UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

ACKNOWLEDGEMENT OF LOSS OF ENTITLEMENT TO ENTITY STATUS DISCOUNT

APPLICATION #	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET #	REQUEST ID
18/179,272	03/06/2023	Curt C. von BADINSKI	PM001.01.03*(112434.0467)	183007

The entity status change request below filed through Patent Center on 03/15/2024 has been accepted.

Certifications

APPLICANT CHANGING TO REGULAR UNDISCOUNTED FEE STATUS

Signature

I certify, in accordance with 37 CFR 1.4(d)(4), that I am one of the signatories making the entity status change.

Signature	Name	Registration #
/Nathan J. Mutter/	Nathan Mutter	70107

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/179,272	03/06/2023	Curt C. von BADINSKI	PM001.01.03*(112434.0467)	3508

179918 7590 01/16/2024

Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

EXAMINER	
HUNNINGS, TRAVIS R	

ART UNIT	PAPER NUMBER
2689	

NOTIFICATION DATE	DELIVERY MODE
01/16/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

oura.pair.acct.1@maxval.com
patentdocket@hollandhart.com
patentdocketing@ouraring.com

Petitioner Samsung Ex-1004, 0002

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.
18/179,272	16-Jan-2024	11874701

Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at https://patentcenter.uspto.gov

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit https://www.uspto.gov/electronicgrants

Petitioner Samsung Ex-1004, 0003

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/179,272	01/16/2024	11874701	PM001.01.03*(112434.0467)	3508

179918 7590 12/27/2023

Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (https://patentcenter.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

Petitioner Samsung Ex-1004, 0004

INVENTOR(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

Curt C. von BADINSKI, Redwood City, CA;
Michael J. Strasser, Redwood City, CA;
Peter Twiss, Redwood City, CA;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

OURARING INC., San Francisco, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

Petitioner Samsung Ex-1004, 0005

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

179918 7598 09/08/2023
Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Jamie LaFleur	(Typed or printed name)
/Jamie LaFleur/	(Signature)
December 8, 2023	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/179,272	03/06/2023	Curt C. von BADINSKI	PM001.01.03*(112434.0467)	3508

TITLE OF INVENTION: WEARABLE COMPUTING DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	12/08/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
HUNNINGS, TRAVIS R	2689	726-019000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Holland & Hart LLP
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Ouraring, Inc.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): San Francisco, CA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via Patent Center or EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 08-2623

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Nathan J. Mutter/ Date December 8, 2023

Typed or printed name Nathan J. Mutter Registration No. 70,107

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Petitioner Samsung Ex-1004, 0006

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/179,272	12/08/2023 01:32:32 PM Z ET	PM001.01.03*(112434.0467)

Title of Invention

WEARABLE COMPUTING DEVICE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3508	FILED BY	Jamie LaFleur
PATENT CENTER #	63539098	AUTHORIZED BY	Nathan Mutter
CUSTOMER #	179918	FILING DATE	03/06/2023
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Curt C. von BADINSKI

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
DA / 082623	E2023B8D33018405	Jamie LaFleur

PRE-AUTHORIZED ACCOUNT

082623

PRE-AUTHORIZED CATEGORY

37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1501	UTILITY ISSUE FEE	1200.00	1	1200.00
			TOTAL AMOUNT:	$1,200.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement

Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/179,272	**12/08/2023 01:32:32 PM Z ET**	**PM001.01.03*(112434.0467)**

Title of Invention

WEARABLE COMPUTING DEVICE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3508	FILED BY	Jamie LaFleur
PATENT CENTER #	63539098	FILING DATE	03/06/2023
CUSTOMER #	179918	FIRST NAMED INVENTOR	Curt C. von BADINSKI
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Nathan Mutter

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
18179272IssueFee.pdf	1	Issue Fee Payment (PTO-85B)	955 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
18179272IssueFee.pdf	3AE18747A2983AFD77619D7BBCC6C22FDAD79D48CDE20352 FF9267D237D9D077CB50742E48E271E4E649E1EFD381DAF91 F22C3965486C68A93C50C87E2E095B3

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as

described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

179918 7590 09/08/2023
Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

EXAMINER	
HUNNINGS, TRAVIS R	
ART UNIT	PAPER NUMBER
2689	

DATE MAILED: 09/08/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/179,272	03/06/2023	Curt C. von BADINSKI	PM001.01.03*(112434.0467)	3508

TITLE OF INVENTION: WEARABLE COMPUTING DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	12/08/2023

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

Petitioner Samsung Ex-1004, 0011

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

179918 7590 09/08/2023
Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/179,272	03/06/2023	Curt C. von BADINSKI	PM001.01.03*(112434.0467)	3508

TITLE OF INVENTION: WEARABLE COMPUTING DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	12/08/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
HUNNINGS, TRAVIS R	2689	726-019000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via Patent Center or EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

Petitioner Samsung Ex-1004, 0012

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/179,272	03/06/2023	Curt C. von BADINSKI	PM001.01.03*(112434.0467)	3508

179918 7590 09/08/2023

Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

EXAMINER	
HUNNINGS, TRAVIS R	
ART UNIT	PAPER NUMBER
2689	

DATE MAILED: 09/08/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

Petitioner Samsung Ex-1004, 0013

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 18/179,272	Applicant(s) von BADINSKI et al.	
	Examiner TRAVIS R HUNNINGS	Art Unit 2689	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 8/31/23.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-20 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/TRAVIS R HUNNINGS/
Primary Examiner, Art Unit 2689

Petitioner Samsung Ex-1004, 0015

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Allowable Subject Matter

Claims 1-20 are allowed.

The following is an examiner's statement of reasons for allowance: the prior art does not disclose nor suggest a wearable electronic device with the particular claimed limitations, including but not solely the electronic part acquiring acceleration data from a user associated with the device, a processor for identifying a gesture based in part on the acceleration data, generating a message associated with the gesture that causes a feedback component to provide feedback to the user, transmit a signal to an external device, or both. The closest prior art to Vescovi (US 20150277559) discloses a similar computing device structure but fails to disclose the particular claimed limitations regarding acceleration monitoring and gesture identification.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TRAVIS R HUNNINGS whose telephone number is (571)272-3118. The examiner can normally be reached MTHF 830-430 (Office); W 8-4 (Home).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on 571-272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TRAVIS R HUNNINGS/
Primary Examiner, Art Unit 2689

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/179,272	von BADINSKI et al.
	Examiner	**Art Unit**
	TRAVIS R HUNNINGS	2689

CPC						
Symbol					**Type**	**Version**
G06F	/	1	/	163	F	2013-01-01
A61B	/	5	/	681	I	2013-01-01
A61B	/	5	/	6826	I	2013-01-01
H02J	/	7	/	35	I	2013-01-01
A61B	/	5	/	332	I	2021-01-01
A61B	/	5	/	349	I	2021-01-01
G06V	/	40	/	10	I	2022-01-01
G06V	/	40	/	70	I	2022-01-01
G06V	/	10	/	751	I	2022-01-01
G01P	/	15	/	00	I	2013-01-01
G04G	/	21	/	02	I	2013-01-01
G06F	/	3	/	014	I	2013-01-01
G06F	/	3	/	017	I	2013-01-01
G08B	/	21	/	02	I	2013-01-01
G08C	/	17	/	02	I	2013-01-01
G06F	/	1	/	1635	I	2013-01-01
G06F	/	3	/	14	I	2013-01-01
G08B	/	5	/	36	I	2013-01-01
H02J	/	7	/	0044	I	2013-01-01
H02S	/	40	/	22	I	2014-12-01
G02B	/	19	/	0052	I	2013-01-01
G02B	/	19	/	0061	I	2013-01-01
H02S	/	99	/	00	I	2013-01-01
A61B	/	5	/	01	I	2013-01-01
A61B	/	5	/	021	I	2013-01-01
A61B	/	5	/	02416	I	2013-01-01
A61B	/	5	/	1118	I	2013-01-01
A61B	/	5	/	14532	I	2013-01-01
A61B	/	5	/	1455	I	2013-01-01
G06F	/	21	/	32	I	2013-01-01
A61B	/	5	/	0205	I	2013-01-01

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/TRAVIS R HUNNINGS/ Primary Examiner, Art Unit 2689	05 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20230905

Petitioner Samsung Ex-1004, 0018

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/179,272	von BADINSKI et al.
	Examiner	**Art Unit**
	TRAVIS R HUNNINGS	2689

CPC						
Symbol					**Type**	**Version**
G04G	/	21	/	025	I	2013-01-01
A61B	/	2560	/	0214	A	2013-01-01
A61B	/	2560	/	0412	A	2013-01-01
A61B	/	2562	/	146	A	2013-01-01
A61B	/	2562	/	164	A	2013-01-01
A61B	/	2562	/	166	A	2013-01-01
Y02E	/	10	/	52	A	2013-01-01
G06V	/	40	/	15	A	2022-01-01
G02B	/	19	/	0042	A	2013-01-01
G08C	/	2201	/	30	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/TRAVIS R HUNNINGS/ Primary Examiner, Art Unit 2689	05 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20230905

Petitioner Samsung Ex-1004, 0019

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/179,272	von BADINSKI et al.
	Examiner	**Art Unit**
	TRAVIS R HUNNINGS	2689

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G06F	/	1	/	16

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/TRAVIS R HUNNINGS/ Primary Examiner, Art Unit 2689	05 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20230905

Petitioner Samsung Ex-1004, 0020

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/179,272	von BADINSKI et al.
	Examiner	**Art Unit**
	TRAVIS R HUNNINGS	2689

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10		19										
	2		11		20										
	3		12												
	4		13												
	5		14												
	6		15												
	7		16												
	8		17												
	9		18												

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 20	
/TRAVIS R HUNNINGS/ Primary Examiner, Art Unit 2689 (Primary Examiner)	05 September 2023 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office — Part of Paper No.: 20230905

Petitioner Samsung Ex-1004, 0021

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/179,272	von BADINSKI et al.
	Examiner	Art Unit
	TRAVIS R HUNNINGS	2689

CPC - Searched*		
Symbol	Date	Examiner
G06F 1/163	07/06/2023	TRH

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
inventor search	07/06/2023	TRH
text search of G06F 1/163	07/06/2023	TRH
SEARCH history attached	07/06/2023	TRH
updated SEARCH history attached	09/05/2023	TRH

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
G06F	1/163	09/05/2023	TRH

/TRAVIS R HUNNINGS/ Primary Examiner, Art Unit 2689	

Petitioner Samsung Ex-1004, 0022

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	16	(("8279107") or ("9373256") or ("9589465") or ("20010052860") or ("20090098903") or ("20110099126") or ("20130106621") or ("20150339924")).PN.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:07 PM
L2	1	L1 and lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:08 PM
L3	6	("9704400").PN.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:08 PM
L4	2356	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:11 PM
L5	386	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:11 PM
L6	2685	L4 L5	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:12 PM
L7	18	L6 and park$4 with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:12 PM
L8	23	("20030112154" | "20040032342" | "20040068433" | "5910782" | "6694259" | "6750786").PN. OR ("7312722").URPN.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2018/01/04 01:14 PM
L9	41	L7 L8	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2018/01/04 01:14 PM
L10	18	L9 and lidar	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2018/01/04 01:14 PM
L11	38	340/$.ccls. and park$4 with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:20 PM
L12	40	340/$.ccls. and (park$4 occupancy) with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:20 PM
L13	24	L12 not L10	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:20 PM
L14	28	340/$.ccls. and (park$4) near3 (space garage occupancy) same lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:22 PM

Petitioner Samsung Ex-1004, 0023

L15	143	(park$4) near3 (space garage occupancy) same lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:22 PM
L16	11	L14 not L12	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:22 PM
L17	79	lidar with occupancy	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:24 PM
L22	2409	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/08/16 12:01 PM
L23	463	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/08/16 12:01 PM
L24	2811	L22 L23	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/08/16 12:01 PM
L33	2448	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/01/04 09:37 AM
L34	521	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/01/04 09:37 AM
L35	2903	L33 L34	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/01/04 09:37 AM
L36	25	L35 and park$4 with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/01/04 09:37 AM
L37	4	("10096247").PN.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/01/04 09:37 AM
L38	2493	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/04/25 03:25 PM
L39	604	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/04/25 03:25 PM
L44	2574	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/09/09 04:40 PM
L45	684	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/09/09 04:40 PM
L46	3182	L44 L45	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/09/09 04:40 PM
L47	35	L46 and park$4 with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/09/09 04:40 PM
L52	9	(("10510250") or	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/04/10

Petitioner Samsung Ex-1004, 0024

		("10373493") or ("10096247")).PN.	EPO; JPO; DERWENT)				10:18 AM
L53	2563	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:16 PM
L54	9150	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146).cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:17 PM
L55	11311	L53 L54	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:17 PM
L56	1341	L55 and lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:17 PM
L57	9	"10748424"	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:37 PM
L58	2	("20150277559").PN.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/15 01:25 PM
L59	2856	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/10/03 12:00 PM
L60	11808	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146).cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/10/03 12:00 PM
L61	7797	59 60	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 12:00 PM
L62	5	("20150277559" "20130106603" "20140230019" "20060055517" "20130027341").pn.	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 02:57 PM
L63	301	("2015/0277559").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/10/03 03:10 PM
L64	213	63 AND ring	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 03:10 PM
L65	25	63 AND (epoxy potting)	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 03:11 PM
L66	9	("6701618" | "7526927" | "9612578" | "20090306485" | "20120218184" | "20150220109" | "20150277559" | "20150342308" | "20180343993").pn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/10/03 03:14 PM
L67	20	("11188124" "10768666" "10901460" "10139859" "10156867"	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 03:20 PM

Petitioner Samsung Ex-1004, 0025

		"9582034" "9958904" "10281953" "10496131" "10126779" "10331168" "10884455").pn.					
L68	1	("11599147").pn.	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:21 PM
L69	12749	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146).cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/06 02:35 PM
L70	8422	59 60	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:35 PM
L71	8422	69 70	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:35 PM
L72	8422	69 70	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:36 PM
L73	2914	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/06 02:36 PM
L74	8422	69 73	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:36 PM
L75	12930	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146).cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/09/05 01:26 PM
L76	2948	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/09/05 01:26 PM
L77	8547	75 76	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/09/05 01:26 PM
L78	6	77 AND (accelerat$4) WITH (gesture)	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/09/05 01:26 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N18	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2018/05/11 02:28 PM
N19	84	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2018/05/11 02:28 PM
N20	921	N18 N19	(USPAT)	OR	ON	ON	2018/05/11 02:28 PM
N21	10	N20 and park$4 with lidar	(USPAT)	OR	ON	ON	2018/05/11 02:28 PM
N25	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2018/08/16 12:01 PM
N26	95	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2018/08/16 12:01 PM
N27	932	N25 N26	(USPAT)	OR	ON	ON	2018/08/16 12:01 PM
N28	10	N27 and (park$4) near3 (space garage	(USPAT)	OR	ON	ON	2018/08/16 12:01 PM

Petitioner Samsung Ex-1004, 0026

		occupancy) same lidar					
N29	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2018/08/23 09:17 AM
N30	95	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2018/08/23 09:17 AM
N31	932	N29 N30	(USPAT)	OR	ON	ON	2018/08/23 09:17 AM
N32	10	N31 and (park$4) near3 (space garage occupancy) same lidar	(USPAT)	OR	ON	ON	2018/08/23 09:17 AM
N40	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2019/04/25 03:25 PM
N41	113	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2019/04/25 03:26 PM
N42	949	N40 N41	(USPAT)	OR	ON	ON	2019/04/25 03:26 PM
N43	11	N42 and (park$4) near3 (space garage occupancy) same lidar	(USPAT)	OR	ON	ON	2019/04/25 03:26 PM
N48	843	340/932.2.ccls.	(USPAT)	OR	ON	ON	2019/09/11 04:46 PM
N49	119	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2019/09/11 04:46 PM
N50	954	N48 N49	(USPAT)	OR	ON	ON	2019/09/11 04:46 PM
N51	13	N50 and (park$4) near3 (space garage occupancy) same lidar	(USPAT)	OR	ON	ON	2019/09/11 04:47 PM
N59	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2021/07/15 01:03 PM
N60	193	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2021/07/15 01:03 PM
N61	1029	N59 N60	(USPAT)	OR	ON	ON	2021/07/15 01:03 PM
N62	22	N61 and (park$4) near3 (space garage occupancy) same lidar	(USPAT)	OR	ON	ON	2021/07/15 01:03 PM
N63	18937	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146 g06f1/163).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N64	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N65	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N66	260	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N67	1096	N18 N19	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N68	28	N20 and park$4 with lidar	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM

Petitioner Samsung Ex-1004, 0027

N69	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N70	260	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N71	1096	N25 N26	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N72	28	N27 and (park$4) near3 (space garage occupancy) same lidar	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N73	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N74	260	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N75	1096	N29 N30	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N76	28	N31 and (park$4) near3 (space garage occupancy) same lidar	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N77	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N78	260	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N79	1096	N40 N41	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N80	28	N42 and (park$4) near3 (space garage occupancy) same lidar	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N81	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N82	260	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N83	1096	N48 N49	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N84	28	N50 and (park$4) near3 (space garage occupancy) same lidar	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N85	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N86	260	g08g1/142.cpc.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N87	1096	N59 N60	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N88	28	N61 and (park$4) near3 (space garage occupancy) same lidar	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N89	18937	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146 g06f1/163).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N90	844	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM

Petitioner Samsung Ex-1004, 0028

N91	20181	N63 N64	(US-PGPUB; USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N92	87	n91 AND (park$4) near3 (space garage occupancy) SAME lidar	(USPAT)	OR	ON	ON	2023/01/11 04:15 PM
N93	20449	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146 g06f1/163).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/05 01:25 PM
N94	882	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/09/05 01:25 PM
N95	21727	N93 n94	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/05 01:25 PM
N96	110	n95 AND (park$4) near3 (space garage occupancy) SAME lidar	(USPAT)	OR	ON	ON	2023/09/05 01:25 PM
N97	882	340/932.2.ccls.	(USPAT)	OR	ON	ON	2023/09/05 01:26 PM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 3508
Badinski et al.	Examiner: Travis R. Hunnings
For: WEARABLE COMPUTING DEVICE	Art Unit: 2689
Application No.: 18/179,272	**AMENDMENT**
Filed: March 6, 2023	**CERTIFICATE OF TRANSMISSION** I hereby certify that this correspondence is being filed electronically with the United States Patent and Trademark Office on: August 31, 2023.
Docket No.: PM001.01.03.01.01.01.01 (112434.0467)	By: / Jamie LaFleur / Jamie LaFleur
Customer No.: 179918	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

In response to the non-final Office Action dated July 11, 2023, please enter the following amendments and remarks:

Amendments to the Claims begin on page 2.

Remarks begin on page 8.

Petitioner Samsung Ex-1004, 0030

Amendments to the Claims

1. (Currently Amended) A wearable electronic device comprising:

a **housing** ~~**body part made of a material, having**~~ **comprising** an inner surface and an outer surface~~**, wherein a cavity is formed on the inner surface of the body part, the cavity extending from the inner surface of the body part towards the outer surface of the body part and having a depth arranged within the inner surface of the body part,;**~~

an electronic part **disposed within the housing** ~~**arranged in the cavity**~~, ~~**wherein at least a portion of**~~ the electronic part **configured to acquire acceleration data from a user associated with the wearable electronic device** ~~**has a thickness that is less than the depth of the cavity,;**~~ and

~~**a coating made of a potting material on the inner surface of the body part, covering the electronic part and the cavity**~~ **one or more processors communicatively coupled to the electronic part, wherein the one or more processors are configured to:**

receive the acceleration data from the electronic part;

identify a gesture performed by the user based at least in part on the acceleration data;

determine that the gesture matches a gesture pattern from a plurality of gesture patterns; and

generate a message based at least in part on the gesture matching the gesture pattern, wherein the message is configured to cause a feedback component of the wearable electronic device to provide feedback to the user, cause a communication component of the wearable electronic device to transmit a signal to an external device, or both.

2. (New) The wearable electronic device of claim 1, wherein the one or more processors are further configured to:

determining that a portion of the acceleration data satisfies an acceleration threshold, wherein identifying the gesture performed by the user is based at least in part on the portion of the acceleration data satisfying the acceleration threshold.

Petitioner Samsung Ex-1004, 0031

3. (New) The wearable electronic device of claim 1, wherein the one or more processors are further configured to:

receive an indication of a training mode for gesture recognition;

receiving additional acceleration data from the electronic part based at least in part on receiving the indication of the training mode; and

generating the gesture pattern included within the plurality of gesture patterns based at least in part on the additional acceleration data.

4. (New) The wearable electronic device of claim 3, wherein the one or more processors are further configured to:

receive a user input comprising a gesture command that is to be performed at least in part by the wearable electronic device upon identifying the gesture that matches the gesture pattern, wherein generating the message is based at least in part on receiving the user input.

5. (New) The wearable electronic device of claim 3, wherein the additional acceleration data is associated with multiple instances of a training gesture performed by the user, the training gesture associated with the gesture, wherein generating the gesture pattern is based at least in part on the multiple instances of the training gesture, wherein the one or more processors are further configured to:

generate one or more error tolerances associated with the gesture pattern based at least in part on the multiple instances of the training gesture, wherein determining that the gesture matches the gesture pattern is based at least in part on the one or more error tolerances.

6. (New) The wearable electronic device of claim 1, wherein the plurality of gesture patterns correspond to a plurality of gesture commands, wherein the one or more processors are further configured to:

identify a gesture command that corresponds to the identified gesture based at least in part on determining that the gesture matches the gesture pattern, the gesture command

Petitioner Samsung Ex-1004, 0032

included within the plurality of gesture commands, wherein the message generated by the one or more processors is configured to perform at least a portion of the gesture command.

7. (New) The wearable electronic device of claim 1, wherein the message instructs the communication component to transmit the signal to the external device, wherein the signal instructs the external device to selectively modify one or more parameters of the external device.

8. (New) The wearable electronic device of claim 1, wherein the gesture comprises a pointing gesture performed by the user, wherein the one or more processors are configured to:

determine a heading associated with the pointing gesture, wherein the feedback component of the wearable electronic device is configured to provide the feedback to the user based at least in part on the heading.

9. (New) The wearable electronic device of claim 8, wherein the one or more processors are configured to:

compare the heading associated with the pointing gesture to a navigational heading associated with an intended destination of the user; and

determining one or more characteristics of the feedback based at least in part on the comparison between the heading and the navigational heading, wherein the feedback component of the wearable electronic device is configured to provide the feedback in accordance with the one or more characteristics.

10. (New) The wearable electronic device of claim 8, wherein the one or more processors are configured to:

identify that the heading of the pointing gesture is in a direction of the external device, wherein the communication component of the wearable electronic device is configured to transmit the signal to the external device to adjust one or more parameters of the external device

Petitioner Samsung Ex-1004, 0033

based at least in part on identifying that the heading of the pointing gesture is in the direction of the external device.

11. (New) The wearable electronic device of claim 1, wherein the one or more processors are configured to:

authenticate an identity of the user based at least in part on determining that the gesture matches the gesture pattern, wherein generating the message is based at least in part on authenticating the identity of the user.

12. (New) The wearable electronic device of claim 11, further comprising:

one or more sensor modules configured to acquire biometric data associated with the user, wherein the one or more processors are configured to:

perform a two-factor authentication procedure based at least in part on the biometric data and the identified gesture, wherein authenticating the identity of the user is performed as part of the two-factor authentication procedure.

13. (New) The wearable electronic device of claim 1, wherein the external device comprises an access node, wherein the communication component is configured to:

transmit the signal to the access node, wherein the signal comprises an indication of the gesture based at least in part on the gesture matching the gesture pattern.

14. (New) The wearable electronic device of claim 7, wherein the external device comprises a smartphone, a door, an appliance, a keypad, an alarm system, or any combination thereof.

15. (New) The wearable electronic device of claim 1, wherein the gesture comprises a pointing gesture, a snapping gesture, a tapping gesture, a knocking gesture, a clicking gesture, a swiping gesture, or any combination thereof.

Petitioner Samsung Ex-1004, 0034

16. (New) The wearable electronic device of claim 1, wherein the electronic part comprises an accelerometer, a gyroscope, a magnetometer, a vibration sensor, or any combination thereof.

17. (New) The wearable electronic device of claim 1, wherein the feedback comprises visual feedback, audio feedback, haptic feedback, or any combination thereof.

18. (New) The wearable electronic device of claim 1, wherein the wearable electronic device comprises a finger-worn wearable device.

19. (New) A system for performing gesture recognition, comprising:

a wearable electronic device configured to measure acceleration data from a user;

a user device communicatively coupled to the wearable electronic device; and

one or more processors communicatively coupled with the wearable electronic device and the user device, wherein the one or more processors are configured to:

receive the acceleration data measured from the user via the wearable electronic device;

identify a gesture performed by the user based at least in part on the acceleration data;

determine that the gesture matches a gesture pattern from a plurality of gesture patterns; and

generate a message based at least in part on the gesture matching the gesture pattern, wherein the message is configured to cause a feedback component of the wearable electronic device to provide feedback to the user, cause a communication component of the wearable electronic device or the user device to transmit a signal to an external device, or both.

Petitioner Samsung Ex-1004, 0035

20. (New) The system of claim 19, wherein the one or more processors are positioned within the wearable electronic device, within the user device, within one or more external servers, or any combination thereof.

Petitioner Samsung Ex-1004, 0036

REMARKS

Status of the Claims

Before this Amendment, claim 1 was present for examination. In this Amendment: claim 1 is amended, and claims 2–20 are added. Therefore, claims 1–20 are present for examination, and claims 1 and 19 are the independent claims. Support for the amendments to the claims may be found throughout the Specification as filed including at least at Paragraphs [0043], [0047], [0095], [0103]–[0107], [0120], [0165], [0166], [0169]–[0172], [0175], [0176], [0169]–[0172], and [0196]–[0198], as well as Figures 2, 9B, 18A, 18B, 19C, 19D, 20, 24A, 24B, 25, and 27. No new matter is added with these amendments.

In the non-final Office Action dated July 11, 2023 ("Office Action"): claim 1 was rejected for non-statutory double patenting over U.S. Patent No. 9,582,034 to von Badinski et al. ("von Badinski"). Applicant respectfully requests reconsideration.

Double Patenting

The Office Action rejected claim 1 on the ground of non-statutory double patenting over von Badinski. *See* Office Action, pp. 2–4.

Without conceding the merits of the rejection of claim 1, Applicant notes that independent claim1 has been amended. Accordingly, Applicant respectfully submits that the rejection of claim 1 is moot.

For at least the foregoing reasons, Applicant requests that the double patenting rejection of claim 1 be withdrawn.

Petitioner Samsung Ex-1004, 0037

CONCLUSION

Applicant believes all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is therefore respectfully requested.

The Commissioner is authorized to charge any fees or underpayments that may be due with this response, or credit any overpayments, to Deposit Account No. 08-2623.

If the Examiner believes a telephone conference would expedite prosecution of this Application, please call the undersigned at 303-473-2700.

Respectfully submitted,

By: / Nathan J. Mutter /
Nathan J. Mutter
Reg. No. 70,107

Holland & Hart LLP
P.O. Box 11583
Salt Lake City, Utah 84147
Tel: 303-473-2700
Fax: 303-473-2720

Petitioner Samsung Ex-1004, 0038

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/179,272	**08/31/2023 06:55:15 PM ET**	**PM001.01.03*(112434.0467)**

Title of Invention

WEARABLE COMPUTING DEVICE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3508	FILED BY	Jamie LaFleur
PATENT CENTER #	62717723	FILING DATE	03/06/2023
CUSTOMER #	179918	FIRST NAMED INVENTOR	Curt C. von BADINSKI
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Nathan Mutter

Documents

TOTAL DOCUMENTS: 3

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
18179272_Amendment.pdf		9	-	132 KB
18179272_Amendment-A....pdf	(1-1)	1	Amendment/Request for Reconsideration-After Non-Final Rejection	80 KB
18179272_Amendment-CLM.pdf	(2-7)	6	Claims	90 KB
18179272_Amendment-REM.pdf	(8-9)	2	Applicant Arguments/Remarks Made in an Amendment	115 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
18179272_Amendment.pdf	27A2E061C2A8793C6FD8481C836E6DCA6883B08AA4164640A44953AB10E0835F904D0C4BDA09AD26F5F10EF1829CA98B8A0F412DEA83E14B68F33DAE8FBE2368
18179272_Amendment-A....pdf	C9C19D14025F94BE69A4C04AB88A97A65B1C98A10372886A660A64F2950A9BC4C54761EEC7664DBF9252DE93BAC78FE5714E73E8421246A4047FD7463054CC1E
18179272_Amendment-CLM.pdf	D283EA9C8F749E7B3135C4A51C063740184007AB95F62D4EA3320FAD6374E8D7E21C74160B860B660116BAFF1E31353193D2B0463D46D8D668EDC21A4076E178
18179272_Amendment-REM.pdf	0D931C3DD914C3E6D5F2F52712659BD3253D1B760F2DDAEE9DE6AEFE607E107793A525A188C92F329AEC776DCC51263ED6955264B81077FA4F65FD0B65677E47

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 18/179,272	Filing Date 03/06/2023	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $ 192 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	08/31/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		x $40 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $ 192 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/TYWANA P LOVELACE/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/179,272	03/06/2023	Curt C. von BADINSKI	PM001.01.03*(112434.0467)	3508

179918 7590 07/11/2023

Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

EXAMINER	
HUNNINGS, TRAVIS R	

ART UNIT	PAPER NUMBER
2689	

NOTIFICATION DATE	DELIVERY MODE
07/11/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

oura.pair.acct.1@maxval.com
patentdocket@hollandhart.com
patentdocketing@ouraring.com

Petitioner Samsung Ex-1004, 0042

Office Action Summary	Application No. 18/179,272	Applicant(s) von BADINSKI et al.	
	Examiner TRAVIS R HUNNINGS	Art Unit 2689	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 3/6/23.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 3/6/23 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Petitioner Samsung Ex-1004, 0043

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Double Patenting

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process... may obtain a patent therefor..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the claims that are directed to the same invention so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claim 1 is/are rejected under 35 U.S.C. 101 as claiming the same invention as that of claim 1 of prior U.S. Patent No. 11,599,147. This is a statutory double patenting rejection.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re*

Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The filing of a terminal disclaimer by itself is not a complete reply to a nonstatutory double patenting (NSDP) rejection. A complete reply requires that the terminal disclaimer be accompanied by a reply requesting reconsideration of the prior Office action. Even where the NSDP rejection is provisional the reply must be complete. See MPEP § 804, subsection I.B.1. For a reply to a non-final Office action, see 37 CFR 1.111(a). For a reply to final Office action, see 37 CFR 1.113(c). A request for reconsideration while not provided for in 37 CFR 1.113(c) may be filed after final for consideration. See MPEP §§ 706.07(e) and 714.13.

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The actual filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission.

For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/apply/applying-online/eterminal-disclaimer.

Claim 1 is rejected on the ground of nonstatutory double patenting as being unpatentable over claims 11 and 12 of U.S. Patent No. 9,582,034. Although the claims at issue are not identical, they are not patentably distinct from each other because they claim the same subject matter.

