US010647508B2

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

(10) **Patent No.: US 10,647,508 B2**
(45) **Date of Patent: May 12, 2020**

(54) **STORAGE STATION FOR STORING CONTAINERS TRANSPORTED BY UNMANNED VEHICLES**

(71) Applicants: **Brandon Eck**, Washington, DC (US); **Brett Wagner**, Washington, DC (US)

(72) Inventors: **Brandon Eck**, Washington, DC (US); **Brett Wagner**, Washington, DC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 201 days.

(21) Appl. No.: **15/821,266**

(22) Filed: **Nov. 22, 2017**

(65) **Prior Publication Data**

US 2019/0152701 A1 May 23, 2019

(51) **Int. Cl.**

B64F 1/32	(2006.01)
B65G 1/06	(2006.01)
B64F 1/36	(2017.01)
B65G 1/04	(2006.01)
B65G 67/04	(2006.01)
B65G 67/24	(2006.01)
B65G 1/137	(2006.01)

(52) **U.S. Cl.**

CPC ***B65G 1/06*** (2013.01); ***B64F 1/32*** (2013.01); ***B64F 1/368*** (2013.01); ***B65G 1/0464*** (2013.01); ***B65G 1/137*** (2013.01); ***B65G 67/04*** (2013.01); ***B65G 67/24*** (2013.01); *B64C 2201/128* (2013.01); *B65G 2814/0302* (2013.01); *B65G 2814/0313* (2013.01); *B65G 2814/0398* (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

9,387,928	B1	7/2016	Gentry et al.	
9,505,493	B2 *	11/2016	Borko	B64C 39/024
2014/0254896	A1	9/2014	Zhou et al.	
2015/0006005	A1	1/2015	Yu et al.	
2015/0120094	A1	4/2015	Kimchi et al.	
2015/0332206	A1	11/2015	Trew et al.	
2016/0207627	A1	7/2016	Hoareau et al.	
2016/0209839	A1	7/2016	Hoareau et al.	
2016/0257423	A1	9/2016	Martin	
2018/0203465	A1 *	7/2018	Suzuki	A47G 29/14
2019/0009906	A1 *	1/2019	von Gostomski	A47G 29/14

OTHER PUBLICATIONS

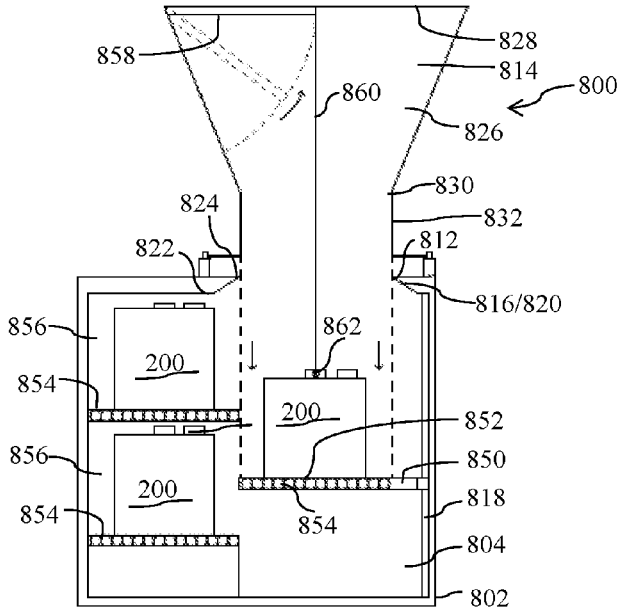
Amazon Prime Air. Accessed Jan. 26, 2017, 9 pages. https://www.amazon.com/Amazon-Prime-Air/b?ie=UTF8&node=8037720011.

(Continued)

Primary Examiner — Mark C Hageman

(74) *Attorney, Agent, or Firm* — Smith Gambrell & Russell LLP

(57) **ABSTRACT**

A storage station includes a housing defining an inner space, and having a top and side passage for passage of a container. One or more funnels are provided at the top passage for guiding the passage of containers therethrough, and an actuator system is provided for, selectively, engaging a container with a suspension system and disengaging a container from a suspension system. Also provided is a transfer system that is inclusive of the storage station, a UAV, a reusable container; and methods of transferring reusable containers between UAVs, the storage station, and other transport stations.

22 Claims, 13 Drawing Sheets