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BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,

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(54) Title: IN-EAR ORTHOTIC FOR RELIEVING TEMPOROMANDIBULAR JOINT-SYMPTOMS

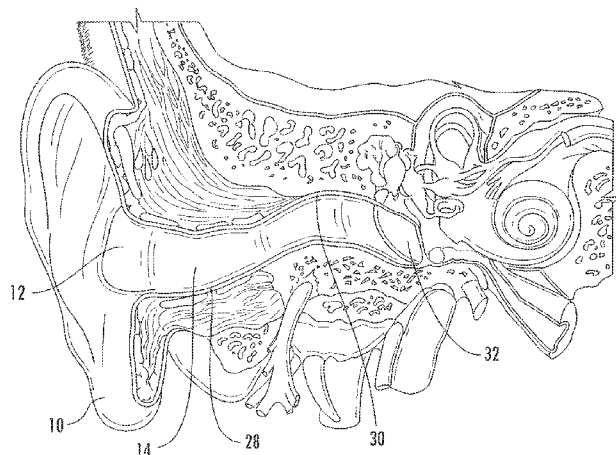


FIG. 1

(57) Abstract: An in-ear orthotic with one or more features to help manage or reduce pain, discomfort, or other symptoms associated with temporomandibular joint disorder. Also disclosed are methods of using optical scanning to create a three dimensional replication of the ear canal that is used to design a customized in-ear orthotic to help manage one or more symptoms of temporomandibular joint disorder.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US14/49403

<p><b>A. CLASSIFICATION OF SUBJECT MATTER</b>                  IPC(8) - A61B 5/04, 5/11; H04N 13/02 (2014.01)                  CPC - A61B 5/0002, 5/0004, 5/0028                  According to International Patent Classification (IPC) or to both national classification and IPC</p>																	
<p><b>B. FIELDS SEARCHED</b></p> <p>Minimum documentation searched (classification system followed by classification symbols)                  IPC(8): A61B 5/04, 5/103, 5/11; H04N 13/00, 13/02 (2014.01);                  CPC: A61B 5/0002, 5/0004, 5/0028, 5/0033; USPC: 600/587, 590, 595</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)                  MicroPatent (US-G, US-A, EP-A, EP-B, WO, JP-bib, DE-C,B, DE-Ä, DE-T, DE-U, GB-A, FR-A); Google; Google Scholar; ProQuest;                  KEYWORDS: ear canal custom orthotic optical scan three dimensional image modeling signal jaw mandible temporomandibular predetermined limit range motion display tracking illumination probe</p>																	
<p><b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b></p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X --- Y</td> <td>US 2012/0281071 A1 (BERGMAN, H. et al.) November 08, 2012; abstract; figures 1-2; paragraph [0025-0029, 0032]; claims 1 and 5</td> <td>13-14 --- 1-12, 15-25</td> </tr> <tr> <td>X</td> <td>US 2011/0130786 A1 (CLAYTON, L. et al.) June 02, 2011; figures 1-3; paragraphs [0022, 0028]</td> <td>26</td> </tr> <tr> <td>Y</td> <td>US 4,986,281 A (PREVES, D. et al.) January 22, 1991; figure 1; column 1, lines 20-43; column 2, lines 26-47; column 3, lines 46-55</td> <td>1-12, 15-25</td> </tr> <tr> <td>Y</td> <td>US 7,914,468 B2 (SHALON, T. et al.) March 29, 2011; column 2, lines 23-56</td> <td>8-9, 21-22</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X --- Y	US 2012/0281071 A1 (BERGMAN, H. et al.) November 08, 2012; abstract; figures 1-2; paragraph [0025-0029, 0032]; claims 1 and 5	13-14 --- 1-12, 15-25	X	US 2011/0130786 A1 (CLAYTON, L. et al.) June 02, 2011; figures 1-3; paragraphs [0022, 0028]	26	Y	US 4,986,281 A (PREVES, D. et al.) January 22, 1991; figure 1; column 1, lines 20-43; column 2, lines 26-47; column 3, lines 46-55	1-12, 15-25	Y	US 7,914,468 B2 (SHALON, T. et al.) March 29, 2011; column 2, lines 23-56	8-9, 21-22
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>																	
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&amp;" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed						
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"P" document published prior to the international filing date but later than the priority date claimed																	
<p>Date of the actual completion of the international search 09 October 2014 (09.10.2014)</p>		<p>Date of mailing of the international search report <b>13 NOV 2014</b></p>															
<p>Name and mailing address of the ISA/US                  Mail Stop PCT, Attn: ISA/US, Commissioner for Patents                  P.O. Box 1450, Alexandria, Virginia 22313-1450                  Facsimile No. 571-273-3201</p>		<p>Authorized officer: Shane Thomas</p> <p>PCT Helpdesk: 571-272-4300                  PCT OSP: 571-272-7774</p>															

\*\*\*-Continued from Box III-\*\*\*

The application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fee must be paid.

Group I: Claims 1-12 and 15-26 are directed towards at least a scanner, a tracking illumination emitter, a display screen, a data processor, a 3D image of an ear canal, a device modeled from the 3D image to be inserted into the ear canal, and a sensory-indication provided to the subject's ear canal when the subject's jaw moves past a predetermined limit.

Group II: Claims 13-14 are directed towards at least a scanner, a tracking illumination emitter, a display screen, a data processor, a 3D image of an ear canal, a device modeled from the 3D image to be inserted into the ear canal, a bend in the ear canal for treating discomfort in a joint between a mandible and a corresponding temporal bone, a disc located between the mandible and the temporal bone and associated musculature, and a generally cylindrical core with an exterior surface shaped to substantially conform to a contour of the portion of the ear canal.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features. Group I has at least a sensory-indication provided to the subject's ear canal when the subject's jaw moves past a predetermined limit that Group II does not have. Group II has at least a bend in the ear canal for treating discomfort in a joint between a mandible and a corresponding temporal bone, a disc located between the mandible and the temporal bone and associated musculature, and a generally cylindrical core with an exterior surface shaped to substantially conform to a contour of the portion of the ear canal that Group I does not have.

The common technical features of Groups I and II are at least a scanner, a tracking illumination emitter, a display screen, a data processor, a 3D image of an ear canal, and a device modeled from the 3D image to be inserted into the ear canal.

These common features are disclosed by US 2012/0281071 A1 to BERGMAN, H. et al. (hereinafter "Bergman"), which discloses a scanner (a scanner body in the form of handheld probe 34; figures 1-2; paragraph [0025-0029]; claim 1), a tracking illumination emitter (a tracking illumination emitter; figures 1-2; paragraph [0025-0029]; claim 1), a display screen (a display screen; figures 1-2; paragraph [0025-0029]; claim 1), a data processor (an image sensor mounted within the scanner body and coupled for data communications to a data processor; figures 1-2; paragraph [0025-0029]; claim 1), a 3D image of an ear canal (the data processor configured so that it functions by constructing a 3D image of the scanned object; figures 1-2; paragraph [0025-0029]; claim 1), and a device modeled from the 3D image to be inserted into the ear canal (outer shape of hearing aid (device adapted to be inserted into ear canal) is custom-fit to patient's ear canal based upon 3D image of patient's ear canal generated by optical scanning device; abstract; figures 1-2; paragraph [0025-0029, 0032]).

Since the common technical features are previously disclosed by Bergman, these common features are not special and so Groups I and II lack unity.