The claim correspondence is as follows:

Claim	Application	11,599,147	9,582,034
1	1. A wearable electronic device comprising: a body part made of a material, having an inner surface and an outer surface, wherein a cavity is formed on the inner surface of the body part, the cavity extending from the inner surface of the body part towards the outer surface of the body part and having a depth arranged within the inner surface of the body part, an electronic part arranged in the cavity, wherein at least a portion of the electronic part has a thickness that is less than the depth of the cavity, and a coating made of a potting material on the inner surface of the body part, covering the electronic part and the cavity.	1. A wearable electronic device comprising: a body part made of a material, having an inner surface and an outer surface, wherein a cavity is formed on the inner surface of the body part, the cavity extending from the inner surface of the body part towards the outer surface of the body part and having a depth arranged within the inner surface of the body part, an electronic part arranged in the cavity, wherein at least a portion of the electronic part has a thickness that is less than the depth of the cavity, and a coating made of a potting material on the inner surface of the body part, covering the electronic part and the cavity.	11. A wearable computing device, comprising: an internal housing portion defining a first enclosing structure, the internal housing portion configured to be disposed near a finger of a user; a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal housing; at least one component disposed on the flexible printed circuit board; and an external housing portion defining a second enclosing structure, the external housing portion configured to seal the at least one component and the printed circuit board in an internal space defined by the interior surface of the internal housing. & 12. The wearable device of claim 11, wherein the external housing portion comprises a substantially transparent external potting.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TRAVIS R HUNNINGS whose telephone number is (571)272-3118. The examiner can normally be reached MTHF 830-430 (Office); W 8-4 (Home).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on 571-272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TRAVIS R HUNNINGS/
Primary Examiner, Art Unit 2689

Notice of References Cited	Application/Control No. 18/179,272	Applicant(s)/Patent Under Reexamination von BADINSKI et al.	
	Examiner TRAVIS R HUNNINGS	Art Unit 2689	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20150277559-A1	10-2015	Vescovi; Marcos Regis	G06F3/017	345/173
*	B	US-20140230019-A1	08-2014	Civelli; Jay Pierre	G06F21/35	726/4
*	C	US-20130106603-A1	05-2013	Weast; Aaron B.	G06F1/163	340/539.11
*	D	US-20130027341-A1	01-2013	Mastandrea; Nicholas J.	G06F3/038	345/173
*	E	US-20060055517-A1	03-2006	Ghabra; Riad	H01Q7/00	340/426.11
*	F	US-11360558-B2	06-2022	Wang; Paul X.	G06T19/006	1/1
*	G	US-11360587-B1	06-2022	Wang; Paul X.	G06F3/016	1/1
*	H	US-11324292-B2	05-2022	Min; Jin-hong	A61B5/0006	1/1
*	I	US-11262795-B2	03-2022	Kuwabara; Hideaki	G06F1/1652	1/1
*	J	US-10863802-B2	12-2020	McLear; John	G06K19/07749	1/1
*	K	US-10579099-B2	03-2020	Wang; Paul X.	G06F1/163	1/1
*	L	US-10082829-B2	09-2018	Kuwabara; Hideaki	G06F1/1635	1/1
*	M	US-10281953-B2	05-2019	von Badinski; Curt C.	A61B5/7264	1/1

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Petitioner Samsung Ex-1004, 0048

Notice of References Cited	Application/Control No. 18/179,272	Applicant(s)/Patent Under Reexamination von BADINSKI et al.	
	Examiner TRAVIS R HUNNINGS	Art Unit 2689	Page 2 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-10884455-B2	01-2021	von Badinski; Curt C.	A61B5/6806	1/1
*	B	US-9582034-B2	02-2017	von Badinski; Curt C.	A61B5/14532	1/1
*	C	US-9958904-B2	05-2018	von Badinski; Curt C.	A61B5/681	1/1
*	D	US-10126779-B2	11-2018	von Badinski; Curt C.	G04G21/02	1/1
*	E	US-10139859-B2	11-2018	von Badinski; Curt C.	G04G21/025	1/1
*	F	US-10156867-B2	12-2018	von Badinski; Curt C.	A61B5/01	1/1
*	G	US-10331168-B2	06-2019	von Badinski; Curt C.	G04G21/02	1/1
*	H	US-10496131-B2	12-2019	von Badinski; Curt C.	G02B19/0061	1/1
*	I	US-10768666-B2	09-2020	von Badinski; Curt C.	A61B5/6826	1/1
*	J	US-10901460-B2	01-2021	von Badinski; Curt C.	H02J7/35	1/1
*	K	US-11188124-B2	11-2021	von Badinski; Curt C.	H02S99/00	1/1
*	L	US-11599147-B2	03-2023	von Badinski; Curt C.	A61B5/349	1/1
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Petitioner Samsung Ex-1004, 0049

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/179,272	von BADINSKI et al.
	Examiner	Art Unit
	TRAVIS R HUNNINGS	2689

CPC - Searched*		
Symbol	**Date**	**Examiner**
G06F 1/163	07/06/2023	TRH

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
inventor search	07/06/2023	TRH
text search of G06F 1/163	07/06/2023	TRH
SEARCH history attached	07/06/2023	TRH

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/TRAVIS R HUNNINGS/ Primary Examiner, Art Unit 2689	

Petitioner Samsung Ex-1004, 0050

Bibliographic Data

Application No: 18/179,272

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /TRAVIS R HUNNINGS/ (Examiner's Signature) | (Initials)

Title: WEARABLE COMPUTING DEVICE

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/06/2023	726	2689	PM001.01.03*(112434.0467)
RULE			

APPLICANTS

OURARING INC., Redwood City, CA, UNITED STATES

INVENTORS

Curt C. von BADINSKI, Redwood City, CA, UNITED STATES

Michael J. Strasser,

Peter Twiss,

CONTINUING DATA

This application is a CON of 17519201 11/04/2021 PAT 11599147

17519201 is a CON of 17013348 09/04/2020 PAT 11188124

17013348 is a CON of 16224686 12/18/2018 PAT 10768666

16224686 is a DIV of 15444217 02/27/2017 PAT 10156867

15444217 is a DIV of 14556062 11/28/2014 PAT 9582034

14556062 has PRO of 62006835 06/02/2014

14556062 has PRO of 61910201 11/29/2013

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

03/24/2023

**** SMALL ENTITY ****

STATE OR COUNTRY

UNITED STATES

ADDRESS

Holland & Hart LLP/Oura Health Oy

P.O. Box 11583

Salt Lake City, UT 84147

UNITED STATES

FILING FEE RECEIVED

$664

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	18179272
Filing Date	2023-03-06
First Named Inventor	von BADINSKI, Curt C.
Art Unit	
Examiner Name	
Attorney Docket Number	984SPMO0048US13

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	1589547		1926-06-22	Novack	
	2	2048878		1936-07-28	Moldenhauer	
	3	3022648		1962-02-27	LEO THALER	
	4	3653051		1972-03-28	WU DAVID J	
	5	3684125		1972-08-15	LAURIZIO JEREMIAH	
	6	4407295		1983-10-04	STEUER ROBERT R et al.	
	7	4541207		1985-09-17	ANTONSON DOUGLAS M	
	8	5191891		1993-03-09	RIGHTER WILLIAM H	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	9	5382778		1995-01-17	TAKAHIRA KENICHI et al.	
	10	5490523		1996-02-13	ISAACSON PHILIP et al.	
	11	5832296		1998-11-03	WANG WEIJIA et al.	
	12	6101843		2000-08-15	NAGANO TOMOHISA	
	13	6255800	B1	2001-07-03	BORK STEPHAN	
	14	6277079	B1	2001-08-21	AVICOLA KENet al.	
	15	6495283	B1	2002-12-17	YOON YOUNG SOO et al.	
	16	6502906	B1	2003-01-07	CHEN CHAO-YING	
	17	6546749	B1	2003-04-15	CANTY JESSE BEN	
	18	7161484	B2	2007-01-09	TSOUKALIS ALEXANDRE	
	19	7375494	B2	2008-05-20	DANIEL SIMON RICHARDet al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	20	7427979	B2	2008-09-23	PARK TAE-SUH et al.	
	21	7444001	B2	2008-10-28	ROBERTS LINDA ANN et al.	
	22	7471060	B2	2008-12-30	RAGHUNATH MANDAYAM THONDANURet al.	
	23	7517222	B2	2009-04-14	ROHRBACH MATTHEW DEAN et al.	
	24	7526927	B2	2009-05-05	PINTO ANTHONY	
	25	7637746	B2	2009-12-29	LINDBERG PHILLIP et al.	
	26	8157161	B2	2012-04-17	YACH DAVID PAUL	
	27	8270914	B2	2012-09-18	PASCOLINI MATTIA et al.	
	28	8346327	B2	2013-01-01	CAMPBELL SHANNON E et al.	
	29	8373656	B2	2013-02-12	HOU ZIFENG et al.	
	30	8421748	B2	2013-04-16	TANAKA MASAHIDE	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0055

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	31	8457654	B1	2013-06-04	ROSKIND JAMES	
	32	8515506	B2	2013-08-20	RIDDER TRENT D et al.	
	33	8554297	B2	2013-10-08	MOON JIM et al.	
	34	8570372	B2	2013-10-29	RUSSELL AUSTIN	
	35	8583167	B2	2013-11-12	CHUN JAMES	
	36	8599572	B2	2013-12-03	NEUDECKER BERND J et al.	
	37	8626249	B2	2014-01-07	UNGARI JOSEPH et al.	
	38	8638190	B1	2014-01-28	WANT ROY et al.	
	39	9076589	B2	2015-07-07	WRIGHT PAUL K et al.	
	40	9148717	B2	2015-09-29	SHAFFER JONATHAN EVERETT	
	41	9197270	B2	2015-11-24	YING ZHINONG et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0056

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	42	9203463	B2	2015-12-01	ASRANI VIJAY L et al.	
	43	9313609	B2	2016-04-12	PRENCIPE JOSEPH NICHOLI	
	44	9335790	B2	2016-05-10	STOTLER JAMES G	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020156352	A1	2002-10-24	EGGERS PHILIP N	
	2	20030142065	A1	2003-07-31	PAHLAVAN KOUROSH	
	3	20050038348	A1	2005-02-17	AVICOLA KENNETH et al.	
	4	20050189906	A1	2005-09-01	SUN HUEI-HSIN	
	5	20060046709	A1	2006-03-02	KRUMM JOHN C et al.	
	6	20060142968	A1	2006-06-29	HAN DAE-HO et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0057

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	7	20070100218	A1	2007-05-03	SWEITZER ROBERT et al.	
	8	20070100666	A1	2007-05-03	STIVORIC JOHN M et al.	
	9	20070123756	A1	2007-05-31	KITAJIMA KAZUMI et al.	
	10	20080045806	A1	2008-02-21	KEPPLER BERNHARD	
	11	20080048036	A1	2008-02-28	MATSUMOTO NAOTO et al.	
	12	20090306485	A1	2009-12-10	BELL JONATHAN ARNOLD	
	13	20100100004	A1	2010-04-22	VAN SOMEREN EUGENIO JOHANNES W	
	14	20100156624	A1	2010-06-24	HOUNSELL BEN	
	15	20100249552	A1	2010-09-30	PRICE THOMAS	
	16	20110038511	A1	2011-02-17	TAKIGUCHI KIYOAKI	
	17	20110057901	A1	2011-03-10	RÄTY MATTI et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0058

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	18	20110070480	A1	2011-03-24	HAHN ROBERT et al.	
	19	20110070829	A1	2011-03-24	GRIFFIN JASON T et al.	
	20	20110312311	A1	2011-12-22	ABIFAKER CHADIA et al.	
	21	20120016793	A1	2012-01-19	PETERS JO-ANN et al.	
	22	20120130203	A1	2012-05-24	STERGIOU STERGIOS et al.	
	23	20120218184	A1	2012-08-30	WISSMAR STANLEY	
	24	20120220835	A1	2012-08-30	CHUNG WAYNE	
	25	20120254809	A1	2012-10-04	YANG JUN et al.	
	26	20120293107	A1	2012-11-22	AJAGBE ADEBOWALE	
	27	20120317024	A1	2012-12-13	RAHMAN HOSAIN SADEQUR et al.	
	28	20120323521	A1	2012-12-20	DE FORAS ETIENNE et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0059

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	29	20130027341	A1	2013-01-31	MASTANDREA JR NICHOLAS J	
	30	20130033418	A1	2013-02-07	BEVILACQUA MATHEW WILLIAM et al.	
	31	20130044215	A1	2013-02-21	ROTHKOPF FLETCHER R et al.	
	32	20130069583	A1	2013-03-21	LEMELMAN BRIAN et al.	
	33	20130088186	A1	2013-04-11	HSIEH FANG-KENG	
	34	20130106603	A1	2013-05-02	WEAST AARON B et al.	
	35	20130108907	A1	2013-05-02	BHARDWAJ RAMESH C et al.	
	36	20130131519	A1	2013-05-23	LEBOEUF STEVEN FRANCIS et al.	
	37	20130144176	A1	2013-06-06	LEC RYSZARD M	
	38	20130167221	A1	2013-06-27	VUKOSZAVLYEV ZORAN et al.	
	39	20130186962	A1	2013-07-25	KENNETT ROBERT et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0060

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	40	20130191789	A1	2013-07-25	CALMAN MATTHEW A et al.	
	41	20130217326	A1	2013-08-22	SYMONS PETER ROBERT	
	42	20130226486	A1	2013-08-29	HENDERSON KRISTOFER et al.	
	43	20130261771	A1	2013-10-03	TEN KATE WARNER	
	44	20130271069	A1	2013-10-17	PARTOVI AFSHIN	
	45	20130314028	A1	2013-11-28	TSENG KUO-FONG	
	46	20140065956	A1	2014-03-06	YANG SONGNAN et al.	
	47	20140102136	A1	2014-04-17	WARREN MICHAEL K	
	48	20150037616	A1	2015-02-05	WYATT PERRY M et al.	
	49	20150277559	A1	2015-10-01	VESCOVI MARCOS REGIS et al.	
	50	20150303722	A1	2015-10-22	LI LIN	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0061

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	51	20150349556	A1	2015-12-03	MERCANDO CHRISTINA et al.	
	52	20150380961	A1	2015-12-31	TSENG JUSTIN et al.	
	53	20160013602	A1	2016-01-14	STRISOWER JOHN et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	103109462	CN	A	2013-05-15	Mastandrea et al.		
	2	103403627	CN	A	2013-11-20	NIKE INTERNATIONAL LTD		
	3	103441306	CN	A	2013-12-11	HUIZHOU TCL HYPERPOWER BATTERIES INC		
	4	204440426	CN	U	2015-07-01	GUANGDONG SEEDCOM ELECTRICAL & LIGHTING CO LTD		
	5	204732935	CN	U	2015-10-28	SHI XIONG		
	6	2660680	EP	A1	2013-11-06	ALCATEL LUCENT		

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0062

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	7	2004078028	WO	A2	2004-09-16	Ken AVICOLA et al.		
	8	2009124076	WO	A1	2009-08-10	NELLCOR PURITAN BENNETT LLC		
	9	2011053235	WO	A1	2011-05-05	Stanley WISSMAR et al.		
	10	2012024889	WO	A1	2012-01-03	Wang		
	11	2013093638	WO	B2	2013-06-27	MASHINERY PTY LTD		
	12	2013163326	WO	A1	2013-10-31	QUALCOMM INCORPORATED		

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1	EP Search Report for application EP201205293.0, mailed September 8, 2022.	
	2	Europen Office Action for application EP14866236.4 mailed April 28, 2021.	
	3	LEEF, "LEEF MAGNET USB 3.0 FLASH DRIVE", "www.leefco.com/magnet-copper", 6/2/2016, Publisher: Leef Group Limited, Published in: US	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0063

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	4	SAMEDAYFLASH, "SET OF 10 2GB/4GB/8GB/16GB WOODEN BAMBOO FLASH DRIVE - BULK PACK O USB 2.0 WOOD BAMBOO STICK DESIGN - WOOD USB FLASH DRIVE", "www.etsy.com/listing/248051205/set-10-2gb4gb8gb16gb-wooden-bamboo?ref+m", 6/2/2016, Publisher: Elsy, Published in: US	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/TRAVIS R HUNNINGS/	Date Considered	07/06/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0064

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Steve Y. Cho/	Date (YYYY-MM-DD)	2023-04-18
Name/Print	Steve Y. Cho	Registration Number	44612

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0065

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.R.H/

Petitioner Samsung Ex-1004, 0066

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	16	(("8279107") or ("9373256") or ("9589465") or ("20010052860") or ("20090098903") or ("20110099126") or ("20130106621") or ("20150339924")).PN.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:07 PM
L2	1	L1 and lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:08 PM
L3	6	("9704400").PN.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:08 PM
L4	2356	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:11 PM
L5	386	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:11 PM
L6	2685	L4 L5	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:12 PM
L7	18	L6 and park$4 with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:12 PM
L8	23	("20030112154" | "20040032342" | "20040068433" | "5910782" | "6694259" | "6750786").PN. OR ("7312722").URPN.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2018/01/04 01:14 PM
L9	41	L7 L8	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2018/01/04 01:14 PM
L10	18	L9 and lidar	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2018/01/04 01:14 PM
L11	38	340/$.ccls. and park$4 with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:20 PM
L12	40	340/$.ccls. and (park$4 occupancy) with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:20 PM
L13	24	L12 not L10	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:20 PM
L14	28	340/$.ccls. and (park$4) near3 (space garage occupancy) same lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:22 PM

Petitioner Samsung Ex-1004, 0067

L15	143	(park$4) near3 (space garage occupancy) same lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:22 PM
L16	11	L14 not L12	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:22 PM
L17	79	lidar with occupancy	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/01/04 01:24 PM
L22	2409	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/08/16 12:01 PM
L23	463	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/08/16 12:01 PM
L24	2811	L22 L23	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2018/08/16 12:01 PM
L33	2448	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/01/04 09:37 AM
L34	521	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/01/04 09:37 AM
L35	2903	L33 L34	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/01/04 09:37 AM
L36	25	L35 and park$4 with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/01/04 09:37 AM
L37	4	("10096247").PN.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2019/01/04 09:37 AM
L38	2493	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/04/25 03:25 PM
L39	604	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/04/25 03:25 PM
L44	2574	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/09/09 04:40 PM
L45	684	g08g1/142.cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/09/09 04:40 PM
L46	3182	L44 L45	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/09/09 04:40 PM
L47	35	L46 and park$4 with lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2019/09/09 04:40 PM
L52	9	(("10510250") or	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/04/10

Petitioner Samsung Ex-1004, 0068

		("10373493") or ("10096247")).PN.	EPO; JPO; DERWENT)				10:18 AM
L53	2563	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:16 PM
L54	9150	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146).cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:17 PM
L55	11311	L53 L54	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:17 PM
L56	1341	L55 and lidar	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:17 PM
L57	9	"10748424"	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2021/07/14 12:37 PM
L58	2	("20150277559").PN.	(US-PGPUB; USPAT; EPO; JPO; DERWENT)	OR	OFF	OFF	2021/07/15 01:25 PM
L59	2856	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/10/03 12:00 PM
L60	11808	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146).cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2022/10/03 12:00 PM
L61	7797	59 60	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 12:00 PM
L62	5	("20150277559" "20130106603" "20140230019" "20060055517" "20130027341").pn.	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 02:57 PM
L63	301	("2015/0277559").urpn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/10/03 03:10 PM
L64	213	63 AND ring	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 03:10 PM
L65	25	63 AND (epoxy potting)	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 03:11 PM
L66	9	("6701618" | "7526927" | "9612578" | "20090306485" | "20120218184" | "20150220109" | "20150277559" | "20150342308" | "20180343993").pn. AND (PGPB | USPT | USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2022/10/03 03:14 PM
L67	20	("11188124" "10768666" "10901460" "10139859" "10156867"	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2022/10/03 03:20 PM

Petitioner Samsung Ex-1004, 0069

		"9582034" "9958904" "10281953" "10496131" "10126779" "10331168" "10884455").pn.					
L68	1	("11599147").pn.	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:21 PM
L69	12749	(G08G1/142 G08G1/04 G08G1/143 G08G1/144 G08G1/146).cpc.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/06 02:35 PM
L70	8422	59 60	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:35 PM
L71	8422	69 70	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:35 PM
L72	8422	69 70	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:36 PM
L73	2914	340/932.2.ccls.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/07/06 02:36 PM
L74	8422	69 73	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/07/06 02:36 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Petitioner Samsung Ex-1004, 0070

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/179,272	03/06/2023	Curt C. von BADINSKI	PM001.01.03*(112434.0467)

CONFIRMATION NO. 3508

179918
Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

PUBLICATION NOTICE

OC000000059058916

Date Mailed: 07/06/2023

Title:WEARABLE COMPUTING DEVICE

Publication No.US-2023-0213970-A1
Publication Date:07/06/2023

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Petitioner Samsung Ex-1004, 0071

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/179,272	03/06/2023	Curt C. von BADINSKI	984SPMO0048US13

CONFIRMATION NO. 3508

163435
Proxy, Inc.
c/o AMPACC Law Group, PLLC
6100 219th Street SW, Suite 580
Mountlake Terrace, WA 98043

POWER OF ATTORNEY NOTICE

OC000000058542918

Date Mailed: 06/22/2023

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/12/2023.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/qnguyen/

Petitioner Samsung Ex-1004, 0072

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/179,272	03/06/2023	Curt C. von BADINSKI	984SPMO0048US13

CONFIRMATION NO. 3508

179918
Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147

POA ACCEPTANCE LETTER

OC000000058542954

Date Mailed: 06/22/2023

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/12/2023.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/qnguyen/

Petitioner Samsung Ex-1004, 0073

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
18/179,272	03/06/2023	OPAP	664	984SPMO0048US13	1	1

CONFIRMATION NO. 3508

REPLACEMENT FILING RECEIPT

179918
Holland & Hart LLP/Oura Health Oy
P.O. Box 11583
Salt Lake City, UT 84147



Date Mailed: 06/22/2023

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Curt C. von BADINSKI, Redwood City, CA;
Michael J. Strasser, Redwood City, CA;
Peter Twiss, Redwood City, CA;

Applicant(s)

OURARING INC., San Francisco, CA;

Power of Attorney: The patent practitioners associated with Customer Number 179918

Domestic Priority data as claimed by applicant

This application is a CON of 17/519,201 11/04/2021 PAT 11,599,147
which is a CON of 17/013,348 09/04/2020 PAT 11,188,124
which is a CON of 16/224,686 12/18/2018 PAT 10,768,666
which is a DIV of 15/444,217 02/27/2017 PAT 10,156,867
which is a DIV of 14/556,062 11/28/2014 PAT 9,582,034
which claims benefit of 62/006,835 06/02/2014
and claims benefit of 61/910,201 11/29/2013

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Petitioner Samsung Ex-1004, 0074

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 03/24/2023

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/179,272**

Projected Publication Date: 07/06/2023

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

WEARABLE COMPUTING DEVICE

Preliminary Class

726

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

Petitioner Samsung Ex-1004, 0075

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor

Petitioner Samsung Ex-1004, 0076

community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Petitioner Samsung Ex-1004, 0077

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	18/179,272
Filing Date	March 6, 2023
First Named Inventor	von Badinski et al.
Title	WEARABLE COMPUTING DEVICE
Art Unit	-
Examiner Name	-
Attorney Docket Number	984SPMO0048US13

SIGNATURE of Applicant or Patent Practitioner

Signature	/Nathan J. Mutter/	Date (Optional)	June 12, 2023
Name	Nathan J. Mutter	Registration Number	70,107
Title (if Applicant is a juristic entity)	Attorney		
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 179918

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Ouraring Inc.

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☐ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☑ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Tom Hale	Date (Optional)	May 26, 2023
Name	Thomas Hale		
Title	CEO		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: R46C.REQ
Document Description: Request under 37 CFR 1.46(c) to correct, update or change the applicant.

PTO/AIA/41 (04-15)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REQUEST TO CORRECT OR UPDATE THE NAME OF THE APPLICANT UNDER 37 CFR 1.46(c)(1), OR CHANGE THE APPLICANT UNDER 37 CFR 1.46(c)(2)
(FOR USE ONLY IN APPLICATIONS FILED ON OR AFTER SEPTEMBER 16, 2012)

Application Number	18/179,272
Filing Date	03-06-2023
First Named Inventor	von Badinski et al.
Art Unit	-
Examiner Name	-
Practitioner Docket Number	984SPMO0048US13

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant hereby **requests that the name of the applicant be corrected or updated under 37 CFR 1.46(c)(1), or that the applicant be changed under 37 CFR 1.46(c)(2),** in the above-identified application. **Requests under 37 CFR 1.46(c)(1) or (c)(2) cannot be submitted after payment of the issue fee or if the application has been patented.**

Please check the applicable box(es) below.

☐ 1. This request is to **correct or update the name of the applicant (under 37 CFR 1.46(c)(1))** and includes:

☐ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) with the corrected or updated information shown with markings (*e.g.*, underlining for insertions, strikethrough for deletions). A Corrected Web-based ADS may be used.

Note: Requests under 37 CFR 1.46(c)(1) may be filed to correct typographical errors in the name of the § 1.46 applicant, or for updating the name of the § 1.46 applicant (*i.e.*, where there is no change in the applicant itself but just in the applicant's name). See the Manual of Patent Examining Procedure (MPEP) section 605.01.

☒ 2. This request is to **change the applicant (under 37 CFR 1.46(c)(2))** and includes:

☒ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) that identifies the changes with proper markings (underlining for insertions and strikethrough for deletions). A Corrected Web-based ADS may be used.

☒ A Statement Under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent). See MPEP 325.

I am the

☐ applicant* ☐ attorney or agent of record Registration number _____ ☒ attorney or agent acting under 37 CFR 1.34 Registration number 70107

Signature /Nathan J. Mutter/
Typed or printed name Nathan J. Mutter
Date June 12, 2023

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. *Juristic entities must be represented by a patent practitioner (See 37 CFR 1.31, applicable to any paper filed on or after September 16, 2012 that is presented on behalf of a juristic entity, regardless of application filing date). Submit multiple forms if more than one signature is required, see below**.

☐ ** Total of _____ forms are submitted.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **If filing this completed form by mail, send to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/179,272	**06/12/2023 03:55:46 PM ET**	**984SPMO0048US13**

Title of Invention

WEARABLE COMPUTING DEVICE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3508	FILED BY	Sherry Soares
PATENT CENTER #	62252073	FILING DATE	03/06/2023
CUSTOMER #	163435	FIRST NAMED INVENTOR	Curt C. von BADINSKI
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Nathan Mutter

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
181792723508_146cCHNG.pdf	1	Request under 37CFR1.46(c) to correct, update, change applicant	176 KB
181792723508_cADS.pdf	8	Application Data Sheet	3223 KB
Warning: This is not a USPTO supplied ADS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
181792723508_373STMT.pdf	29	Assignee showing of ownership per 37 CFR 3.73	4507 KB
181792723508_POA.pdf	2	Power of Attorney	722 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
181792723508_146cCHNG.pdf	B4D4C0B0A4E923BF05B04702169130DDF27E9B856751050B247C9E33B71BB13FB3453EC6A61321BCFA2D281F79BD2739F0648E441AD014F4765609ABD41594DA
181792723508_cADS.pdf	D3AEC825751332738F0CBC3602095F44F951C57323E53E02C1A05F3E53BEF022117DABD0DD89378E515A482F5650A7C9A4AFB1D2E34D476DB747CB8B08F034B0
181792723508_373STMT.pdf	1871EDE814E5ED6B425C1F2F5A9F945C61FE18169A1C2D365CA8CC9E5E1CEBE8BEECC2A6360B75F6F46D5E5F7C59885086BC0135D1E11FDB95B9D09357E0C99A
181792723508_POA.pdf	93DC9A99BC0205FE42DF17F4A619E9B8E22F5CC6C55250050C0269B4CCC1A3D0E8B2DB382231229D4CD78795B0E5D70AB283C1A272D0123B3436F4242A152E1B

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Corrected Application Data Sheet 37 CFR 1.76	Attorney Docket Number	984SPMO0048US13
	Application Number	18/179,272
Title of Invention	WEARABLE COMPUTING DEVICE	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Curt	C.	von BADINSKI	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	Redwood City	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	275 Shoreline Drive, Suite 505		
Address 2			
City	Redwood City	State/Province	CA
Postal Code	94065	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael	J.	STRASSER	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	Redwood City	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	275 Shoreline Drive, Suite 505		
Address 2			
City	Redwood City	State/Province	CA
Postal Code	94065	Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Peter		TWISS	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

Petitioner Samsung Ex-1004, 0083

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Corrected Application Data Sheet 37 CFR 1.76	Attorney Docket Number	984SPMO0048US13
	Application Number	18/179,272
Title of Invention	WEARABLE COMPUTING DEVICE	

City	Redwood City	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	275 Shoreline Drive, Suite 505		
Address 2			
City	Redwood City	State/Province	CA
Postal Code	94065	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	~~163435~~ 179918		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	WEARABLE COMPUTING DEVICE		
Attorney Docket Number	984SPMO0048US13	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	33	Suggested Figure for Publication (if any)	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Petitioner Samsung Ex-1004, 0084

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Corrected Application Data Sheet 37 CFR 1.76	Attorney Docket Number	984SPMO0048US13
	Application Number	18/179,272
Title of Invention	WEARABLE COMPUTING DEVICE	

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	◯ Limited Recognition (37 CFR 11.9)
Customer Number	~~163435~~ 179918		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation of	17519201	2021-11-04	11599147	2023-03-07
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
17519201	Continuation of	17013348	2020-09-04	11188124	2021-11-30
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
17013348	Continuation of	16224686	2018-12-18	10768666	2020-09-08
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16224686	Division of	15444217	2017-02-27	10156867	2018-12-18
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15444217	Division of	14556062	2014-11-28	9582034	2017-02-28

Petitioner Samsung Ex-1004, 0085

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Corrected Application Data Sheet 37 CFR 1.76	Attorney Docket Number	984SPMO0048US13
	Application Number	18/179,272
Title of Invention	WEARABLE COMPUTING DEVICE	

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14556062	Claims benefit of provisional	62006835	2014-06-02
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14556062	Claims benefit of provisional	61910201	2013-11-29
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.			Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.			Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Petitioner Samsung Ex-1004, 0086

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Corrected Application Data Sheet 37 CFR 1.76	Attorney Docket Number	984SPMO0048US13
	Application Number	18/179,272
Title of Invention	WEARABLE COMPUTING DEVICE	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Petitioner Samsung Ex-1004, 0087

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Corrected Application Data Sheet 37 CFR 1.76	Attorney Docket Number	984SPMO0048US13
	Application Number	18/179,272
Title of Invention	WEARABLE COMPUTING DEVICE	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	~~Proxy, Inc.~~ OURARING INC.

Mailing Address Information For Applicant:

Address 1	~~275 Shoreline Drive, Suite 505~~ 415 Mission St., Floor 37		
Address 2			
City	~~Redwood City~~ San Francisco	**State/Province**	CA
Country	US	Postal Code	~~94065~~ 94105
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Petitioner Samsung Ex-1004, 0088

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Corrected Application Data Sheet 37 CFR 1.76	Attorney Docket Number	984SPMO0048US13
	Application Number	18/179,272
Title of Invention	WEARABLE COMPUTING DEVICE	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Nathan J. Mutter/			Date (YYYY-MM-DD)	2023-06-12
First Name	Nathan	Last Name	Mutter	Registration Number	70107

Additional Signature may be generated within this form by selecting the Add button. Add

Petitioner Samsung Ex-1004, 0089

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Corrected Application Data Sheet 37 CFR 1.76	Attorney Docket Number	984SPMO0048US13
	Application Number	**18/179,272**
Title of Invention	WEARABLE COMPUTING DEVICE	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Petitioner Samsung Ex-1004, 0090

PTO/AIA/96 (08-12)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Curt C. von Badinski, Michael J. Strasser, Peter Twiss

Application No./Patent No.: 18/179,272 Filed/Issue Date: March 6, 2023

Titled: WEARABLE COMPUTING DEVICE

Ouraring Inc., a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. [✓] The assignee of the entire right, title, and interest.

2. [ ] An assignee of less than the entire right, title, and interest (check applicable box):

   [ ] The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   [ ] There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. [ ] The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. [ ] The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. [✓] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: C.C.von Badinski, M.J.Strasser, P.Twiss To: MECHIO INC.

   The document was recorded in the United States Patent and Trademark Office at

   Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: MECHIO INC. To: MOTIV INC.

   The document was recorded in the United States Patent and Trademark Office at

   Reel _____, Frame _____, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Petitioner Samsung Ex-1004, 0091

PTO/AIA/96 (08-12)
Approved for use through 11/30/2020 OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: MOTIV INC. To: MOTIV (ABC), LLC

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: MOTIV (ABC), LLC To: PROXY, INC.

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: PROXY, INC. To: TWIN MERGER SUB II, LLC

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: TWIN MERGER SUB II, LLC To: OURARING INC.

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Nathan J. Mutter/	June 12, 2023
Signature	Date
Nathan J. Mutter	70,107
Printed or Typed Name	Title or Registration Number

Petitioner Samsung Ex-1004, 0092

ASSIGNMENT OF PATENT APPLICATION

FOR GOOD AND VALUABLE CONSIDERATION,

We, the undersigned (each) have agreed and hereby agree to assign for good and valuable consideration, receipt of which is hereby expressly acknowledged, and do hereby sell, assign and transfer unto

Mechio Inc.

an entity organized under the laws of California, with offices at 179 11th Street, 3rd Floor, San Francisco, CA 94103 as Assignee, and its successors, assigns and legal representatives, the entire right, title and interest, for all countries in and to certain inventions relating to

WEARABLE COMPUTING DEVICE

described in an application for Letters Patent of the United States, identified as Attorney Docket No. 340/0002, at Loginov & Associates, PLLC, 214 South Main Street, Concord, NH 03301-4844 and filed on 11/28/2014 as Application Serial No. 14/556,062, and the invention(s) and improvement(s) set forth therein, and any and all continuations, continuations-in-part, divisionals, and renewals of and substitutes for said application for said Letters Patent, and all the rights and privileges under any and all Letters Patent that may be granted therefor in any country, and any reissues, or reexaminations, or extensions of said Letters Patent. We request that any and all Letters Patent for said inventions be issued to said Assignee, its successors, assigns and legal representatives, or to such nominees as it may designate.

We agree that, when requested, we will, without charge to said Assignee but at its expense, sign all papers, take all rightful oaths, and do all acts which may be necessary, desirable or convenient for securing and maintaining patents for said inventions in any and all countries and for vesting title thereto in said Assignee, its successors, assigns and legal representatives or nominees.

We authorize and empower the said Assignee, its successors, assigns and legal representatives or nominees, to invoke and claim for any application for patent or other form of protection for said inventions filed by it or them, the benefit of the right of priority provided by the International Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it, and to invoke and claim such right of priority without further written or oral authorization from us.

We hereby consent that a copy of this assignment shall be deemed a full legal and formal equivalent of any assignment, consent to file or like document which may be required in any country for any purpose and more particularly in proof of the right of the said Assignee or nominee to claim the aforesaid benefit of the right of priority provided by the International convention which may henceforth be substituted for it.

We covenant with said Assignee, its successors, assigns and legal representatives, that the rights and property herein conveyed are free and clear of any encumbrance, and that we have full right to convey the same as herein expressed.

IN WITNESS WHEREOF, we have hereunto signed our names on the day and year set forth below.

Curt von Badinski — 4/1/2015

Inventor's Signature — DATE

Curt C. von Badinski

Inventor's Printed Name

3/19/2015

Inventor's Signature — DATE

Michael J. Strasser

Inventor's Printed Name

3/23/2015

Inventor's Signature — DATE

Peter Twiss

Inventor's Printed Name

RECORDED: 04/23/2015

PATENT
REEL: 063320 FRAME: 0598

Petitioner Samsung Ex-1004, 0093

State of California
Secretary of State

NAME CHANGE
CERTIFICATE OF QUALIFICATION

C3633500

I, ALEX PADILLA, Secretary of State of the State of California, hereby certify that on the **18th day of March 2016**, there was filed in this office an Amended Statement and Designation by Foreign Corporation whereby the corporate name of **MECHIO INC.**, a corporation organized and existing under the laws of **Delaware**, was changed to **MOTIV INC.**. This corporation complied with the requirements of California law in effect on that date for the purpose of qualifying to transact intrastate business in the State of California and as of said date has been and is qualified and authorized to transact intrastate business in the State of California, subject however, to any licensing requirements otherwise imposed by the laws of this State.

IN WITNESS WHEREOF, I execute this certificate and affix the Great Seal of the State of California this day of March 23, 2016.

