



US009409544B1

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

(10) **Patent No.:** **US 9,409,544 B1**  
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **ACTIVE BOLSTER STRESS RELIEF VENTS FOR FAILSAFE WELD PROTECTION**

(56) **References Cited**

U.S. PATENT DOCUMENTS

(71) Applicant: **FORD GLOBAL TECHNOLOGIES, LLC**, Dearborn, MI (US)

6,213,497 B1 \* 4/2001 Spencer ..... B60R 21/045  
280/730.1

(72) Inventors: **Kaitlin M. Cischke**, Bloomfield Hills, MI (US); **Stacey H. Raines**, Ypsilanti, MI (US); **Nicholas A. Mazzocchi**, Ann Arbor, MI (US)

8,328,233 B2 12/2012 Kalisz  
8,454,054 B1 6/2013 Raines  
8,931,803 B2 1/2015 Roychoudhury  
8,936,273 B1 1/2015 Raines et al.  
8,973,942 B1 3/2015 Raines et al.  
9,156,423 B1 \* 10/2015 Aselage ..... B60R 21/239  
9,260,075 B2 \* 2/2016 Young ..... B60R 21/276  
2002/0125691 A1 \* 9/2002 Conlee ..... B60R 21/045  
280/730.1  
2012/0112439 A1 \* 5/2012 Roychoudhury ..... B60R 21/02  
280/728.3  
2012/0267878 A1 \* 10/2012 Kalisz ..... B60R 13/02  
280/728.2

(73) Assignee: **FORD GLOBAL TECHNOLOGIES, LLC**, Dearborn, MI (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.

\* cited by examiner

*Primary Examiner* — Toan To

(74) *Attorney, Agent, or Firm* — Vichit Chea; MacMillan, Sobanski & Todd, LLC

(21) Appl. No.: **14/925,155**

(57) **ABSTRACT**

(22) Filed: **Oct. 28, 2015**

An active bolster mounts at an interior trim surface of a passenger compartment in an automotive vehicle. A plastic front wall deploys in a deployment direction toward a passenger in the passenger compartment. A plastic expandable bladder member is joined along an outer perimeter with the front wall by a weld seam to form a bladder. The weld seam has a nominal separation pressure. An inflator couples an inflation gas to inflate the bladder in response to a crash event. The bladder member includes a plurality of vent openings configured to regulate an inflation pressure of the inflation gas during an impact according to a passenger restraint profile. The bladder member further includes at least one stress relief vent comprising a frangible tear seam partially cut into the bladder member configured to tear open at a predetermined pressure between the passenger restraint profile and the nominal separation pressure.

(51) **Int. Cl.**  
**B60R 21/30** (2006.01)  
**B60R 21/239** (2006.01)  
**B60R 21/2342** (2011.01)

(52) **U.S. Cl.**  
CPC ..... **B60R 21/239** (2013.01); **B60R 21/2342** (2013.01); **B60R 2021/2395** (2013.01)

(58) **Field of Classification Search**  
CPC B60R 21/206; B60R 21/205; B60R 21/2165; B60R 2021/21654  
USPC ..... 280/739, 748, 749, 751  
See application file for complete search history.

**13 Claims, 7 Drawing Sheets**

