

ThumbRay

Skin-Touching
Electromagnetic Sensing
Wearable

Patent Portfolio



Patent family of ThumbRay®
as of November 2024

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PATENT PORTFOLIO

PCT & Granted European Patent


<u>Jurisdiction</u>	<u>Application (n°, route)</u>	<u>Publication/Grant</u>
 EUROPEAN PATENT	20746986 (2021/10/4) PCT regional phase	EP3938872A1 (2021/02/4) EP3938872B1 (2022/11/9)
 PCT	PCT/EP2020/071675 (2020/07/31) EPO examination	WO2021019075 (2021/02/4)

Granted National Patents

<u>Jurisdiction</u>	<u>Application (n°, route)</u>	<u>Publication/Grant</u>
 CHINA	202080054884.2 (2022/01/28) PCT national phase	CN 114207558 A (2022/03/18) 202080054884.2 (2024/8/27)
 FRANCE	EP20746986.7 (2020/07/31) EP validation	EP3938872 (2022/01/19) EP3938872 (2022/11/9)
 GERMANY	EP20746986 (2020/07/31) EP validation	EP3938872 (2022/01/19) EP3938872 (2022/11/9)
 ITALY	502023000010374 (2020/07/31) EP validation	EP3938872 (2022/01/19) EP3938872 (2022/11/9)
 MEXICO	MX/a/2022/001184 (2022/01/27) PCT national phase	MX/a/2022/001184 (2022/2/22) 412166 (2024/4/12)
 PHILIPPINES	12022550135 (2022/01/19) PCT national phase	12022550135 12022550135 (2024/08/21)
 SINGAPORE	11202200123P (2022/01/6) PCT national phase	11202200123P (2022/02/25) 11202200123P (2024/07/05)
 SPAIN	E20746986 (2020/07/31) EP validation	EP3938872 (2022/01/19) EP3938872 (2022/11/9)

<u>Jurisdiction</u>	<u>Application (n°, route)</u>	<u>Publication/Grant</u>
 UNITED KINGDOM	EP20746986.7 (2020/07/31) EP validation	EP3938872 (2022/01/19) EP3938872 (2022/11/9)
 USA	17628909 (2022/01/21) PCT national phase	US20220244790A1 (2022/08/4) US12045393 (2024/07/23)

Pending National Patents

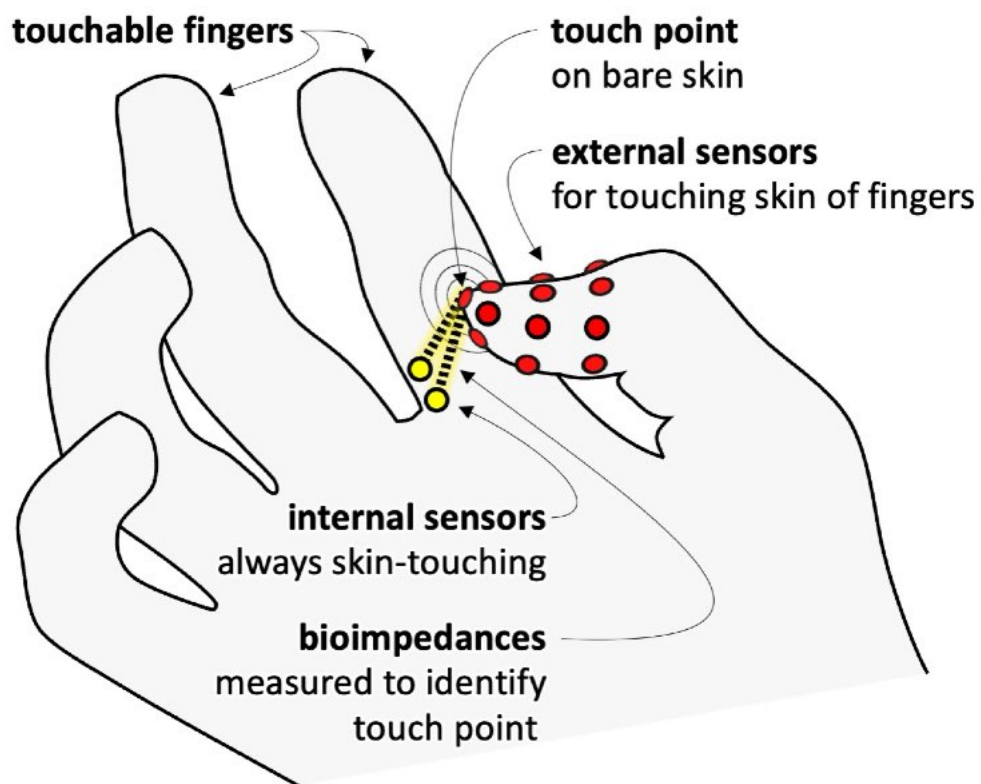
<u>Jurisdiction</u>	<u>Application (n°, route)</u>	<u>Publication/Grant</u>
 INDIA	202217005900 (2022/02/3) PCT national phase	202217005900 (2022/04/8)
 ISRAEL	290206 (2022/01/30) PCT national phase	IL290206A (2022/07/1)
 JAPAN	100167818 (2022/01/18) PCT national phase	JP2022542845 (2022/10/7)
 KOREA	10-2022-7003462 (2022/02/28) PCT national phase	1020220025072 (2022/03/3)
 USA (Cont.)	18679886 (2024/05/31) CONTINUATION APPLICATION of appl 17628909)	

