

US010300229B2

# (12) United States Patent Djupesland et al.

## (54) NASAL DELIVERY DEVICES

(71) Applicant: **OPTINOSE AS**, Oslo (NO)

(72) Inventors: Per Gisle Djupesland, Oslo (NO);

Michael Leclerc, Cranston, RI (US); Ramy A. Mahmoud, Skillman, NJ (US); Shane Siwinski, Providence, RI (US); Joseph Gordon, Mansfield, MA

(US); Justin Fisk, Providence, RI (US)

(73) Assignee: OptiNose AS, Oslo (NO)

(\*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 862 days.

(21) Appl. No.: 14/380,827

(22) PCT Filed: Feb. 25, 2013

(86) PCT No.: PCT/EP2013/053746

§ 371 (c)(1),

(2) Date: Aug. 25, 2014

(87) PCT Pub. No.: WO2013/124491

PCT Pub. Date: Aug. 29, 2013

(65) Prior Publication Data

US 2015/0013670 A1 Jan. 15, 2015

#### Related U.S. Application Data

(60) Provisional application No. 61/603,095, filed on Feb. 24, 2012.

(51) Int. Cl.

**A61M 15/08** (2006.01) **A61M 15/00** (2006.01)

(52) U.S. Cl.

(Continued)

### (10) Patent No.: US 10,300,229 B2

(45) **Date of Patent:** May 28, 2019

#### (58) Field of Classification Search

CPC .... A61M 11/00; A61M 11/006; A61M 11/08; A61M 15/00; A61M 15/0001;

(Continued)

#### (56) References Cited

#### U.S. PATENT DOCUMENTS

605,436 A 6/1898 Kellogg 642,748 A 2/1900 Manners (Continued)

#### FOREIGN PATENT DOCUMENTS

CN 1258223 A 6/2000 CN 101056666 A 10/2007 (Continued)

#### OTHER PUBLICATIONS

Cindy H. Dubin, *Nothing to Sneeze At*, Pharmaceutical Formulation & Quality Magazine (Jan. 29, 2003).

(Continued)

Primary Examiner — (Jackie) Tan-Uyen T Ho
Assistant Examiner — Joseph D Boecker
(74) Attorney, Agent, or Firm — Finnegan, Henderson,
Farabow, Garrett & Dunner, LLP

#### (57) ABSTRACT

A nasal delivery device for and method of delivering substance to a nasal airway of a subject, the delivery device comprising: a nosepiece (117) for fitting to a nasal cavity of a subject; a mouthpiece (119) into which the subject in use exhales; a delivery unit, which comprises an actuation part which is manually displaceable to actuate the delivery unit to deliver substance from the nosepiece; and a valve assembly (127) which is fluidly connected to the nosepiece and the mouthpiece, wherein the valve assembly comprises a body element (128) and a valve element (131) which is movably disposed to the body element between closed and open configurations by manual displacement of the actuation part (Continued)

