

(12) United States Patent Blair et al.

(54) AIRFLOW ADAPTOR FOR A BREATH-ACTUATED DRY POWDER **INHALER**

(71) Applicant: Norton Healthcare Limited, West

Yorkshire (GB)

(72) Inventors: Julian Alexander Blair, Stradbally

(IE); Daniel Buck, Waterford (IE); Jan Geert Hazenberg, Kilkenny (IE); Xian-Ming Zeng, London (GB)

Assignee: **NORTON HEALTHCARE**

LIMITED, West Yorkshire (GB)

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

patent is extended or adjusted under 35

U.S.C. 154(b) by 98 days.

Appl. No.: 15/270,160

(22)Filed: Sep. 20, 2016

(65)**Prior Publication Data**

> US 2017/0007787 A1 Jan. 12, 2017

Related U.S. Application Data

Continuation of application No. 13/949,679, filed on Jul. 24, 2013, which is a division of application No. (Continued)

(30)Foreign Application Priority Data

Nov. 6, 2009 (GB) 0919465.5

(51) Int. Cl. A61M 15/00 A61K 9/00

(2006.01)(2006.01)

(Continued)

(10) Patent No.: US 10,195,375 B2

(45) Date of Patent:

Feb. 5, 2019

(52) U.S. Cl.

CPC A61M 15/0086 (2013.01); A61K 9/0075 (2013.01); A61K 31/137 (2013.01);

(Continued)

Field of Classification Search

CPC A61M 15/0086; A61M 15/0065; A61M

15/0091; A61M 2202/064;

(Continued)

(56)References Cited

U.S. PATENT DOCUMENTS

4/1994 Lerk et al. 5,301,666 A

5,647,349 A * 7/1997 Ohki A61M 15/0028

128/203.12

(Continued)

FOREIGN PATENT DOCUMENTS

JP 2003215734 7/2003 WO $01/04118\ A2$ 1/2001 (Continued)

Primary Examiner — Gregory Anderson Assistant Examiner — Elliot S Ruddie (74) Attorney, Agent, or Firm — Morgan, Lewis &

(57)**ABSTRACT**

Bockius LLP

An airflow adaptor for a breath-actuated dry powder inhaler. The airflow adaptor includes a conduit having a proximal end and a distal end, wherein the proximal end allows fluid communication from a deagglomerator outlet port to the distal end of the conduit, and wherein the airflow adaptor further includes provisions for allowing air to flow from a proximal end of the adaptor to a distal end of the adaptor independently of the airflow in the conduit when a breath induced low pressure is applied to the distal end of the airflow adaptor.

21 Claims, 6 Drawing Sheets