ALEX PADILLA
Secretary of State

NP-25 (REV 01/2015)

ACP

Petitioner Samsung Ex-1004, 0094

A0782298

Amended Statement By Foreign Corporation

3633500

FILED
Secretary of State
State of California
MAR 18 2016

Motiv Inc.
[Name of Corporation]

,

a corporation organized and existing under the laws of Delaware,
[State or Place of Incorporation]

and which is presently qualified for the transaction of intrastate business in the State of California, makes the following statement:

That the name of the corporation has been changed to that hereinabove set forth and that the name relinquished at the time of such change was Mechio Inc.

.

[Signature of Corporate Officer]

MICHAEL STRASSER, CEO, 2/18/2016
[Typed Name and Title of Officer Signing]

A0782298

Delaware

The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THAT THE SAID "MECHIO INC.", FILED A RESTATED CERTIFICATE, CHANGING ITS NAME TO "MOTIV INC" ON THE TWELFTH DAY OF FEBRUARY, A.D. 2016, AT 4:07 O`CLOCK P.M.

AND I DO HEREBY FURTHER CERTIFY THAT THE AFORESAID CORPORATION IS DULY INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE AND IS IN GOOD STANDING AND HAS A LEGAL CORPORATE EXISTENCE NOT HAVING BEEN CANCELLED OR DISSOLVED SO FAR AS THE RECORDS OF THIS OFFICE SHOW AND IS DULY AUTHORIZED TO TRANSACT BUSINESS.

Jeffrey W. Bullock, Secretary of State

5455044 8320
SR# 20161711256

Authentication: 202000836
Date: 03-17-16

You may verify this certificate online at corp.delaware.gov/authver.shtml

Petitioner Samsung Ex-1004, 0096

I hereby certify that the foregoing transcript of 2 page(s) is a full, true and correct copy of the original record in the custody of the California Secretary of State's office.

MAR 2 3 2016

Date:

ALEX PADILLA, Secretary of State

PATENT ASSIGNMENT AGREEMENT

This PATENT ASSIGNMENT AGREEMENT is made effective as of March 27, 2020, by and between MOTIV INC. a Delaware Corporation ("Assignor"), and MOTIV (ABC), LLC a California limited liability company, as Assignee for the Benefit of Creditors of Motiv Inc., ("Assignee"), pursuant to a certain General Assignment Agreement dated as of March 27, 2020, (the "Assignment Agreement"). Capitalized terms used without definitions herein shall have the meanings ascribed to such terms in the Assignment Agreement.

WHEREAS, Assignor has agreed to sell to Assignee, and Assignee has agreed to acquire from Assignor, all of Assignor's rights, title and interest in and to the Assigned Patents (as defined below); and

WHEREAS, the parties accordingly wish to execute this recordable instrument, assigning all of Assignor's right, title and interest in and to the Assigned Patents to Assignee;

NOW, THEREFORE, for valuable consideration set forth in the Assignment Agreement, the receipt and sufficiency of which are hereby acknowledged, Assignor and Assignee agree as follows:

1. Assignor hereby assigns, transfers, conveys, and sets over to Assignee, and its lawful successors and assigns, and Assignee acknowledges receipt of and accepts, Assignor's entire right, title, and interest throughout the world in and to the patents and patent applications identified in Schedule A attached hereto, together with all rights to the inventions described or claimed therein, and all divisions, continuations and continuations-in-part thereof, and all Letters Patent of the United States which may be granted thereon, and all reissues thereof, and all rights to claim priority therefrom, and all applications for Letters Patent which may hereafter be filed for this invention in any foreign country and all Letters Patent which may be granted on this invention in any foreign country, and all extensions, renewals, and reissues, thereof (collectively, the "Assigned Patents") and Assignor hereby authorizes and requests the Commissioner of Patents and Trademarks of the United States and any official of any foreign country whose duty it is to issue patents, utility models, design registrations, inventors' certificates, or like rights of exclusion on applications as described above, to (a) issue all Letters Patent, utility models, design registrations, inventors' certificates and like rights of exclusion for any invention disclosed and claimed in any Assigned Patent to Assignee, its successors and assigns, in accordance with the terms of this Patent Assignment Agreement and (b) record Assignee as the assignee of the Assigned Patents and to deliver to Assignee and to Assignee's attorneys, agents, successors and/or assigns all official documents and communications as may be warranted by this Patent Assignment Agreement.

2. Assignor further assigns to Assignee all rights to (a) register or apply in all countries and regions for patents, utility models, design registrations, inventors' certificates and like rights of exclusion for the Assigned Patents, (b) prosecute, maintain, and defend the Assigned Patents before any public or private agency, office, or registrar, (c) claim priority based on the filing dates of any of the Assigned Patents under the International Convention for the Protection of Industrial Property, the Patent Cooperation Treaty, the European Patent Convention, the Paris Convention, and all other treaties of like purposes, and (d) (i) sue and recover for any past, present or future actions, causes of action and rights to recover damages or payments (including lost profits), for past, present, or future infringement of any Assigned Patent, as well as the right to take over and continue any and all existing suits related to any Assigned Patent, (ii) obtain equitable relief, including injunctive relief, in

respect of such infringement, and (iii) fully and entirely stand in the place of Assignor in all matters related to the Assigned Patents.

3. This Patent Assignment Agreement is subject to the terms and conditions of the Assignment Agreement and this Patent Assignment Agreement shall not be deemed to limit, enlarge or extinguish any obligation of Assignor or Assignee under the Assignment Agreement, all of which obligations shall survive the delivery of this Patent Assignment Agreement in accordance with the terms of the Assignment Agreement, and that to the extent there is any conflict between this Patent Assignment Agreement and the terms and conditions of the Assignment Agreement, the Assignment Agreement shall control.

4. This Patent Assignment Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

ASSIGNOR:

MOTIV INC. a Delaware Corporation

DocuSigned by:
By: Tejash Unadkat
B48AE61040634DD...
Name: Tejash Unadkat
Title: Chief Executive Officer

ASSIGNEE:

MOTIV (ABC), LLC a California Limited Liability Company, as Assignee for the Benefit of Creditors of Motiv Inc.

By: _____
Name: David Miller
Its: Manager

[Signature Page to Patent Assignment]

147086381

Petitioner Samsung Ex-1004, 0099

respect of such infringement, and (iii) fully and entirely stand in the place of Assignor in all matters related to the Assigned Patents.

3. This Patent Assignment Agreement is subject to the terms and conditions of the Assignment Agreement and this Patent Assignment Agreement shall not be deemed to limit, enlarge or extinguish any obligation of Assignor or Assignee under the Assignment Agreement, all of which obligations shall survive the delivery of this Patent Assignment Agreement in accordance with the terms of the Assignment Agreement, and that to the extent there is any conflict between this Patent Assignment Agreement and the terms and conditions of the Assignment Agreement, the Assignment Agreement shall control.

4. This Patent Assignment Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

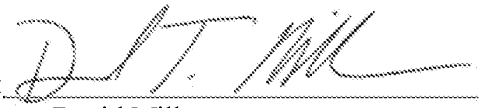
ASSIGNOR:

MOTIV INC. a Delaware Corporation

By: _____
Name: Tejash Unadkat
Title: Chief Executive Officer

ASSIGNEE:

MOTIV (ABC), LLC a California Limited Liability Company, as Assignee for the Benefit of Creditors of Motiv Inc.

By: 
Name: David Miller
Its: Manager

Schedule A
To Patent Assignment Agreement

Issued Patents

Title	Country	Patent No.	Issuance Date
WEARABLE COMPUTING DEVICE	United States	9582034	February 28, 2017
WEARABLE COMPUTING DEVICE	United States	9958904	May 1, 2018
WEARABLE COMPUTING DEVICE	United States	10156867	December 18, 2018
WEARABLE COMPUTING DEVICE	United States	10126779	November 13, 2018
WEARABLE COMPUTING DEVICE	United States	10139859	November 27, 2018
WEARABLE DEVICE AND DATA TRANSMISSION METHOD	United States	10281953	May 7, 2019
WEARABLE COMPUTING DEVICE	United States	10496131	December 3, 2019
WEARABLE COMPUTING DEVICE	United States	10331168	June 25, 2019
USB CHARGER	United States	D810016	February 13, 2018
KEY HOLDER	United States	D809782	February 13, 2018
WEARABLE COMPUTING DEVICE	United States	D804471	December 5, 2017
WEARABLE COMPUTING DEVICE	United States	D756999	May 24, 2016
WEARABLE COMPUTING DEVICE	United States	D791765	July 11, 2017
WEARABLE COMPUTING DEVICE	United States	D791764	July 11, 2017
HEART RATE SENSOR	United States	D817496	May 8, 2018
PACKAGE	United States	D828767	September 18, 2018

Petitioner Samsung Ex-1004, 0101

Pending Patent Applications

Title	Country	Application No.	Application Date
WEARABLE COMPUTING DEVICE	United States	16/202054	November 27, 2018
WEARABLE COMPUTING DEVICE	United States	16/224686	December 18, 2018
WEARABLE COMPUTING DEVICE	United States	16/189038	November 13, 2018
WEARABLE COMPUTING DEVICE	United States	16/718135	December 17, 2019
EXPANDABLE RING	United States	29/683561	March 14, 2019
WEARABLE COMPUTING DEVICE	Hong Kong	17102435	September 9, 2017
WEARABLE COMPUTING DEVICE	Canada	CA 2931973	November 28, 2014
WEARABLE COMPUTING DEVICE	China	201480074476	November 28, 2014
WEARABLE COMPUTING DEVICE	Europe	EU2014866236	November 28, 2014
WEARABLE COMPUTING DEVICE	Japan	P2017-506376A	March 2, 2017

EXHIBIT 6.2 (ii)

TO ASSET PURCHASE AGREEMENT

PATENT ASSIGNMENT AGREEMENT

THIS PATENT ASSIGNMENT AGREEMENT is made as of March 27, 2020, by and between MOTIV (ABC), LLC, a California limited liability company ("Seller"), as Assignee for the Benefit of Creditors of Motiv Inc., a Delaware corporation, and Proxy, Inc., a Delaware corporation ("Buyer"). Seller and Buyer are parties to a certain Asset Purchase Agreement dated as of March 27, 2020, (the "Asset Purchase Agreement"). Capitalized terms used without definitions herein shall have the meanings ascribed to such terms in the Asset Purchase Agreement.

WHEREAS, Seller has agreed to sell to Buyer, and Buyer has agreed to acquire from Seller, all of Seller's rights, title and interest in all patents and patent applications owned by Seller, including those patents and patent applications identified in Schedule A attached herein ("Assigned Patents"); and

WHEREAS, the parties accordingly wish to execute this recordable instrument, assigning all of Seller's right, title and interest in and to the Assigned Patents to Buyer;

NOW, THEREFORE, for valuable consideration set forth in the Asset Purchase Agreement, the receipt and sufficiency of which are hereby acknowledged, Seller and Buyer agree as follows:

1. Seller hereby sells, assigns, transfers, and sets over to Buyer, and its lawful successors and assigns, the Seller's entire right, title, and interest throughout the world in and to the Assigned Patents, together with all rights to the inventions described or claimed therein, and all divisions, continuations and continuations-in-part thereof, and all Letters Patent of the United States which may be granted thereon, and all reissues thereof, and all rights to claim priority therefrom, and all applications for Letters Patent which may hereafter be filed for this invention in any foreign country and all Letters Patent which may be granted on this invention in any foreign country, and all extensions, renewals, and reissues, thereof and Seller hereby authorizes and requests the Commissioner of Patents and Trademarks of the United States and any official of any foreign country whose duty it is to issue and record patents, applications and title thereto, as described above, and to issue all Letters Patent for any invention disclosed and claimed in any Assigned Patent as the property of Buyer, its successors and assigns, in accordance with the terms of this Patent Assignment Agreement.

2. Seller further assign to Buyer all rights to sue and recover for any past, present or future actions, causes of action and rights to recover damages or payments (including lost profits), for infringement or misappropriations of any Assigned Patent, as well as the right to take over and continue any and all existing suits related to any Assigned Patent.

3. This Patent Assignment Agreement is subject to the terms and conditions of the Asset Purchase Agreement and this Patent Assignment Agreement shall not be deemed to limit, enlarge or extinguish any obligation of Seller or Buyer under the Asset Purchase Agreement, all of which obligations shall survive the delivery of this Patent Assignment Agreement in accordance with the terms of the Asset Purchase Agreement, and that to the extent there is any conflict between this Patent Assignment Agreement and the terms and conditions of the Asset Purchase Agreement, the Asset Purchase Agreement shall control.

4. This Patent Assignment Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

Petitioner Samsung Ex-1004, 0103

SELLER:

MOTIV (ABC), LLC, a California limited liability company, as Assignee for the Benefit of Creditors of Motiv Inc.

By:_____

Name: David Miller

Title: Manager

BUYER:

PROXY, INC., a Delaware corporation

By:_____

Name:_____

Title:_____

DocuSign Envelope ID: 22FC4643-15A9-4569-9630-831B4162D7CE

SELLER:

MOTIV (ABC), LLC, a California limited liability company, as Assignee for the Benefit of Creditors of Motiv Inc.

By:_____

Name: David Miller

Title: Manager

BUYER:

PROXY, INC., a Delaware corporation

By: DocuSigned by: Denis Mars
35193D03125D455...

Name: Denis Mars

Title: President

Petitioner Samsung Ex-1004, 0105

Schedule A
To Patent Assignment Agreement
Assigned Patents

Issued Patents

Title	Country	Patent No.	Issuance Date
WEARABLE COMPUTING DEVICE	United States	9582034	February 28, 2017
WEARABLE COMPUTING DEVICE	United States	9958904	May 1, 2018
WEARABLE COMPUTING DEVICE	United States	10156867	December 18, 2018
WEARABLE COMPUTING DEVICE	United States	10126779	November 13, 2018
WEARABLE COMPUTING DEVICE	United States	10139859	November 27, 2018
WEARABLE DEVICE AND DATA TRANSMISSION METHOD	United States	10281953	May 7, 2019
WEARABLE COMPUTING DEVICE	United States	10496131	December 3, 2019
WEARABLE COMPUTING DEVICE	United States	10331168	June 25, 2019
USB CHARGER	United States	D810016	February 13, 2018
KEY HOLDER	United States	D809782	February 13, 2018
WEARABLE COMPUTING DEVICE	United States	D804471	December 5, 2017
WEARABLE COMPUTING DEVICE	United States	D756999	May 24, 2016
WEARABLE COMPUTING DEVICE	United States	D791765	July 11, 2017
WEARABLE COMPUTING DEVICE	United States	D791764	July 11, 2017
HEART RATE SENSOR	United States	D817496	May 8, 2018
PACKAGE	United States	D828767	September 18, 2018

Petitioner Samsung Ex-1004, 0106

Pending Patent Applications

Title	Country	Application No.	Application Date
WEARABLE COMPUTING DEVICE	United States	16/202054	November 27, 2018
WEARABLE COMPUTING DEVICE	United States	16/224686	December 18, 2018
WEARABLE COMPUTING DEVICE	United States	16/189038	November 13, 2018
WEARABLE COMPUTING DEVICE	United States	16/718135	December 17, 2019
EXPANDABLE RING	United States	29/683561	March 14, 2019
WEARABLE COMPUTING DEVICE	Hong Kong	17102435	September 9, 2017
WEARABLE COMPUTING DEVICE	Canada	CA 2931973	November 28, 2014
WEARABLE COMPUTING DEVICE	China	201480074476	November 28, 2014
WEARABLE COMPUTING DEVICE	Europe	EU2014866236	November 28, 2014
WEARABLE COMPUTING DEVICE	Japan	P2017-506376A	March 2, 2017

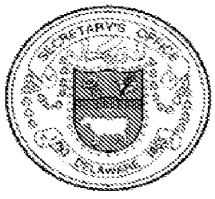
Delaware

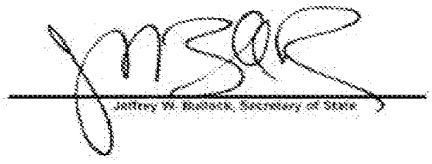
The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF MERGER, WHICH MERGES:

"PROXY, INC.", A DELAWARE CORPORATION,

WITH AND INTO "TWIN MERGER SUB II, LLC" UNDER THE NAME OF "TWIN MERGER SUB II, LLC", A LIMITED LIABILITY COMPANY ORGANIZED AND EXISTING UNDER THE LAWS OF THE STATE OF DELAWARE, AS RECEIVED AND FILED IN THIS OFFICE ON THE TWENTY-SECOND DAY OF MAY, A.D. 2023, AT 5:07 O`CLOCK P.M.





7431690 8100M
SR# 20232261723

Authentication: 203399810
Date: 05-23-23

You may verify this certificate online at corp.delaware.gov/authver.shtml

State of Delaware
Secretary of State
Division of Corporations
Delivered 05:07 PM 05/22/2023
FILED 05:07 PM 05/22/2023
SR 20232261723 - File Number 7431690

CERTIFICATE OF MERGER

MERGING

PROXY, INC.
a Delaware corporation

WITH AND INTO

TWIN MERGER SUB II, LLC
a Delaware Limited Liability Company

Pursuant to Title 8, Section 264(c) of the Delaware General Corporation Law and Title 6, Section 18-209 of the Limited Liability Company Act, the undersigned limited liability company executed the following Certificate of Merger:

FIRST: The name of the surviving limited liability company is Twin Merger Sub II, LLC that was formed pursuant to the Delaware Limited Liability Company Act, and the name of the corporation being merged into this surviving limited liability company is Proxy, Inc. that was incorporated pursuant to the Delaware General Corporation Law.

SECOND: An Agreement and Plan of Reorganization, dated as of May 6, 2023, by and among Oura Health Oy, Ouraring Inc., Twin Merger Sub I, Inc., Proxy, Inc., Twin Merger Sub II, LLC, and Shareholder Representative Services LLC, as the securityholder representative (the "**Merger Agreement**"), has been approved, adopted, certified, executed and acknowledged by the surviving limited liability company and the merged corporation in accordance with Section 264 and Section 228 of the Delaware General Corporation Law and Section 18-209 of the Delaware Limited Liability Company Act.

THIRD: The name of the surviving limited liability company is "Twin Merger Sub II, LLC".

FOURTH: The merger shall become effective upon the filing of this Certificate of Merger with the Secretary of State of the State of Delaware.

FIFTH: The Merger Agreement is on file at 415 Mission St., Floor 37, San Francisco, CA 94105, the place of business of the surviving limited liability company.

SIXTH: A copy of the Merger Agreement will be furnished by the surviving limited liability company on request, without cost, to any member of any constituent limited liability company or stockholder of any constituent corporation.

[*Signature Page Follows*]

Petitioner Samsung Ex-1004, 0109

IN WITNESS WHEREOF, Twin Merger Sub II, LLC has caused this Certificate of Merger to be signed by an authorized person, the 22nd day of May, 2023.

TWIN MERGER SUB II, LLC

By: /s/ Thomas Hale
Name: Thomas Hale
Title: President

Petitioner Samsung Ex-1004, 0110

ASSIGNMENT

For good and valuable consideration, the receipt of which is hereby acknowledged, Twin Merger Sub II, LLC, a Delaware limited liability company, having a place of business at 415 Mission St. Floor 37, San Francisco, California 94105, United States of America ("ASSIGNOR") has sold, assigned, and transferred and does hereby sell, assign, and transfer to Ouraring Inc., a corporation of Delaware, having a place of business at 415 Mission St. Floor 37, San Francisco, California 94105, United States of America ("ASSIGNEE"), for itself and its successors, transferees, and assignees, the following:

1. The entire worldwide right, title and interest in all inventions and improvements ("SUBJECT MATTER") that are disclosed in the patent applications and Letters Patents ("PATENT RIGHTS") listed in Exhibit A, and;

2. The entire worldwide right, title and interest in and to:

(a) the PATENT RIGHTS, including any right of priority;

(b) any provisional, divisional, continuation, substitute, renewal, reissue, and other related applications thereto which have been or may be filed in the United States or elsewhere in the world;

(c) any patents which may be granted on the applications set forth in (a) and (b) above; and

(d) the right to sue in its own name and to recover for past infringement of any or all of any applications or patents issuing therefore together with all rights to recover damages for infringement of provisional rights.

ASSIGNOR agrees to do the following, when requested, and without further consideration, in order to carry out the intent of this Assignment:

1. execute all oaths, assignments, powers of attorney, applications, and other papers necessary or desirable to fully secure to ASSIGNEE the rights, titles, and interests herein conveyed;

2. communicate to ASSIGNEE all known facts relating to the SUBJECT MATTER of the above-identified PATENT RIGHTS; and

3. generally do all lawful acts that ASSIGNEE shall consider desirable for securing, maintaining, and enforcing worldwide patent protection relating to the SUBJECT MATTER of the above-identified PATENT RIGHTS, and for vesting in ASSIGNEE the rights, titles, and interests herein conveyed.

Petitioner Samsung Ex-1004, 0111

ASSIGNOR further agrees to provide any successor, transferee, assignee, or legal representative of ASSIGNEE with the benefits and assistance provided to ASSIGNEE hereunder.

ASSIGNOR represents that ASSIGNOR has the rights, titles, and interests to convey as set forth herein, and covenants with ASSIGNEE that the ASSIGNOR has made or will make hereafter no assignment, grant, mortgage, license, or other agreement affecting the rights, titles, and interests herein conveyed.

Duly authorized Representative of ASSIGNOR **Date of Signature**

DocuSigned by:
Tom Hale
97BC197EE863413...

May 26, 2023

Printed Name: Thomas Hale
Title: President
Twin Merger Sub II, LLC

Petitioner Samsung Ex-1004, 0112

EXHIBIT A

PATENT RIGHTS

(TWIN MERGER SUB II, LLC PATENT APPLICATIONS)

Appl. No.	*Filing Date*	*Inventors*	*Patent No.*	*Title*
US 14/556,062	2014-11-28	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 9582034 B2	WEARABLE COMPUTING DEVICE
US 15/043,412	2016-02-12	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 9958904 B2	WEARABLE COMPUTING DEVICE
US 15/444,208	2017-02-27	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 10139859 B2	WEARABLE COMPUTING DEVICE
US 15/444,217	2017-02-27	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 10156867 B2	WEARABLE COMPUTING DEVICE
US 15/444,227	2017-02-27	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 10126779 B2	WEARABLE COMPUTING DEVICE
US 15/444,237	2017-02-27	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 10331168 B2	WEARABLE COMPUTING DEVICE
US 15/716,464	2017-09-26	MARS, Denis RATNER, Simon	US 10721625 B2	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
US 15/854,783	2017-12-27	VON BADINSKI, Curt C. TWISS, Peter Miles POST, Daniel Jeffrey AMBUEHL, Anthony STRASSER, Michael J. STRASSER, Eric	US 10281953 B2	WEARABLE DEVICE AND DATA TRANSMISSION METHOD
US 15/967,559	2018-04-30	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 10496131 B2	WEARABLE COMPUTING DEVICE
US 16/129,859	2018-09-13	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL ID SYSTEM AND METHODS
US 16/129,901	2018-09-13	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL SYSTEM AND METHODS
US 16/164,822	2018-10-19	MARS, Denis RATNER, Simon	--	UNIVERSAL ID SYSTEM AND METHODS AND BIOMETRIC INFORMATION
US 16/164,831	2018-10-19	MARS, Denis RATNER, Simon	--	UNIVERSAL ID WITH WIRELESS COMMUNICATION DEVICES DETECTING ADVERTISING SIGNALS WHILE IN THE PROCESS OF CONNECTING TO ELECTRONIC DEVICES
US 16/164,841	2018-10-19	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
US 16/166,076	2018-10-20	MARS, Denis RATNER, Simon	--	UNIVERSAL ID OPERABLE WITH BLOCKCHAIN
US 16/189,038	2018-11-13	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	--	WEARABLE COMPUTING DEVICE
US 16/202,054	2018-11-27	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 10901460 B2	WEARABLE COMPUTING DEVICE
US 16/204,345	2018-11-29	MARS, Denis RATNER, Simon	--	UNIVERAL ID OPERABLE WITH MODES OF TRANSPORTATION
US 16/204,416	2018-11-29	MARS, Denis RATNER, Simon	--	SYSTEM AND METHODS FOR PHYSICAL WORLD PAYMENTS USING A UNIVERSAL ID

Petitioner Samsung Ex-1004, 0113

Appl. No.	*Filing Date*	*Inventors*	*Patent No.*	*Title*
US 16/204,453	2018-11-29	MARS, Denis RATNER, Simon	--	UNIVERSAL ID SYSTEM AND METHODS WITH BIOMETRIC INFORMATION ENROLLMENT
US 16/204,492	2018-11-29	MARS, Denis RATNER, Simon	--	UNIVERSAL ID SYSTEM AND METHODS WITH AUGMENTATION
US 16/224,686	2018-12-18	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 10768666 B2	WEARABLE COMPUTING DEVICE
US 16/404,542	2019-05-06	VON BADINSKI, Curt TWISS, Peter POST, Daniel AMBUEHL, Anthony STRASSER, Michael STRASSER, Eric	--	WEARABLE DEVICE AND DATA TRANSMISSION METHOD
US 16/573,806	2019-09-17	MARS, Denis RATNER, Simon	US 11509475 B2	METHOD AND APPARATUS FOR OBTAINING MULTIPLE USER CREDENTIALS
US 16/573,830	2019-09-17	MARS, Denis RATNER, Simon	--	METHOD AND APPARATUS FOR PROVIDING MULTIPLE USER CREDENTIALS
US 16/591,327	2019-10-02	MARS, Denis RATNER, Simon	--	BIOMETRIC CREDENTIAL IMPROVEMENT METHODS AND APPARATUS
US 16/591,362	2019-10-02	MARS, Denis RATNER, Simon	--	SECURE BIOMETRIC CREDENTIAL AUTHORIZATION METHODS AND APPARATUS
US 16/677,489	2020-10-14	MARS, Denis RATNER, Simon	US 10826699 B2	HIGH AVAILABILITY BLE PROXIMITY DETECTION METHODS AND APPARATUS
US 16/717,951	2019-12-17	MARS, Denis RATNER, Simon	US 11539522 B2	METHODS AND APPARATUS FOR AUTHORIZING AND PROVIDING OF SERVICES
US 16/717,973	2019-12-17	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR AUTHORIZING AND PROVIDING OF GOODS
US 16/718,010	2019-12-17	MARS, Denis RATNER, Simon	US 11109234 B2	READER DEVICE WITH SENSOR STREAMING DATA AND METHODS
US 16/718,044	2019-12-17	MARS, Denis RATNER, Simon	US 11438767 B2	METHODS AND APPARATUS FOR PREAUTHORIZING READER DEVICES
US 16/718,135	2019-12-17	VON BADINSKI, Curt C. TWISS, Peter Miles POST, Daniel Jeffrey AMBUEHL, Anthony STRASSER, Michael J. STRASSER, Eric	US 10884455 B2	WEARABLE DEVICE AND DATA TRANSMISSION METHOD
US 16/736,665	2020-01-07	MARS, Denis TAM, Andrew	--	WIRELESS CHARGING OF USER ACCESS READER DEVICE AND METHODS
US 16/736,695	2020-01-07	MARS, Denis TAM, Andrew	US 11201740 B2	WIRELESS READER DEVICE WITH WIEGAND INTERFACE AND METHODS
US 16/840,193	2020-04-03	MARS, Denis RATNER, Simon	US 11562054 B2	AUTHORIZED GESTURE CONTROL METHODS AND APPARATUS
US 16/858,459	2020-04-24	MARS, Denis RATNER, Simon	US 11238683 B1	METHODS AND APPARATUS FOR ENABLING DIGITAL IDENTITY SUPPORT ON LEGACY ACCESS CONTROL SYSTEMS
US 16/933,607	2020-07-20	MARS, Denis RATNER, Simon	US 11240668 B2	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
US 17/013,348	2020-09-04	VON BADINSKI, Curt C. STRASSER, Michael J. TWISS, Peter	US 11188124 B2	WEARABLE COMPUTING DEVICE
US 17/068,314	2020-10-12	MARS, Denis RATNER, Simon PAPPER, William	US 11398123 B1	METHODS AND APPARATUS FOR FACILITATING OPERATION OF CONTROL ACCESS SYSTEMS

Petitioner Samsung Ex-1004, 0114

Appl. No.	*Filing Date*	*Inventors*	*Patent No.*	*Title*
US 17/088,414	2020-11-03	MARS, Denis RATNER, Simon	--	HIGH AVAILABILITY BLE PROXIMITY DETECTION METHODS AND APPARATUS
US 17/097,828	2020-11-13	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR KEY REGENERATION
US 17/098,095	2020-11-13	MARS, Denis RATNER, Simon	US 11462095 B2	FACILITY CONTROL METHODS AND APPARATUS
US 17/098,246	2020-11-13	MARS, Denis RATNER, Simon	US 11546728 B2	METHODS AND APPARATUS FOR PRESENCE SENSING REPORTING
US 17/174,913	2021-02-12	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR AUTHORIZING AND PROVIDING OF GOODS OR SERVICES WITH REDUCED HARDWARE RESOURCES
US 17/174,950	2021-02-12	MARS, Denis RATNER, Simon	US 11411735 B2	METHODS AND APPARATUS FOR AUTHORIZING AND PROVIDING OF DISTRIBUTED GOODS OR SERVICES
US 17/195,392	2021-03-08	MARS, Denis RATNER, Simon	--	AUTHORIZED WIRELESS CHARGING METHODS AND APPARATUS
US 17/195,407	2021-03-08	MARS, Denis RATNER, Simon	US 11539706 B2	AUTHORIZED OFF-LINE ACCESS METHODS AND APPARATUS
US 17/229,762	2021-04-13	MARS, Denis RATNER, Simon	--	AUTHORIZED REMOTE CONTROL DEVICE GESTURE CONTROL METHODS AND APPARATUS
US 17/326,101	2021-05-20	MARS, Denis RATNER, Simon	--	PERSONAL ANOMALY DETECTION METHODS AND APPARATUS
US 17/326,122	2021-05-20	MARS, Denis RATNER, Simon	--	AUTHENTICATED HEALTH CREDENTIAL ACCESS METHODS AND APPARATUS
US 17/326,197	2021-05-20	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR PRESENCE MONITORING
US 17/326,201	2021-05-20	MARS, Denis RATNER, Simon VON BADINSKI, Curt C.	--	SMART RING AND METHODS FOR MANUFACTURING
US 17/352,923	2021-06-21	MARS, Denis RATNER, Simon VON BADINSKI, Curt C.	--	WEARABLE DEVICE AND METHODS OF MANUFACTURING
US 17/385,705	2021-07-26	MARS, Denis RATNER, Simon	--	READER DEVICE WITH SENSOR STREAMING DATA AND METHODS
US 17/454,000	2021-11-08	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR FACILITATING SECURE TRANSACTIONS WITH REDUCED HARDWARE REQUIREMENTS
US 17/465,726	2021-09-02	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR PRIVACY-CONTROLLED SECURE TRANSACTIONS
US 17/465,747	2021-09-02	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FACILITATING HIGH SECURITY TRANSACTIONS
US 17/516,301	2021-11-01	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR FACILITATING NFC TRANSACTIONS
US 17/519,201	2021-11-04	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	US 11599147 B2	WEARABLE COMPUTING DEVICE
US 17/547,174	2021-12-09	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR CONFIGURING WEARABLE DEVICES
US 17/573,168	2022-01-11	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
US 17/704,925	2022-03-25	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR FACILITATING SECURE MULTIPARTY TRANSACTIONS WITH REDUCED HARDWARE REQUIRMENTS
US 17/704,945	2022-03-25	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR FACILITATING DISTRIBUTION OF AUTHENTICATED DATA WITH REDUCED HARDWARE REQUIRMENTS

Petitioner Samsung Ex-1004, 0115

Appl. No.	*Filing Date*	*Inventors*	*Patent No.*	*Title*
US 17/734,967	2022-05-02	MARS, Denis RATNER, Simon	--	WEARABLE DEVICE SYNCHRONIZATION SYSTEM AND METHODS
US 17/740,222	2022-05-09	MARS, Denis RATNER, Simon	--	SMART RING AND METHODS FOR MANUFACTURING
US 17/878,785	2022-08-01	MARS, Denis RATNER, Simon	--	DISPLAY READER DEVICE AND METHODS
US 18/179,272	2023-03-06	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	--	WEARABLE COMPUTING DEVICE
US 29/492,739	2014-06-02	VON BADINSKI, Curt STRASSER, Michael	US D756999 S1	WEARABLE COMPUTING DEVICE
US 29/550,957	2016-01-08	VON BADINSKI, Curt STRASSER, Michael	US D791764 S1	WEARABLE COMPUTING DEVICE
US 29/551,034	2016-01-08	VON BADINSKI, Curt STRASSER, Michael	US D791765 S1	WEARABLE COMPUTING DEVICE
US 29/573,392	2016-08-05	VON BADINSKI, Curt C. STRASSER, Michael J. ZELIFF, Zachary Joseph	US D804471 S1	WEARABLE COMPUTING DEVICE
US 29/573,393	2016-08-05	STIRN, Andres VON BADINSKI, Curt C. ZELIFF, Zachary Joseph	US D817496 S1	HEART RATE SENSOR
US 29/573,394	2016-08-05	STIRN, Andres VON BADINSKI, Curt C. ZELIFF, Zachary Joseph	US D828767 S1	PACKAGE
US 29/574,680	2016-08-18	VON BADINSKI, Curt C. STRASSER, Michael J. ZELIFF, Zachary Joseph HUANG, Ting-Che	US D810016 S1	USB CHARGER
US 29/575,004	2016-08-21	VON BADINSKI, Curt C. STRASSER, Michael J. ZELIFF, Zachary Joseph HUANG, Ting-Che	US D809782 S1	KEY HOLDER
US 29/665,935	2018-10-09	VON BADINSKI, Curt C. STRASSER, Michael ZELIFF, Zachary Joseph STRASSER, Eric HUANG, Ting-Che	US D885333 S1	CHARGER
US 29/683,561	2019-03-14	VON BADINSKI, Curt C.	US D960755 S1	EXPANDABLE RING
US 29/744,892	2020-07-31	MARS, Denis	--	DISPLAY SCREEN OR PORTION THEREOF WITH ANIMATED GRAPHICAL USER INTERFACE
US 29/746,078	2020-08-11	JAYE, Ian	US D937894 S1	DISPLAY SCREEN OR PORTION THEREOF WITH ANIMATED GRAPHICAL USER INTERFACE
US 29/746,082	2020-08-11	JAYE, Ian	US D937895 S1	DISPLAY SCREEN OR PORTION THEREOF WITH ANIMATED GRAPHICAL USER INTERFACE
US 29/746,086	2020-08-11	JAYE, Ian	US D939573 S1	DISPLAY SCREEN OR PORTION THEREOF WITH ANIMATED GRAPHICAL USER INTERFACE
US 29/746,088	2020-08-11	JAYE, Ian	US D939574 S1	DISPLAY SCREEN OR PORTION THEREOF WITH ANIMATED GRAPHICAL USER INTERFACE
US 29/746,089	2020-08-11	JAYE, Ian	--	DISPLAY SCREEN OR PORTION THEREOF WITH ICON
US 29/759,201	2020-11-20	VON BADINSKI, Curt C.	--	RING
US 29/770,248	2021-02-10	VON BADINSKI, Curt C.	--	RING

