US009408347B2

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

(10) **Patent No.: US 9,408,347 B2**
(45) **Date of Patent: Aug. 9, 2016**

(54) **AGRICULTURAL HARVESTER**

(71) Applicant: **Maschinenfabrik Bernard Krone GmbH**, Spelle (DE)

(72) Inventors: **Stefan Menke**, Spelle (DE); **Bernd Schniederbruns**, Wietmarschen (DE); **Lars Ambrosy**, Bremen (DE); **Rainer Hory**, Bremen (DE)

(73) Assignee: **Maschinenfabrik Bernard Krone GmbH**, Spelle (DE)

(*) 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.: **14/535,469**

(22) Filed: **Nov. 7, 2014**

(65) **Prior Publication Data**

US 2015/0149048 A1 May 28, 2015

(30) **Foreign Application Priority Data**

Nov. 8, 2013 (DE) 10 2013 018 724

(51) **Int. Cl.**

G02B 26/00	(2006.01)
A01D 43/073	(2006.01)
A01D 43/08	(2006.01)
G01J 1/02	(2006.01)
G01J 1/04	(2006.01)
G02B 26/10	(2006.01)

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

CPC ***A01D 43/073*** (2013.01); ***A01D 43/087*** (2013.01); ***G01J 1/0242*** (2013.01); ***G01J 1/0403*** (2013.01); *G02B 26/101* (2013.01)

(58) **Field of Classification Search**

CPC G01J 1/0242; G01J 1/0403; A01D 43/087; A01D 43/073; G02B 26/101

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,575,316	A *	11/1996	Pollklas	A01D 43/073 141/198
7,504,988	B2 *	3/2009	Tsuchihashi	G01S 13/34 342/158
8,234,047	B2 *	7/2012	Madsen	A01D 43/073 56/10.2 R
8,451,139	B2 *	5/2013	Morselli	A01D 43/086 340/901
8,499,537	B2 *	8/2013	Correns	A01D 43/087 141/231
8,682,540	B2 *	3/2014	Missotten	A01D 41/1217 701/50
9,119,342	B2 *	9/2015	Bonefas	A01D 34/001
2002/0021229	A1 *	2/2002	Stein	B60K 31/0008 340/933
2003/0174207	A1 *	9/2003	Alexia	A01D 43/073 348/89
2006/0109536	A1	5/2006	Mettenleiter et al.	
2007/0219720	A1 *	9/2007	Trepagnier	B60W 30/00 701/300
2009/0044505	A1 *	2/2009	Huster	A01D 43/087 56/10.2 R
2009/0096994	A1 *	4/2009	Smits	G02B 26/101 353/30

(Continued)

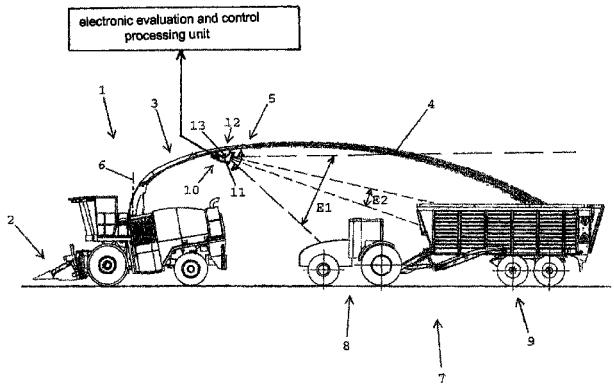
FOREIGN PATENT DOCUMENTS

DE	44 26 059 A1	2/1996
EP	2 306 219 A2	4/2011

Primary Examiner — Truc M Do

(74) *Attorney, Agent, or Firm* — Gudrun E. Huckett

(57) **ABSTRACT**

An agricultural harvester is provided with a pivotable discharge elbow that conveys picked-up and processed crop into a transport container of a transport vehicle. An electro-optical device is correlated with the discharge elbow. An electronic evaluation and control processing unit is connected to the electro-optical device and processes signals received from the electro-optical device to effect an automatic targeted control of the crop stream into the transport container based on the processed signals. The electro-optical device is a 3D laser scanner provided with a 2D laser scanner and a pivot unit that pivots the 2D laser scanner about an approximately horizontal axis.

5 Claims, 1 Drawing Sheet