



US009320862B2

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

(10) **Patent No.:** **US 9,320,862 B2**
(45) **Date of Patent:** ***Apr. 26, 2016**

(54) **FLUID DISPENSING DEVICE**

(71) Applicant: **Glaxo Group Limited**, Brentford,
Middlesex (GB)

(72) Inventors: **Michael Birsha Davies**, Hertfordshire
(GB); **Mark Graham Hedley**,
Hertfordshire (GB); **James William**
Godfrey, Hertfordshire (GB)

(73) Assignee: **Glaxo Group Limited**, Brentford,
Middlesex (GB)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 4 days.

This patent is subject to a terminal dis-
claimer.

(21) Appl. No.: **14/303,773**

(22) Filed: **Jun. 13, 2014**

(65) **Prior Publication Data**

US 2014/0290652 A1 Oct. 2, 2014

Related U.S. Application Data

(63) Continuation of application No. 10/577,977, filed as
application No. PCT/GB2004/004626 on Nov. 2,
2004, now Pat. No. 8,752,543.

(30) **Foreign Application Priority Data**

Nov. 3, 2003 (GB) 0325629.4
Mar. 11, 2004 (GB) 0405477.1
Sep. 17, 2004 (GB) 0420539.9

(51) **Int. Cl.**

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

(Continued)

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

CPC **A61M 15/0001** (2014.02); **A61M 15/009**
(2013.01); **A61M 15/08** (2013.01);
B05B 11/3052 (2013.01); **B05B 11/3056**
(2013.01); **B05B 11/3059** (2013.01); **B65D**
83/386 (2013.01); **B05B 11/0037** (2013.01);
B65D 83/16 (2013.01); **B65D 83/201** (2013.01)

(58) **Field of Classification Search**

CPC . A61M 11/00; A61M 11/006; A61M 11/008;
A61M 11/08; A61M 15/00; A61M 15/0001;
A61M 15/009; B65D 83/14; B65D 83/16;
B65D 83/20; B65D 83/201; B65D 83/202;
B65D 83/206; B65D 83/207; B65D
2251/1066; B65D 2251/1075; B65D
2543/00888; B65D 43/26; B65D 43/265;
B65D 43/267; B65D 47/249; B65D 47/248;
B65D 47/20

USPC 128/200.14

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,602,569 A 7/1952 Ryan
2,673,008 A 3/1954 Ryan

(Continued)

FOREIGN PATENT DOCUMENTS

DE 2633901 A1 2/1977
DE 19610456 A1 9/1997

(Continued)

OTHER PUBLICATIONS

U.S. Appl. No. 10/513,201, filed May 7, 2003.

(Continued)

Primary Examiner — Justine Yu

Assistant Examiner — Colin W Stuart

(74) *Attorney, Agent, or Firm* — James P. Riek

(57) **ABSTRACT**

A fluid dispensing device for dispensing a fluid form medi-
cament formulation having a viscosity of from 10 to 2000
mPa-s, is disclosed having a housing and a fluid discharge
device. The fluid discharge device is arranged to be actuated
by one or more levers, so as to apply a force to the fluid
discharge device which is used to move a container forming
part of the fluid discharge device, along a longitudinal axis of
the fluid discharge device to cause actuation of a pump form-
ing. A pre-load mechanism prevents actuation of the pump
until a pre-determined force is applied to each lever of suffi-
cient magnitude to guarantee the production of a well-devel-
oped, efficient spray from the fluid dispensing device.

18 Claims, 22 Drawing Sheets