Note: some other national patents have been granted, lapsed, and may still be recoverable.

KEY FUNCTIONALITIES

KEYBOARD

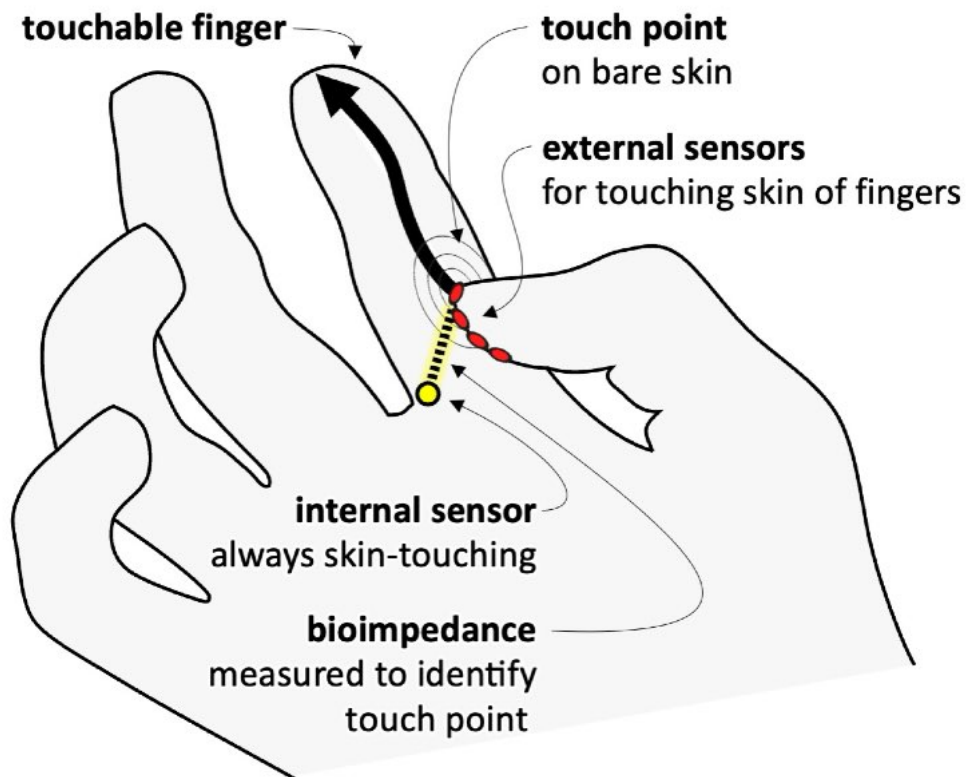
Discrete Touching



- To allow identification of touches on index and middle finger, at least 2 internal sensors are needed.
- Multiple external sensors allow differentiating touches on different sides of the touchable fingers.
- Each thumb-to-finger touch is uniquely identified by bioimpedances measured and external sensors used.
- External sensors may be supported by a thimble-like element and internal sensors by ring-like elements.

