



US011839477B2

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

(10) **Patent No.:** **US 11,839,477 B2**
(45) **Date of Patent:** **Dec. 12, 2023**

(54) **EEG ELECTRODE ASSEMBLY**

(71) Applicant: **Carnegie Mellon University**,
Pittsburgh, PA (US)

(72) Inventors: **Arnelle Etienne**, Pittsburgh, PA (US);
Harper Weigle, Pittsburgh, PA (US);
Pulkit Grover, Pittsburgh, PA (US);
Ashwati Krishnan, Pittsburgh, PA
(US); **Shawn K. Kelly**, Pittsburgh, PA
(US)

(73) Assignee: **CARNEGIE MELLON**
UNIVERSITY, Pittsburgh, PA (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 580 days.

(21) Appl. No.: **17/025,715**

(22) Filed: **Sep. 18, 2020**

(65) **Prior Publication Data**

US 2021/0085206 A1 Mar. 25, 2021

Related U.S. Application Data

(60) Provisional application No. 62/973,199, filed on Sep.
20, 2019.

(51) **Int. Cl.**
A61B 5/291 (2021.01)
A61B 5/00 (2006.01)

(52) **U.S. Cl.**
CPC **A61B 5/291** (2021.01); **A61B 5/6838**
(2013.01); **A61B 2562/125** (2013.01)

(58) **Field of Classification Search**

CPC **A61B 5/291**; **A61B 5/6814**; **A61B 5/6838**
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,469,577 A * 9/1969 Kater A61N 1/04
600/397
4,274,418 A * 6/1981 Vesterager A61B 5/6833
204/415
4,936,306 A * 6/1990 Doty A61B 5/377
600/382
11,311,228 B1 * 4/2022 Oakley A61B 5/0006
2015/0065838 A1 * 3/2015 Wingeier A61B 5/296
600/397
2016/0157777 A1 * 6/2016 Attal A61B 5/291
600/383
2021/0219896 A1 * 7/2021 Dauguet A61B 5/291

* cited by examiner

Primary Examiner — Eun Hwa Kim

(74) *Attorney, Agent, or Firm* — KDW Firm PLLC

(57) **ABSTRACT**

The invention comprises an EEG electrode assembly for use
in attaching an EEG electrode to the scalp of a subject
having coarse, curly and/or long hair, or to subjects having
their hair in cornrows, braids, and/or dreadlocks. The inven-
tion comprises clips for engaging the hair of the subject, the
clips being attached to a central portion for holding electrode
in contact with the scalp of the subject when the clips are
engaged with the hair of the subject.

15 Claims, 7 Drawing Sheets