Petitioner Samsung Ex-1004, 0116

Appl. No.	*Filing Date*	*Inventors*	*Patent No.*	*Title*
US 29/771,355	2021-02-22	MARS, Denis	--	DISPLAY SCREEN OR PORTION THEREOF WITH ANIMATED GRAPHICAL USER INTERFACE
US 29/811,359	2021-10-13	MARS, Denis PUERTOLAS, Clement	--	IDENTITY SENSOR
US 29/811,361	2021-10-13	MARS, Denis PUERTOLAS, Clement	--	IDENTITY SENSOR
US 61/910,201	2013-11-29	VON BADINSKI, Curt STRASSER, Michael FASTE, Haakon	--	FINGER RING DEVICE FOR ACTIVITY MONITORING OR GESTURAL INPUT
US 62/006,835	2014-06-02	VON BADINSKI, Curt STRASSER, Michael TWISS, Peter	--	WEARABLE COMPUTING DEVICE
US 62/685,292	2018-06-15	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
US 62/781,618	2018-12-19	MARS, Denis	--	READER WITH SENSOR STREAMING DATA
US 62/781,625	2018-12-19	MARS, Denis	--	READER AND PRE-AUTHORIZATION
US 62/789,051	2019-01-07	MARS, Denis LAM, Andrew	--	INDUCTIVE CHARGING DOOR PLATE
US 62/789,063	2019-01-07	MARS, Denis LAM, Andrew	--	WIRELESS COMMUNICATION DEVICES WITH BOARD THAT OVERLAYS AN EXISTING WIEGAND BOARD AND OR SUPERIMPOSES DATA ON AN EXISTING WIEGAND INTERFACE
US 62/838,202	2019-04-24	MARS, Denis RATNER, Simon	--	EMULATING AN RFID CARD READER TO BE A MOBILE DEVICE READER
US 62/913,599	2019-10-10	MARS, Denis RATNER, Simon PAPPER, Will	--	METHODS AND APPARATUS FOR FACILITATING OPERATION OF CONTROL ACCESS SYSTEMS
US 62/934,908	2019-11-13	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR KEY REGENERATION
US 62/934,981	2020-11-15	MARS, Denis RATNER, Simon	--	FACILITY CONTROL METHODS AND APPARATUS
US 62/935,000	2019-11-13	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR PRESENCE SENSING REPORTING
US 62/986,397	2020-03-06	MARS, Denis RATNER, Simon	--	AUTHORIZED WIRELESS CHARGING METHODS AND APPARATUS
US 62/986,408	2020-03-06	MARS, Denis RATNER, Simon	--	AUTHORIZED OFF-LINE ACCESS METHODS AND APPARATUS
US 63/009,323	2020-04-13	MARS, Denis RATNER, Simon	--	AUTHORIZED REMOTE CONTROL DEVICE GESTURE CONTROL METHODS AND APPARATUS
US 63/027,769	2020-05-20	MARS, Denis RATNER, Simon VON BADINSKI, Curt C.	--	AUTHENTICATED HEALTH CREDENTIAL ACCESS METHODS AND APPARATUS
US 63/027,774	2020-05-20	MARS, Denis RATNER, Simon VON BADINSKI, Curt C.	--	HEALTH MONITORING SYSTEM INCLUDING WEARABLE DEVICE AND METHODS
US 63/029,004	2020-05-22	MARS, Denis RATNER, Simon	--	AUTHENTICATED HEALTH CREDENTIAL ACCESS METHODS AND APPARATUS
US 63/041,012	2020-06-18	MARS, Denis RATNER, Simon VON BADINSKI, Curt C.	--	WEARABLE DEVICE FOR HEALTH MONITORING SYSTEM AND METHODS
US 63/073,578	2020-09-02	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR PRIVACY-CONTROLLED SECURE TRANSACTIONS
US 63/073,585	2020-09-02	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FACILITATING HIGH SECURITY TRANSACTIONS
US 63/108,218	2020-10-30	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR FACILITATING NFC TRANSACTIONS

Petitioner Samsung Ex-1004, 0117

Appl. No.	*Filing Date*	*Inventors*	*Patent No.*	*Title*
US 63/110,695	2020-11-06	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR FACILITATING SECURE TRANSACTIONS WITH REDUCED HARDWARE REQUIREMENTS
US 63/123,252	2020-12-09	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR CONFIGURING WEARABLE DEVICES
US 63/167,497	2021-03-29	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR FACILITATING SECURE MULTIPARTY TRANSACTIONS WITH REDUCED HARDWARE REQUIRMENTS
US 63/167,502	2021-03-29	MARS, Denis RATNER, Simon	--	METHODS AND APPARATUS FOR FACILITATING DISTRIBUTION OF AUTHENTICATED DATA WITH REDUCED HARDWARE REQUIRMENTS
US 63/183,372	2021-05-03	MARS, Denis RATNER, Simon	--	WEARABLE DEVICE SYNCHRONIZATION SYSTEM AND METHODS
US 63/185,827	2021-05-07	MARS, Denis RATNER, Simon	--	SMART RING AND METHODS FOR MANUFACTURING
US 63/227,950	2021-07-30	MARS, Denis RATNER, Simon	--	DISPLAY READER DEVICE AND METHODS
US 63/227,965	2021-07-30	MARS, Denis RATNER, Simon	--	IDENTITY VERIFICATION WITH REDUCED HARDWARE RESOURCES AND METHODS
US 63/245,079	2021-09-16	MARS, Denis RATNER, Simon	--	SECURITY MODULE AND METHODS
US 63/282,009	2021-11-22	MARS, Denis RATNER, Simon	--	IDENTITY SENSOR AND METHODS
PCT/US2014/067823	2014-11-28	VON BADINSKI, Curt C. STRASSER, Michael J. TWISS, Peter	--	WEARABLE COMPUTING DEVICE
CA 2931973	2014-11-28	VON BADINSKI, Curt C. STRASSER, Michael J. TWISS, Peter	--	WEARABLE COMPUTING DEVICE
CN 201480074476.8	2014-11-28	VON BADINSKI, Curt C. STRASSER, Michael J. TWISS, Peter	CN 106104408 B (ZL2014800744768)	WEARABLE COMPUTING DEVICE
CN 202110786269.7	2021-07-12	VON BADINSKI, Curt C. STRASSER, Michael J. TWISS, Peter	--	WEARABLE COMPUTING DEVICE
EP 14866236.4	2014-11-28	VON BADINSKI, Curt C. STRASSER, Michael J. TWISS, Peter	--	WEARABLE COMPUTING DEVICE
EP 21205293.0	2021-10-28	VON BADINSKI, Curt C. STRASSER, Michael J. TWISS, Peter	--	WEARABLE COMPUTING DEVICE
JP 2016-535040	2014-11-28	VON BADINSKI, Curt C. STRASSER, Michael J. TWISS, Peter	--	WEARABLE COMPUTING DEVICE
HK 17102435.0	2017-09-03	VON BADINSKI, Curt C. STRASSER, Michael J. TWISS, Peter	--	WEARABLE COMPUTING DEVICE
PCT/US2021/021376	2021-03-08	MARS, Denis RATNER, Simon	--	AUTHORIZED OFF-LINE ACCESS METHODS AND APPARATUS
PCT/US2021/027156	2021-04-13	MARS, Denis RATNER, Simon	--	AUTHORIZED REMOTE CONTROL DEVICE GESTURE CONTROL METHODS AND APPARATUS
PCT/US2019/037553	2019-06-17	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
AU 2019286536	2019-06-17	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
CA 3103863	2019-06-17	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
CN 201980053412.2	2019-06-17	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL

Petitioner Samsung Ex-1004, 0118

Appl. No.	*Filing Date*	*Inventors*	*Patent No.*	*Title*
EP 19819403.7	2019-06-17	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
KR 10-2021-7001425	2019-06-17	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
JP 2021-519531	2019-06-17	MARS, Denis RATNER, Simon	--	UNIVERSAL PERSONAL IDENTIFICATION SIGNAL
AU 202114484	2021-07-28	VON BADINSKI, Curt C.	AU 202114484	RING
AU 202116343	2021-10-13	VON BADINSKI, Curt C.	AU 202116343	RING
CA 205571	2021-08-04	VON BADINSKI, Curt C.	--	RING
CN 202130515499.0	2021-08-10	VON BADINSKI, Curt C.	--	RING
EP 008643852	2021-08-05	VON BADINSKI, Curt C.	EP 8643852	FINGER RINGS
GB 6153742, 6153743, 6153744	2021-08-10	VON BADINSKI, Curt C.	GB 6153742, 6153743, 6153744	RING
JP 2021-017515, 2021-017516, 2021-017517	2021-08-10	VON BADINSKI, Curt C.	JP 1731879, 1731801	RING
KR 30-2021-0037880	2021-08-10	VON BADINSKI, Curt C.	KR 30-1154656	RING
SG 30202109610T	2021-08-04	VON BADINSKI, Curt C.	SG 30202109610T	RING

Petitioner Samsung Ex-1004, 0119

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	18179272
Filing Date	2023-03-06
First Named Inventor	von BADINSKI, Curt C.
Art Unit	
Examiner Name	
Attorney Docket Number	984SPMO0048US13

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	1589547		1926-06-22	Novack	
	2	2048878		1936-07-28	Moldenhauer	
	3	3022648		1962-02-27	LEO THALER	
	4	3653051		1972-03-28	WU DAVID J	
	5	3684125		1972-08-15	LAURIZIO JEREMIAH	
	6	4407295		1983-10-04	STEUER ROBERT R et al.	
	7	4541207		1985-09-17	ANTONSON DOUGLAS M	
	8	5191891		1993-03-09	RIGHTER WILLIAM H	

Petitioner Samsung Ex-1004, 0120

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	9	5382778		1995-01-17	TAKAHIRA KENICHI et al.	
	10	5490523		1996-02-13	ISAACSON PHILIP et al.	
	11	5832296		1998-11-03	WANG WEIJIA et al.	
	12	6101843		2000-08-15	NAGANO TOMOHISA	
	13	6255800	B1	2001-07-03	BORK STEPHAN	
	14	6277079	B1	2001-08-21	AVICOLA KENet al.	
	15	6495283	B1	2002-12-17	YOON YOUNG SOO et al.	
	16	6502906	B1	2003-01-07	CHEN CHAO-YING	
	17	6546749	B1	2003-04-15	CANTY JESSE BEN	
	18	7161484	B2	2007-01-09	TSOUKALIS ALEXANDRE	
	19	7375494	B2	2008-05-20	DANIEL SIMON RICHARDet al.	

Petitioner Samsung Ex-1004, 0121

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	20	7427979	B2	2008-09-23	PARK TAE-SUH et al.	
	21	7444001	B2	2008-10-28	ROBERTS LINDA ANN et al.	
	22	7471060	B2	2008-12-30	RAGHUNATH MANDAYAM THONDANURet al.	
	23	7517222	B2	2009-04-14	ROHRBACH MATTHEW DEAN et al.	
	24	7526927	B2	2009-05-05	PINTO ANTHONY	
	25	7637746	B2	2009-12-29	LINDBERG PHILLIP et al.	
	26	8157161	B2	2012-04-17	YACH DAVID PAUL	
	27	8270914	B2	2012-09-18	PASCOLINI MATTIA et al.	
	28	8346327	B2	2013-01-01	CAMPBELL SHANNON E et al.	
	29	8373656	B2	2013-02-12	HOU ZIFENG et al.	
	30	8421748	B2	2013-04-16	TANAKA MASAHIDE	

Petitioner Samsung Ex-1004, 0122

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	31	8457654	B1	2013-06-04	ROSKIND JAMES	
	32	8515506	B2	2013-08-20	RIDDER TRENT D et al.	
	33	8554297	B2	2013-10-08	MOON JIM et al.	
	34	8570372	B2	2013-10-29	RUSSELL AUSTIN	
	35	8583167	B2	2013-11-12	CHUN JAMES	
	36	8599572	B2	2013-12-03	NEUDECKER BERND J et al.	
	37	8626249	B2	2014-01-07	UNGARI JOSEPH et al.	
	38	8638190	B1	2014-01-28	WANT ROY et al.	
	39	9076589	B2	2015-07-07	WRIGHT PAUL K et al.	
	40	9148717	B2	2015-09-29	SHAFFER JONATHAN EVERETT	
	41	9197270	B2	2015-11-24	YING ZHINONG et al.	

Petitioner Samsung Ex-1004, 0123

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	42	9203463	B2	2015-12-01	ASRANI VIJAY L et al.	
	43	9313609	B2	2016-04-12	PRENCIPE JOSEPH NICHOLI	
	44	9335790	B2	2016-05-10	STOTLER JAMES G	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020156352	A1	2002-10-24	EGGERS PHILIP N	
	2	20030142065	A1	2003-07-31	PAHLAVAN KOUROSH	
	3	20050038348	A1	2005-02-17	AVICOLA KENNETH et al.	
	4	20050189906	A1	2005-09-01	SUN HUEI-HSIN	
	5	20060046709	A1	2006-03-02	KRUMM JOHN C et al.	
	6	20060142968	A1	2006-06-29	HAN DAE-HO et al.	

Petitioner Samsung Ex-1004, 0124

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	7	20070100218	A1	2007-05-03	SWEITZER ROBERT et al.	
	8	20070100666	A1	2007-05-03	STIVORIC JOHN M et al.	
	9	20070123756	A1	2007-05-31	KITAJIMA KAZUMI et al.	
	10	20080045806	A1	2008-02-21	KEPPLER BERNHARD	
	11	20080048036	A1	2008-02-28	MATSUMOTO NAOTO et al.	
	12	20090306485	A1	2009-12-10	BELL JONATHAN ARNOLD	
	13	20100100004	A1	2010-04-22	VAN SOMEREN EUGENIO JOHANNES W	
	14	20100156624	A1	2010-06-24	HOUNSELL BEN	
	15	20100249552	A1	2010-09-30	PRICE THOMAS	
	16	20110038511	A1	2011-02-17	TAKIGUCHI KIYOAKI	
	17	20110057901	A1	2011-03-10	RÄTY MATTI et al.	

Petitioner Samsung Ex-1004, 0125

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	18	20110070480	A1	2011-03-24	HAHN ROBERT et al.	
	19	20110070829	A1	2011-03-24	GRIFFIN JASON T et al.	
	20	20110312311	A1	2011-12-22	ABIFAKER CHADIA et al.	
	21	20120016793	A1	2012-01-19	PETERS JO-ANN et al.	
	22	20120130203	A1	2012-05-24	STERGIOU STERGIOS et al.	
	23	20120218184	A1	2012-08-30	WISSMAR STANLEY	
	24	20120220835	A1	2012-08-30	CHUNG WAYNE	
	25	20120254809	A1	2012-10-04	YANG JUN et al.	
	26	20120293107	A1	2012-11-22	AJAGBE ADEBOWALE	
	27	20120317024	A1	2012-12-13	RAHMAN HOSAIN SADEQUR et al.	
	28	20120323521	A1	2012-12-20	DE FORAS ETIENNE et al.	

Petitioner Samsung Ex-1004, 0126

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	29	20130027341	A1	2013-01-31	MASTANDREA JR NICHOLAS J	
	30	20130033418	A1	2013-02-07	BEVILACQUA MATHEW WILLIAM et al.	
	31	20130044215	A1	2013-02-21	ROTHKOPF FLETCHER R et al.	
	32	20130069583	A1	2013-03-21	LEMELMAN BRIAN et al.	
	33	20130088186	A1	2013-04-11	HSIEH FANG-KENG	
	34	20130106603	A1	2013-05-02	WEAST AARON B et al.	
	35	20130108907	A1	2013-05-02	BHARDWAJ RAMESH C et al.	
	36	20130131519	A1	2013-05-23	LEBOEUF STEVEN FRANCIS et al.	
	37	20130144176	A1	2013-06-06	LEC RYSZARD M	
	38	20130167221	A1	2013-06-27	VUKOSZAVLYEV ZORAN et al.	
	39	20130186962	A1	2013-07-25	KENNETT ROBERT et al.	

Petitioner Samsung Ex-1004, 0127

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	40	20130191789	A1	2013-07-25	CALMAN MATTHEW A et al.	
	41	20130217326	A1	2013-08-22	SYMONS PETER ROBERT	
	42	20130226486	A1	2013-08-29	HENDERSON KRISTOFER et al.	
	43	20130261771	A1	2013-10-03	TEN KATE WARNER	
	44	20130271069	A1	2013-10-17	PARTOVI AFSHIN	
	45	20130314028	A1	2013-11-28	TSENG KUO-FONG	
	46	20140065956	A1	2014-03-06	YANG SONGNAN et al.	
	47	20140102136	A1	2014-04-17	WARREN MICHAEL K	
	48	20150037616	A1	2015-02-05	WYATT PERRY M et al.	
	49	20150277559	A1	2015-10-01	VESCOVI MARCOS REGIS et al.	
	50	20150303722	A1	2015-10-22	LI LIN	

Petitioner Samsung Ex-1004, 0128

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	51	20150349556	A1	2015-12-03	MERCANDO CHRISTINA et al.	
	52	20150380961	A1	2015-12-31	TSENG JUSTIN et al.	
	53	20160013602	A1	2016-01-14	STRISOWER JOHN et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	103109462	CN	A	2013-05-15	Mastandrea et al.		
	2	103403627	CN	A	2013-11-20	NIKE INTERNATIONAL LTD		
	3	103441306	CN	A	2013-12-11	HUIZHOU TCL HYPERPOWER BATTERIES INC		
	4	204440426	CN	U	2015-07-01	GUANGDONG SEEDCOM ELECTRICAL & LIGHTING CO LTD		
	5	204732935	CN	U	2015-10-28	SHI XIONG		
	6	2660680	EP	A1	2013-11-06	ALCATEL LUCENT		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	7	2004078028	WO	A2	2004-09-16	Ken AVICOLA et al.		
	8	2009124076	WO	A1	2009-08-10	NELLCOR PURITAN BENNETT LLC		
	9	2011053235	WO	A1	2011-05-05	Stanley WISSMAR et al.		
	10	2012024889	WO	A1	2012-01-03	Wang		
	11	2013093638	WO	B2	2013-06-27	MASHINERY PTY LTD		
	12	2013163326	WO	A1	2013-10-31	QUALCOMM INCORPORATED		

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1	EP Search Report for application EP201205293.0, mailed September 8, 2022.	
	2	Europen Office Action for application EP14866236.4 mailed April 28, 2021.	
	3	LEEF, "LEEF MAGNET USB 3.0 FLASH DRIVE", "www.leefco.com/magnet-copper", 6/2/2016, Publisher: Leef Group Limited, Published in: US	

Petitioner Samsung Ex-1004, 0130

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

	4	SAMEDAYFLASH, "SET OF 10 2GB/4GB/8GB/16GB WOODEN BAMBOO FLASH DRIVE - BULK PACK O USB 2.0 WOOD BAMBOO STICK DESIGN - WOOD USB FLASH DRIVE", "www.etsy.com/listing/248051205/set-Jf-10-2gb4gb8gb16gb-wooden-bamboo?ref+m", 6/2/2016, Publisher: Elsy, Published in: US	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Petitioner Samsung Ex-1004, 0131

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	18179272
	Filing Date	2023-03-06
	First Named Inventor	von BADINSKI, Curt C.
	Art Unit	
	Examiner Name	
	Attorney Docket Number	984SPMO0048US13

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Steve Y. Cho/	Date (YYYY-MM-DD)	2023-04-18
Name/Print	Steve Y. Cho	Registration Number	44612

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Petitioner Samsung Ex-1004, 0132

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Petitioner Samsung Ex-1004, 0133

Espacenet

Bibliographic data: CN204440426 (U) — 2015-07-01

NFC ring

Inventor(s): LYU FEI; ZHANG YULU; YAN JUNJIE ± (LYU FEI, ; ZHANG YULU, ; YAN JUNJIE)

Applicant(s): GUANGDONG SEEDCOM ELECTRICAL & LIGHTING CO LTD ± (GUANGDONG SEEDCOM ELECTRICAL & LIGHTING CO., LTD)

Classification: **- international:** ***A44C9/00; G06K17/00***
- cooperative:

Application number: CN20142835867U 20141223

Priority number (s): CN20142835867U 20141223

Abstract of CN204440426 (U)

A NFC ring comprises an inner ring, an outer ring, a side ring, an electronic assembly and a magnet. The outer ring sleeves the inner ring, a containing cavity is formed between the outer ring and the inner ring, the side ring is mounted on one end face of the inner ring, and the outer ring presses between the inner ring and the side ring. The electronic assembly is contained and fixed in the containing cavity. The side wall of the outer ring is provided with a containing groove, and the magnet is contained in the containing groove. The electronic assembly comprises a circuit board, a reed switch, a light emitting diode, a chip and an antenna, the reed switch, the light emitting diode, the chip and the antenna are arranged on the circuit board, the light emitting diode is connected with the chip to form a parallel circuit, one end of the parallel circuit is connected with one end of the antenna, the other end of the parallel circuit is connected with the other end of the antenna through the reed switch. In the NFC ring, a circuit can be opened or closed through cooperation of the magnet and the reed switch, so that an off state and an on state can be switched, the usage safety of the products can be raised, the risk that user information is stolen can be reduced.

Petitioner Samsung Ex-1004, 0134

(19)中华人民共和国国家知识产权局

(12)发明专利申请

(10)申请公布号 CN 103441306 A
(43)申请公布日 2013.12.11

(21)申请号 201310383162.3

(22)申请日 2013.08.28

(71)申请人 惠州TCL金能电池有限公司
地址 516006 广东省惠州市仲恺高新区惠台工业园63号小区
申请人 惠州泰科立集团股份有限公司

(72)发明人 余成平 郭也平 王兴勇 赵健 唐克军

(74)专利代理机构 广州华进联合专利商标代理有限公司 44224
代理人 邓云鹏

(51)Int.Cl.
H01M 10/058(2010.01)

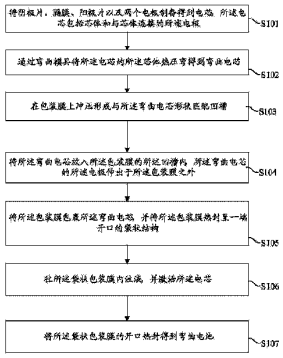
权利要求书1页 说明书5页 附图6页

(54)发明名称

弯曲电池制造方法

(57)摘要

一种弯曲电池制造方法，包括如下步骤：将阴极片、隔膜、阳极片以及两个电极制备得到电芯，电芯包括芯体和与芯体连接的电极；通过弯曲模具将电芯的芯体热压弯得到弯曲电芯；在包装膜上冲压形成与弯曲电芯形状匹配凹槽；将弯曲电芯放入包装膜的凹槽内，弯曲电芯的电极伸出于包装膜之外；将包装膜包裹弯曲电芯，并将包装膜热封呈一端开口的袋状结构；往袋状包装膜内注液，并激活电芯；将袋状包装膜的开口热封得到弯曲电池。上述方法中在电芯完成后便进行热压弯电芯，弯曲时正负极片以及隔膜之间的易于滑动形成弧形。配合成型有凹陷的包装膜，避免了弯折损伤和错位导致的电池性能不佳，电池损坏和外包装膜破损的问题，保障了弯曲电池的性能。



CN 103441306 A

Petitioner Samsung Ex-1004, 0135

1. 一种弯曲电池制造方法，其特征在于，包括如下步骤：

将阴极片、隔膜、阳极片以及两个电极制备得到电芯，所述电芯包括芯体和与所述芯体连接的所述电极；

通过弯曲模具将所述电芯的所述芯体热压弯得到弯曲电芯；

在包装膜上冲压形成与所述弯曲电芯形状匹配凹槽；

将所述弯曲电芯放入所述包装膜的所述凹槽内，所述弯曲电芯的所述电极伸出于所述包装膜之外；

将所述包装膜包裹所述弯曲电芯，并将所述包装膜热封呈一端开口的袋状结构；

往所述袋状包装膜内注液，并激活所述电芯；

将所述袋状包装膜的开口热封得到弯曲电池。

2. 根据权利要求 1 所述的弯曲电池制造方法，其特征在于，所述将所述包装膜包裹所述弯曲电芯，并将所述包装膜热封呈一端开口的袋状结构的步骤中：

热封采用的热封模具包括两个凹凸对应的热封模组，所述热封模组的凹凸形状与所述电芯的弯曲形状对应，将位于所述电芯的弯曲侧边的所述包装膜置于两个所述热封模组之间加压加热进行热封。

3. 根据权利要求 1 所述的弯曲电池制造方法，其特征在于，所述将所述袋状包装膜的开口热封得到弯曲电池的步骤中：

热封采用的热封模具包括两个凹凸对应的热封模组，所述热封模组的凹凸形状与所述电芯的弯曲形状对应，将位于所述包装膜置于两个所述热封模组之间加压加热进行热封。

4. 根据权利要求 1 所述的弯曲电池制造方法，其特征在于，所述包装膜为金属层和树脂层复合膜。

5. 根据权利要求 1 所述的弯曲电池制造方法，其特征在于，所述电芯制成方式为卷绕式或叠片式。

6. 根据权利要求 1 所述的弯曲电池制造方法，其特征在于，所述电芯和所述凹槽的弯曲形状为弧面。

7. 根据权利要求 1 所述的弯曲电池制造方法，其特征在于，所述将所述包装膜包裹所述弯曲电芯的步骤中，是将所述包装膜折叠以包裹所述弯曲电芯。

8. 根据权利要求 1 所述的弯曲电池制造方法，其特征在于，所述弯曲模具包括凹凸相对的两个模组。

Petitioner Samsung Ex-1004, 0136

弯曲电池制造方法

技术领域

[0001] 本发明涉及一种电池制造方法，特别是涉及一种弯曲电池的制造方法。

背景技术

[0002] 目前，液态 / 凝胶 / 聚合物锂离子电池绝大多数都是形状规则的矩形电池。

[0003] 近年来，便携式电子设备逐步趋向于外观形状多样化，为这些电子装置提供电力的锂离子电池也需要随设备的形状而实现多样化，以最大限度的利用设备内部的空间。一类比较有代表性的电子装置是考虑到人体工程性设计的弧形曲面电子装置，如腕表类可佩带电子装置，可佩带于手腕上测运动量。为了给这样的弧形曲面电子设备提供尽可能多的电力，最大限度利用装置内部空间，锂离子电池需要被设计为弯曲电池。

[0004] 传统制造方法是在矩形电池成型后，直接用弧形成形模型对矩形电池进行加压，加热，弯曲，形成弯曲电池。

[0005] 直接通过加压加温的方式热压弯折成型，存在以下品质问题和安全性风险：

[0006] 热压弯折成型，会导致电池内部极片相对移动，产生短路，极片之间界面也受损导致电化学性能劣化，还可能对电池的外包装膜造成破坏，引起电池漏液和气胀，导致弯曲电池损坏和引发安全性事故。

发明内容

[0007] 基于此，有必要提供一种可提高电池性能稳定性的弯曲电池制造方法。

[0008] 一种弯曲电池制造方法，包括如下步骤：

[0009] 将阴极片、隔膜、阳极片以及两个电极制备得到电芯，所述电芯包括芯体和与所述芯体连接的所述电极；

[0010] 通过弯曲模具将所述电芯的所述芯体热压弯得到弯曲电芯；

[0011] 在包装膜上冲压形成与所述弯曲电芯形状匹配凹槽；

[0012] 将所述弯曲电芯放入所述包装膜的所述凹槽内，所述弯曲电芯的所述电极伸出于所述包装膜之外；

[0013] 将所述包装膜包裹所述弯曲电芯，并将所述包装膜热封呈一端开口的袋状结构；

[0014] 往所述袋状包装膜内注液，并激活所述电芯；

[0015] 将所述袋状包装膜的开口热封得到弯曲电池。

[0016] 其中一个实施例中，所述将所述包装膜包裹所述弯曲电芯，并将所述包装膜热封呈一端开口的袋状结构的步骤中：

[0017] 热封采用的热封模具包括两个凹凸对应的热封模组，所述热封模组的凹凸形状与所述电芯的弯曲形状对应，将位于所述电芯的弯曲侧边的所述包装膜置于两个所述热封模组之间加压加热进行热封。

[0018] 其中一个实施例中，所述将所述袋状包装膜的开口热封得到弯曲电池的步骤中：

[0019] 热封采用的热封模具包括两个凹凸对应的热封模组，所述热封模组的凹凸形状与

Petitioner Samsung Ex-1004, 0137

所述电芯的弯曲形状对应，将位于所述包装膜置于两个所述热封模组之间加压加热进行热封。

[0020] 其中一个实施例中，所述包装膜为金属层和树脂层复合膜。

[0021] 其中一个实施例中，所述电芯制成方式为卷绕式或叠片式。

[0022] 其中一个实施例中，所述电芯和所述凹槽的弯曲形状为弧面。

[0023] 其中一个实施例中，所述将所述包装膜包裹所述弯曲电芯的步骤中，是将所述包装膜折叠以包裹所述弯曲电芯。

[0024] 其中一个实施例中，所述弯曲模具包括凹凸相对的两个模组。

[0025] 上述弯曲电池制造方法中在电芯完成后便进行热压弯电芯，此时的电芯没有外包装的束缚，弯曲时正负极片以及隔膜之间的易于滑动形成弧形。配合冲压成型有对应凹陷的包装膜，使得热封包装膜后直接得到弯曲电池。如此避免了传统的在电池成型后强行弯曲产生的弯折损伤和错位导致的电池性能不佳，电池损坏和外包装膜破损的问题，保障了弯曲电池和矩形电池一样的性能和高的电池合格率。此外，由于包装膜的弯曲形状为直接成型，也避免了传统方式 中热压弯的包装膜回弹形变问题。

附图说明

[0026] 图 1 为本发明一较佳实施例的弯曲电池制造方法步骤流程图；

[0027] 图 2 为本实施例的卷绕式电芯的结构示意图；

[0028] 图 3 为通过弯曲模具将图 2 所示的电芯弯曲工艺示意图；

[0029] 图 4 为弯曲后的电芯的结构示意图；

[0030] 图 5 为冲压有与与弯曲电芯形状匹配的凹槽的包装膜的结构示意图；

[0031] 图 6 为图 5 所示的包装膜另一视角的结构示意图；

[0032] 图 7 为图 4 所示的弯曲电芯放入到图 5 所示的包装膜的凹槽内后的状态示意图；

[0033] 图 8 为弯曲电芯被包装膜包裹且热封呈袋状结构的状态示意图；

[0034] 图 9 为热封模具热封位于电芯的弯曲侧边的包装膜的工艺示意图；

[0035] 图 10 为将所述袋状包装膜的开口热封后的结构示意图；

[0036] 图 11 为通过图 1 所示的方法制造的弯曲电池结构示意图。

具体实施方式

[0037] 如图 1 所示，其为本发明一较佳实施例的弯曲电池制造方法步骤流程图，包括如下步骤：

[0038] 步骤 S101，将阴极片、隔膜、阳极片以及两个电极制备得到电芯，所述电芯包括芯体和与芯体连接的所述电极。

[0039] 电芯制成方式可以是卷绕式或叠片式，如图 2 所示，其为本实施例的卷绕式电芯 20 的结构示意图，其包括芯体 201 和伸出于芯体 201 的两个电极 202。所述电芯 20 的芯体 201 为平板状。

[0040] 步骤 S102，通过弯曲模具将所述电芯的所述芯体热压弯得到弯曲电芯。

[0041] 电芯弯曲形状可以是标准弧形，也可以是非标准弧形的其他弯曲或弯折结构，此形状根据实际需要设定。

Petitioner Samsung Ex-1004, 0138

[0042] 如图 3 所示，其为通过弯曲模具 30 将图 2 所示的电芯 20 弯曲工艺示意图。弯曲模具 30 包括凹凸相对的两个弯曲模组 301 和 302，将电芯 20 置于两个弯曲模组 301 和 302 之间，加压加热后分离，得到如图 4 所示的弯曲电芯 20。图 4 中，电芯 20 的芯体 201 弯曲成弧形结构。由于弯曲过程中，电芯 20 阴极片、隔膜、阳极片由于没有外包装膜的束缚，弯曲时便于各层之间产生的相对滑动释放其张力易于形成弧形。

[0043] 步骤 S103，在包装膜上冲压形成与所述弯曲电芯形状匹配凹槽。

[0044] 本实施例的包装膜金属层和树脂层复合膜，如图 5 和图 6 所示，其为包装膜 50 冲压形成凹槽 501 的正反面结构示意图，包装膜 50 一面形成凹槽 501，另一面则为与所述凹槽 501 对应的凸起结构。凹槽 501 的底部为弯曲电芯 20 形状匹配的弯曲面，本实施例为弧面。采用的冲压模具形状和所述弯折模具的成型部分形状相同或相对应。

