



(12) **United States Patent**  
**Yoshikawa**

(10) **Patent No.:** **US 9,510,996 B2**  
(45) **Date of Patent:** **Dec. 6, 2016**

(54) **MULTI-LAYER TUBE FOR MEDICAL USE AND MEDICAL INFUSION BAG**

*B32B 2250/24* (2013.01); *B32B 2250/242* (2013.01); *B32B 2535/00* (2013.01)

(75) Inventor: **Katsuyuki Yoshikawa**, Tokyo (JP)

(58) **Field of Classification Search**  
CPC ..... *A61J 1/1475*  
See application file for complete search history.

(73) Assignee: **Hosokawa Yoko Co., Ltd.**, Tokyo (JP)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 29 days.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,004,636 A 12/1999 Nicola et al.  
6,713,137 B1 3/2004 Andersson et al.  
(Continued)

FOREIGN PATENT DOCUMENTS

CN 1486243 A 3/2004  
EP 0 567 210 10/1993  
(Continued)

OTHER PUBLICATIONS

International Search Report in Application No. PCT/JP2011/067073, mailed Sep. 6, 2011.  
(Continued)

(21) Appl. No.: **13/813,156**

(22) PCT Filed: **Jul. 27, 2011**

(86) PCT No.: **PCT/JP2011/067073**

§ 371 (c)(1),  
(2), (4) Date: **Jan. 29, 2013**

(87) PCT Pub. No.: **WO2012/014927**

PCT Pub. Date: **Feb. 2, 2012**

(65) **Prior Publication Data**

US 2013/0123739 A1 May 16, 2013

(30) **Foreign Application Priority Data**

Jul. 30, 2010 (JP) ..... 2010-172263

(51) **Int. Cl.**

*A61J 1/14* (2006.01)  
*A61J 1/10* (2006.01)

(Continued)

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

CPC ..... *A61J 1/1475* (2013.01); *A61J 1/10* (2013.01); *A61L 29/085* (2013.01); *A61M 5/14* (2013.01); *B32B 1/08* (2013.01); *B32B 7/12* (2013.01); *B32B 27/08* (2013.01); *B32B 27/32* (2013.01); *A61J 1/1468* (2015.05); *A61L 2420/08* (2013.01); *A61M 39/12* (2013.01);

(57) **ABSTRACT**

Disclosed is a multi-layer tube for medical use, the tube being characterized by having: an outer layer including a resin material that contains high-density polyethylene, and an inner layer including a resin material that contains random polypropylene and/or block polypropylene. Also disclosed a medical infusion bag provided with the multi-layer tube.

**3 Claims, 2 Drawing Sheets**

