US009409014B2

(12) **United States Patent**
Lindenthaler

(10) **Patent No.: US 9,409,014 B2**
(45) **Date of Patent: *Aug. 9, 2016**

(54) **METHOD FOR MODIFYING LARYNX POSITION BY TRANS-POSITIONING MUSCLE AND ELECTRODE STIMULATION**

(71) Applicant: **MED-EL Elektromedizinische Geraete GmbH**, Innsbruck (AT)

(72) Inventor: **Werner Lindenthaler**, Oberperfuss (AT)

(73) Assignee: **MED-EL Elektromedizinische Geraete GmbH**, Innsbruck (AT)

(*) 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.: **14/819,512**

(22) Filed: **Aug. 6, 2015**

(65) **Prior Publication Data**

US 2016/0030738 A1 Feb. 4, 2016

Related U.S. Application Data

(63) Continuation-in-part of application No. 14/289,935, filed on May 29, 2014, now Pat. No. 9,108,054.

(60) Provisional application No. 61/834,403, filed on Jun. 12, 2013.

(51) **Int. Cl.**

A61N 1/36	(2006.01)
A61N 1/05	(2006.01)
A61B 17/24	(2006.01)

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

CPC ***A61N 1/36003*** (2013.01); ***A61B 17/24*** (2013.01); ***A61N 1/0551*** (2013.01); ***A61N 1/3601*** (2013.01)

(58) **Field of Classification Search**

CPC A61N 1/36003; A61N 1/0551; A61N 1/3601; A61B 17/32; A61B 17/24

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,280,503	A	7/1981	Ackerman
4,488,561	A	12/1984	Doring

(Continued)

FOREIGN PATENT DOCUMENTS

CA	2414898	A1	9/2002
DE	4228351	C1	4/1994

(Continued)

OTHER PUBLICATIONS

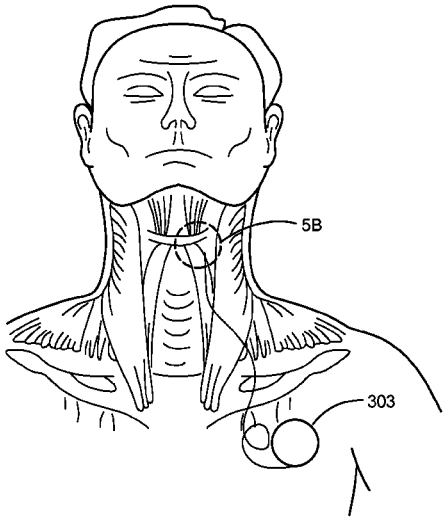
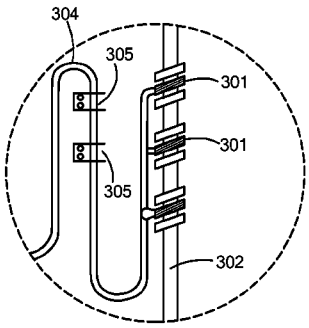
Schuenke et al., "Atlas of Anatomy: Neck and Internal Organs," Ed. Lawrence Ross., New York, NY, Thieme, 2006, pp. 28 & 30.

(Continued)

Primary Examiner — Mark W Bockelman

(74) *Attorney, Agent, or Firm* — Sunstein Kann Murphy & Timbers LLP

(57) **ABSTRACT**

A method of modifying larynx position in a horse includes cutting one end of digastric muscle, attaching the cut end of the digastric muscle to thyroid cartilage or thyrohoid bone thereby trans-positioning the digastric muscle, providing a stimulation electrode configured to stimulate the trans-positioned digastric muscle, generating at least one stimulation parameter for the stimulation electrode using a processor, and stimulating the trans-positioned digastric muscle with the stimulation electrode using the stimulation parameter in order to modify the larynx position.

8 Claims, 22 Drawing Sheets