



US009409340B2

(12) **United States Patent**  
**Bertrand**

(10) **Patent No.:** **US 9,409,340 B2**  
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **METHOD FOR COOLING PLASTIC FILM TUBE IN BLOWN FILM PROCESS**

(71) Applicant: **Poly-America, L.P.**, Grand Prairie, TX (US)

(72) Inventor: **Anthony H. Bertrand**, Mansfield, TX (US)

(73) Assignee: **Poly-America, L.P.**, Grand Prairie, TX (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.

(21) Appl. No.: **14/924,295**

(22) Filed: **Oct. 27, 2015**

(65) **Prior Publication Data**

US 2016/0046057 A1 Feb. 18, 2016

**Related U.S. Application Data**

(63) Continuation of application No. 14/244,210, filed on Apr. 3, 2014, now Pat. No. 9,193,107.

(51) **Int. Cl.**

**B29C 47/88** (2006.01)  
**B29C 47/00** (2006.01)  
**B29C 47/08** (2006.01)  
**B29C 47/92** (2006.01)  
**B29L 23/00** (2006.01)

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

CPC ..... **B29C 47/8885** (2013.01); **B29C 47/0021** (2013.01); **B29C 47/0026** (2013.01); **B29C 47/0057** (2013.01); **B29C 47/0811** (2013.01); **B29C 47/8825** (2013.01); **B29C 47/8835** (2013.01); **B29C 47/92** (2013.01); **B29C 2947/926** (2013.01); **B29C 2947/92209** (2013.01); **B29C 2947/92704** (2013.01); **B29C 2947/92971** (2013.01); **B29K 2023/06** (2013.01); **B29L 2023/001** (2013.01)

(58) **Field of Classification Search**

CPC ..... B29C 47/0026; B29C 47/0057; B29C 47/8825; B29C 47/883; B29C 47/8835  
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,461,976 A \* 2/1949 Schenk ..... B29C 47/8835  
156/244.14  
3,576,929 A \* 4/1971 Turner et al. .... B29C 47/8835  
264/237  
4,115,047 A \* 9/1978 Stelmack ..... B29C 47/8825  
264/28  
4,434,129 A \* 2/1984 Bose ..... B29C 47/8825  
264/557  
6,068,462 A \* 5/2000 Wybenga ..... B29C 47/0026  
425/326.1  
7,883,327 B2 \* 2/2011 Fahling ..... B29C 47/0026  
425/326.1

\* cited by examiner

*Primary Examiner* — Yogendra Gupta

*Assistant Examiner* — Joseph Leyson

(74) *Attorney, Agent, or Firm* — Daniel J. Layden; Brandon J. Lee

(57) **ABSTRACT**

The present invention is directed to an apparatus for differential cooling of a plastic film tube. The apparatus and method includes the use of a blown film extrusion die that extrudes a plastic film tube upward. An air cooling system applies cooling air across one or more surfaces of the plastic film tube. One or more throttling valves are coupled to a pressurization pump that provides a pressurized working fluid, preferably water. The throttling valves are positioned to project the pressurized working fluid from outlets of the throttling valves towards circular arcs of the plastic film tube, the circular arcs of the plastic film tube being less than the circumference of the plastic film tube to provide a blown film tubular plastic film with controlled gauge variation.

**13 Claims, 3 Drawing Sheets**

