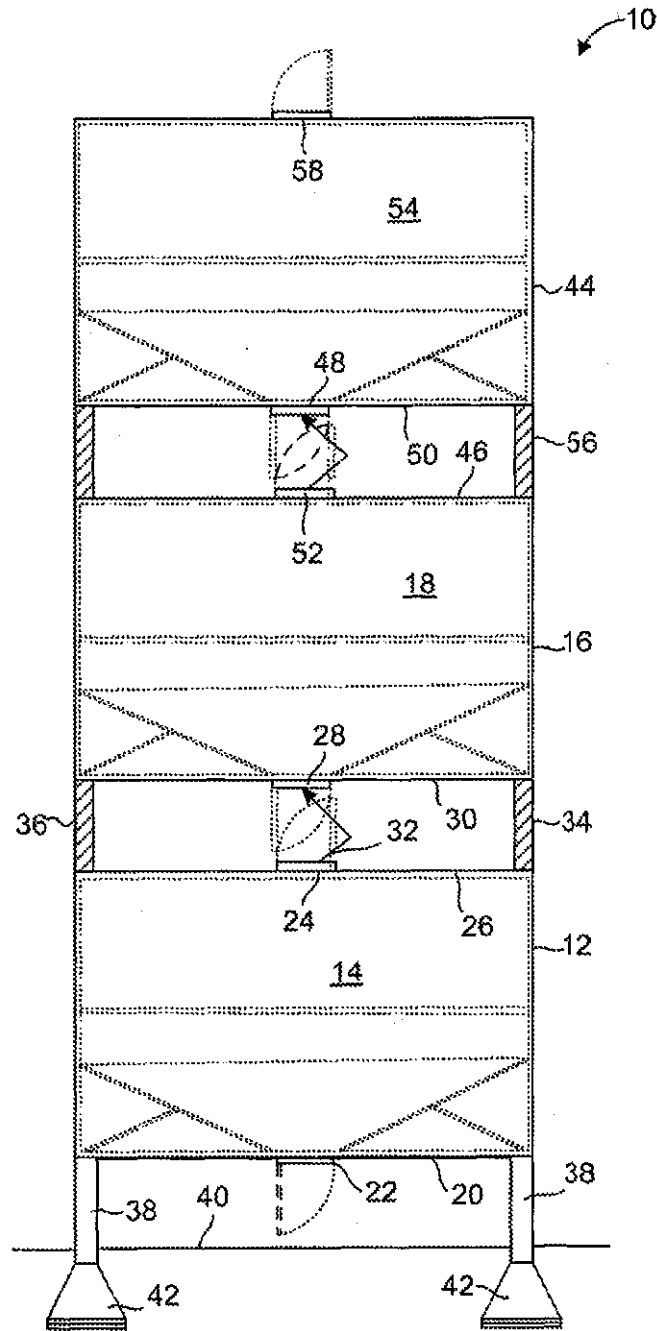


FIG. 1

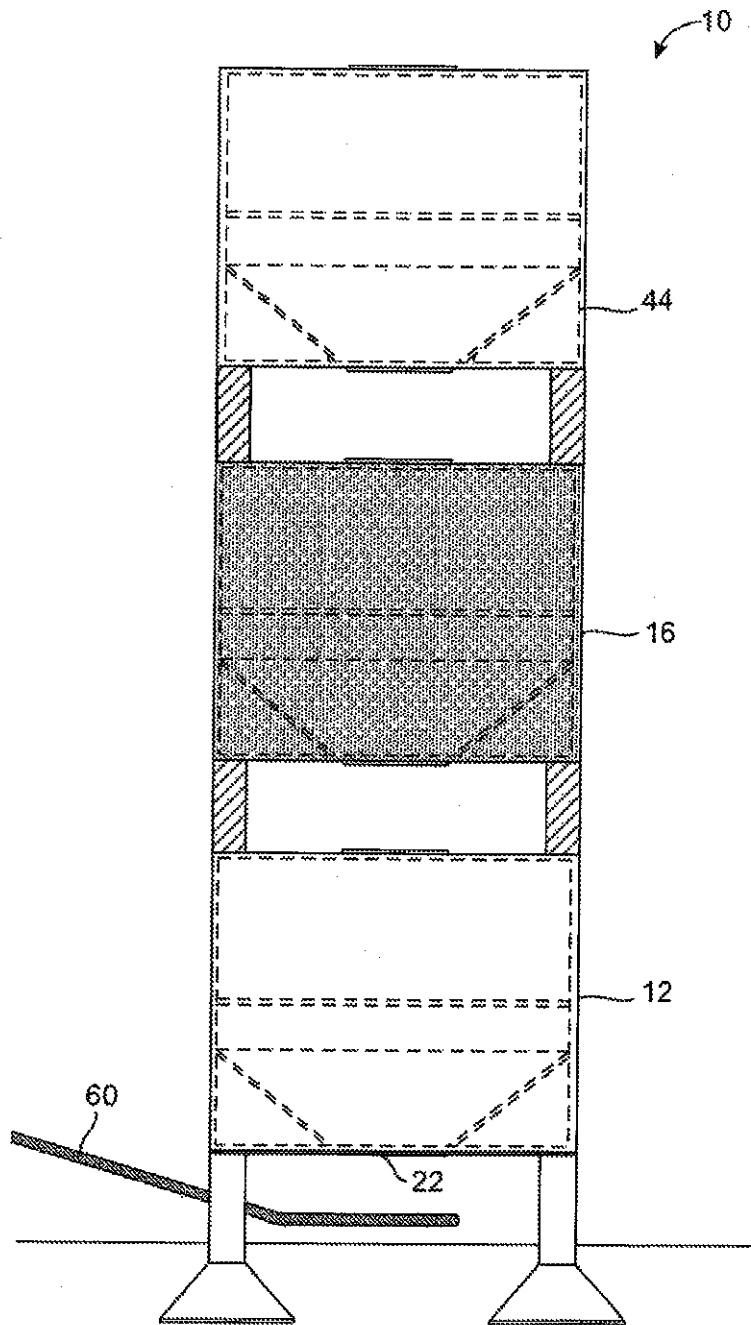


FIG. 2

