



US010124131B2

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

(10) **Patent No.:** **US 10,124,131 B2**
(45) **Date of Patent:** ***Nov. 13, 2018**

(54) **DOSE COUNTER FOR INHALER HAVING AN ANTI-REVERSE ROTATION ACTUATOR**

(71) Applicants: **IVAX Pharmaceuticals Ireland, Utrecht (NL); Norton Waterford, Utrecht (NL); Teva Pharmaceuticals Ireland, Utrecht (NL)**

(72) Inventors: **Declan Walsh, Co. KilKenny (IE); Derek Fenlon, Co. Wexford (IE); Simon Kaar, Co. Cork (IE); Jan Geert Hazenberg, Co. Kilkenny (IE); Dan Buck, Co. Waterford (IE); Paul Clancy, Waterford (IE); Robert Charles Uschold, Leominster, MA (US); Jeffrey A. Karg, Hopkinton, MA (US)**

(73) Assignees: **Ivax Pharmaceuticals Ireland, Waterford (IE); Norton (Waterford) Limited, Waterford (IE); Teva Pharmaceuticals Ireland, Waterford (IE)**

(*) 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.: **15/617,769**

(22) Filed: **Jun. 8, 2017**

(65) **Prior Publication Data**

US 2017/0333647 A1 Nov. 23, 2017

Related U.S. Application Data

(60) Continuation of application No. 14/699,584, filed on Apr. 29, 2015, now abandoned, which is a
(Continued)

(51) **Int. Cl.**
G06M 1/06 (2006.01)
A61M 11/00 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC **A61M 15/0078** (2014.02); **A61M 11/00** (2013.01); **A61M 15/007** (2014.02);
(Continued)

(58) **Field of Classification Search**
USPC 235/8; 128/200.23, 203.12
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,174,890 A 11/1979 Johnson
4,669,838 A 6/1987 Hibbard
(Continued)

FOREIGN PATENT DOCUMENTS

CA 2501726 9/2006
CN 1265601 9/2000
(Continued)

OTHER PUBLICATIONS

Advisory Action dated Mar. 13, 2017 for U.S. Appl. No. 14/699,567.
(Continued)

Primary Examiner — Daniel Hess

(74) *Attorney, Agent, or Firm* — Morgan, Lewis & Bockius LLP

(57) **ABSTRACT**

An incremental dose counter for a metered dose inhaler having a body arranged to retain a canister for movement of the canister relative thereto, the incremental dose counter having a main body, an actuator arranged to be driven and to drive an incremental output member in a count direction in response to canister motion, the actuator being configured to restrict motion of the output member in a direction opposite to the count direction.

28 Claims, 17 Drawing Sheets