[0045] 步骤 S104，将所述弯曲电芯放入所述包装膜的所述凹槽内，所述弯曲电芯的所述电极伸出于所述包装膜之外。

[0046] 如图 7 所示，其为图 4 所示的弯曲电芯 20 放入到图 5 所示的包装膜 50 的凹槽 501 内后的状态示意图。由于凹槽 501 与弯曲电芯 20 的形状匹配，使得弯曲电芯 20 的外表面与所述包装膜 40 贴合。

[0047] 步骤 S105，将所述包装膜包裹所述弯曲电芯，并将所述包装膜热封呈一端开口的袋状结构。

[0048] 本实施例中，位于所述电芯弯曲侧边的所述包装膜热封后形成与所述电芯弯曲相同的形状。即采用弧形热封工艺，所述弧形可以为标准弧形或非标准弧形。

[0049] 如图 8 所示，其为弯曲电芯 20 被包装膜 50 包裹且热封呈袋状结构的状态示意图。执行步骤是，首先沿着箭头 A 方向折叠包装膜 50 使得包装膜 50 覆盖凹槽 501，然后通过热封模具，将包装膜 50 沿着电芯 20 的边缘进行热封，热封线 801 和包装膜 50 一起形成袋状结构，开后为箭头 B 所指位置。由于本实施例的包装膜 50 折叠边缘无需热封，所以此步骤中只需热封电极 202 所在侧边以及其中一个弯曲侧边，所以图 8 中热封线 801 为 L 型。所留的开口部分是为了便于烘烤、注液和预充激活产生的气体的储存。

[0050] 请同时参阅图 9，其为热封模具 90 热封位于电芯 20 的弯曲侧边的包装膜 50 的工艺示意图。热封模具 90 包括两个凹凸对应的热封模组 901 和 902，热封模组 901 和 902 的凹凸形状与所述电芯 20 的弯曲形状对应。先将位于电芯 20 的弯曲侧边包装膜 50 置于两个热封模组 901 和 902 之间加压加热后分离，即可实现弯曲热封。

[0051] 步骤 S106，往所述袋状包装膜内注液，并激活所述电芯。

[0052] 步骤 S107，将所述袋状包装膜的开口热封得到弯曲电池。

[0053] 本实施例中，所述开口位置的包装膜热封后形成与所述电芯弯曲相同的形状。同样采用上述热封模具进行热封。

[0054] 如图 10 和 11 所示，其为将所述袋状包装膜 50 的开口热封后的结构示意图，电芯 20 被包装膜 50 贴合包裹，形成弯曲电池 100。

[0055] 上述步骤 S106 的实际操作中注液后，需预热封所述袋状包装膜的开口，此时的热封位置离电芯较远，便于容纳激活时产生的气体。激活后，再执行步骤 S107，此时的热封位置则为贴近电芯的侧边位置。

[0056] 上述弯曲电池制造方法相对传统制造方法主要不同之处在于：

Petitioner Samsung Ex-1004, 0139

[0057] 传统制造方法在矩形电池成型后，热压弯整个电池。上述方法中在电芯完成后便进行热压弯电芯，此时的电芯没有外包装的束缚，弯曲时正负极片以及隔膜之间的易于滑动形成弧形。配合冲压成型有对应凹陷的包装膜，使得热封包装膜后直接得到弯曲电池。如此避免了传统的在电池成型后强行弯曲产生的弯折损伤和错位导致的电池性能不佳，电池损坏和外包装膜破损的问题，保障了弯曲电池和矩形电池一样的性能和高的电池合格率。此外，由于包装膜的弯曲形状为直接成型，也避免了传统方式中热压弯的包装膜回弹形变问题。

[0058] 以下为利用上述弯曲电池的制造方法制备电池的实验数据。

[0059] (1)配方与极片参数设计：

[0060] 最大厚度 4.50mm，最大宽度 15.5mm，最大长度 35.0mm，弧形 R25；

[0061] 最小容量 200mAh，设计中值容量 210mAh。

[0062] 按照以上参数进行配方与正负极片参数设计。

[0063] (2)正负极片制作：按照设计好的配方按照常规锂离子电池生产流程进行 配料，混料，并按照设计好的极片参数涂布，压片，分切 / 段切后制成正 / 负极极片。

[0064] (3)通过上述弯曲电池的制造方法制备电池。

[0065] (4)电池续充下线后测试容量与内阻，下线电压如下表所示；

[0066]

编号	内阻 (mΩ)	容量 (0.5C, mAh)	电压 (V)
1	111.1	212	3.83
2	110.9	212	3.827
3	114.4	210	3.829
4	111.0	208	3.827
5	108.4	214	3.827
6	112.6	210	3.828
7	109.2	209	3.827
8	111.2	209	3.829
9	110.7	209	3.828
10	111.9	208	3.829
11	110.9	209	3.825
12	111.9	208	3.828
13	107.2	213	3.828
14	107.0	211	3.829
15	112.0	210	3.829
最大值	114.4	214	3.830
最小值	107.0	208	3.825
平均值	110.7	210	3.828

[0067] 下线数据显示，按照此流程生产的弯曲电池容量能达到设计容量，内阻电压无异常。

[0068] (5)弯曲电池下线后取 15 只，45 度高温老化 3 天 + 常温静置 1 天后测试 OCV1，再 45 度高温老化 3 天 + 常温静置 1 天后测试 OCV2，取两次电压差值计算弯曲电池电压降；下线电压降测试数据下表所示：

[0069]

Petitioner Samsung Ex-1004, 0140

序号	OCV1(V)	OCV2(V)	ΔV(mV/h)
1	3.821	3.816	0.069
2	3.822	3.817	0.069
3	3.823	3.819	0.056
4	3.821	3.817	0.056
5	3.816	3.811	0.069
6	3.821	3.816	0.069
7	3.823	3.819	0.056
8	3.822	3.817	0.069
9	3.82	3.815	0.069
10	3.823	3.818	0.069
11	3.819	3.815	0.056
12	3.822	3.817	0.069
13	3.817	3.812	0.069
14	3.82	3.815	0.069
15	3.822	3.817	0.069

[0070] OCV 测试数据显示，按照此流程生产的弯曲电池的电压降测试小于常规电芯 0.1mV/h。

[0071] (6) OCV 测试后取弯曲电池 4 只，进行 0.5C 循环 300 周测试，如下表所示：

[0072]

循环倍率	不同循环次数容降（%）								
	50	75	100	125	150	175	200	250	300
0.5C	5.73	6.48	7.14	7.79	8.36	8.73	9.11	10.42	11.17
	5.51	6.73	7.76	8.79	9.72	10.47	11.03	12.99	14.39
	4.61	6.05	6.72	7.68	8.55	9.32	9.51	11.91	13.54
	5.68	6.72	7.47	8.51	9.37	10.12	10.60	12.96	14.85

[0073] 循环数据显示，按照此流程生产的弯曲电池能满足客户循环要求。

[0074] 以上所述实施例仅表达了本发明的几种实施方式，其描述较为具体和详细，但并不能因此而理解为对本发明专利范围的限制。应当指出的是，对于本领域的普通技术人员来说，在不脱离本发明构思的前提下，还可以做出若干变形和改进，这些都属于本发明的保护范围。因此，本发明专利的保护范围应以所附权利要求为准。

Petitioner Samsung Ex-1004, 0141

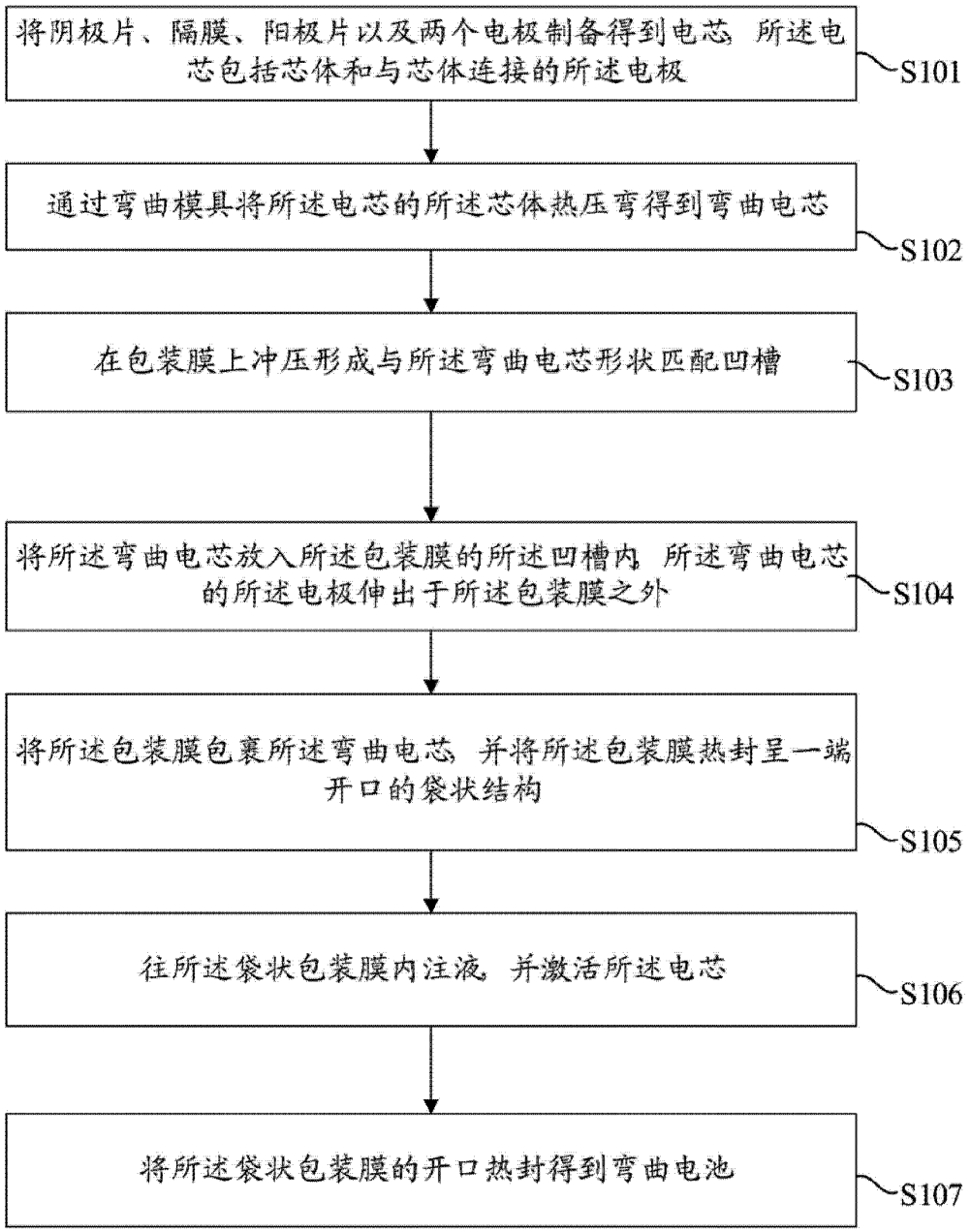


图 1

Petitioner Samsung Ex-1004, 0142

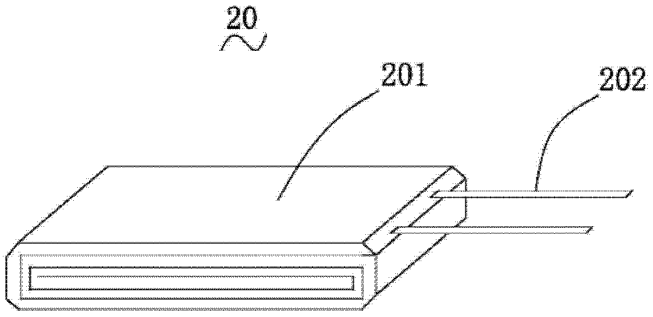


图 2

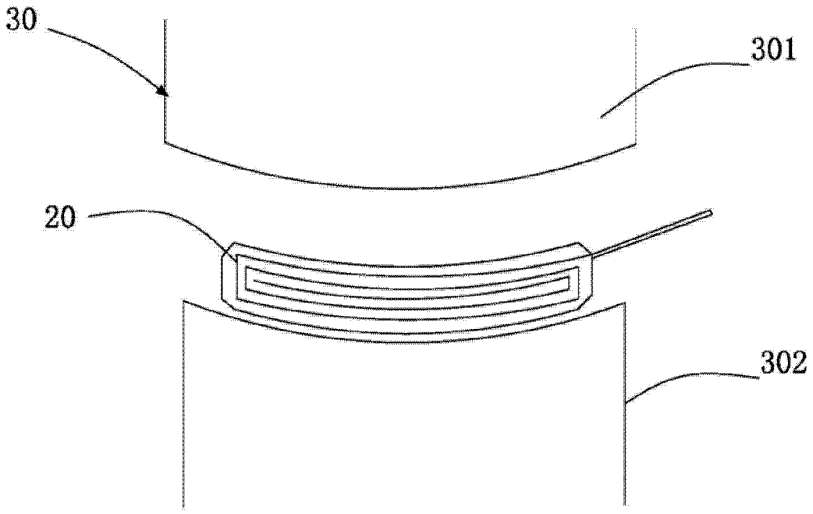


图 3

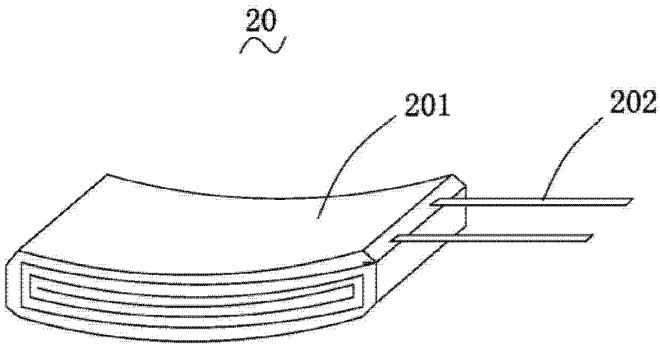


图 4

Petitioner Samsung Ex-1004, 0143

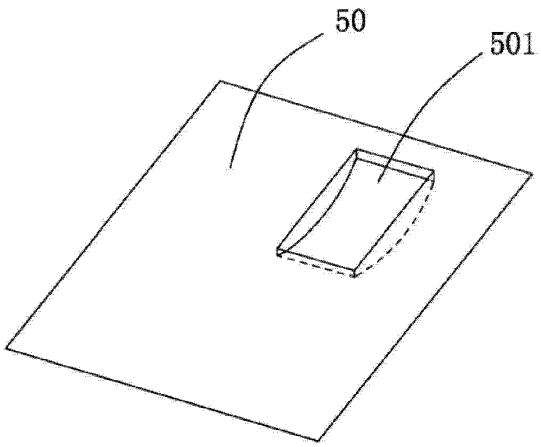


图 5

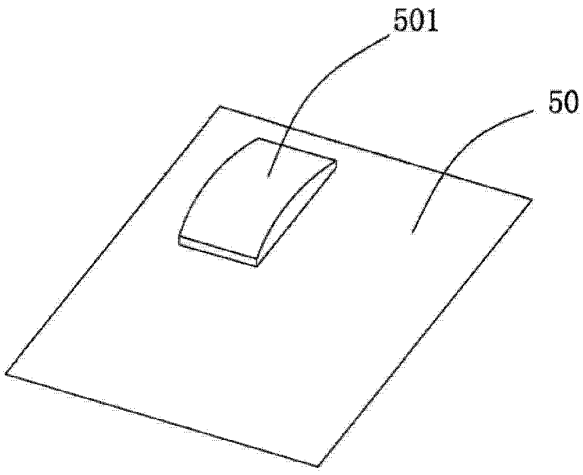


图 6

Petitioner Samsung Ex-1004, 0144

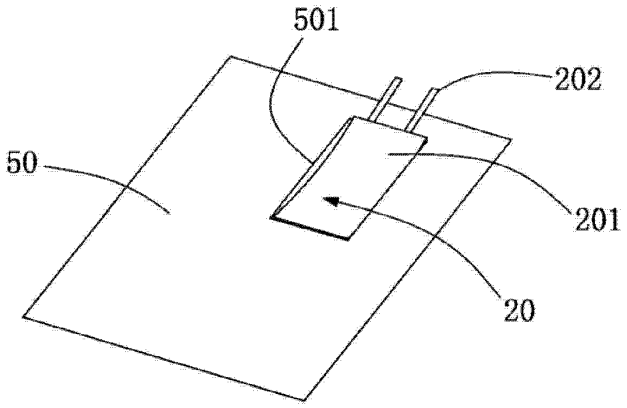


图 7

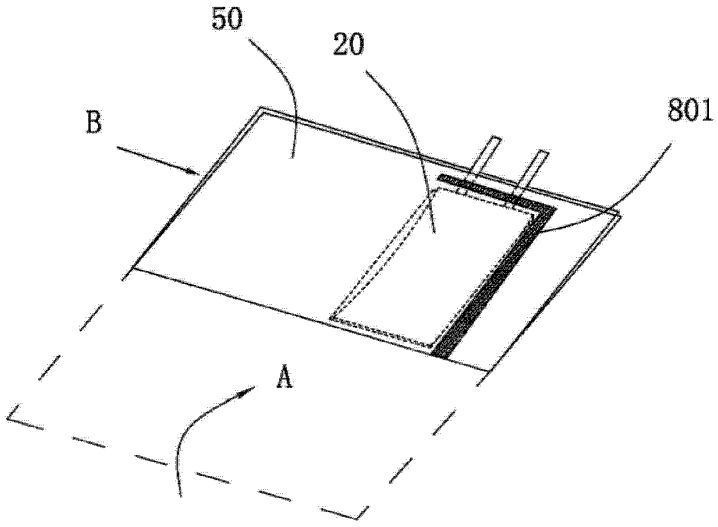


图 8

Petitioner Samsung Ex-1004, 0145

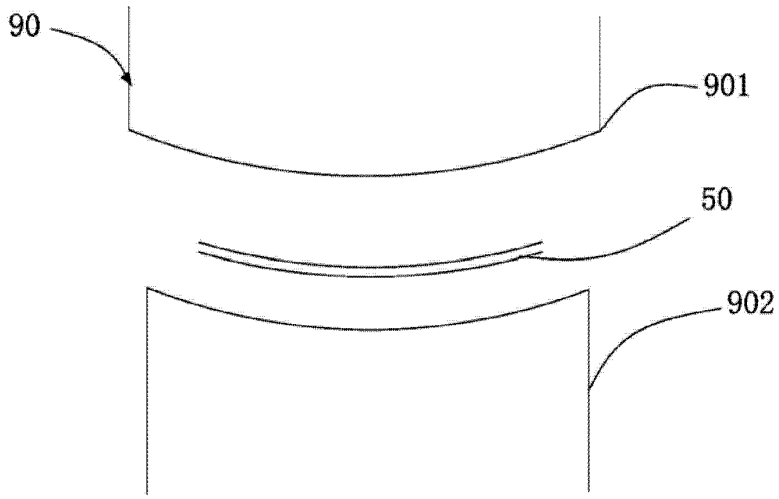


图 9

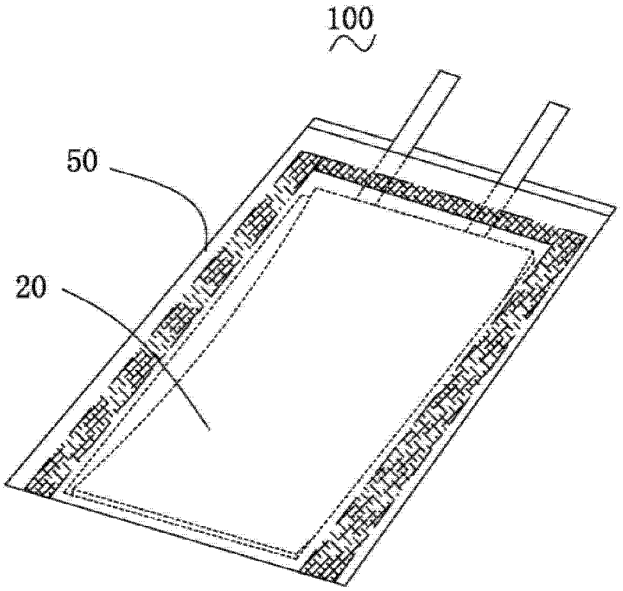


图 10

Petitioner Samsung Ex-1004, 0146

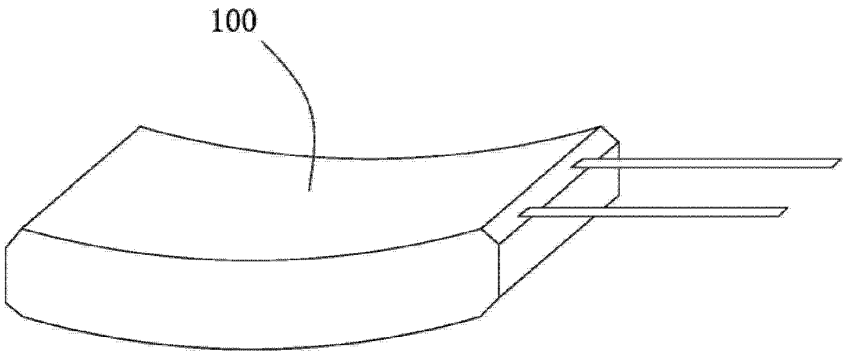


图 11

Petitioner Samsung Ex-1004, 0147

Europäisches Patentamt
European Patent Office
Office européen des brevets

Espacenet

Bibliographic data: CN103403627 (A) — 2013-11-20

Wearable device assembly having athletic functionality

Inventor(s): WEAST AARON B; COBBETT JAMIAN R ± (WEAST AARON B, ; COBBETT JAMIAN R, ; A.B.韦斯特, ; J.R.科贝特, ; K·克兰克森, ; B·卡什, ; L·奥伊博, ; 小爱德华·S·洛, ; M·米歇尔蒂, ; B·巴克斯顿, ; D·雷文, ; K·亨德森, ; J·齐珀尔, ; N·威滕斯坦, ; J·比尔曼, ; K·卡明斯, ; J·斯普劳斯, ; J·G·戈德堡, ; R·A·里科米尼, ; M·C·玛凯)

Applicant(s): NIKE INTERNATIONAL LTD ± (NIKE INTERNATIONAL, LTD, ; 耐克创新有限合伙公司)

Classification: - international: ***G04G17/08***
- cooperative: **A61B5/08**; **A61B5/1118**; **A61B5/681**; **A63B24/0062**; **A63B71/0622**; **G04G17/045**; **G04G17/08**; **G04G21/025**; **G06F19/3481**; **G06Q10/0639**; **H04B1/385**; A61B2560/0242; A61B5/02; A61B5/1112; A63B2071/0625; A63B2071/0655; A63B2071/0663; A63B2220/12; A63B2220/30; A63B2220/40; A63B2225/15; A63B2225/20; A63B2225/50; A63B2230/50; A63B2230/75; G05B15/02; H04M1/7253; H04M2250/02; H04M2250/04

Application number: CN2011852818 20111101 Global Dossier

Priority number(s): WO2011US58852 20111101 ; US20100409082P 20101101

Also published as: CN103403627 (B) BR112013010489 (A2) BR112013010761 (A2) CA2815432 (A1) CA2815518 (A1) more

Abstract of CN103403627 (A)

A wearable device assembly has a housing supporting a controller, display and indicator system thereon. The controller has at least one sensor wherein activity of a user wearing the device is detected. The controller selectively illuminates the indicator system to indicate a level of activity of the user.

Petitioner Samsung Ex-1004, 0148

Espacenet

Description: CN103403627 (A) — 2013-11-20

Wearable device assembly having athletic functionality

Description of CN103403627 (A)

A high quality text as facsimile in your desired language may be available amongst the following family members:

CA2815432 (A1) JP2013544140 (A) KR20130111569 (A) US2013110264 (A1) WO2012061438 (A2) CA2815518 (A1) JP2014500740 (A) KR20130111570 (A) WO2012061440 (A2)

The EPO does not accept any responsibility for the accuracy of data and information originating from other authorities than the EPO; in particular, the EPO does not guarantee that they are complete, up-to-date or fit for specific purposes.

一种可佩戴装置组件包括将控制器、显示屏和标示系统支撑在其上的壳体。控制器包括至少一个传感器，其中检测佩带该装置的用户的活动。控制器选择地点亮标示系统，以标示用户的活动水平。

具有运动功能的可佩戴装置组件

技术领域

本发明一般涉及可佩戴装置组件。更具体地，方面涉及一种具有标示活动水平的发光特征的可佩戴运动信息装置。

背景技术

锻炼和健身已经变得越来越流行，且来自这些活动的益处是众所周知的。多种类型的技术被合并进入健身以及其他运动活动之中。例如，很多种便携式电子装置可用于健身运动，诸如MP3或其他音频播放器、广播、便携式电视、DVD播放器、或其他视频播放装置、手表、GPS系统、计步器、移动电话、寻呼器、呼叫器等。许多健身爱好者或运动员在锻炼或训练中使用一个或多个这些装置，以保持其愉悦、记录和提供运动表现数据、或保持他们和其他人保持联系等。

技术的进步也已经提供了更复杂的运动表现监测系统。运动表现监测系统允许对和锻炼或健身运动相关的许多物理或生理特性或其他运动表现的容易和方便的监测，包括例如速度和距离数据、海拔数据、GPS数据、心率、脉搏、血压数据、体温、进行的步数等。该数据可通过由用户携带的便携式电子装置提供至用户。例如，一种运动表现监测系统可合并入声音播放器，其中可包括用于在声音播放器上显示或进一步交流的数据。其他系统可包括一装置，其包括其自己的显示屏或能力，以将信息显示在诸如智能手机的分立的移动装置上。尽管根据现有技术的运动表现监测系统提供了多种优势的特征，它们仍然具有一定的局限性。例如，一些用户偏好于不使用可携带声音播放器，或偏好在声音播放器之外获取和显示表现数据。其他运动表现监测系统具有受限的能力从而不能进一步将数据上传至个人计算机或其他位置，以进一步回顾和考虑，或这样的数据传输对于用户来说是麻烦的。此外的其他系统仅可监测单个类型的运动活动，且不能在一天或预定的时间周期记录各种类型的活动的累计。其他系统也不提供关于记录和监测的活动的充分和新颖的反馈。本发明尝试克服这些局限性中的一些以及现有技术的其他弱点，以及提供此前不可用的新的特征。

参照下列详细描述对本发明的特征和优势进行完整的讨论，其沿用附图中的附图标记。

发明内容

下文中提供了本公开的方面的概述，以提供关于其至少一些方面的基本的理解。该概述不意图作为本发明的详尽的概括。其不意图确定本发明的关键或决定性元件，或勾勒出本发明的范围。下文中的概述仅以下文中更详尽的描述的前序的总体形式展示了本发明的一些概念。

本发明提供了一种可佩戴装置，其在一个示例性实施例中是具有电子数据存储类型装置的运动活动监测和追踪装置。

根据本发明的一个方面，USB装置被用作具有可佩戴支架的组件的一部分。此外，支架和/或USB装置可包括和传感器通信的控制器，以作为整体的运动表现监测系统记录和监测运动表现。可佩戴装置可包括发光特征，其配置为将各种类型的信息传输至用户。

此处描述的方面可进一步包括对应于装置的不同模式的用户界面屏显。在一个示例中，可在评价时间周期中显示第一组用户界面。其他用户界面可仅在用户完成评价时间周期时可访问。附加地或替换地，各种装置模式可包括信息循环模式和动作模式。信息循环和动作模式可被不同地显示，以便于区别。

此处描述的方面可进一步包括活动追踪应用（application），其可在不同于可佩戴活动追踪装置的移动装置或固定装置上执行。追踪应用可用来记录活动数据、追踪目标、追踪里程碑和其他成就，并提供比赛和团队模式。

Petitioner Samsung Ex-1004, 0151

在本公开中还描述了其他方面和特征。

附图说明

为了理解本发明，将仅通过示例的方式参照附图对本发明的实施例进行描述，其中：

图1是使用运动表现监测和反馈系统的人员的视图，该系统在本发明的一个示例性实施例中包括具有运动功能的可佩戴装置组件；

图2是图1中示出的可佩戴装置组件的透视图；

图2A是可佩戴装置组件的替换性实施例；

图3是图2中示出的可佩戴装置组件的正视图；

图4是图2中示出的可佩戴装置组件的侧视图；

图5是图2中示出的可佩戴装置组件的透视图，其中组件的部分以透明形式示出，以示出内部构件；

图6是沿图4中的线6-6截取的可佩戴装置组件的示意性横截视图；

图7A是可佩戴装置组件的脊柱部件中使用的电池隔室的透视图；

体7B是作为脊柱部件一部分的电池隔室的透视图；

图8A是脊柱部件的前透视图；

图8B是脊柱部件的底侧透视图；

图9是具有附连的USB连接器的脊柱部件的透视图；

图10A-10C是USB连接器的视图；

Petitioner Samsung Ex-1004, 0152

图11A-F是用于在可佩戴装置组件中使用并使用USB连接器的紧固机构的接收器部件以及其他构件的视图；

图12A-C是在可佩戴装置组件中使用的间隔器部件或延展元件的视图；

图13是附连至可佩戴装置组件的间隔器部件的透视图；

图14是此处描述的可佩戴装置组件的控制器的挠性电路部件的示意性平面图；

图15和16是具有附连至其的装置的一些构件的脊柱部件的透视图；

图17是和控制器关联的输入按键的放大视图；

图18是图17中的输入按键的局部横截视图；

图19是具有形成于其上的外部部件并示出电池隔室的脊柱部件的透视图；

图19A是示出了具有端口开口的电池隔室的部分的装置的底部侧透视图；

图20是电池和闭合部件的局部透视图，并示出了电池的触点；

图21A-21D公开了根据此处描述的一个或多个方面的各个脊柱部件和电池构造；

图22是装置的控制构件的替换性实施例的分解透视图；

图23A-C公开了根据装置的替换性实施例的控制器构件和显示以及标示系统的附加视图；

图24是和装置的控制器相关联的显示和标示系统的替换性实施例的局部分解透视图；

图25A是图24中示出的显示屏中使用的帽部件的透视图；

Petitioner Samsung Ex-1004, 0153

图25B是图24中示出的装置的底侧视图；

图26是图24中示出的显示屏的局部横截视图；

图27是图24的显示屏的灯部件和帽部件的局部放大横截视图；

图28是装置的替换性显示屏的构件的局部分解透视图；

图29是装置的显示屏的替换性实施例的分解视图；

图30是并入USB连接器的栓锁部件的构件的局部横截视图；

图31A-33D是装置的替换性实施例的栓锁机构的视图；

图34A-34B是装置的替换性实施例的栓锁机构的视图；

图35A-37E是装置的栓锁机构的另一替换性实施例的视图；

图38A-B是装置的间隔器组件的另一替换性实施例的视图；

图39-42是示出了形成本发明的装置的过程的示意图；

图43是可佩戴装置组件的示意块图；

图44是插入计算机的USB口的可佩戴装置组件的透视图；

图45是可佩戴装置组件的评价时间周期的示例性过程流程；

图46是可佩戴装置组件的信息显示模式的示例性过程流程；

图47、47B和48-56示出了处在信息显示模式中的可佩戴装置组件的示例性用户界面；

图57A和57B示出了可佩戴装置组件的示例性电池标示界面；

Petitioner Samsung Ex-1004, 0154

图58是可佩戴装置组件的动作模式的示例性过程流程；

图59A-59D、60A-60D、61A-61C、62A、62B、63A-63D、64和65示出了处在动作模式中的可佩戴装置的示例性用户界面；

图66示出了由其可检测位置的示例性过程；

图67-71示出了可佩戴装置组件的附加的示例性用户界面；

图72示出了用于配置和注册可佩戴装置组件的示例性过程；

图73A-73G示出了示例性注册和配置用户界面；

图74A示出了用于配置和注册可佩戴装置组件的另一示例性过程；

图74B-74P示出了示例性注册、配置和设置界面；

图75和76示出了标示可佩戴装置组件可以使用的示例性信息；

图77示出了用于使用可佩戴装置组件的示例性信息屏显；

图78A-78G示出了用于登录和定制活动追踪应用的示例性界面；

图79-81示出了将活动追踪账户和一个或多个社交网络账户相关联的示例性界面；

图82A和82B示出了示例性用户档案界面；

图82C示出了示例性应用模式选择界面；

图82D示出了另一示例性用户档案界面；

图83A-83D示出了用于追踪和可视化目标成就进度的示例性用户界面；

图84A-84F示出了用于追踪活动水平和目标的示例性告示；

Petitioner Samsung Ex-1004, 0155

图85A、85B、86、87A和87B示出了可在用户完成初始评价周期后提供的示例性界面和信息屏显；

图88A和88B示出了用于定义和/或设定活动目标的示例性界面；

图89A-89D示出了用于观察当前目标信息和活动总结的示例性界面；

图90A-90C、91-93、94A和94B示出了附加的示例性目标设定界面；

图95A-95C、96A-96C、97A-97C示出了包括进度条的示例性进度追踪界面；

图98A-98C和99示出了示例性串追踪界面；

图100A-100C示出了用于将信息和记录的活动关联的示例性标记界面；

图101、102A、102B、103A和103B示出了通过其用户可分享活动信息的示例性分享界面；

图104A-104C和105示出了示例性活动总结界面；

图106A、106B、107A、107B、108A、108B、109A和109B示出了示例性记录、奖杯、和里程碑界面；

图110A和110B示出了示例性告示指示器；

图111示出了示例性活动告示；

图112A-112C、113A-113C、114A、114B、115和116示出了示例性成就和成果追踪界面；

图117示出了示例性活动应用设置菜单；

图118A-118C示出了示例性活动应用设置界面；

Petitioner Samsung Ex-1004, 0156

图119A、119B、120A-120C、121A-121C、122A-122C、123A和123B示出了包括活动类型追踪特征的示例性活动追踪界面；

图124A-124C、125A-125C、126A-126C、127A-127C、128A-128C、129A-129C、130A-130C、131A-131C、132A-132C、133A-133C、134A-134C示出了包括通过活动类型的活动分类的示例性活动总结界面；

