



(12) **United States Patent**  
**Kuphal**

(10) **Patent No.:** **US 9,408,379 B2**  
(45) **Date of Patent:** **Aug. 9, 2016**

- (54) **BI-DIRECTIONAL BREAK-AWAY BOOM WITH ROLLER AND ROTARY DAMPER**
- (71) Applicant: **AGCO Corporation**, Hesston, KS (US)
- (72) Inventor: **John Kuphal**, Jackson, MN (US)
- (73) Assignee: **AGCO Corporation**, Duluth, GA (US)
- (\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 80 days.

(21) Appl. No.: **14/509,511**  
(22) Filed: **Oct. 8, 2014**

(65) **Prior Publication Data**  
US 2015/0098753 A1 Apr. 9, 2015

**Related U.S. Application Data**  
(60) Provisional application No. 61/888,140, filed on Oct. 8, 2013.

(51) **Int. Cl.**  
*A01M 7/00* (2006.01)  
*E05F 1/12* (2006.01)  
*A01C 23/00* (2006.01)

(52) **U.S. Cl.**  
 CPC ..... *A01M 7/0078* (2013.01); *A01C 23/008* (2013.01); *A01M 7/0075* (2013.01); *Y10T 16/304* (2015.01); *Y10T 403/32254* (2015.01)

(58) **Field of Classification Search**  
None  
See application file for complete search history.

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*Primary Examiner* — Joshua J Michener  
*Assistant Examiner* — Kyle Walraed-Sullivan

(57) **ABSTRACT**  
A break-away apparatus for a boom arm has a main boom portion and a boom tip. The apparatus is positioned at a joint between the main boom portion and the boom tip. The apparatus allows the boom tip to assume a neutral position and to pivot to a forward position and to a rearward position with respect to the main boom portion. The apparatus includes a first plate disposed at the joint, a second plate disposed at the joint, a hinge assembly positioned between the first plate and the second plate, a cam element attached to the first plate, the cam element having an arcuate surface, and a roller attached to the second plate and positioned to roll against the arcuate surface.

**11 Claims, 5 Drawing Sheets**

