



US007414090B2

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

(10) **Patent No.:** **US 7,414,090 B2**
(45) **Date of Patent:** ***Aug. 19, 2008**

(54) **LOW-TEMPERATURE PRESS PROCESS FOR MAKING INSULATING GLASS ASSEMBLIES**

(75) Inventors: **Bing Wang**, Woodbury, MN (US); **John E. Grenzweig**, Minneapolis, MN (US); **Mark E. Hackbarth**, Stillwater, MN (US)

(73) Assignee: **H.B. Fuller Licensing & Financing, Inc.**, St. Paul, MN (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.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **11/684,041**

(22) Filed: **Mar. 9, 2007**

(65) **Prior Publication Data**

US 2007/0154663 A1 Jul. 5, 2007

Related U.S. Application Data

(62) Division of application No. 10/798,590, filed on Mar. 11, 2004, now Pat. No. 7,204,902.

(60) Provisional application No. 60/453,552, filed on Mar. 11, 2003.

(51) **Int. Cl.**
C08L 23/26 (2006.01)
C08L 23/22 (2006.01)

(52) **U.S. Cl.** **524/515**; 524/271; 524/274; 524/474; 524/476; 524/499

(58) **Field of Classification Search** 524/271, 524/274, 474, 476, 515, 499
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 3,424,836 A 1/1969 McKelvey et al.
- 3,919,023 A 11/1975 Bowser et al.
- 4,109,432 A 8/1978 Pilz
- 4,546,723 A 10/1985 Leopold et al.
- 4,617,073 A 10/1986 Scott
- 4,831,799 A 5/1989 Glover et al.
- 4,950,344 A 8/1990 Glover et al.
- 5,061,531 A 10/1991 Catalano
- 5,234,730 A 8/1993 Lautenschlaeger et al.
- 5,264,515 A 11/1993 Cody et al.
- 5,397,648 A 3/1995 Babu et al.
- 5,436,040 A 7/1995 Lalond
- 5,510,416 A 4/1996 Meyer et al.

- 5,632,122 A 5/1997 Spinks
- 5,849,832 A 12/1998 Vimelson et al.
- 5,855,972 A 1/1999 Kaeding
- 5,994,474 A 11/1999 Wey et al.
- 6,055,783 A 5/2000 Guhl et al.
- 6,121,354 A 9/2000 Chronister
- 6,235,848 B1 5/2001 Bickert et al.
- 6,245,145 B1 6/2001 Lisec
- 6,281,288 B1 8/2001 Bickert et al.
- 6,286,288 B1 9/2001 France
- 6,319,990 B1 11/2001 Spence et al.
- 6,355,317 B1 3/2002 Reid et al.
- 6,368,408 B1 4/2002 Schuler
- 6,401,428 B1 6/2002 Glover et al.
- 6,455,637 B1 9/2002 Jackson et al.
- 6,463,706 B1 10/2002 Guhl et al.
- 6,679,013 B2 1/2004 Hornung
- 6,682,818 B2 1/2004 Czaplicki et al.
- 6,706,813 B2 3/2004 Chiba et al.
- 6,846,893 B1 1/2005 Sherman et al.
- 6,866,928 B2 3/2005 Narum et al.
- 2002/0069823 A1 6/2002 Briese et al.
- 2002/0072561 A1 6/2002 Johoji et al.
- 2002/0194813 A1 12/2002 Vimelson et al.
- 2004/0059069 A1 3/2004 Grimm et al.
- 2004/0074588 A1 4/2004 Hornung et al.
- 2004/0180154 A1* 9/2004 Wang et al. 428/34

FOREIGN PATENT DOCUMENTS

- CA 2258585 6/1998
- DE 951040 9/1956
- DE 196 24 236 A1 1/1998
- DE 198 21 355 A1 11/1999
- EP 0 852 280 B1 7/1998
- EP 1 052 362 A2 11/2000
- FR 2301678 9/1976
- FR 2612244 9/1988
- GB 1 496 540 12/1977
- JP 1-163255 6/1989
- JP 4-159371 6/1992
- JP 5-179217 7/1993
- WO WO 89/11513 A1 11/1989
- WO WO 91/06580 5/1991
- WO WO 98-25001 A2 6/1998
- WO WO 00/47687 A1 8/2000

* cited by examiner

Primary Examiner—Peter Szekely

(57) **ABSTRACT**

A process for making an insulating glass assembly is disclosed, the process including applying a sealant composition to a surface of a spacer; contacting the sealant composition with a glass pane, and applying pressure on the glass pane to bond the glass pane to the spacer through the sealant composition, the pressure being applied at an ambient temperature of from about 15° C. to about 60° C.

17 Claims, No Drawings