图135A-135D示出了用于追踪和活动搭档一起进行的活动的示例性界面；

图136A-136C示出了用于将用户的活动和其他人的进行比较的示例性界面；

图137A、137B、138A和138B示出了示例性活动总结界面；

图139A、139B、140A和140B示出了用户活动的示例性奖励和成就告示；和

图141示出了显示追踪朝向面向团队的目标的进度的信息的示例性界面。

具体实施方式

在下文中对于本发明的各个示例性实施例的描述中，参照附图，所述附图构成了此处的一部分，且其中通过示例的方式示出在其中可实施本发明的方面的各个示例性装置、系统以及环境。应理解也可使用零件、示例性设备、系统和环境的其他特定布置，且可进行结构以及功能性的修改而不背离本发明的范围。此处，尽管在本说明书中使用术语"顶部"、"底部"、"前部"、"背部"、"侧面）等来描述本发明的各个示例性特征以及元件，所述术语仅出于便利的原因，且示例性地基于附图中所示的示例性取向。不应将本说明中任何部分理解为需要特定的机构的三维取向以落入本公开的范围中。

关于本发明的方面的总体描述

本发明提供了一种具有运动功能的可佩戴电子装置组件。在一个示例性实施例中，可佩戴电子运动装置组件可包括将运动信息传输至佩戴者的可发光部分。附加地，可佩戴电子运动装置可包括配置为连接至（直接地或间接地）另一设备的数据传输部分。在一个示例中，可佩戴电子运动装置可包括USB连接器和存储装置，其可连接至另一装置的USB口，以传输和接收数据。

Petitioner Samsung Ex-1004, 0157

在一种布置中，可佩戴电子运动装置可包括USB存储装置，其也可配置为作为连接器，以将可佩戴电子运动装置组件的两个端部彼此固定。USB装置被连接至支架，该支架在一个示例性实施例中为腕带。

电子可佩戴装置组件还可包括壳体部分，其将控制器支撑在其中。控制器包括诸如电源和电路的相关联的构件。各种传感器可可操作地和诸如三轴加速度器的控制器相关联。该壳体具有其中壳体是防水且防撞击的结构构造。

在一个或多个布置中，控制器可使用具有特定特征的用户界面，以增强装置的功能。例如，可佩戴电子运动装置组件可包括显示屏，其可包括标示系统，其中运动数据可显示或以其他方式传输至用户。显示屏可包括LCD屏幕、由一系列LED灯构成的显示屏、LED图形化用户界面等。显示在显示屏上的数据可存储在内部的不可移除存储器或可移除USB存储装置上。附加地，可佩戴电子运动装置的USB装置可插入在计算机中，其中表现数据可自动上传至远端站点或移动装置，用于进一步处理、显示和回顾。装置还可配置用于使得用户被提醒，以开始数据传输操作。装置也可能能够和其他移动装置或远端站点进行通用的无线通信。

此外，可佩戴运动装置可佩戴在用户身体上的多个位置，包括用户的胸部（诸如，胸带）、绕用户的手腕、绕用户的胳膊、在用户的头部上、在用户的脚踝或大腿上等。

在一个示例性实施例中，显示屏可包括显示屏和标示系统。标示系统可显示对应于佩戴装置组件的用户的活动水平的信息。标示系统可包括多个光元件，其可选择性地发光，以提供信息。该多个光元件中的每一个可以多种颜色发光。显示和标示系统可分立或协同地操作，以将标记显示给用户。

在附加的示例性实施例中，装置可包括间隔器部件，其可调节装置的尺寸，以适应各种用户。

在此外的其他示例性实施例中，装置可和移动装置以及远端站点交互，以向用户提供增强的体验。

本发明的具体示例

尽管上文中已经大致描述了本发明的方面，下文中的详尽描述和附图一起提供了如本发明所述的运动表现监测系统和方法的更详尽的示例。本领域技术人员将当然能够理解，下列描述仅构成本发明的示例的描述，而不应被理解为以任何方式限制本发明。

图1大致地公开了使用运动表���监测和反馈系统1的人，该系统在本发明的一个示例性实施例中包括具有运动功能的可佩带装置组件10。如在下文

Petitioner Samsung Ex-1004, 0158

中更详尽地描述地，可佩戴装置组件10包括和诸如三轴加速度器相关联的传感器，其中装置10能够监测用户的运动活动或整体活动。如在图1中所示，运动表现监测和反馈系统1还可包括另外的模块或传感器2和移动装置3，该模块或传感器2诸如由鞋支撑或嵌入在鞋中。将理解系统1还可根据需要使用其他类型的传感器和装置，包括心率监视器。如在下文中更详尽地描述的，包括可佩戴装置10的系统1的各个构件可彼此无线地通讯，以记录和监测运动表现或总体用户活动。还将理解，人员可仅利用可佩戴装置10以记录和监测运动表现或整体活动。运动表现数据或整体活动可包括多种不同的参数、指标或生理特性，包括但不限于速度、距离、已行进步数、以及诸如卡路里、心率和出汗检测的能量消耗。这样的参数也可以活动点数或由用户基于用户的活动赚取的货币为单位来表示。

基于鞋的传感器2可包括多个电子构件，包括电源、磁性传感器元件、微处理器、存储器、发送系统和其他合适的电子装置。传感器2在一个示例性实施例中被安装在图1中示出的用户的鞋上。传感器2和系统的其他组件一起使用，以记录诸如速度和距离的数据以及运动表现的其他参数。传感器2可为在美国专利公开Nos.2007/0006489、2007/0011919和2007/0021269中公开的传感器。这些美国专利公开被合并于此并成为本申请的一部分。传感器2也可为力传感器阵列，以采集和用户相关的附加数据，其诸如在美国专利公开No.2010/0063778和No.2010/0063779中公开的，前述公开和通过应用的方式合并于此并成为本文的一部分。移动装置可为智能手机或其他类型的便携显示装置。可佩戴装置组件10可与其他类型的传感器交互和通信，包括基于服饰的传感器和与诸如跑步比赛或其他运动比赛的事件相关联的传感器。

图2-6示出了图1中的可佩戴装置组件的不同视图。可佩戴装置组件10总体包括壳体12、控制器14、输入按键16、显示屏18和标示系统20。将理解控制器14包括各种相关的构件和/或操作地连接至其，该构件包括电源、传感器和相关的电路。图2A公开了一种可替换装置10，其包括更大的标示系统20。将首先对装置10的结构进行描述，然后对装置的操作以及由装置和相关的系统提供的附加的用户操作进行描述。

壳体12为诸如腕带的可佩戴带，且通常包括内脊部件22（图6-9），其具有用于电源的隔室、外壳部件24、以及紧固机构26或栓锁机构26。在一些示例性实施例中，壳体12可包括一个或多个间隔器部件28，以调节装置10的尺寸，将在下文中对其进行进一步描述。

如在图2-6中进一步示出的，可佩戴装置组件10为环形的或大致为圆形的，且在该示例性实施例中，配置为绕用户的腕部佩戴。可佩戴装置组件10可为各种其他的形状，而不背离本发明，诸如椭圆卵形、椭圆形、八边形、矩形等。装置10可配置为附连至夹或其他装置，其可可移除地附连至人、或合并入其他服饰中。可佩戴装置组件10和壳体12可包括大致平面部分，且沿侧部具有倒圆或成斜面的边沿。在示例性实施例中，成斜面的边沿可仅包括在壳体12的一个侧部上。壳体的端部被配置为经由紧固机构26彼此结合。在一个或多个布置中，可佩戴装置组件10的壳体12的向外或朝外的侧部可包括平滑的纹路，而向内的侧部（例如，接触佩戴者身体的侧部）可包括摩擦结构部。在一个示例中，可佩戴装置10的朝内的侧部可设有棱纹，以绕用户的腕部或其他身体部分改进摩擦和阻止滑动。纹路可在整个内侧上

Petitioner Samsung Ex-1004, 0159

都是均匀的或可为不均匀的。例如，棱纹或其他纹路可随着纹路远离形成在壳体的端部处的紧固机构而愈发显著。在其他布置中，纹路也可附加至可佩戴装置组件14的外侧，且内侧可为平滑的。可使用纹路的多种组合和构造。在此外的其他实施例中，壳体12可并入位于装置10的内直径上的吸汗部件，或芯吸元件(wicking element)。

如图7-9所示，内脊部件22是包括基本刚性部分和一些挠性部分或区域的部件。脊柱部件22大致支撑控制器14的构件，如将在此处进一步描述的。脊柱部件22可视作底盘部件，其包括附连至其的各种构件。脊柱部分22包括大致曲线的构造，且包括外表面30和内表面32。脊柱部分22包括延伸至第一远端36和第二远端38的中间部分34。中间部分34包括中心部分或中心段40，以及第一段42和第二段44。中间部分34还包括第一挠性区域46或部件，其将中心部分40的一个端部连接至第一段42，中间部分34还包括第二挠性区域48或部件，其将中心部分40的另一端部连接至第二段44。挠性区域46、48提供这些区域处脊柱部分22以及整个装置的更容易的挠曲，而第一段42和第二段44以及中心部分40被视作刚性区域或基本刚性区域。在示例性实施例中，挠性区域46、48可被视作挠性铰链区域且为成大致凹形形状的弯曲段。因此，挠性区域包括中心部分或基体部分，其中一对部件从基部部分延伸出，并由此限定出向内弯曲的部分。弯曲的段包括在凹形构造的基部或中心部分处减薄的厚度，以增强挠性区域46、48的挠性特性。因此，脊柱部件22包括沿其长度（例如，刚性中心部分和刚性第一和第二段）的总体厚度或第一厚度，而挠性区域具有较小的第二厚度“t”，以辅助总体壳体12和部件22的挠性特性。特别地，挠性区域的基体部分具有较刚性中心部分和第一和第二刚性段小的厚度。如将在下文中更详尽地描述的，挠性区域46、48在装置10挠曲时（例如当布置在用户的腕部上时或将装置10从用户的腕部移除时）辅助由脊柱部件22支撑的构件最靠近其中应力最小化的中性轴线。

如图7-9所示，中间部分34的第一段42具有第一凹陷隔室50，而中间部分34的第二段44具有第二凹陷隔室52。这些段具有曲线的构造。凹陷隔室50、52尺寸设定为接收与控制器14相关联的电源。在图7A和7B中示出的示例性实施例中，凹陷隔室50、52初始地由金属壳（诸如触变模制成的金属部件55）。触变模制成的（A thixo-molded）部件在一个示例性实施例中使用，而其他部件也可使用，诸如任意铸造金属部件、模铸部件或任意金属注射成型部件。形为金属帽的金属罩或闭合部件也如下文所述地被提供，以提供电源的金属壳。希望形成一个或多个电池142的金属壳，且将理解该壳可包括相对的金属部件，其不形成完整的腔室，但基本环绕电池。将理解触变模制隔室可初始地形成为其中脊柱部件22的其余部分在触变模制隔室上形成。脊柱部件的部分可形成在限定出隔室50、52的底部部分的触变模制部件之上。隔室50、52还包括一对开口59，以接收将被描述的电池端子或触点。凹陷隔室50、52可总体地尺寸变动或相对于彼此尺寸变动。因此，凹陷隔室50、52可具有增加的尺寸，以适应具有增加的容量的更大的电源。这些特征将在下文中被更详尽地描述。

中间部分34还支撑靠近外表面30的控制器14的其他构件，以及下文中将描述的显示屏18和标示系统20。脊柱部件22可具有将标示系统20支撑在其上的成斜面的边沿。脊柱部件22具有一定的开口，以接收紧固机构（诸如粘合剂和螺纹紧固件），以将控制器构件固定地附连至脊柱部件22。第一远端36和第二远端38支撑紧固机构26和可选的间隔件28。

Petitioner Samsung Ex-1004, 0160

在一个示例性实施例中，帮助形成隔室50、52的触变模制部件55由镁形成，其中脊柱部件22的其余部分由形成在部件55上的聚丙烯材料制成。将理解可将其他材料用于脊柱部件22以及电池壳。

如图2、3、6和19所示，外壳部件24布置在脊柱部件22周围，且罩住控制器14、显示屏18和标示系统20。在示例性实施例中，外壳部件24是热塑性弹性体部件，其在下文中将详述的注射成型工艺中形成。相应地，外壳部件24具有可回复的弹性，而保持环形形状。外壳部件24具有大致圆形的外表面56以及大致平面的内表面58，且可视作具有限定出装置10的内直径的内部部分以及限定出装置10的外直径的外部部分。外表面56具有大致大的半径，以形成弧度，而大致看上去是平面的。侧部边沿具有较外表面小的半径，且成斜面的侧部边沿还具有小的半径。外壳部件24的表面协同形成内部容积，以接收装置的各个构件，而同时保持最小的横截面尺寸。外壳部件还包括成斜面的侧部边沿60。标示系统20布置为靠近成斜面的侧部边沿60。将理解壳体12可按需在每个侧部边沿上具有成斜面的边沿。外壳部件24具有孔62，以容纳输入按键，用于和控制器14交互。外壳部件24包括第一区域64以适应观察显示屏18，且包括第二区域66以适应观察标示系统20。将理解第一区域64被构造且尺寸设定为使得由显示屏18投射的标示可被通过外壳部件24的第一区域64看到。还将理解第二区域66被构造且尺寸设定为使得由标示系统20投射的标示可被通过外壳部件24的第二区域66看到。外壳部件24可包括提供深色外观的染色剂。染色剂的数量被控制，使得由外壳部件24罩住的构件不能被看见。但是，当显示屏18和标示系统20激活时，光轻易地投射通过外壳部件24，且视觉地可感知。例如，在一个示例性实施例中，外壳部件是半透明的热塑性弹性体，其具有一定百分比的染色剂。外壳部件24还可被视作基本透明的，但具有由一定量的黑色材料提供的染色。在该构造中，外壳部件24中的内部构件大致不可见，但是，当显示屏18和/或标示系统20激活时，灯部件通过外壳部件24清晰地可见。因此，内部构件由裸眼不可见，但显示屏和/或标示系统可在激活时通过外壳部件可见。装置10还可配置为使得显示屏和标示系统中的一个总是可见的，而显示屏和标示系统中的另一个仅在激活时可见。例如，显示屏可一直是可见的，以诸如示出日时间，而标示系统仅在激活时可见。还可理解外壳部件24可为透明的材料或包括各种不同的染色剂或多种染色剂。一定的颜色可标示装置10被特别设计用于一定类型的用途或事件。第一区域64和第二区域66可被构造为透明的。在示例性实施例中，这些区域被染色至更深的颜色，其中显示屏18和标示系统20透过其发光。将理解，替换地，开口可设置在第一区域64和第二区域66处，以观察显示屏18和标示系统20。外壳部件24的内表面58具有靠近由脊柱部件22支撑的电源的位置的第二开口70和第一开口68。第一开口68由通过紧固件固定在第一开口68上的第一帽72或闭合部件覆盖，且第二开口70由通过紧固件固定在第二开口70上的第二帽74或闭合部件覆盖。第一帽72和第二帽74由金属材料形成，以和金属电池隔室50、52协作，以提供用于将被描述的电源的金属壳。外壳部件24可包括不同的材料，包括不同的聚合物、塑料或橡胶、热塑性弹性体部件、热塑性聚氨酯部件、液态硅酮部件、和橡胶复合材料、以及其他可模制的弹性材料、和/或诸如氯丁二烯橡胶的合成物、塑料、织物、金属和/或以上的组合。在一个或多个示例中，材料可包括热聚氨酯和/或热塑性橡胶。使用的材料还可提供一些挠性，使得由可佩戴装置组件10形成的环件的尺寸可变大，而不使得组件10开裂或破裂。如将在下文中详述的，可将粘性促进剂使用在脊柱部件22和支撑在其上的构件上，以辅助外壳部件24的粘合。将在下文中描述形成装置10的过程时详述脊柱部件22和外壳部

Petitioner Samsung Ex-1004, 0161

件24。

如图6和10-11所示，紧固部件26或栓锁部件26大致包括第一突起部件90和第二接收器部件92。第一突起部件90布置为靠近壳体12的第一端部，且第二接收器部件92布置为靠近壳体12的第二端部。将理解部件90、92可按需要布置在壳体12的相对端部上。第一突起部件90并入输入/输出部件94用于数据传输，且在示例性实施例中，为具有大致刚性本体96的USB连接器94。USB连接器94包括多个导线98，其嵌入在刚性本体96的顶表面中。导线98包括操作地连接至控制器14的连接器。如图10C所示，第一突起部件90还包括布置在刚性本体96的底表面中的凹部100，其大致和USB导线98相对。底部凹部100限定出接合表面102。

如图6和11A-F所示，第二接收器部件92在其中限定出开口104，且支撑枢转部件106。枢转部件106包括指针部分108，且包括弹簧110，以将指针部分108朝向栓锁位置偏置。枢转部件还包括可压下的按键112，以将指针部分108移动远离栓锁位置。第二接收器部件92还包括位于和开口104相对的端部处的一对叉形件120。叉形件120包括倾斜或弯曲的凸轮表面122。槽124沿叉形件120的长度限定出。

如在图11A-F中进一步示出的，第一突起部件90接收在第二接收器部件92中，该第二接收器部件在实施例中可连接至脊柱部件22的一个端部。初始地，指针部分108从栓锁位置枢转且偏置开。一旦指针部分108插入凹部100中，则指针部分108由弹簧110偏置进入凹部100中并偏置进入栓锁位置中。装置10继而处在闭合位置中，其中指针部分108可邻接接合表面102，以将装置10保持在闭合、环形构造中。当在示例性实施例中时，紧固构件26并入常用的USB连接器94，将理解也可使用其他类型的连接构造，用于通信。例如，装置10可使用micro USB连接器、火线接口、16针插座、或其他类型的基于物理接触的连接部，或可包括无线或无接触通信接口，诸如Wi-Fi、蓝牙、近场通信、RFID、蓝牙低能量、紫峰（Zigbee）或其他无线传输技术的接口，或用于红外或其他光通信技术的接口。还将理解装置10可配置为完全从诸如USB连接器94的数据传输部件进行通信和数据传输，或完全经由无线通信进行或通信和数据传输，或经由无线通信和各种类型的插入式通信的组合进行通信和数据传输。

图10A-10F公开了USB连接器94的附加视图。USB连接器94具有结构性特征，其提供更干净、更外观愉悦地构造，而同时保持操作性。在常用的USB连接器中，引线被不均匀地隔开，具有矩形形状，且引线的相应的端部未被对齐。如在图10A中所示，USB连接器94的引线98跨刚性本体96以一距离均匀地间隔开。此外，引线98相对于刚性本体96的顶表面114凹陷。附加地，刚性本体96限定出均匀地隔开的圆形开口116，且其中开口116的端部被对齐。引线98通过开口116曝露。由于引线98相对于刚性本体96的顶面凹陷，每一个引线98具有突起的棱纹118，其靠近刚性本体96的顶表面114延伸。在示例性实施例中，引线98布置在模中，在其中材料被注射成型在引线98周围，以形成具有均匀和对齐的圆形开口116的刚性本体。这样的结构提供增强的USB连接器94。

装置10可在周界尺寸上变动，其中装置10可限定出更小和更大的环形

Petitioner Samsung Ex-1004, 0162

构造，以例如适应用户的不同腕部尺寸。为了该目的，壳体12可并入间隔器部件28或延展部件或元件28，如图12-13所示。将理解可使用单个间隔器部件28或可使用多个间隔器部件28，或完全不使用，其中装置10简单地具有在壳体12的端部处连接的栓锁机构。间隔器部件28与壳体12的一个端部以及紧固机构26的接收器部件92的一个端部协助，以增加装置10的周界尺寸。间隔器部件20具有本体130，其具有包括尺寸设定为接收一对叉形件120的一对开口132的一个端部，所述一对叉形件120布置在紧固机构26的接收器部件92上。本体130支撑靠近开口132的旋转棘爪134。旋转棘爪134包括弯曲的凸轮表面135，且包括偏置弹簧136。旋转棘爪134由图12B中示出的紧固件和罩面板大致固定在本体130的中心位置处。旋转棘爪134大致可绕中心位置旋转。本体130的另一端部支撑一对叉形件137，其包括和接收器部件92的叉形件120类似的凸轮表面138。如可从图11F和13理解的，当使用间隔器部件28时，间隔器部件28的叉形件137接收在壳体12的端部中的开口中，且固定在其中。壳体12的该端部包括对应的结构，以接收这样的叉形件137。紧固机构26的接收器部件92上的叉形件120被插入在位于间隔器部件28的本体130上的一对开口130中。为了该目的，接收器部件92上的倾斜的凸轮表面122接合旋转棘爪134上的凸轮表面135，其中旋转棘爪134旋转（图12C中的箭头A，出于清晰目的，罩面板被移除），允许叉形件120进一步插入开口132中。一旦叉形件120上的槽124和旋转棘爪134对齐，旋转棘爪134的端部被接收在槽124中，且由此将间隔器部件部件固定至紧固机构26的接收器部件92中（参见图11F和13）。将理解可设置入口孔以在需要时旋转旋转棘爪134，以将间隔器部件28从装置10移除。将理解可使用多个间隔器元件28以增加尺寸，或间隔器部件28可被移除以减小尺寸。间隔器部件28的长度可变动且在一些情形中，可在5-10mm的范围中。在一个示例中，间隔器元件28的长度可每个为8mm。在另一示例中，间隔器部件28的长度可为6mm。还将理解如果未使用延展元件28，则接收器部件92上的叉形件120和壳体12的端部协作以被固定至其。在示例性实施例中，间隔器元件28可具有和壳体类似的构造，所述壳体诸如是具有布置在本体上的热塑性部件的塑料本体。叉形件120可为本体中金属插入件的一部分。在一些示例性实施例中，可能使用间隔器部件的装置10的内直径可从约147mm变动至221mm。

装置10包括由壳体12支撑的控制器14。控制器14通常包括印刷电路板140，其具有包括电路、处理单元、数据存储存储器、连接器以及其他本领域中已知的构件的各个构件（图43）。控制器14还包括为电池组（一个或多个）或多个电池形式的电源142、天线组件144以及传感器组件146。控制器14还可包括其他构件，诸如扬声器，以传输声音信息。图43公开了控制器的块状图，其示出了和其相关的附加构件，且将在下文中详述。

图14示出了印刷电路板（PCB部件）140的示意图。在示例性实施例中，PCB部件140是挠性电路部件。PCB部件具有多个区域或区段，以将各个部件支撑在其上。PCB部件还包括中心区域140a，其中显示屏18和标示系统20操作地连接至其。PCB部件还包括挠曲区域140b，其在位置上对应于脊柱部件22的挠性区域46、48。此处描述的其他构件也连接至PCB部件140。如图15和16所示，PCB部件140绕在脊柱部件22上，且安装至其。可使用紧固件以将PCB部件固定地附连至脊柱部件22。将理解连接时PCB部件的中心区域140a对应于脊柱部件22的中心部分34。PCB部件140大致符合脊柱部件22的轮廓，该轮廓包括挠性区域46、48的轮廓。因此，挠性区域140b布置在脊柱部件22的挠性区域46、48处，且成大致面-面接合。该构造允许PCB部件被移动至中性轴线附近，当装置10被挠曲时在该中性

Petitioner Samsung Ex-1004, 0163

轴线处作用在PCB部件上应力最小。

如上所述，PCB部件140支撑控制器14的各个构件。例如，PCB部件140支撑天线组件144以及传感器组件146。PCB部件还支撑数据存储存储器构件。数据存储存储器接收来自传感器组件的输入，以及来自USB连接器94的输入。由控制器14存储的数据也可经由USB连接器94传输至诸如计算机的另一装置，以及经由计算机传输至远端站点（图44）。

由PCB部件140支撑的天线组件144辅助和其他移动装置的通信。因此，装置10能够和移动装置无线通信，且在一个示例性实施例中，控制器14使用蓝牙无线通信。因此，控制器14可具有蓝牙无线电，且使用天线组件144，其中装置10可和移动装置无线通信。将理解装置10装备有其他必要的构件，以进行该无线通信。将在下文中详述该通信的其他示例。

如所述，PCB部件140将传感器组件146支撑在其上。传感器组件146可包括多个不同的传感器。在示例性实施例中，传感器组件146包括形为三轴加速度器的加速度器。如已详述的，传感器146检测对应于佩戴装置10的用户的活动的运动。将理解系统1和/或控制器14还可按需包括其他传感器。例如，由用户使用的系统1可使用基于鞋的传感器，其和装置10通信。用户还可具有基于服饰的传感器，其可和装置10通信。还将理解传感器组件146可包括心率传感器。心率传感器可按需为胸部安装传感器。将理解心率传感器也可合并入装置10的壳体12中，该心率传感器诸如靠近用户的腕部检测心率的传感器。也可使用诸如GPS传感器的其他传感器。还可将附加的传感器并入装置10中。在一个示例性实施例中，传感器可包括陀螺仪传感器。传感器可为微机电系统（MEMS）类型陀螺仪装置。这样的传感器可和装置中的其他传感器（诸如加速度器）协作，以提供增强的功能和能力，以及提供对感知的用户的运动的进一步区分。

如所述，控制器14包括为多个电池142形式的电源142。将理解也可在该设计中使用单个电池142。这样的设计可允许挠性电路部件具有附加的区域来支撑与装置10相关的附加的构件。但是，在示例性实施例中，电源142使用一对电池142。如从图6和20可理解的，电池142包括曲线或弯曲的构造，且大致为刚性部件。电池142限定出弯曲的平面表面。在示例性实施例中，装置10使用电池142对。第一电池142布置在脊柱部件22的第一凹陷隔室50中，而第二电池142布置在脊柱部件22的第二凹陷隔室52中。电池142具有大致对应于凹部50、52的深度的厚度。电池142大致和脊柱部件22的内表面32平齐。将理解电池142操作地连接至控制器14，以提供功率至装置10。如图20所示，电池142具有和其关联的弹性罩部件148。罩部件148具有一对圆形的凸起部149，且电池142的电池触点150粘合在圆形凸起部149上。电池布置在凹陷的隔室50、52中，其中触点150延伸穿过隔室50、52中的开口59，且接合PCB部件140，以提供电力至装置10。当帽70、72被紧固至脊柱部件22上时，圆形凸起部149和触点150被弹性地卡至PCB部件140，提供增强的导电连接部。将理解每一个电池142都使用弹性罩部件148。在附加的示例性实施例中，可使用导电环氧树脂部件来结合电池触点。电池142和相应的凹陷的隔室50、52的总体尺寸可变动，诸如变大，以增加电池容量和需要重新充电之前的装置的续航。将理解刚性电池142可安装在脊柱部件22的更刚性的第一段42和刚性的第二段44中。脊柱部件22的挠曲区域46、48允许段42、44和电池142铰链地绕挠曲区

Petitioner Samsung Ex-1004, 0164

域46、48枢转，以提供总体挠性的壳体12和装置10。

如图2-6和16-19所示，装置10包括可压下输入按键16，以辅助装置10的操作。如从图17和18可理解的，输入按键16操作地连接至控制器14，其由大致邻近显示屏18的壳体12支撑。输入按键16可经由输入按键16由用户访问，可输入按键延伸通过壳体12的外壳部件24。输入按键16具有在两杆成型工艺（two-shot molding process）中一起整体地形成的刚性的基部部件76以及挠性的帽78。内部腔室79由输入按键16限定，以支撑可与控制器14交互的触摸式开关。刚性基部部件76包括限定出第一工具表面82的上环部80和靠近挠性帽78并限定出第二工具表面86的下环部84。在形成装置10的过程中，当外壳部件24注射成型在脊柱部件22和被支撑的构件周围时，第一工具表面82和第二工具表面86以紧密的面-面接合接合工具。该接合阻止注射成型的材料流入输入按键16的内部腔室79中，这可阻止输入按键16正常地操作。将在下文中更详尽地描述经由输入按键16提供输入的装置10的操作。

如图2和15以及16所示，装置10的显示系统18或显示屏18由壳体12支撑，且操作地连接至控制器14。该显示屏可视作壳体12或装置10的可发光部分。显示系统18可包括一系列单独的发光元件或灯部件，在示例性实施例中诸如为LED灯152。LED灯可以阵列形成且在中心位置处操作地连接至PCB部件140。LED152可布置为使得词、字母、数字、符号等可由单个离散的LED灯152的各种组合发光而产生。例如，LED灯152可以阵列形状布置，其具有特定数量的行和列。壳体12的外壳部件24围绕并保护LED灯152。如所述，外壳部件24具有第一区域64并对应于LED灯152的位置，使得一旦LED灯发光时，光通过外壳部件24可见（在替换性实施例中，第一区域64可为透明或基本透明的）。将理解第一区域可为单独并离散的。例如，每一个发光区域可由外壳部件24的不透明或不透光部分围绕，使得来自LED152中的每一个的光不混杂在一起。显示系统18可仅覆盖可佩戴装置组件10的整个周界的一部分。例如，如图2所示，显示系统占据了装置10的与紧固机构26相对的顶部部分或中心部分。显示系统18的尺寸（例如单个LED灯的数量、灯的行和列的数量、总体宽度或长度）可基于最大量的数据确定，以在任意一次、以使用的任意字体和/或特性和/或以上的组合显示出。在一个示例中，显示系统18可包括成5行的20个LED灯152，其中每行大致平行于可佩戴装置组件10的长度。附加地或替换地，总体外周界（例如，装置组件14的朝外的表面）可在174-182mm的范围中。还将理解显示屏18可包括灯部件，其标示装置10正在经由诸如蓝牙通信的无线连接和移动装置通信。

又如图2和15以及16所示，装置10的标示系统20由壳体12支撑，且操作地连接至控制器14。标示系统20还可视作总体的显示屏18的一部分或部件。装置10的显示系统可视作包括第一显示屏和第二显示屏。将理解标示系统20可操作，且和显示屏18一起发光，或完全独立于显示屏18发光。标示系统20还可包括多个附加的发光元件160或灯部件160，其在示例性实施例中也可形为LED灯。灯部件160操作地连接至控制器14，并由PCB部件140支撑。标示系统20总体地布置在壳体12的侧部边沿处。在一个特定的示例中，标示系统20可包括一系列20个发光元件160。可选地，发光元件41可沿可佩戴装置组件10的壳体12的两个侧部边沿分布。在示例性实施例中，发光元件160也可以以大致线性的构造布置。标示系统20的发光元件160可形状上不同于显示系统18的灯152。形状、尺寸或其他外观属

Petitioner Samsung Ex-1004, 0165

性的不同可允许用户识别被传输的信息的类型。例如，发光元件160可将可佩戴装置组件10的壳体12的成斜面的侧部边沿60的一个或多个对齐，以方便用户的观察。在其中可佩戴装置组件14的侧部或边缘被圆形化的示例中，发光元件160可布置在圆形化的边沿的外部曲线上，使得佩带时光可见（例如，背离装置14佩带于的用户腕部或其他本体部分）。和显示屏18的灯152的构造类似，外壳部件24具有第二区域66（图19），其位于对应于标示系统20的发光元件160的位置处。从标示系统20的灯部件投射出的光在第二区域66处通过外壳部件24可见（在替换性实施例中，第二区域64可为透明的或基本透明的）。在一个或多个配置中，由发光元件160产生的照明的外观可由外壳部件24的对应的部分的尺寸、形状、透明度以及其他外观属性限定。例如，发光元件160可实际为环形的（例如，环形灯管），但可用于照明外壳部件24的透明的矩形区域，以由此形成矩形标示（例如参见图2A）。标示系统20的多个灯160可绕装置组件10的周界的一部分延伸。在一个示例中，标示系统20的多个灯160延伸大致显示屏18的长度的相同长度。在标示系统20和显示屏18的多个灯之间的间隔也可为类似的。在另一示例中，灯部件160可绕周界的大致一半延伸，而在其他示例中，标示灯部件160可绕周界的大致三分之一延伸。在此外的其他示例中，灯部件160可绕可佩戴装置组件10的整个周界的3/4或大致整个周界延伸。还将理解构成标示系统的多个灯160可被集合在一起，其中标示系统可具有不同的段。标示系统20的不同段可以下文中将详述的不同的构造发光。每一个发光元件160可被视作显示屏的分立的单个段。从显示屏18和标示系统20的构造可理解，显示屏18可沿第一方向投射光，且标示系统20可沿第二方向20投射光，其中第一方向不同于第二方向。在一个示例性实施例中，第二方向可大致横向于第一方向。还将理解显示屏的灯部件可具有提供发光特性的不同的形式和结构。

图39-42是示出了形成根据本发明的方面的可佩戴装置组件的模制过程的示意图。在图39中，第一模170可用于形成可佩戴装置组件10的脊柱部件22。如所述，脊柱部件22的结构特征允许可佩戴装置组件10的各个电子构件和非电子构件的连接、插入和配合。脊柱部件22可由诸如注射进入模子170中的热塑性材料的塑性材料模制成。脊柱部件22可在诸如挠性区域的一些部分中较窄，以在这些区域中提供挠性。相对地，诸如支撑电池的段的其他部分可较厚，以提供更多的刚性。附加地，诸如电路和发光元件（例如LED）的电子构件可附连至更刚性的部分，以防止断裂。因此，脊柱部件22可和如上所述的其他构件装配。例如，电池组142、电路、显示屏18和标示系统20可和脊柱部件22装配。

如图40进一步所示，支撑各个构件中的一些的装配成的脊柱部件22可继而被缠绕或加载至插入芯部172，用于后续的注射成型。内直径或内部部分可继而注射成型在脊柱部件22上。在图41和42中，模制组件可继而插入外直径模子174中，且可佩戴装置组件10的外直径或外部部分可被模制，以完全地形成壳体12的外壳部件24。装置组件10可继而从插入芯部172移除。