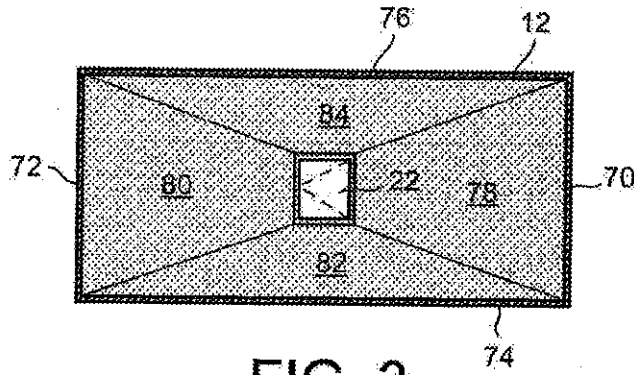


FIG. 3

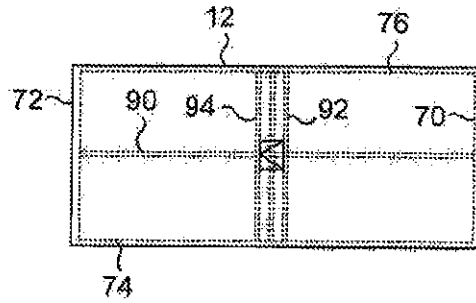


FIG. 4

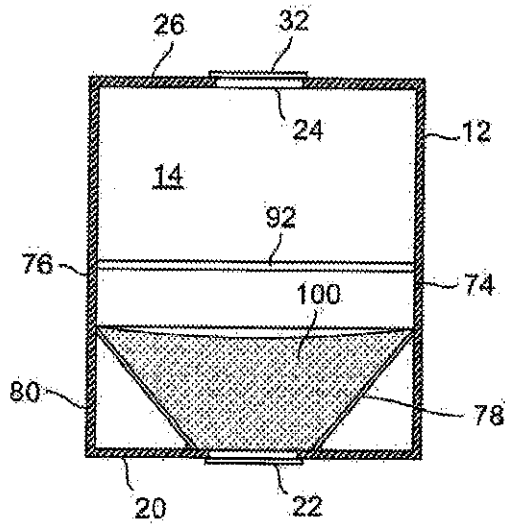