SLIDER

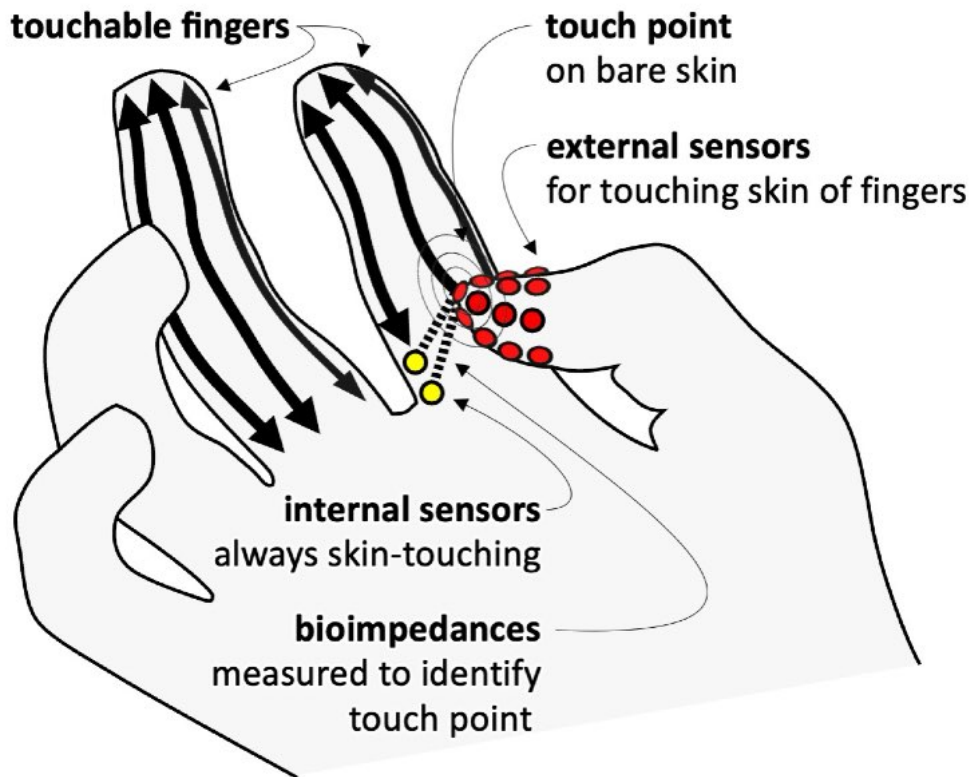
Monolinear Continuous Touching



- A linear continuous touch is just a sequence of discrete touches along an imaginary line on the finger skin.
- As compared with keyboard use, greater processing capacity and sensing resolution are needed; and multiple external sensors (close to each other) is recommendable.
- If touches are only on index finger, only one internal sensor may be needed.