将理解可使用附加的过程来形成诸如图1-6中示出的装置10的装置。在示例性实施例中，形成脊柱部件22的过程初始地包括形成电池隔室。如从图7A、7B、8A和8B可理解的，设置有模子，其中经由触变模制过程（thixo-molding process），镁被注射进入模子中，以形成触变模制部件55。镁制触变模制部件55和金属帽70、74（图2）协作，以提供电池142的大

Petitioner Samsung Ex-1004, 0166

致金属的壳。如所述，可使用其他金属成型过程。一旦形成后，触变模制部件55被布置在模子中，其中材料被注入该模子中，以形成脊柱部件22。材料被环绕触变模制部件55外模制，其中一定量的注射材料在部件55的内表面上延伸（图7-8）。将理解模子被设计为合并入脊柱部件22的基本刚性的部分，脊柱部件22的挠性区域46、48，以及其他用于接收、安装或以其方式支撑此处所述的装置10的各个构件的结构。在示例性实施例中，注入在触变模制部件55上以形成脊柱部件22的其余部分的材料是聚丙烯。

一旦形成脊柱部件22后，附加的构件被连接至脊柱部件22。例如，脊柱部件22的一个端部可和连接结构连接，该连接结构将和栓锁机构或间隔器元件中的任意一个协作。还将理解USB连接器94形成为具有上述的特征。如从图10A-10C可理解的，USB引线98设置为具有凸起的棱纹118，其例如通过冲压工艺形成。引线98布置在模子中，其中塑性注射模制材料绕引线98成型，以形成绕引线98的刚性本体96。将理解模子被设计为使得形成圆形开口116，且其中引线98继而被等距地间隔开且垂直地对齐。当引线98在圆形开口中凹陷时，凸起的肋部118延伸以靠近刚性本体96的顶表面114。模子还设计为在USB连接器94的刚性本体96中形成凹部100。形成后，USB连接器94连接至脊柱部件22的端部，而引线的端部将可用于连接至控制器（图9）。

具有附连的构件的脊柱部件22可继而插入模子中，其中装置的内直径部分被外模制（overmold）。热塑性弹性体材料被注入模子中，以形成壳体12的内部部分。将理解可使用粘性促进剂，其中粘性促进剂在外模制热塑性弹性体材料之前被施加至脊柱部件22的内表面。粘性促进剂辅助增强热塑性弹性体材料至脊柱部件22的粘结。在一个示例性实施例中，由3M公司出售的3M Primer94用作粘性促进剂。还将理解模子被设计为使得开口设置在壳体12的与将接收电池142的凹陷的隔室50、52连通的内部部分中。

附加的构件继而可附连至脊柱部件。如从图15和16可理解的，控制器14的PCB部件140形成有必需的电路、其他电子构件、天线、以及包括三轴加速度器在内的需要的传感器。此外，显示屏18和标示系统20构件还连接至PCB部件140。还将理解输入按键16在两杆注射成型工艺中形成，其中刚性基部部件整体地连接至挠性帽（图17-18）。输入按键也连接至PCB部件140。PCB部件140连接至脊柱部件22。PCB部件140缠绕至脊柱部件且大致以面-面接合（包括在脊柱部件22的挠性区域46、48处的接合）符合脊柱部件22的轮廓。（图6、15、16）PCB部件140固定地附连至脊柱部件22。如所述，该构造辅助提供其中来自挠曲的应力被最小化的更中性的轴线。USB连接器94的引线的端部还焊接至PCB部件140。电池142插入在电池隔室（图19-20)中。凸起的触点布置为通过电池隔室50、52中的开口59，其中触点和印刷电路板上的接收触点匹配。电池闭合部件经由螺纹紧固件（图2）固定地附连至装置的内部部分，其中电池触点被朝向和PCB部件140关联的匹配触点偏置。

该中间组件继而被插入在附加的模子中，用于附加的外模制过程。模子包括工具，其接合输入按键16的第一环表面82和第二环表面86，以阻止热塑性弹性体材料移入输入按键16的内部部分中（图17-18）。热塑性弹性体材料被注入模子中，以完成外壳部件24的制成。在一个示例性实施例中，脊柱部件22包括具有端口开口380的管结构，其中材料通过该管结构注入，

Petitioner Samsung Ex-1004, 0167

以形成外壳部件24的外部部分。如图19A所示，端口开口380设置在电池隔室52的倾斜表面中，且通过脊柱部件22和管结构连通。一旦布置在恰当的模子部件中，注入的材料被注射通过端口开口380，并在模子中流动，以形成外壳部件24的外部部分。将理解端口开口380可位于脊柱部件22的电池隔室或其他位置中。端口开口380还可包括多个端口开口。因此，支撑在脊柱部件22上的各个构件被罩入在外壳部件24中。热塑性弹性体材料流至输入按键16的侧表面并与其接合，其中材料的进一步流动被工具阻止（见图6）。一旦外模制过程完成，则栓锁机构的接收器部分以及任意需要的间隔器元件可被附连（图2、3和19）。在这样的构造中，将理解壳体12是容易挠性的，以允许将装置布置在用户的腕部上。装置10在脊柱部件22的挠性区域46、48处挠曲，其中将理解电池142安装于其上的多个刚性段一起移动。外壳部件24的弹性属性方便地允许这样的枢转，而同时提供充分的结构，以保护由脊柱部件22支撑的构件。

装置10继而被形成，且可用于操作（图2）。下文描述了操作以及其他用户体验。

本发明的装置10包括多个替换性结构和构造。例如，图21-38公开了可在装置10中使用以及可和上述的装置10的特征接合的壳体12、控制器14、显示屏18以及标示系统20的各个构件的附加的实施例。

图21A-D示出了可用于本发明的装置10的脊柱部件和电池的替换性实施例的示意性侧视图。通过类似的附图标记引用类似的结构。脊柱部件22a包括多个挠性区域46a、48a和刚性段或基本刚性的段或区域42a、44a。图21A-D示出了形为脊柱部件22a的较薄部分的挠性区域。较薄部分可对应于更挠性的区域，而脊柱部件22a的较厚部分可对应于多个非挠性区域或刚性区域。将理解脊柱部件22a更易挠曲，或更易绕挠性区域铰链地枢转。刚性区域42a、44a可能为非挠性的，以允许诸如电路板、发光系统、电池组以及其他电子组件的非挠性构件被固定。例如，刚性区域42a、44a可各自包括电池组142。附加地或替换地，一个或多个刚性区域42a、44a可包括用于处理、存储和/或感知运动信息的电路。显示构件可设置在大致在支撑电池的刚性区域42a、44a之间延伸的附加的中心刚性区域中。刚性区域42a、44a可具有受限量的挠性，以至少允许装置组件10的预定量的延展。

如从图21A-21B可理解的，电池组142的长度可被调节，以增加或减少电池容量。由于电池组142的长度的变化，显示构件、标示系统构件、或其他控制器构件的长度或其他尺寸也可被影响。例如，如果电池组142的长度增加，则显示器的尺寸或显示屏可降低，以进行补偿。类似地，在图21C-21D中，电池组142的厚度可被改动，以调节电池容量和装置续航。通过增加装置的厚度而不是长度，挠性区域的尺寸可最大化，这是由于不存在电池组142沿装置组件10的长度的延展。但是，增加厚度也可增加重量和/或装置周界。电池142和刚性段或区域42a、44a可协同地尺寸设定为提供一装置10，其具有合适的容量以在重新充电之前记录活动以及显示信息。

图22和23公开了根据本发明的替换性实施例的控制器的构件。通过类似的附图标记引用类似的构件。PCB部件140支撑控制器14的其他构件。标示系统20还设置有分立的灯部件隔室180以及布置在标示系统的灯部件

Petitioner Samsung Ex-1004, 0168

上的罩部件182。附加的罩部件184可布置在PCB部件140上，如图23A-C所示。可理解如图23A-C所示的控制器可缠绕在脊柱部件22，并固定地附连至其。

图24-27公开了装置10的替换性实施例的显示构件。图24公开了根据本发明的替换性实施例的显示屏的构件的分解视图。可通过类似的附图标记引用类似的构件。该实施例中的显示屏18包括多个灯部件152，其操作地连接至控制器14的PCB部件，且安装至脊柱部件22。密封部件190包括通过其的开口，并形状设定为布置为围绕多个灯部件152的周界边沿。包括多个通过其的孔的第一帽部件192布置在多个灯部件152上。孔布置为对应于相应的灯部件。一对附加的透明罩部件194布置在帽部件192上。也可使用单个透明的罩部件。如从图24可理解的，密封部件190、帽部件192和罩部件194布置在显示屏18的多个灯部件152上。帽部件192夹在密封部件190和罩部件194之间。当多个灯部件152发光时，光可穿过帽部件192的孔并通过罩部件194可见。

图25A和25B更详尽地公开了帽部件192。帽部件192配置为布置在显示屏18的多个灯部件152上。帽部件192具有凸起的外表面。图25B公开了图25A中示出的帽部件的底部视图。帽部件192具有多个孔，其大致对应于显示屏18的多个灯部件152的位置。如图26进一步示出的，每一个孔都和延伸进入帽部件192的底部侧中的柱196连通。如图26和27所示，每一个柱196都具有大致截头圆锥体形状。柱的底部部分尺寸设定为完全围绕显示屏18的灯部件152。如可从图26和27理解的，帽部件192布置在多个灯部件152上，其中每一个灯部件152布置在帽部件192的相应的柱196中。装置10的外壳部件24布置在帽部件192上，且结构和尺寸设定为使得当灯部件发光时，光通过外壳部件24可见。如图27所示，当灯部件发光时，截头圆锥体柱196辅助反射光，使得光被以更集中的方式引导通过孔和外壳部件24。将理解在该实施例中外壳部件可包括开口，其中透明的罩部件194延伸通过该开口，且其中灯部件通过该开口可见。

图28和29示出了显示屏的附加的替换性实施例。在图28中，薄、透明的罩部件198布置在显示屏的多个灯部件152上。包括多个互连的帽的帽部件200布置在多个灯部件152上。每一个帽都尺寸设定为配合在相应的灯部件上。图29还示出了在多个灯部件上使用透明罩部件202的显示屏。包括多个孔的帽部件204布置在罩部件202上。

图30示出了USB连接器94的局部横截视图。USB连接器94连接至脊柱部件22的远端部。USB连接器包括多个USB引线98，且其中USB引线98包括位于其上的棱纹，并由此具有凸起的构造。如图30进一步示出的，USB引线连接至延伸穿过脊柱部件22的连接器，且操作地连接至控制器14。

图31-33示出了可在本发明的装置10中使用的替换性紧固机构。紧固机构300包括协作构件，其可操作地和装置10的壳体12相关联。紧固部件300大致包括第一突起部件302和第二接收器部件304。和此前的实施例类似，紧固机构并入了USB装置，该USB装置配置为在一侧附连至装置组件10的壳体12，并在另一侧连接至壳体12的接收端部。例如，如图31A和31B所示，并入第一突起部件302中的USB连接器306可插入第二接收器

Petitioner Samsung Ex-1004, 0169

部件304。USB连接器结构上和此前的实施例类似，且包括多个引线。接收器部件304包括开口308或槽，其具有对应于USB连接器306的尺寸和形状。接收器部件304的开口308可包括弹簧加载栓锁310，其配置为在插入后将USB连接器306固定至接收器部件304。开口308或槽可沿长度方向延伸穿过整个接收器部件304。接收器部件304的长度可小于USB连接器306的整个长度。在一个示例中，接收器部件304的长度可对应于USB连接器306的长度的约一半或1/3。弹簧加载栓锁310可延伸出并通过接收器部件304的尾部部分，以在USB连接器306完全插入接收器部件304时和USB连接器306的一个或多个部分对齐。

图32A示出了接收器部件304的内部视图。栓锁310绕弹簧312枢转，且将栓锁偏置至栓锁位置。栓锁310还包括指针314和按键316，以激活栓锁310。栓锁指针314沿相反的方向枢转至按键316。通过按压按键316，指针314可从USB连接器306移出（图31A-31B），允许USB连接器306从接收器部件304移除/拆下。

图32b示出了配置为和接收器部件302的栓锁310接合的USB连接器306的底表面。USB连接器306的底表面包括限定出接合表面320的凹部318，其中栓锁310配置为当USB连接器306插入时接合该表面。在示出的布置中，凹部318位于USB连接器306和USB连接器引线相对的表面上。

由于接收器部件304可能较USB连接器306的整个长度短，可佩戴装置组件10的壳体的端部可包括一开口，开口的长度等于在插入接收器部件304后保持曝露在外的USB连接器61的长度。

图33A-33D示出了一过程，通过其USB连接器306插入接收器部件304以及可佩戴装置组件10的壳体12的端部中的另一开口，接收器部件304附连至该另一开口。在图33A中，栓锁310可初始地偏置，使得指针314突出进入壳体12的开口中。随着USB连接器306插入接收器部件304的开口308且进入附加的开口（如图33B所示），指针314可由接触指针314的倾斜表面的USB连接器306向下施压。在USB连接器306被插入接收器304以及开口至一点后（在该点处凹部318和栓锁310对齐），指针314可突出进入凹部318并由于如图33D所示的弹簧偏置而接合接合表面320。该接合提供了USB连接器306和接收器部件304之间的牢固的连接。相应地，紧固机构设置在装置10的壳体的端部之间。

图34A和34B公开了用于增加可佩戴装置组件10的尺寸的间隔器组件或延展元件，且其还可和图31-33中示出的紧固机构300一起使用。延展元件还可包括开口336，USB连接器306的一部分可插入该开口中并和其接合。示例性地，图34A-34B示出了延展元件330，其包括配置为和壳体12中的开口334接合并连接的连接器部分332。可连接部可具有多种形式。例如，连接器部分332的形状可匹配开口334的形状和尺寸。为了促进延展元件的使用，接收器部件304可从可佩戴装置组件10的主本体可移除地拆下。延展元件330可继而被插至接收器部件304和壳体12的端部之间。在开口334和/或连接器部分332中还可包括扣或其他类型的紧固机构，以提供牢固的附连。延展元件330的一个端部可包括开口336，其具有和壳体12的端部中的开口334类似的形状和尺寸。这在用户希望使用一个或多个延展元件时允许

Petitioner Samsung Ex-1004, 0170

USB连接器306和延展元件330中的开口匹配。图34B示出了延展元件330插入以及USB连接器连接至接收部分之后的整个装置组件。

图35-37示出了另一示例性替换性紧固机构，其中可使用micro USB连接器来取代全尺寸USB连接器。在该布置中，micro USB连接器其在形状上逐渐收窄，以帮助简化micro USB连接器和可佩戴装置组件10的另一端部的接收部分之间的接合。紧固机构350包括协作构件，其可操作地和装置的壳体12相关联。紧固部件300大致包括第一突起部件352和第二接收器部件354。

如图35A-C所示，第一突起部件352支撑micro USB连接器356。micro USB连接器356可包括可用于将micro USB连接器端部356固定至可佩戴装置组件10的接收器部件354的金属栓358。

图36A和36B示出了接收器部件354的不同透视图。如所示，接收器部件354包括具有支撑在其中的钩部件360的开口，以栓锁至金属栓358（参见图35B和35C）。在示例性实施例中，钩部件360可使用弹簧部件362偏置，且由可按压按键364克服弹簧偏压而移动。

图37A-E示出了一示例性过程，通过其第一突起部件352的micro USB连接器356连接至接收器部件354。随着micro USB连接器356插入接收器部件354的开口，钩部件360的倾斜表面接合金属栓358，且向上对抗弹簧362的力受压。一旦进一步插入开口中，钩部件360超出金属栓358，其中弹簧362向下偏置钩，其中钩部件360接合栓358，其中栓锁机构处在栓锁位置中。用户可按压按键364以脱开部件352、354。

图38A和38B示出了使用延展元件370的图35-37的紧固机构350。特别地，接收器部件354可从可佩戴装置组件10的壳体12可移除地拆下，使得诸如延展元件370的延展元件可插在接收器部件354和可佩戴装置组件10的壳体12之间。每一个延展元件370都可包括开口372，其中接收器部件354可插入该开口并固定至其。图38B示出了具有mirco USB连接器356以及插入的延展元件370或间隔器的可佩戴装置组件10。

将理解可使用其他替换性紧固机构来可脱开地连接可佩戴装置组件的壳体12的远端部。其他结构可包括干涉配合连接部、钩环紧固件、或其他扣类型构造。壳体12还可包括永久的环形构造，而同时具有延展的构造，以允许用户将组件安装在腕部等。

如此处所述以及示出的，可佩戴装置组件10的各个构件由脊柱部件22连接和支撑，其中弹性体材料形成在构件上，以将装置10布置在其最终形态中，如图1和2所示。如从附图可理解的，紧固机构26可被解开栓锁，其中装置10可布置为绕用户的腕部，且紧固机构26可继而布置在栓锁位置中。需要的话，用户可所有时间都佩带装置10。

Petitioner Samsung Ex-1004, 0171

当由用户佩带时，装置10可追踪用户的活动。将理解装置10的控制器14具有和控制器以及传感器相关联的一些算法，以处理和利用由一个或多个传感器感知的数据。将理解控制器可按照需要利用单个算法或多个算法。可将一些算法用于由用户参与的特定活动。控制器10还可配置为使得一些算法被基于由传感器感知的数据自动地选择。在示例性实施例中，输入可被提供至装置10用于激活，其中装置10开始追踪用户的活动。例如，诸如三轴加速度器的传感器可感知用户的运动，其中装置10记录和这样的运动相关联的数据。追踪的活动可变动，包括由用户采取的步骤、由用户消耗的能量或其他指标或参数。追踪的一些参数还可包括速度和距离、心率、或其他参数。可将附加的处理和传感器、算法以及感知的数据一起使用。在一个示例性实施例中，装置10可利用转换函数/算法，其转换加速度器测得的数据以及能量消耗，其中加速度被映射至近似氧气动力学（消耗的卡路里）。显示和/或标示系统可显示标示这样的活动的标识。装置还可和与用户或远端站点（诸如专用于健身或健康相关专题的站点）相关联的移动装置无线地交互。在一些预定的时刻，用户可能希望将数据从该装置传送至另一位置。如图44所示，用户可能将装置10解栓锁，并将USB连接器94插入计算机中。作为响应，存储在装置10上的数据可转移至用户的计算机和/或至用于进一步处理和显示的远端站点。数据也可从用户的计算机或远端站点加载至装置10。装置10和/或计算机可配置为使得用户被提醒开始数据传输，或数据传输可在装置10被插入计算机的端口中时自动地开始。这样的数据可配置为触发装置10上的可操作事件，诸如基于时间、活动货币或其他变量点亮显示屏或标示系统。当装置10插入计算机中以同步和传输数据时，标示系统的一些灯部件可被点亮，以标示同步过程。当USB连接器94插入用户的计算机时，装置10也可被充电。将理解装置10还可配置为使得数据传输和/或装置充电可经由无线和/或有线连接完成。例如，装置10可配置为经由感应充电对电池重新充电。装置10还可配置为如果装置10感知另一合适的配对装置则自动地无线传输数据。一旦同步过程完成且装置10被充分地充电，装置10可从计算机移除，并由用户再次佩带和激活，以开始检测活动。将在下文中描述和装置的运行相关联的其他的用户界面和用户体验。在一些布置中，标示系统（例如标示系统20）可为第二显示屏。标示系统20和显示屏18可独立于彼此地被控制。

图43是可佩戴活动检测和追踪装置4300的示例性块状图。装置可包括包括主控制器或主机处理器4301在内的多个构件，该主控制器或主机处理器配置为执行指令并根据指令控制装置4300的其他构件。装置4300还可包括用于存储数据和指令的存储器，包括易失性和非易失性存储器，诸如随机存取存储器（RAM）4304、只读存储器（ROM）4305和存储器4307。此外，装置4300可包括充电构件4309，用于对给装置4300供电的一个或多个电池（未示出）充电。装置4300还可包括各种输入和输出适配器以及其他构件，包括环境光传感器4311、显示屏适配器4313、加速度器4314和输入适配器4317。为了可视性，可将环境光传感器4311用来确定一个或多个显示屏的亮度水平。也可将光传感器4311用来确定大致的每天中的时间。输入适配器4317可配置为接收和处理各种类型的输入，包括按钮按压、触摸输入、滚轮输入等，取决于包括在装置4300中的输入装置的类型。加速度器4315可配置为用于在装置被佩带时监测可佩戴装置和用户的运动。在一些示例中，加速度器4315可为六轴加速度器。包括心率传感器、温度传感器、湿度传感器等在内的其他传感器也可包括在装置4300中。

装置4300的通信可通过有线以及无线连接装置进行。在一个示例中，装置4300可包括无线电构件4319，其配置为通过无线电频率传输和其他装

Petitioner Samsung Ex-1004, 0172

置无线地通信。无线电构件4319可对应于蓝牙收发器、RFID装置、Wi-LAN收发器、蜂窝收发器等和/或以上的组合，和/或可包括专用的处理器。显示适配器4313可配置为控制装置的一个或多个显示屏，以传输各种活动信息、交互信息、警报、告示等。在一个示例中，显示屏适配器4313可配置为独立于控制装置4300的第二显示屏而控制第一显示屏。可佩戴装置还可包括诸如全球定位系统（GPS）构件4321的位置确定构件。位置确定还可使用包括蜂窝收发器（例如基于蜂窝网络三角测量）在内的其他装置进行。此处描述的构件可合并进入单个装置中，或可分布在多个构件上。此外，可将附加的或替换的构件用于提供附加的替换性的功能。

例如，装置10可提供每日进度目标标示。用户可设定装置10的目标，其中用户将在一天或24个小时的周期或更少的时间周期中完成一定量的活动。装置10可在用户在该一天中进展时检测和记录用户的活动。基于感知的活动，控制器点亮标示系统上对应于朝向在装置10上设定的目标的进度的灯元件。例如，基于朝向用户的目标的进度的量（例如，a%）的标示系统上的多个灯元件被点亮。此外，点亮的灯部件的颜色标示用户在最近的预定量的时间上的活跃程度。例如，标示系统可被点亮，以用从红至黄至绿的颜色梯度示出用户在最近的一个小时的活跃程度，其中红色为最不活跃，而绿色为最活跃。当用户参与了完成目标的足够的活动时，标示系统的全部灯元件将被点亮。一个或多个灯元件（例如，在标示系统或显示屏的侧部上）也可开关地闪烁，以标示已经达成目标。例如，最左的灯元件可每5秒开关地闪烁一次，直至接收一些用户交互（例如，通过特定的输入装置或任意输入装置的用户输入）。即使在装置未和用户交互时也可触发这样的闪烁构造。也可经由与控制器操作地关联且由壳体支撑的扬声器提供声学的警报。装置10还可具有可后续由用户变动的初始缺省目标。如果设定了新目标，标示系统的特定的灯元件可初始地闪烁，以向用户标示标示系统上目标进度将从何处开始。在此处进一步描述了目标和目标追踪。附加地或替换地，可在每天中的预定时刻处或在目标时间周期过期时重置目标和运动信息。

如所述，装置10追踪用户活动并诸如在标示系统20上显示标示这样的活动的标识。装置10能够根据若干不同的特征显示数据。在一个示例性实施例，标示系统20包括20个灯部件。标示系统的每个灯部件可显示多个被不同地感知的颜色，包括诸如红色、黄色、绿色、橙色、白色、蓝色或其他希望的颜色在内的颜色。可点亮一定数量的灯元件来标示活动水平（例如，一个点亮的灯元件用于低活跃度而20个点亮的灯元件用于高活跃度），且可将一定的颜色用于标示活动水平（例如，红色用于低活跃度，黄色用于中等活跃度而绿色用于高活跃度）。也可使用这样点亮的灯元件的组合。此外，可将特定的点亮的颜色或点亮的颜色图样用于特定的用途，例如用于标示特定的发起的时间，用于标示该用户正在进行支持慈善的活动，或用于标示该用户正在和其他用户进行交互。标示系统的多个灯元件也可指定成独立的段，以显示根据此处描述的本发明的方面的标识。

根据一个或多个构造，诸如可佩戴装置4300（图43）的可佩戴运动表现装置可包括多个模式和功能。在一个示例中，在装置已经激活了第一时间后，装置可进入初始启动模式，其显示标示装置将被插入计算机的图标。一旦连接至计算机，装置可进入设置模式，允许用户通过在该装置连接至的计算机上执行的程序配置装置的各个方面。在特定的示例中，计算机上的设置程序可在装置连接后自动地安装在计算机上且由计算机启动。在一些情形中，设置程序可存储在装置上，并在连接装置后传输至并安装在计算机上。

Petitioner Samsung Ex-1004, 0173

附加地或替换地，在设置模式中，电池图标可显示在装置的显示屏上（例如，顶部显示屏或侧部显示屏），标示当前的电池水平。电池标示可保持在装置的显示屏上，直至装置组件从计算机拔下为止。在一些布置中，为了从设置模式前进（例如，至诸如活动追踪模式的后续模式），用户可能需要通过设置程序完成设置过程。如果用户在完成设置过程之前拔下装置，装置可能返回预设定模式（例如，初始启动模式）。如果用户通过设置程序完成设置过程，则装置可进入后续的模式，诸如活动评价模式。在一些示例中，活动评价模式可能仅在装置已经达到一定量的电池充电量时（例如，20%、30%、40%、50%、65%、75%、100%等）可用或被激活。在其他示例中，活动评价模式可不论电池充电水平而都可用或被激活。

活动评价模式可能包括装置的初始激活之后的特定时间周期，在其中用户的活动水平被测量和记录。活动评价模式可能为装置完全激活之前（例如，解锁全部功能）必需的活动。图45示出了装置的活动评价模式的示例性流程图。流程图4500可代表活动评价模式被激活后的功能或状态流程。在特定的示例中，其中用户的活动水平被测量和记录的时间周期可为1天（例如，24小时）。但是，可使用任意的时间周期，包括30分钟、1小时、6小时、12小时、1周、5天等。在一些布置中，可将该时间周期用于校准装置和/或建立装置的佩戴者的基线活动水平。校准可包括确定检测到的运动表现指标值和实际运动指标值之间的转换系数。例如，如果装置检测到用户奔跑了0.8英里，但实际奔跑距离为1英里（例如，基于用户的自身测量或判断），则校准可设定1.25的转换系数，以弥补该偏差。另一方面，基线测量可用于确定用户的当前和/或典型（例如平均）运动活动水平，并可用于定义用户运动水平中的目标以及确定趋势。

图4500的过程仅可在装置确定初始校准或基线活动测量未被进行或尚未完成时可执行。例如，装置可在进行初始校准或基线活动水平测量后设置标志，从而评价模式不会被再次激活。相应地，如果标志未被设置，装置可进行图4500的过程。替换地，装置可检查校准或基线活动测量数据，以确定是否进行了初始基准或基线测量。在一些示例中，如果初始校准和/或基线活动水平测量已经完成（例如，在初始事件已经过去或过期时），可设置标志。

图4500的过程可包括用于确定评价时间周期是否已经过期的剩余时间检查、用于确定消息是否在装置或连接至的通信装置上接收到的消息检查、用于确定可用充电量水平以及确定充电水平是否低于特定的阈值的低电量警报屏显的的电池检查。附加地或替换地，可进行存储器检查以确定装置上的可用存储器量是否为低。如果是的话，将显示警报和/或装置可能不允许进一步的数据追踪和存储。例如，使用加速度器检测到的数据可能不能记录或存储在装置中。

可当装置处于睡眠模式时在装置上的按键被按压或与装置上的输入构件的其他交互后，进行和展示各种检查和警报信息。睡眠模式可对应于其中显示屏未激活的模式。例如，睡眠模式可对应于一模式，其中在没有用户交互的预定量的时间后（例如，没有按压一个或多个按键或与装置上的输入机构的其他交互）一个或多个显示屏被中止。在特定示例中，用户可按压按键以观察消耗的卡路里的量。装置上的屏显可标示消耗的卡路里的量，并如果没有接受到进一步的用户交互则随后关闭。屏显可包括信息的静态显示（例

Petitioner Samsung Ex-1004, 0174

如，文本、图表、图像、标记等）以及动画。在一些布置中，信息还可听觉地或触觉地传播。根据一些构造，睡眠模式可对应于未激活显示屏模式，而不活跃或低功耗模式可对应于一定量的非活跃时间后一个或多个附加的构件的中止。睡眠模式不需要基于不活跃的时间的量。

用于进入睡眠或不活跃模式的暂停时间周期可能对于不同的功能和信息屏显来说是不同的。例如，链接或配对功能可能具有较长的暂停时间周期，因为相较于诸如输入标记，可能花费较长的时间量来建立链接。此外，暂停周期可能在不同的装置模式之间时不同，诸如在信息显示模式或循环模式之间以及在动作模式或循环模式之间不同。

睡眠模式可包括一状态，其中显示和标示系统两者都不点亮。通过按压输入按键，用户可检查活动进度。响应于按压输入按键，标示系统可以动画的方式点亮，其中单独的灯部件被渐进地点亮，直至灯部件达到对应于用户的活动水平的数量。如果用户未按压装置上的按键，或以其他方式和装置交互（例如，装置的移动、使用装置的任意输入元件等），装置可能在预定的时间量（例如4秒、30秒、1分钟、2分钟等)之后进入睡眠模式或不活跃模式，这是用户可配置的。装置还可提供倒计时屏显，作为图4500的过程的一部分。倒计时可标示用于评价周期的剩余时间量。例如，评价周期可在24小时处开始，并从其开始倒数。如果评价周期过去了（例如，剩余时间量为0），装置可显示评价完成信息，而不是倒计时信息。在一些示例中，倒计时或评估完成信息可能是总在第一次按键按压或天或活动时间周期(例如，目标时间周期）的其他用户交互时显示的第一信息界面。在其他示例中，倒计时或评估完成信息可能总是基于其他规则首先被显示，这些其他规则包括检测到第一次按键按压或时间、分钟、12小时、上午、下午、晚间等的用户交互。但其他的触发器可包括特定的按键或其他具体的输入机构被按压和/或输入的类型（包括按键被按压的时间的量、按键按压的模式（例如，5秒内4次短按键按压或1次短按键按压后2秒的按键按压等））。可使用这样的显示规则来最大化显示的信息与用户的相关度。如果装置确定已经完成了评价周期，替代显示倒计时，装置可显示祝贺完成的信息，后面是插头的图表或动画，要求用户将装置连接至计算装置，以同步数据（例如，上传记录的活动信息至计算装置)。

在接收到进一步的按键按压后（或相同类型或不同类型的用户交互后），装置屏显可在累计点数屏显（例如，运动活动测量屏显）、每日时间屏显、卡路里屏显、步骤屏显和消息屏显之间滚动。在一些示例中，信息屏显可仅在在装置或连接至的通信装置上有信息时示出。例如，装置可无线或有线地连接至诸如移动电话的通信装置。相应地，装置可配置为检测移动电话上的信息（例如，接收其告示）。信息可包括语音邮件信息、电子邮件信息、短消息、多媒体消息等。如果没有消息是可用的，装置可能不显示信息屏显（例如，不是显示0信息，可能不提供信息屏显）。在一些布置中，装置可能仅提供新信息或未读/未听取信息数量的标示。在评价模式时间周期过期后，一个或多个指标或信息屏显可能被隐藏，和可能不再可被访问或观察。例如，在评价模式时间周期过期后，活动点数屏显、卡路里屏显和步骤屏显可能被隐藏或不再显示，留下每日时间和/或信息数量作为仅有的可观察或可读取屏显。

根据一些构造，可能需要装置上评价模式的完成来进入活动目标追踪模

Petitioner Samsung Ex-1004, 0175

式。在一个示例中，评价模式的完成可包括将装置连接至计算装置，并将数据和计算装置同步。在一些布置中，装置可无线地（或使用有线的连接）和移动装置同步。计算装置和/或其上执行的软件可能后续地传输信号至装置，激活活动目标设置模式。在一些示例中，同步可能上传至远端网络站点。相应地，在确定评价周期已经完成且该时间周期的活动数据已经同步后，可能由远端网络站点授权或以其他方式规定活动目标追踪模式的激活。替换地或附加地，可佩戴装置可独立地或和其他装置或系统结合地确定评价时间周期是否已经完成，和在确定评价时间周期已经完成后激活目标追踪模式。

活动目标追踪模式可包括两个用户界面子模式：信息循环模式和动作循环模式。信息循环模式可包括第一组界面，其显示活动和时间信息至用户，而动作循环模式可包括第二组界面，其提供使用装置的各个功能的可访问性。信息显示循环可由第一持续时间长度的按键按压激活，而活动循环可由第二持续时间长度的按键按压激活。在一个示例中，第一持续时间长度可为0.5秒，而第二持续时间长度可为多于2秒。可定义其他的持续时间长度和交互规则用于活动目的追踪模式中的各个循环的激活。附加地或替换地，在这些模式的每一个中提供的信息或界面可以不同的方式表现出，以帮助用户区别两个模式或循环。例如，信息显示循环的界面可沿第一方向（例如水平地）在显示屏上滚动，而活动循环的界面可沿第二方向(例如垂直地）在显示屏上滚动。图46示出了目标追踪模式中信息显示循环的过程流程图。目标追踪模式可包括当目标设定时和当目标未设定时追踪用户活动。在信息显示循环中，装置可在检测到诸如按键按压的用户交互或输入后初始地进行一系列检查4601。在一些布置中，该系列检查4601可仅以特定的日程进行（例如，每小时一次、每30分钟一次、每5分钟一次、每30秒一次等）。因此，该系列检查设置为仅每分钟一次进行，装置可仅当用户在一分钟周期中按压按键超过一次时进行一次检查4601。

在完成检查4601以及显示了任意可用的警告信息后，装置可在例如通过进入睡眠模式或不活跃模式而离开信息显示循环之前转至显示最后看过的指标或屏显。例如，如果用户在特定的时间量中未和装置交互，则装置可通过中止一个或多个屏显（例如，为了节约电力）和/或其他装置构件而从信息屏显循环暂停。在一些布置中，当装置使用时第一次按键按压后（或其他用户交互后）或当装置被第一次使用时或当装置被重置时（例如，替代显示最后看的指标），可一直首先显示活动点数的数量。在另一示例中，在第一次按键按压、重置等之后，每天的时间可一直作为第一信息屏显显示出。指标或屏显可包括活动点数、每日时间、卡路里、跨步、信息等，且可从信息屏显循环切换开关。例如，用户可选择将卡路里和跨步从信息屏显移除，使得卡路里和跨步不在用户滚动浏览活动指标和信息时显示。

