United States of America

To Promote the Progress of Science and Useful Arts

The Director

of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this United States

Patent

grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Performing the Functions and Duties of the Under Secretary of Commerce for Intellectual Property and

Director of the United States Patent and Trademark Office

US011185240B2

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

(10) **Patent No.: US 11,185,240 B2**
(45) **Date of Patent: Nov. 30, 2021**

(54) **DEVICE FOR THE DIRECT DETECTION OF THE ENDOVASCULAR PRESSURE OF A FLUID IN A VESSEL**

(71) Applicant: **M.E.A. Pharma Sagl**, Paradiso (CH)

(72) Inventors: **Fabio Nicola Arrizza**, Pescara (IT); **Nicola Quinto**, Arsago Seprio (IT); **Stefano Costantini**, Cassano Magnago (IT)

(73) Assignee: **M.E.A. PHARMA SAGL**, Paradiso (CH)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 682 days.

(21) Appl. No.: **16/076,195**

(22) PCT Filed: **Feb. 6, 2017**

(86) PCT No.: **PCT/IB2017/050871**
§ 371 (c)(1),
(2) Date: **Aug. 7, 2018**

(87) PCT Pub. No.: **WO2017/141183**
PCT Pub. Date: **Aug. 24, 2017**

(65) **Prior Publication Data**

US 2021/0177276 A1 Jun. 17, 2021

(30) **Foreign Application Priority Data**

Feb. 16, 2016 (IT) 102016000015623

(51) **Int. Cl.**
A61B 5/0215 (2006.01)
A61M 1/16 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 5/0215*** (2013.01); ***A61M 1/16*** (2013.01); ***A61M 25/0014*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC A61B 5/0215; A61B 2562/0347; A61M 1/16; A61M 5/34; A61M 39/02; A61M 25/0014
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,786,810 A 1/1974 Pannier et al.
3,807,389 A 4/1974 Kanbar et al.
(Continued)

FOREIGN PATENT DOCUMENTS

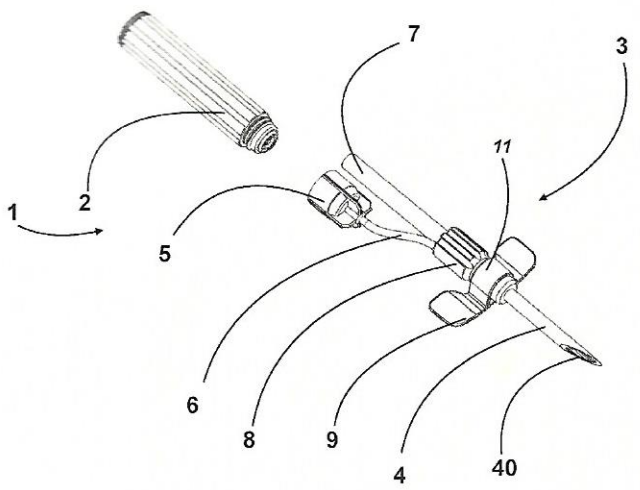
EP 2301610 A2 3/2011
GB 2488810 A 9/2012
WO 2014054791 A1 4/2014

Primary Examiner — Sean P Dougherty
Assistant Examiner — Alexander H Connor
(74) *Attorney, Agent, or Firm* — Volpe Koenig

(57) **ABSTRACT**

A device for the detection of endovascular pressure of a fluid in a vessel detects through an air column which inside capillary ducts, is in contact with endovascular fluid which exerts its pressure thereon, by separating such air column from outside in each process phase, and then prevents that the fluid from being polluted or infected thereby, and including a connector with a valve, which defines a connection terminal cavity arranged outside a needle-holding element and is in fluid communication with the capillary ducts through a duct extending from the needle-holding element to the connector; and a re-usable element including a pressure sensor and connector to connect to the connector at the terminal cavity of the disposable portion, which receives the pressure sensor, with the terminal cavity, the opening of the valve being determined by the connection between the re-usable element and the disposable portion.