MULTI-SLIDER

Multilinear Continuous Touching

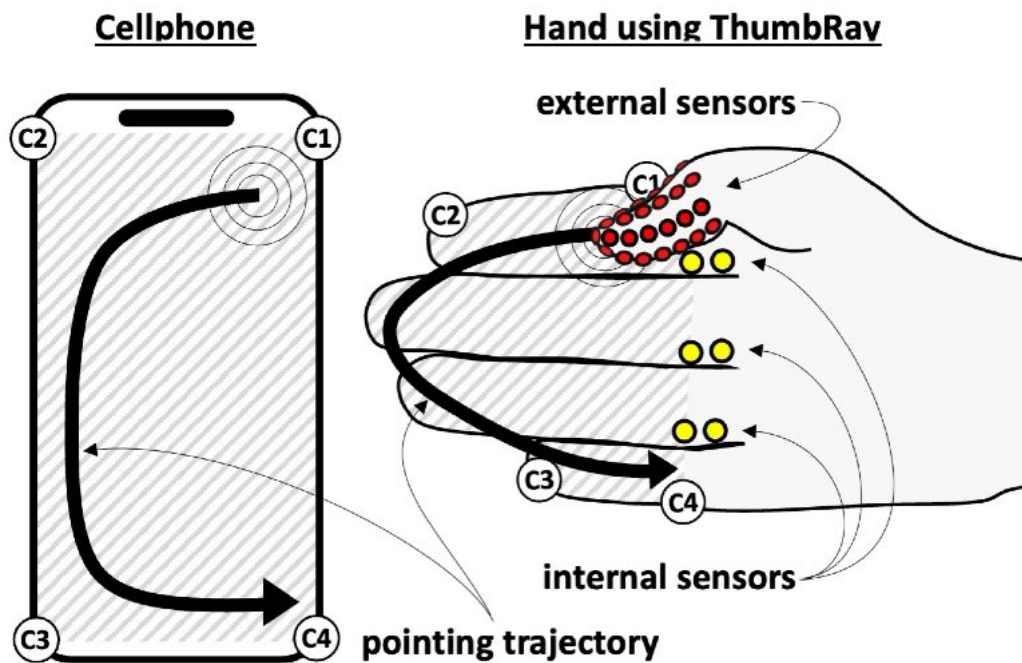


- A multi-linear continuous touch is just a group of mono-linear touches along different sides of fingers.
- As compared with mono-slider use, greater number of external sensors surrounding thumb are needed.
- To allow identification of touches on index - and middle finger -, at least 2 internal sensors are needed (placed on base of index finger).

ThumbRay

MOUSE

Planar Continuous Touching





- A planar (bidimensional) continuous touch can be considered a combination of multilinear continuous touches across palmar sides of different fingers.
- To allow identification of touches on all not-thumb fingers, pairs of internal sensors are needed on all those fingers except on the little finger.
- When thumb naturally slides over palm side of fingers, these present varying degrees of flexion/extension.
- Imaginary points on hand palm (C1-4) correspond with 4 cellphone screen corners.
- Pointing pad on hand could also be configured vertically or using only 3 (or 2) fingers.

PATENT GRANT CERTIFICATIONS

China

证书号第7326841号





专利公告信息

发明专利证书

发明名称: 手戴式数据输入装置

专利权人: 图姆布雷技术有限责任公司

地址: 西班牙马德里

发明人: 丹尼尔·萨恩斯·洛萨克

专利号: ZL 2020 8 0054884.2 授权公告号: CN 114207558 B

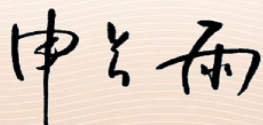
专利申请日: 2020年07月31日 授权公告日: 2024年08月27日

申请日时申请人: 图姆布雷技术有限责任公司

申请日时发明人: 丹尼尔·萨恩斯·洛萨克


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局长
申长雨



2024年08月27日

第1页(共1页)



EUROPE

(validated in UK, Germany, France, Italy, Spain, Netherlands...)



(11) **EP 3 938 872 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
09.11.2022 Bulletin 2022/45

(21) Application number: **20746986.7**

(22) Date of filing: **31.07.2020**

(51) International Patent Classification (IPC):
G06F 3/01^(2006.01) G06F 1/16^(2006.01)

(52) Cooperative Patent Classification (CPC):
G06F 3/017; G06F 3/014

(86) International application number:
PCT/EP2020/071675

(87) International publication number:
WO 2021/019075 (04.02.2021 Gazette 2021/05)

(54) **HAND-WORN DATA-INPUT DEVICE**

HANDGETRAGENE DATENEINGABEVORRICHTUNG

DISPOSITIF D'ENTRÉE DE DONNÉES PORTÉ À LA MAIN

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **31.07.2019 EP 19382659**

(43) Date of publication of application:
19.01.2022 Bulletin 2022/03

(73) Proprietor: **Thumbray Technologies S.L.**
28035 Madrid (ES)

(72) Inventor: **SÁENZ LÖBSACK, Daniel**
28035 Madrid (ES)

(56) References cited:
WO-A1-2007/076592 CN-A- 1 766 943
JP-A- 2007 287 086 US-A1- 2003 001 578
US-A1- 2010 220 054 US-A1- 2013 169 420
US-A1- 2016 259 408 US-A1- 2017 027 479

EP 3 938 872 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Mexico



TÍTULO DE PATENTE No. 412166

Titular(es): THUMBRAV TECHNOLOGIES, S.L.
Domicilio: C. Cantalejo N° 6 3-C, 28035, Madrid, ESPAÑA
Denominación: DISPOSITIVO DE ENTRADA DE DATOS PORTABLE EN MANO.
Clasificación: **CIP:** G06F3/01; G06F1/16; G06F3/041
CPC: G06F3/017; G06F1/163; G06F1/1656; G06F3/01; G06F3/014; G06F3/016; G06F3/044; G06F3/03547
Inventor(es): DANIEL SÁENZ LÖBSACK

SOLICITUD

Número:
MX/a/2022/001184

Fecha de Presentación Internacional:
31 de Julio de 2020

PRIORIDAD

País:
EP

Fecha:
31 de julio de 2019

Número:
19382659.1

Vigencia: Veinte años

Fecha de Vencimiento: 31 de julio de 2040

Fecha de Expedición: 12 de abril de 2024

La patente de referencia se otorga con fundamento en los artículos 1°, 2° fracción I, 5° fracción I, y 119 de la Ley Federal de Protección a la Propiedad Industrial.

