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# (12) United States Patent

Eaton et al.

# (54) SINUS DELIVERY OF SUSTAINED RELEASE THERAPEUTICS

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This patent is subject to a terminal dis-

claimer.

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See application file for complete search history.

# (56) References Cited

# U.S. PATENT DOCUMENTS

4,580,568 A 4/1986 Gianturco 4,737,141 A 4/1988 Spits (10) Patent No.: US 7,662,141 B2 (45) Date of Patent: \*Feb. 16, 2010

| 4,753,636 | A            | 6/1988 | Free             |
|-----------|--------------|--------|------------------|
| 5,035,706 | A            | 7/1991 | Giantureo et al. |
| 5,116,311 | A            | 5/1992 | Löfstedt         |
| 5,139,832 | A            | 8/1992 | Hayashi et al.   |
| 5,189,110 | A            | 2/1993 | Ikematu et al.   |
| 5,246,455 | $\mathbf{A}$ | 9/1993 | Shikani          |
| 5,342,296 | A            | 8/1994 | Persson et al.   |
|           |              |        |                  |

#### (Continued)

## FOREIGN PATENT DOCUMENTS

WO WO-01/02024 A1 1/2001

#### (Continued)

#### OTHER PUBLICATIONS

Final Office Action mailed on Jan. 8, 2009 for U.S. Appl. No. 10/800,162, filed Mar. 12, 2004, 5 pages.

#### (Continued)

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# (57) ABSTRACT

The invention provides biodegradable implants for treating sinusitis. The biodegradable implants have a size, shape, density, viscosity, and/or mucoadhesiveness that prevents them from being substantially cleared by the mucociliary lining of the sinuses during the intended treatment period. The biodegradable implants include a sustained release therapeutic, e.g., an antibiotic, a steroidal anti-inflammatory agent, or both. The biodegradable implants may take various forms, such as rods, pellets, beads, strips, or microparticles, and may be delivered into a sinus in various pharmaceutically acceptable carriers.

## 40 Claims, 2 Drawing Sheets