11 Claims, 5 Drawing Sheets



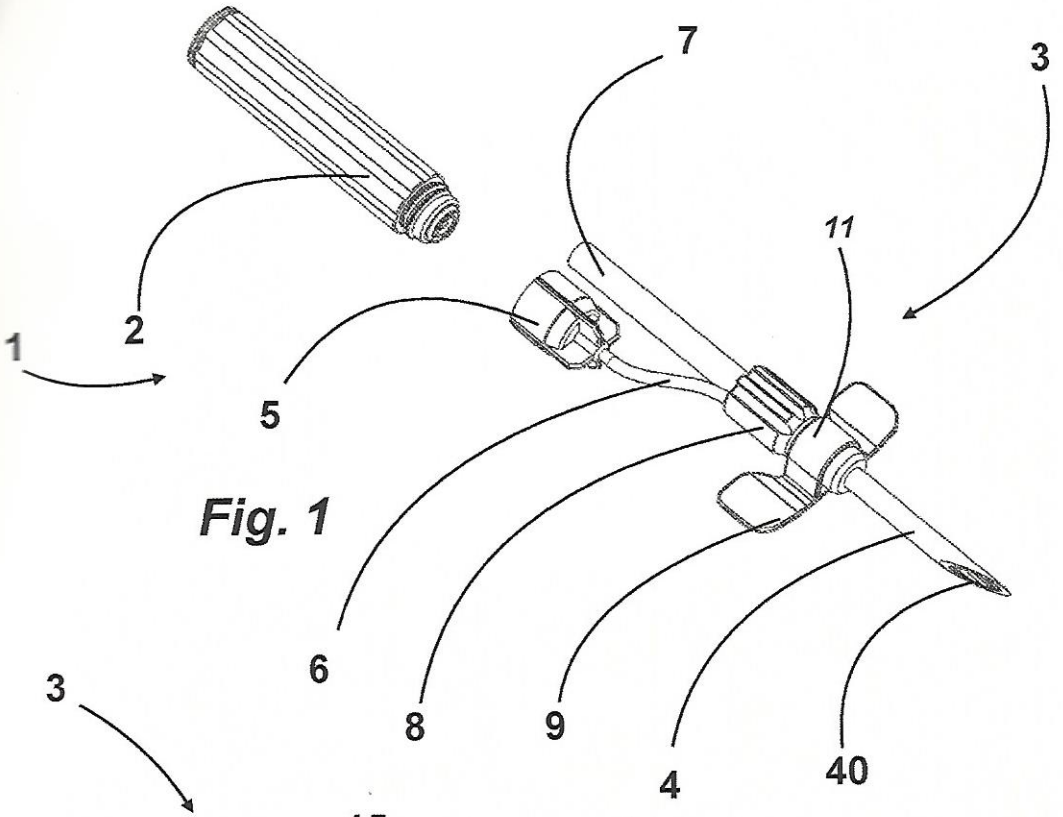


Fig. 1

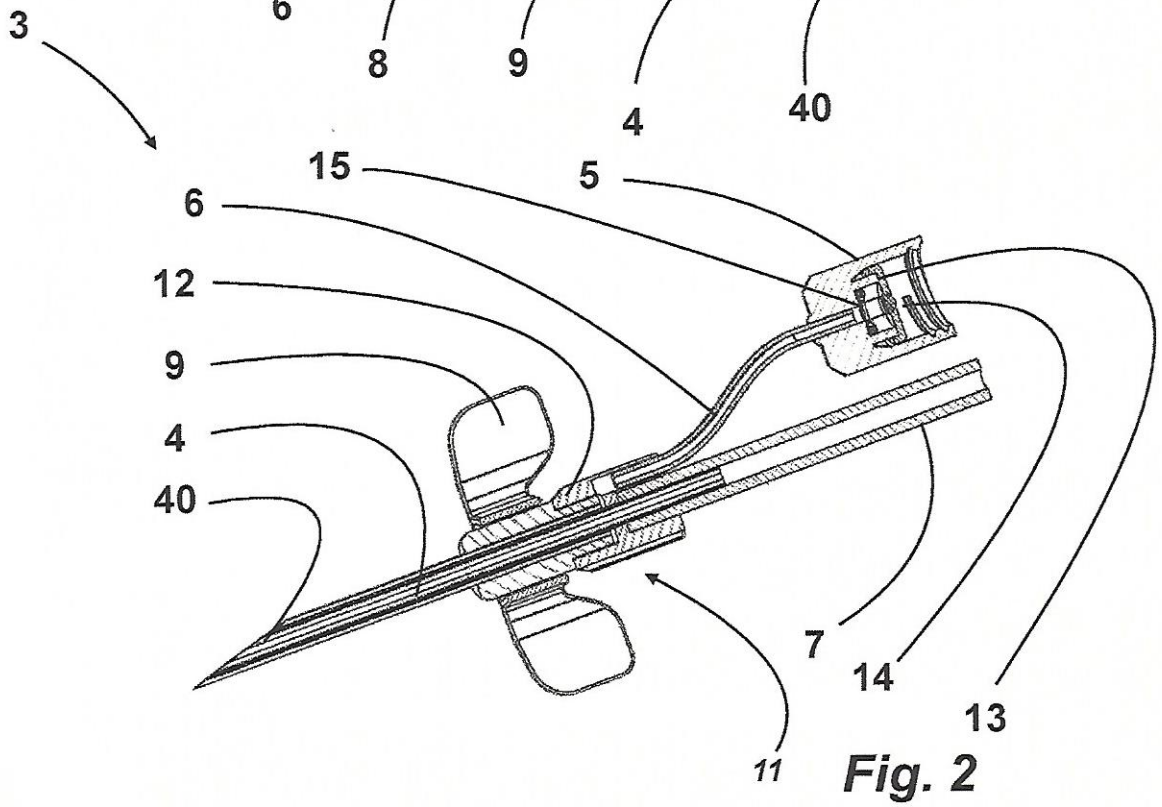


Fig. 2