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(54) Title: SYSTEM AND METHOD FOR TRANSLATING SOUND TO TACTILE

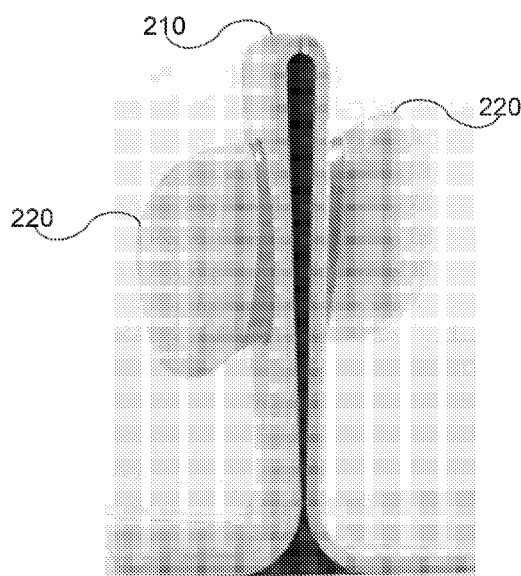


FIG. 2A

(57) Abstract: A Sound translating system configured to
touch human skin comprising: a sound converter configured
to process sound waves to a plurality of sound bands,
wherein each sound band of the plurality of sound bands is
represented by at least one electrical signal having specific
electrical characteristics, wherein the sound converter is fur-
ther configured to transmit the at least one electrical signal; at
least one device comprising a plurality of actuators, wherein
at least one actuator of the plurality of actuators is configured
to convert the at least one electrical signal to mechanical vi-
bration, wherein the mechanical vibration of each actuator
stimulate tactile of one of a plurality of zones on the human
skin, wherein the at least one actuator is dedicated to at least
one predefined zone of the plurality of zones; and wherein,
the predefined zone complies with a map used to allocate
sound bands to zones on the human skin.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL16/51107

A. CLASSIFICATION OF SUBJECT MATTER

IPC - G09B 21/04; G06F 3/01; G10L 21/16, 21/18; A61F 11/04; G08B 6/00; B06B 1/04 (2017.01)

CPC - H04R 9/00, 9/08; G09B 21/003, 21/004, 21/007, 21/009, 21/025, 21/04; G06F 3/016; G10L 21/16, 21/18; A61F 11/045; G08B 6/00; B06B 1/045

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,388,992 A (FRANKLIN, D. et al.) February 14, 1995; abstract; figures 2-3 & 6; column 6, line 64 to column 7, line 54; column 8, lines 37-61	1-23
A	WO 2014/027228 A2 (UAB GAMINU) February 20, 2014; abstract; page 4, last five paragraphs; page 6, second and third paragraphs; figures 1-2	1-23
A	US 2011/0215913 A1 (ULLRICH, C. et al.) September 8, 2011; abstract; paragraphs [0030-0042, 0070]	1-23
P, X	US 2016/0012688 A1 (Baylor College Of Medicine) January 14, 2016; entire document	1-23

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL16/51107

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
See extra sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-23

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL16/51107

-Continued from Box III-

This 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 1-23 appear to be directed towards at least one device comprising a plurality of actuators.

Group II: Claims 24 & 25 appear to be directed towards a continuously determining a plurality of sound bands to reflect content of the sound based on the sound signals amplitude and frequencies.

The inventions listed as Groups I-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.

The special technical features of Group I appear to be at a sound converter configured to process sound waves to a plurality of sound bands, wherein said sound converter is further configured to transmit the at least one electrical signal, at least one device comprising a plurality of actuators, wherein, a predefined zone complies with a map used to allocate sound bands to zones on the human skin, which are not present in Group II. The special technical features of Group II appear to be at least receiving sound signals selected from the group consisting of: microphone signals; Bluetooth signals; AM signals; FM signals; digital audio signals and analogue audio signals; continuously analyzing the sound signals amplitude and frequencies; continuously determining a plurality of sound bands to reflect content of the sound based on the sound signals amplitude and frequencies; continuously analyzing the sound band of the plurality of sound bands to an electrical signal of a plurality of electrical signals, which are not present in Group I.

The common technical features are at least a plurality of actuators, wherein at least one actuator of said plurality of actuators is configured to convert the at least one electrical signal to mechanical vibration, wherein the mechanical vibration of each actuator stimulate tactile of one of a plurality of zones on the human skin, wherein the at least one actuator is dedicated to at least one predefined zone of the plurality of zones on human skin, which are previously disclosed by US 5,583,478 A (RENZI).

RENZI discloses a plurality of actuators, wherein at least one actuator of said plurality of actuators is configured to convert the at least one electrical signal to mechanical vibration, wherein the mechanical vibration of each actuator stimulate tactile of one of a plurality of zones on the human skin, wherein the at least one actuator is dedicated to at least one predefined zone of the plurality of zones on human skin.

Since RENZI anticipated the common features they are not special and Groups I & II lack unity.