FIG. 5

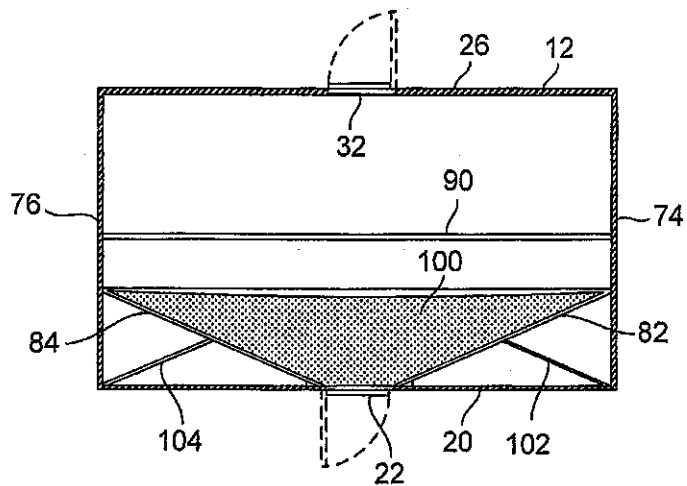


FIG. 6

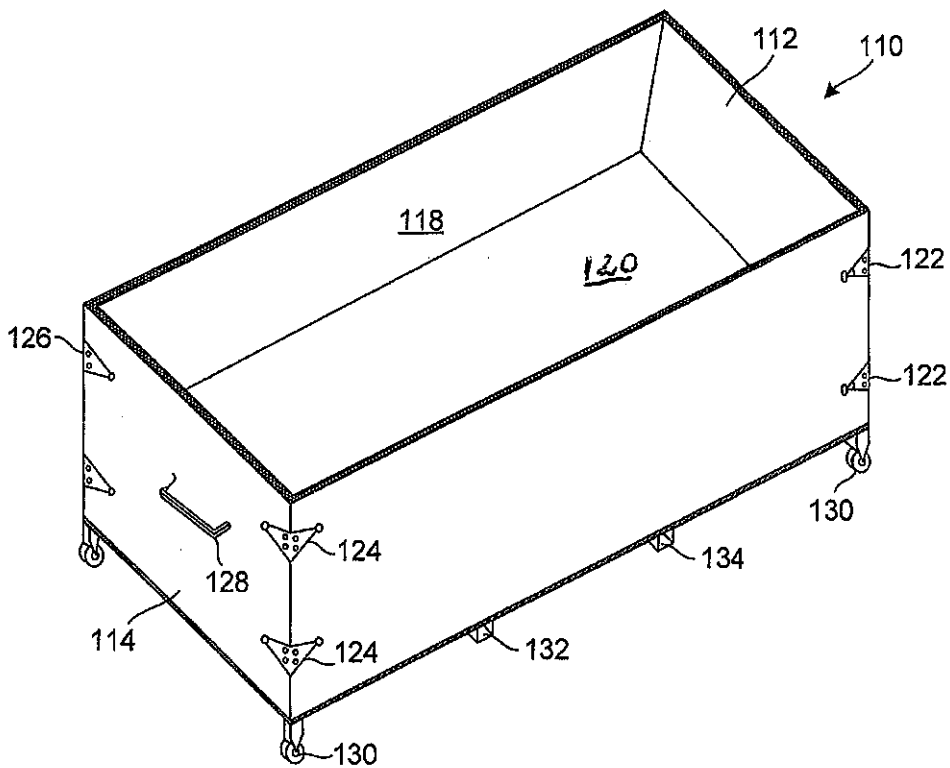


FIG. 7