De conformidad con el artículo 53 de la Ley Federal de Protección a la Propiedad Industrial, la presente patente tiene una vigencia de veinte años improrrogables, contada a partir de la fecha de presentación de la solicitud internacional y estará sujeta al pago de la tarifa para mantener vigentes los derechos.

Quien suscribe el presente título lo hace con fundamento en lo dispuesto por los artículos 5° fracción I, 9, 10 y 119 de la Ley Federal de Protección a la Propiedad Industrial; artículos 1°, 3° fracción V, inciso a), 4° y 12° fracciones I y III del Reglamento del Instituto Mexicano de la Propiedad Industrial; artículos 1°, 3°, 4°, 5° fracción V, inciso a), 16 fracciones I y III y 30 del Estatuto Orgánico del Instituto Mexicano de la Propiedad Industrial; 1°, 3° y 5° fracción I Acuerdo Delegatorio de Facultades del Instituto Mexicano de la Propiedad Industrial.

El presente documento electrónico ha sido firmado mediante el uso de la firma electrónica avanzada por el servidor público competente, amparada por un certificado digital vigente a la fecha de su elaboración, y es válido de conformidad con lo dispuesto en los artículos 7 y 9 fracción I de la Ley de Firma Electrónica Avanzada y artículo 12 de su Reglamento. Su integridad y autoría, se podrá comprobar en www.gob.mx/impj.

Asimismo, se emitió conforme lo previsto por los artículos 1° fracción III; 2° fracción VI; 37, 38 y 39 del Acuerdo por el que se establecen lineamientos en materia de Servicios Electrónicos del Instituto Mexicano de la Propiedad Industrial.

SUBDIRECTORA DIVISIONAL DE EXAMEN DE FONDO DE PATENTES ÁREAS MECÁNICA, ELÉCTRICA Y DE DISEÑOS INDUSTRIALES Y MODELOS DE UTILIDAD

MARINA OLIMPIA CASTRO ALVEAR



Cadena Original:
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TRIBUTARIA|1987||MX/2024/34377|MX/a/2022/001184|Título de patente PCT|1980|SRH|Pág(s)
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MX/2024/34377

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Philippines



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FORM NUMBER	IPOPHL-BOP-INV-NOA-04	ED: 01.07.2023
PAPER NO.	6	
IN-SERVICE E-MAIL ADDRESS	info@recurraph.com	
MAILING DATE : [mailingdatehere]		

Application Type/No:	Invention 1/2022/550135	NPE/Received Date:	19 January 2022 (19.01.2022)
Applicant:	THUMBRAV TECHNOLOGIES, S.L. (ES)		
Title:	HAND-WORN DATA-INPUT DEVICE		
Division:	Inventions (MED)	Examiner:	Arrem C. Mesa

NOTICE OF ALLOWANCE

Applicant's response filed on 7 February 2024 has been acknowledged and marked as Paper No. 5.


Pursuant to Section 50 of RA 8293, as amended, this application is in condition for allowance.

The following are allowed:

- a. Priority claim(s) under Section 31 of RA 8293, as amended.
- b. Claims 1-15 filed on 7 February 2024.

Prosecution on the merits is closed.

This application has been recommended for allowance and subsequent issuance of Letters Patent. The patent certificate shall contain the attached bibliographic details of this application. Should applicant find inconsistencies or errors in the bibliographic data attached herewith, correction/s in the details should be communicated to the Office not later than twenty-one (21) days from the mailing date stamped hereon. Otherwise, the details shall be considered correct.


