



US009409267B2

(12) **United States Patent**
Plantan

(10) **Patent No.:** **US 9,409,267 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **SNAP-IN CENTER SEAL BUSHING**

(75) Inventor: **Ronald S. Plantan**, Mooresville, NC
(US)

(73) Assignee: **Bendix Spicer Foundation Brake LLC**,
Elyria, OH (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 654 days.

(21) Appl. No.: **12/817,951**

(22) Filed: **Jun. 17, 2010**

(65) **Prior Publication Data**

US 2011/0311170 A1 Dec. 22, 2011

(51) **Int. Cl.**

B23P 19/10 (2006.01)

F16J 15/32 (2016.01)

B23P 19/08 (2006.01)

F16D 125/00 (2012.01)

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

CPC **B23P 19/084** (2013.01); **F16J 15/3268**
(2013.01); **F16D 2125/00** (2013.01); **Y10T**
29/49947 (2015.01)

(58) **Field of Classification Search**

CPC B62D 3/12; F16H 2055/281; F16C 29/02;
F16C 29/002; B23P 19/084; F16J 15/3268
USPC 384/16, 15, 37-39, 41, 215, 26, 29, 32,
384/42, 222, 275, 276, 295, 296, 428;
277/551, 609, 616, 577; 188/322.16,
188/322.17; 92/165 R, 168, 63, 64;
267/158-161, 163

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,549,818 A * 4/1951 Joy 92/168
3,071,800 A * 1/1963 Patriquin 277/585
3,136,230 A * 6/1964 Buckley 384/16

3,333,513 A * 8/1967 Wettstein 92/165 R
4,185,721 A 1/1980 Karklins et al.
4,324,438 A * 4/1982 Lister 384/16
5,181,581 A * 1/1993 Engler 384/16
5,272,933 A 12/1993 Collier et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CN 1136344 A 11/1996
DE 43 09 304 A1 9/1993

(Continued)

OTHER PUBLICATIONS

EPO Translation of the Description of WO 2009/106254 A1, Eck et
al., Sep. 3, 2009.*

(Continued)

Primary Examiner — Daniel Yabut

(74) *Attorney, Agent, or Firm* — Crowell & Moring LLP

(57)

ABSTRACT

A bushing adapted to secure an O-ring seal in position relative to an area of a passage permitting reciprocation of a push rod forms a generally circular bushing body with opposed end faces. The end faces are separated by a gap so as to provide the bushing with an approximately C-shaped structure. The bushing includes a plurality of locking elements resistant to axial loads imposed on the bushing by the push rod disposed at least substantially within a corresponding plurality of recesses distributed around a circumferential exterior of the bushing. Solid ribs are interspersed with the locking fingers to resist radial loads imposed on the bushing by the push rod during operation. The O-ring seal is secured in position within the passage area of the passage by an end surface of the bushing.

11 Claims, 2 Drawing Sheets

