



US011033696B2

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

(10) **Patent No.:** **US 11,033,696 B2**
(45) **Date of Patent:** **Jun. 15, 2021**

(54) **NASAL DELIVERY DEVICES**

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

(72) Inventors: **Per Gisle Djupestrand**, Oslo (NO);
Michael Leclerc, Cranston, RI (US);
Ramy A Mahmoud, Skillman, NJ
(US); **Shane Siwinski**, Barrington, 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 84 days.

(21) Appl. No.: **16/093,174**

(22) Filed: **Oct. 12, 2018**

(65) **Prior Publication Data**

US 2019/0290863 A1 Sep. 26, 2019

Related U.S. Application Data

(63) Continuation of application No. 14/380,827, filed as
application No. PCT/EP2013/053746 on Feb. 25,
2013, now Pat. No. 10,300,229.

(Continued)

(51) **Int. Cl.**

A61M 15/08 (2006.01)

A61M 15/00 (2006.01)

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

CPC **A61M 15/08** (2013.01); **A61M 15/002**
(2014.02); **A61M 15/009** (2013.01);
(Continued)

(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 — 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 of the delivery unit to provide for an air flow through the nosepiece simultaneously with delivery of substance.

32 Claims, 11 Drawing Sheets