Arrem C. Mesa
Patent Examiner

Recommending Approval:

DENNIS LIONEL P. ACEVEDO
Division Chief

Document No: 2024/24451

Singapore



Details of Patent

[Print](#)
[Patents Open Dossier](#)

Application Details

Application No.	11202200123P
Application Status	Patent In Force
Filing Date	31/07/2020
Lodgement Date	06/01/2022
PCT Application No.	PCT/EP2020/071675
Entry Date	06/01/2022
Title of Invention	HAND-WORN DATA-INPUT DEVICE
International Patent Classification	G06F 3/01 G06F 1/16
Expiry Date	31/07/2040
PCT Publication No.	WO/2021/019075
Date of Publication of Entry into National Phase	
Date of Grant of Patent	05/07/2024
Next Renewal Due Date	05/10/2024
Year of Last Renewal	

Priority Claims

S/N	Priority Date	Priority No.	Country / Territory
1	31/07/2019	19382659.1	EUROPEAN PATENT OFFICE (EPO)

Current Applicant/Proprietor Details

S/N	Name	UEN/Company Code	Country / Region or Nationality	Address	Sole Proprietor or Partner's Name	Country / Region of Incorporation / Residence	State of Incorporation

USA



US012045393B2

(12) **United States Patent**
Sáenz Löbsack

(10) **Patent No.:** **US 12,045,393 B2**
(45) **Date of Patent:** **Jul. 23, 2024**

(54) **HAND-WORN DATA-INPUT DEVICE**

(71) Applicant: **THUMBRA Y TECHNOLOGIES, S.L.**, Madrid (ES)

(72) Inventor: **Daniel Sáenz Löbsack**, Madrid (ES)

(73) Assignee: **THUMBRA Y TECHNOLOGIES SL**, Madrid (ES)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 272 days.

(21) Appl. No.: **17/628,909**

(22) PCT Filed: **Jul. 31, 2020**

(86) PCT No.: **PCT/EP2020/071675**
§ 371 (c)(1),
(2) Date: **Jan. 21, 2022**

(87) PCT Pub. No.: **WO2021/019075**
PCT Pub. Date: **Feb. 4, 2021**

(65) **Prior Publication Data**
US 2022/0244790 A1 Aug. 4, 2022

(30) **Foreign Application Priority Data**
Jul. 31, 2019 (EP) 19382659

(51) **Int. Cl.**
G06F 3/01 (2006.01)
G06F 1/16 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC **G06F 3/017** (2013.01); **G06F 1/163** (2013.01); **G06F 1/1656** (2013.01); **G06F 3/011** (2013.01);
(Continued)

(58) **Field of Classification Search**

None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,141,643 A 10/2000 Harmon
6,380,923 B1 4/2002 Fukumoto et al.
(Continued)

FOREIGN PATENT DOCUMENTS

CN 1766943 A 5/2006
JP 2007287086 A 11/2007
(Continued)

Primary Examiner — Christopher J Fibbi

(57) **ABSTRACT**

A hand-worn data-input device is provided. The hand-worn data-input device is wearable on a hand, for entering data-inputs into electronic/computing devices by reading and interpreting, via electromagnetic sensing, static/dynamic user-inputted gestures between digits, other portions of the hand and other hand-worn components of the data-input device, relative to each other, wherein sensing units are configured to be placed at/by specific spots/regions of the hand and comprise fixation, insulating and/or electromagnetic shielding means, and wherein the hand-worn data-input device comprises at least one energy unit, at least one thumb-worn sensing unit, at least one body-contact sensing unit, at least one signals/data connection unit and at least one data-inputs connection unit, and wherein when fingertip sensing units are worn, the fingertip sensing units are uniquely identified and simultaneous multi-channeled electromagnetic coupling between the fingertip sensing units and other sensing units is enabled.

20 Claims, 7 Drawing Sheets

RELEVANT LINKS

<i>type</i>	<i>subject</i>	<i>link</i>	<i>comments</i>
WEBSITE	ThumbRay Technologies	https://www.thumbray.tech	company website
VIDEO	Presentation by founder	https://youtu.be/u5qmqd_Dq00	audio in Spanish, subtitles in English
VIDEO	US Patent Grant	https://youtube.com/shorts/Ctzck9IPQnA?	no audio
VIDEO	China Patent Grant	https://youtu.be/qJ-CQ4CXJQo	no audio
VIDEO	European Patent Grant	https://youtu.be/p5yFY_-UXzY?si=DAXwSsSvPJyrnM-n	audio in English
VIDEO	Old 'mockup' prototype	https://youtube.com/shorts/Ued7M7HTyac	no audio
EMAIL	Enquiries	info@taurum.com buy@taurum.com invest@taurum.com dsl@taurum.com	



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