图47A、47B和48-52示出了示例性装置界面屏显，其可在信息循环中提供。根据一个或多个方面，包括在信息屏显中的活动信息可包括在评价模式中可观察或访问的信息之外的不同的活动指标或信息类型。在一个示例中，信息循环可包括至少一个未包括在评价模式的信息界面中的指标。

图47A和47B示出了活动点数（activity point）屏显。例如，在图47A中，装置可初始地在顶部显示屏4701中显示活动点数符号，以及在侧部显示屏4707中显示累计的活动点数4703的当前量以及标示活动点数4705的目标水平的标识。累计的活动点数4703的量可由在显示屏4707旁激活的灯

Petitioner Samsung Ex-1004, 0176

的数目（例如LED)或可点亮段表示。例如，如果有20盏灯或可点亮段，每一个灯或段可代表目标的5%。因此，如果用户已经完成目标的50%，则可点亮10个标示灯或段。在另一示例中，目标量的99%或99.99%可被均匀地划分，或以除一个之外的可点亮段标示。最后的段仅在通过完成目标的最后1%或0.01%而实现目标时点亮。因此，如果有20盏灯，前19盏灯的每一个可代表目标的99.99%/19。最后的段或等可代表目标的最后0.01%。

在一些布置中，显示屏4707旁的灯可颜色不同，或可配置为基于达到的活动水平而改变颜色。例如，显示屏4707中的灯的颜色可从右至左（或替换地从左至右）从红过渡至绿。显示屏4707中的灯可改变颜色，使得全部激活的灯显示取决于用户活动水平的相同颜色。例如，如果用户已经累积了低水平的活动点数，20盏灯中的3盏可点亮，且灯可以红色点亮，而如果用户已经累积了中等水平的活动点数，20盏灯中的10盏可点亮，全部呈黄色。在又一示例中，灯可闪烁或以其他方式成动画，以反映活动水平。在特定的示例中，随着用户累积更多的活动点数，灯可更快地闪烁。可将颜色、图案、动画等的各个其他组合用来传输活动水平。

标示以及活动点数水平的屏显可以一种或多种构造成动画。例如，标示可在显示屏4701上滚动。附加地，侧部显示屏4707的灯或可点亮段可以和标示在显示屏4701上滚动至最终位置的相同速率顺序地（例如，从右至左）点亮。侧部显示屏4707的目标灯或段可闪烁一定次数，以表示目标活动水平。一旦点数图标或标示已经被显示，活动点数的数量可显示在顶部显示屏4701中，替代图标或标示。显示图标或标示可向用户通告将被显示的指标。在一些情形中，活动点数的数量的显示可使得侧部显示屏4707被清空（例如，全部灯或可点亮段中止）。在其他布置中，装置可在即使活动点数的数量显示在顶部显示屏4701中之后将活动水平和目标信息保持在侧部显示屏4707上。

图47B示出了示例性屏显，其中对应于当前目标进度的数量的侧部显示元件4711以顺序的方式点亮。在一个示例中，侧部显示元件4711的数量点亮的速率对应于累积的活动点数的量在顶部显示屏4715上滚动或以其他方式显示的速率。

图48-50示出了包括时间（图48）、卡路里（图49)和跨步（图50）在内的活动指标的附加示例。这些附加的活动指标的显示可类似于活动点数的显示地操作。尽管未示出，也可将侧部显示屏用于追踪具体至每一个活动指标的目标。因此，用户可为各个活动指标中的每一个设定不同的目标，并分立地追踪这些目标。装置可在接收用户互动（例如按键按压）之后，显示特定指标，确定是否为该指标设定了目标。如果是，则装置也可激活且在侧部显示屏中显示目标信息。

图51和52示出了在用户达到目标或目标后可显示的示例性界面。在显示活动点数总量或在显示目标设定至的任意其他指标之后，可显示目标祝贺。替换地，可在不显示指标值的情况下显示目标祝贺。目标祝贺信息可包括用户指明或选定的图案或信息。替换地或附加地，装置的侧部显示屏可提供目标已经达到的标示，而不论装置是否当前显示信息循环。例如，在达到活动点数目标之后，侧部显示屏可以静态的方式或以动画的方式(例如，以

Petitioner Samsung Ex-1004, 0177

从左至右的顺序等闪烁或激活灯）点亮一个或多个灯或可点亮段，来标示目标已经达到。在特定的示例中，最左边的可点亮段或灯可闪烁，以标示用户已经达到他或她的目标。装置可在进入睡眠模式之后停止标示目标完成，但在退出睡眠模式后（例如，在活动传感器检测到活动或运动后）重新激活目标标示。目标完成标识还可在目标祝贺屏显开始（例如按压按键以显示目标祝贺图像或图标）之后停止闪动或闪烁。可取决于用户偏好将目标祝贺信息和目标实现标识切换开关。在一个或多个布置中，装置还可显示完成目标仍然需要的活动点数的量。在目标以外，也可标示奖牌以及其他成就。

图53示出了另一示例性系列装置屏显，其标示用户已经完成他或她的目标。特别地，可佩戴装置组件显示诸如代表目标完成的奖牌5301的符号。目标信息还可自动地显示（例如，在显示奖牌5301之后）或在用户选择按键5303之后显示。其他的目标信息可包括标示目标已经达成的信息，以及，在一些情形中，标示用户是否已经超过目标以特定的量（例如，50卡路里或50分钟或50英里）。标识灯5303还可通过点亮预定的灯（诸如最右边的标识灯5307）且在一些布置中，点亮特定颜色的灯（诸如绿色）来标示目标完成。灯可在用户朝向目标进展时从左至右点亮或从右至左点亮。侧部显示屏在目标何时达成之外显示目标何时被超过具体的量（例如达到目标，但未实现具体的超过量）。例如，侧部显示屏可间隔地点亮灯元件，以表示用户超出了目标10%或一指标的绝对值。如果用户超过目标25%，则侧部显示屏可交替地点亮侧部显示屏的左半个和侧部显示屏的右半个。可使用任意的各种图案、动画、发光构造、颜色等。

图54示出了示例性滚动消息，其可在用户完成运动目标后显示在可佩戴装置组件上。

图55示出了示例性滚动消息，其可在用户完成运动目标后显示在可佩戴装置组件上。新的目标（例如，在完成前一目标之后）可由用户设定或可适应性地被控制和限定。在一个示例中，可佩戴装置组件可在完成前一目标和/或目标时间周期后通过增加跑动的距离、消耗的卡路里、举起的重量、达到的心率、进行运动活动的时间的量和/或这些的组合而自动地定义用户的目标。但是，如果用户未完成前一目标，装置可能不增加目标和/或将目标增加和用户已经完成目标相比较小的量。在一些布置中，可基于由用户表明的总体目标而限定适应性限定的目标。例如，如果用户表达了针对马拉松进行训练的愿望，可佩戴装置组件可在锻炼计划上限定新的目标，以帮助用户达到将允许他或她跑动26.2英里的耐力水平。

图56示出了用于显示距离信息的示例性界面。

图57A和57B示出了可佩戴装置组件的示例性电池水平标示屏显。例如，在图57A中，屏显可仅包括电池图案或可包括电池图案或图标以及代表充电量的数字（例如，充电百分比）。

在另一示例中，图57B示出了显示处在多个状态中的电池图标的界面5711、5713、5715。界面5711示出了当具有低充电量（例如10%、15%、5%等）时的电池图标。在装置充电时，显示屏的发光元件可按照从底部至

Petitioner Samsung Ex-1004, 0178

顶部以及从右至左的顺序发光。因此，如界面5713所示，底部发光元件（不包括形成电池边界的发光元件）至当前发光电池列的紧左边的发光元件发光。在一些示例中，对应于当前充电水平（例如26%。35%等）的发光元件可显示为闪光或闪烁元件，以表示装置正在充电至该水平。界面5715示出了装置几乎完全充满电时的电池图标，而界面5715示出了装置完全充满电时的电池图标。

当装置达到低电力时（例如，诸如3%-10%的具体的电力范围），信息循环可弹出"低电力"动画。在该低电力范围中，可能没有指标生成的变化，以及数据存储的变化。但是，如果电池电力达到另一阈值或水平（例如低于3%），则屏显（例如，信息循环）可停止生成指标，且装置可停止存储数据（例如，加速度器数据样本）。附加地或替换地，在该更低的电力范围中（低于3%），无线电连接可被关闭，且网络处理器也可被关闭。显示屏还可示出"插头"动画，表示需要充电的需求。如果装置充电至3%水平之上，则在USB或电源拔下后，可能会重新激活网络处理器，指标产生恢复，且样本再次被存储。显示屏还可示出完整的信息循环（具有任意恰当的警告）。如果电池被完全耗尽（例如，0%电力），时间可能被重置。在充电后，装置可能需要用户再次连接至设置或配置软件，以重新初始化装置。例如，装置可仅显示"同步"信息，表示需要连接至配置程序和/或装置的需求。

根据一些布置，装置还可被重新配置，以将通知显示给用户。这些通知可包括注册装置和/或同步数据的通知。通知可由特定的规则触发。例如，注册通知可在用户尚未注册装置且通知已在特定的时间周期上（例如，最近的30分钟、最近的一小时、最近的一天、最近的一周）和/或对于特定数量的用户交互或对于特定数量的装置的状态变化（例如最近的5次按键按压、最近10次从睡眠状态的转变等）未示出时被触发。注册/同步通知信息可包括用户可注册和或同步他或她的可佩戴运动装置的网络地址的标识。如果信息（通告或其他）过宽或过高，以至于不能被同时地显示在装置显示屏上时，信息可沿特定的方向滚动，从而可显示全部的信息。文本也可用于传输其他的指标、指标类型和/或测量值的单元（诸如消耗的卡路里、行进的步数、赚取的活动点数等）。

图58示出了可在装置上激活的活动循环的示例性过程流程。在唤醒后（例如，从睡眠模式起的过渡）可在装置上进行的装置检查5801之外，装置还可进行电池检查、存储器检查和链接检查。可将链接检查用来确定是否出于各种原因在两个装置之间存在连接（有线的或无线的），这些原因包括同步、消息通告等。在一个示例中，装置可确定和此前装置连接至的另一装置的连接是否仍然是活跃的。在链接检查完成后，装置可转至活动循环。根据一个构造，装置可响应于第一类型用户交互（诸如连续按压按键）而继续滚动经过活动循环。松开按键或第二类型的用户交互可阻止循环继续，且按压以及松开按键或第三类型用户交互可激活或取消/中止当前显示的功能或活动。

在初始链接检查后，装置可转至标签功能，其允许用户对当前的时间和/或位置加标签，作为动作循环的一部分。取决于在链接检查过程中是否检测到链接，标签功能可不同地操作。例如，如果标签功能被激活，装置可确定并记录时间戳和/或位置戳。如果装置链接至其他装置，则装置可传输标签。如果不存在链接，装置可不尝试传输标签至其他装置。在一些布置中，位置

Petitioner Samsung Ex-1004, 0179

戳仅可在至其他装置的链接是活跃的时可用。例如，如果活动追踪装置不包括位置确定机构，活动追踪装置可请求通过其他装置的位置戳。因此，如果至其他装置的链接部存在或不活跃，活动追踪装置可能不提供位置戳功能。

图59A-59D示出了示例性标签界面，其可显示在活动追踪装置上。图59A示出了标签功能标识，其可作为动作循环的一部分显示。在图59B中，用户可在界面a中选择标签功能。继而，界面可显示标签图标，继而是检查标记，以表示时间和/或位置戳已经被记录，如界面b所示。如果装置连接至另一装置，则界面可显示数据传输过程的标识。在一个示例中，装置可闪烁标签图标，以表示正在尝试数据传输。如果数据传输成功，则界面可显示标签图标，其后跟随两个标识（诸如检查标记），一个表示时间和/或位置戳的记录，而另一个标示标签的成功传输，如图59C所示。但是，如果数据传输不成功，则界面可显示标签图标，其后跟随第一标识，说明标签是否被记录，以及第二符号或标识（例如，“X”符号），标示数据传输不成功，如图59D所示。可使用其他的符号、图标、文本、图像等来表示标签和/或传输的成功或不成功。

再次参见图58，动作循环可从标签功能转至可选的链接功能，以及从链接功能（或标签功能，如果未提供链接功能的话）转至配对功能。链接功能和配对功能两者可允许用户将活动追踪装置连接至诸如移动电话或便携式音乐播放器的另一装置。链接功能可涉及第一类型无线或有线连接，而配对功能可涉及第二类型无线或有线连接。例如，第一类型连接可包括Wi-Fi连接，而第二类型连接可包括蓝牙/蓝牙低功耗（BLUETOOTH/BLUETOOTH LOW ENERGY）连接。其他类型的连接可包括红外连接、紫峰、其他基于RF的连接等。链接和配对功能的显示可包括表明链接或配对各自是否当前活跃的状态标识。如应注意到的，在一些布置中，链接功能可能未提供在动作循环中。

图60A和60B示出了示例性界面，其中链接功能图标显示具有状态标识。例如，在图60A中，状态标识表明链接是不活跃的。在图60B中，状态标识表明链接是活跃的。链接功能图标也可取决于链接是活跃的或是不活跃的而改变。例如，链接功能图标可显示代表两个装置的两个图标。如果链接是活跃的，图标可被显示和/或以相同的照度/强度显示。但是，如果链接是不活跃的，图标中的一个可以较低的照度或强度显示，或可能完全不被显示。

在激活链接功能后，链接图标或符号的外观可被改动，以反映链接装置的尝试。在一个示例中，状态标识也可从界面移除，且连接图标(一个或多个）可开始间断地闪速，如图60C所示。链接尝试可持续特定的时间周期（例如，12秒）。如果链接成功，界面可显示正链接标识，如在图60D的界面中示出的。在另一方面，如果链接过程不成功，界面可显示负链接标识，如在图60D的界面b中示出的。如果链接当前是活跃的，选择或激活链接功能可使得链接断开或中止。

在一个或多个示例中，链接功能可能不需要提供为活动循环中的用户可选择选项。而是，装置可在第一按键按压或其他触发事件后（例如，在图58中示出的链接检查中和/或和链接检查一起）自动地尝试和一个或多个装置建

Petitioner Samsung Ex-1004, 0180

立链接。在一个示例中，在用户选择按键而装置处在睡眠模式中时，装置可自动地激活链接建立功能（和上述的类似），而不需要用户手动地启动链接过程。链接是否自动地建立或选项是否作为用户可选择项显示在动作循环中可由用户配置。

图61A-61C示出了配对功能的示例性用户界面。例如，装置可包括蓝牙通信功能（或其他短距离网络功能）并由此可和其他本地装置连接。图61A示出了配对功能图标，而图61B和61C分别示出了成功和不成功的配对过程。在一个示例中，在检测到诸如短按键按压的特定类型的用户交互后，装置可启动配对过程，以检测和尝试连接至兼容的装置。如果装置成功地配置至另一装置，显示屏可提供成功的配对标识，诸如图61B中示出的检查标记。但是，如果配对是不成功的，则显示屏可提供不成功的配对标识，诸如图61C中示出的X标记。

替换地或附加地，配对功能仅可在配对功能激活后显示配对状态（例如，成功或失败）。因此，当用户仅通过动作循环浏览至功能时，可能不显示配对状态。装置还可能能够和多个装置配对。当已经配对最大数量的装置时用户对另一个装置配对时，此前配对的第一个装置可从存储器中移除（例如，先进先出规则）。

飞行模式功能也可包括在动作循环中。图62A和62B示出了示例性切换过程，以开关飞行模式。飞行模式可指向一设置，其中装置的全部无线通信能力被中止，以不干预飞机的运行。但是，可将飞行模式用于任意希望的环境中，而不是限于飞机环境中。在图62A中，显示屏可初始体提供当前飞行模式设置（例如，开或关）的标识。在激活该功能后（例如，经由特定类型的用户交互（诸如短的按按键），飞行模式功能可将设置切换至诸如打开，如图62B所示。在打开的设置中，装置可自动将全部无线通信构件关闭，包括装置的配对和链接模块。在一些布置中，如果飞行模式中止，则配对和链接功能也可从动作循环移除，使得其不可被选择和激活。在中止飞行模式后，配对和链接功能可被再次插入动作循环中。该自动移除和插入可帮助用户确定在飞行模式中允许的动作或功能。在其他布置中，飞行模式的激活或中止不影响配对和链接功能是否显示在动作循环中。但是，如果用户激活链接或配对功能，飞行模式将自动地切换至关闭（例如，当该模式设置为打开时）。替换地或附加地，诸如顶部显示屏或侧部显示屏上的闪烁或静态的灯或两者的飞行模式标识可被点亮。

图63A-63D示出了用户界面的示例性系列，其可显示用于重置功能。可将重置功能用于擦除装置的存储器和/或重置装置上的全部设置（例如，目标、校准、初始活动测量值等）。例如，在图63A中，在动作循环达到重置功能时，重置图标、动画、符号、文本等可初始地显示出。在激活后（例如，响应于按键的短按压，或其他类型的特定的用户交互），装置可显示装置将要启动重置功能的警告或确认。在特定的示例中，如在图63B中所示，装置可将重置图标、动画、符号或文本闪烁特定的时间量（例如，4秒、5秒、10秒、1秒等）。在该警告或确认时间周期中，用户可被允许通过提供诸如短按键按压的特定类型的用户交互而中止或取消重置功能。也可使用其他类型的警告或确认信息、动画、听觉、触觉反馈等。如果用户不取消重置请求，则装置可在警告或确认周期的结束处开始重置过程。取消重置请求可包括用户以诸如短按键按压（例如，长度小于特定的阈值长度的按键按压）、长按键

Petitioner Samsung Ex-1004, 0181

按压（例如，长度为至少2秒、3秒、10秒等的按键按压）、装置的移动等的特定的方式和装置交互。在特定的示例中，取消重置请求可对应于和激活重置功能相同类型的用户交互。

如果重置请求未在警告或取消周期中被取消，则装置可启动重置过程。图63C示出了示例性屏显，其可用于传输重置过程的进程。例如，重置图标、动画、符号或文本可以相同的方式运动，例如顺时针地点亮，直至重置过程完成。一旦重置过程完成，完成的标识（例如，标志）可显示在装置上，如图63D所示。完成标识可包括多种图像、符号、文本、图标等，且可包括静态和动画标识两者。如在此注意到的，不同类型的用户输入或用户交互可对应于不同的命令、功能、动作等。

在一个布置中，可佩戴装置可仅包括单个用户输入装置，以最小化复杂度。用户输入装置可包括按键、滚轮、触摸敏感输入装置、操纵杆、轨迹球等。在这样的情形中，和输入装置的不同类型的交互可对应于不同的动作，诸如通过动作循环激活和滚动、通过信息循环激活和滚动、切换功能开关、激活各种功能等。例如，将按键按压不同的长度或保持按键为被压下，可唤醒不同的动作和功能。在另一示例中，按按键的模式还可用于区分动作和功能。在触摸敏感输入装置的示例中，不同姿态或动作类型可对应于不同的动作。在特定的示例中，用户可使用单个手指接触触摸敏感输入装置以激活动作循环，以及使用两个手指(同时或基本同时地）接触触摸敏感输入装置以激活信息循环。

根据一个或多个方面，用户可通过无线连接将他或她的可佩戴装置和其他用户的可佩戴装置配对。在一个示例中，可佩戴装置可同时和装置配对且和装置无线链接。在特定的示例中，配对功能可具体地涉及蓝牙配对以及连接，而链接可指向Wi-Fi或其他类型有线或无线连接。在其他示例中，配对功能可涉及第一类型连接，而链接可指向不同于第一类型的第二类型连接。例如，其他连接类型可包括红外以及RFID。

当用户位于和另一用户的预定的接近程度中时，用户的可佩戴装置可检测其他用户的可佩戴装置。第一用户可继而通过启动经由第一用户可佩戴装置的搜索过程（例如，蓝牙信号检测）而将第二用户加为好友。诸如联系信息或朋友标识的数据可继而被从第二用户的装置传送至第一用户的装置（例如，通过有线或无线连接）。在装置之间传输的联系信息或标识可配置为使得用户可规定传输至其他装置和用户的联系信息或标识的类型和内容。在第一用户将他或她的可佩戴装置同步至运动表现监测服务或站点后，好友信息可添加至第一用户的账户。在一个或多个配置中，可能在允许或执行任意数据传输之前需要来自其他用户的确认。在一些示例中，另一装置用户的标识可对应于社交网络或其他社交站点的注册用户标识。因此，用户可从另一用户的装置接收脸书（FACEBOOK）用户名或标识用于标识目的。装置可继而将其他用户的脸书用户名或标识存储为装置中的好友和/或存储于运动活动追踪服务的账户中。

通过装置的配对的好友的添加可进一步造成或触发社交站点上的两个用户之间的关系的建立。在其中将脸书用户名用作标识的上述事例中，装置在连接至网络后可触发通过脸书至其他用户的关系请求的产生和传输。因

Petitioner Samsung Ex-1004, 0182

此，诸如"好友"或"工作搭档"的关系可在其他用户接受请求之后或在检测到双向的请求被产生和发送后在社交站点上建立。

图64示出了用于通过用户可佩戴装置添加好友的示例性过程和界面。例如，用户可初始地按压交互按键一预定量的时间，以激活好友搜索功能。在找到好友后，"+FRND"信息可显示，且边沿标识灯可点亮，以表示数据传输的过程。如上所述，传输的数据可包括姓名、email地址、其他联系信息、用户ID等。该数据可稍后被用户将该好友添加至涌动表现监测站点上的用户账户。

根据另一方面，用户可将地理位置限定和/或存储在装置中。这可允许可佩戴装置识别（或假设)正在进行的活动的类型（例如，公园的位置可对应于跑步活动，或滑雪度假村可对应于滑雪）。图65示出了示例性界面，如果该位置被预定义，则其可用于确定用户的位置。例如，在用户的可佩戴装置检测到用户位置后，可佩戴装置可确定该位置是否已知（例如，存储在装置或其他数据库中）。识别位置可基于经纬度、一组坐标附近的区域、特定的地址或特定地址周围的区域和/或以上的组合进行。位置信息可由装置或基于从连接至的装置接收的信息确定，该连接至的装置诸如具有位置确定构件（例如GPS、蜂窝网络三角测量等）的移动通信装置或便携式音乐播放器。如果位置信息从另一装置接收，则位置信息可说明其他装置的位置。继而可将其他装置的位置用于标签活动，或可基于可佩戴装置和其他装置之间的已知或大概的距离确定可佩戴装置或用户的位置。

在一些示例中，用户可通过装置手动地说明位置（例如，通过输入邮编、地址等）。如果找到预定且存储的位置，对应的姓名或标签可显示用于用户的信息。姓名或标签可从网络数据库自动地限定，或可由用户手动地输入和限定。网络数据库可例如包括从搜索引擎获取的信息和/或可包括由好友或服务的其他用户定义的位置信息。在一些示例中，可佩戴可通过查询其自身的存储系统而初始地确定该位置是否是已知存储的位置。如果位置不是可佩戴装置中的已知存储位置，装置可查询网络数据库或连接至的装置的数据库，以确定该位置是否已知。

图66示出了一过程，通过其位置确定系统可用于追踪用户的位置。位置信息可和特定运动活动进程的运动数据一起存储。在一个示例中，在用户启动锻炼或运动进程之后，位置确定系统和功能（例如，使用全球定位系统）可自动地被触发。位置确定系统可由可佩戴装置提供，或可位于分立的装置上，诸如移动通信装置。在一个示例中，可佩戴装置可通信地链接至分立的位置确定装置/系统。在任一情形中，位置确定应用可开始试联（ping）或检测装置的位置。如果用户的位置已经变动，用户可记录新的位置并在再次检测到装置的位置之前等待预定量的时间。例如，应用可在请求装置的位置之前等待10秒、15秒、30秒、1分钟、5分钟等。但是，如果用户的位置尚未变动，该应用可在再次检测到装置的位置之前等待预定量的时间。对于装置位置未变化的每个连续的时间，连续等待时间可对数地、增量地、指数地增加，或可完全不增加。

在其中定位确定在分立的移动通信装置上进行的情形中，应用可自动地将从可佩戴装置接收的运动数据和由位置确定系统检测到的位置信息相关

Petitioner Samsung Ex-1004, 0183

联。例如，位置数据可存储为元数据或运动数据的其他类型的属性。

为了激励运动表现，用户可彼此竞争。例如，用户可和另一用户竞争，以确定在一天或其他预定的时间框架内哪个用户可累积最多的活动点数、消耗的卡路里、奔跑的英里数等。活动点数可在时间周期中基于用户的物理运动或活动累积。例如，对于消耗的每20卡路里可赚取1点。在另一个示例中，对于每0.25英里的跑动可赚取1点。可使用其他类型的转换系数。在其他布置中，竞赛度量值可为活动指标（例如，英里数、卡路里、心率等）。在这样的情形中，未根据运动统计数据测量的其他类型的活动可能需要在被朝向总数累计之前被转换，或可能不为了竞赛而被累计。竞赛总数/进度可独立于总体活动进度，且也可被分立地存储。

图67示出了可佩戴装置上的示例性界面，用于标示两个用户之间的竞赛的当前状态。进度可通过诸如"v Lisa:YOU+425"的信息传输，其可表示竞赛为对抗名为Lisa的另一用户，且本用户位于Lisa之前425点数或卡路里或其他指标。竞赛者数据（例如，消耗的卡路里的量、赚取的活动点数的数字等）可通过远端网络系统同步和/或在用户的可佩戴装置之间直接同步。在另一示例中，一个或多个用户可佩戴装置可通过以有线或无线方式连接的本地通信装置或其他中继装置和其他用户同步。

在一个或多个布置中，两个用户的相对位置也可表示在边沿发光部上。图68和69示出了使用可佩戴装置的边缘灯（例如，侧部显示屏）的竞赛状态的示例。例如边缘灯偏向右侧的发光可表示用户领先（如图68所示），而边缘灯偏向左侧的发光可表示用户落后（如图69所示）。平衡或相等点数（例如，用户的进度彼此大致相等的位置）可定义在沿侧部显示屏的任意位置处。在一个示例中，点亮的灯距离该组边缘灯的中心点的距离可代表用户领先或落后的程度。其他显示屏或可佩戴装置可类似地显示这样的信息。例如，可佩戴装置的顶部LED矩阵可类似地传输两个或更多个个体之间的竞赛的状态。

图70示出了另一系列示例性用户装置界面，以标示佩戴者和一个或多个其他用户之间的比赛或竞赛状态。如和其他信息一样，如果其过大以至于不能一次在显示屏界面上显示，则竞赛状态可滚动。替换地或附加地，如果信息、图像或其他信息过大以至于不能一次在单个显示屏上显示，可使用多个显示屏。例如，如果信息对于可佩戴装置的顶部显示屏来说过高，则附加的部分可显示在可佩戴装置的侧部显示屏上。

图71示出了示例性界面消息，其可在识别或添加新的对手后显示出。例如，可显示新的对手的姓名。用户可能需要通过将交互按键按压预定量的时间来确认检测到或识别出的新对手是希望的对手。

图72示出了示例性注册过程流程，其中用户可被引导初始地插入装置，下载软件并将装置同通过其进行注册的装置(例如，连接至网络的装置）配对。连接后，用户可继而输入注册信息以限定用于运动表现监测服务的服务档案。该档案可继而被存储在活动监测服务处，且提供至可佩戴装置用于存储。如果用户在完成之前退出注册过程，装置可使用缺省的设置。

Petitioner Samsung Ex-1004, 0184

在一些布置中，应用可下载至一个或多个计算装置，以促进和/或增强活动数据的追踪。例如，应用可允许活动信息的图形化，且显示这些图形，并提供用于改进和目标设置的推荐。应用还可促进装置的配置和更新，以及促进装置和诸如活动监测服务/站点之间的通信。附加或替换地，可佩戴装置可在注册前锁定而不能使用（例如，注册之外的全部功能被中止、除正常的运动表现监测之外的全部功能被中止）。正常的活动表现监测可包括感知用户的活动、将该信息显示在显示屏界面上和/或追踪目标。但是，不能存储数据且不能在用户和数据之间建立关联性。在一些示例中，在初始阶段、启动阶段和/或注册阶段期间，诸如活动信息的一些数据可存储在装置或应用中。

图73A-73G示出了示例性注册界面，其可用于通过互联网或其他网络注册新用户和/或装置。

图74A示出了另一示例性注册过程流程，其中用户可通过移动应用注册装置和用户。和图72中的过程流程不同，图74A的注册通过在移动通信装置上执行的应用进行，而在图72中，注册通过网站或其他软件（例如，在台式机或固定计算装置上执行的软件）进行。

图74B-74P示出了示例性注册界面，其可用于通过移动装置上的应用注册新用户和/或装置。

在成功的注册后，可佩戴装置和移动通信装置上的应用可提供标示，表明装置和应用可以开始追踪活动。例如，图75示出了可佩戴装置上的示例性用户界面屏显，其包括问候用户的消息。该问候可表示装置可以开始追踪活动。也可使用其他标示。

在图76和77中，应用可分别提供一消息，表明可佩戴装置可以追踪活动，且还提供关于追踪活动中的应用的能力的信息。例如，尽管装置可测量和记录包括活动点数、消耗的卡路里、跑动的距离等的各个指标，应用可配置为处理测量到和记录的数据，以提供包括位置/路径信息、进度/发展信息和比较数据（例如，将用户的活动和好友或其他用户进行比较）在内的附加信息。

图78A-78G示出了示例性用户界面，用于为现有的用户注册新的装置。例如，为现有的用户注册新的装置可能需要用户输入登录证明。用户可继而在成功的授权之后链接新的装置。

也可使用其他类型的注册过程，包括按活动追踪服务和/或用户需要具有更多或更少选项的注册过程。在一些示例中，注册过程的部分可以是可选的（例如，设置每日目标、显示屏设置等）。

根据一个或多个方面，用户可使用多个不同的账户（包括不是由活动追

Petitioner Samsung Ex-1004, 0185

踪服务提供的账户）登录或登记至活动追踪服务或应用。示例性地，图79示出了在移动装置上的应用屏显，其提供使用包括活动追踪服务账户、FACEBOOK账户和TWITTER账户在内的不同账户的登录选项。在一个或多个示例中，活动追踪站点可对应于活动追踪应用的供应者。为了使用诸如FACEBOK或TWITTER账户的外部账户登录或注册活动追踪服务，用户可能需要授权在活动追踪服务和外部系统或站点之间数据传输和/或其他交互。

图80和81示出了示例性用户界面，以提供活动追踪站点的授权，以和每一个外部服务通信数据。

例如，图80示出可需要用户输入登录信息的FACEBOOK登录页面，以将活动追踪服务链接至用户的FACEBOOK账户。在另一方面，图81示出了需要用户登录以授权活动追踪服务或应用的TWITTER登录项，以和用户的TWITTER账户交互。如图81所示，用户可被告知应用或服务将被授权，且外部服务的功能、数据、界面将对接收授权的应用或服务可用。

一旦用户登录进入活动追踪服务或应用，用户可被提供有诸如图82A和82B所示的档案信息。应用界面8200可包括档案图片8201、活动标尺8203、装置使用的标识8205以及包括每日活动均值和活动天数在内的其他指标。使用的活动追踪装置8205的标识可对应于用于测量和记录活动的装置，且如果用户的活动被使用多个不同的装置追踪，可包括多个装置的列表。在一些情形中，仅该多个装置中的一个可在界面8200中标明。例如，追踪用户的大部分活动的装置可显示出，而不标示其他装置。在其他示例中，用户可选择在装置标识8205中标明的装置。

在部分8207中，可显示出最近的活动。活动可由诸如天、周、月、小时、两个小时、六个小时、12个小时等的时间周期分组。因此，最近的活动部分8207可显示最靠近的活动周期的数目。在特定的示例中，部分8207可显示最近3天的活动，每一天都作为一项列在部分8207中。部分8209可用于显示用户已经完成的记录。记录部分8209可包括多个预定的记录种类，诸如最佳单日、最佳单周、最佳单月、每周最佳单日、最长的串等。选择一个种类可使得应用显示该种类的对应的记录。在最近的活动和记录之外，界面8200还可包括荣誉部分8211，其配置为显示用户的奖励和成就。例如，可限定各种荣誉和里程碑，包括在一天中达到一定数量的活动点数、连续多天其中个体达到活动点数目标、超出目标以特定的量等。

功能条或工具条8213可显示在界面8200中，以允许用户在各种顶部水平模式之间切换。例如，在条8213中选择"Me"标号可显示图82A和82B中示出的档案信息。在另一方面，选择"Home"标号可产生将显示的当前进程或时间周期的活动的当前水平的虚拟显示。在一个示例中，"Home"标号可使得活动点数追踪器在评价周期中显示。如所述，在一些情形中，评价周期可对应于使用装置的第一个24小时。

替换地或附加地，Home、Activity和Me模式或界面可作为下拉菜单或其他类型的菜单，其在用户选择如图82C所示的菜单选项后显示出。通过隐藏Home、Activity和Me模式选项，显示屏可提供更多的面积给其他可视化

Petitioner Samsung Ex-1004, 0186

项。和图82A和82B的界面不同，图82C的界面可能在选择应用的一个总体部分之前需要附加的用户输入或交互。

根据图82D中示出的另一布置，档案界面还可包括用于应用的附加功能的菜单。在一个示例中，菜单8221可在接收到不同于配置为触发图82C所示的通用模式选择菜单的用户交互的用户交互后显示出。例如，在菜单8221中，用户可被提供有诸如同步(例如，和可佩戴活动追踪装置）、观察告示、设置和分享的选项。包括在菜单8221中的选项可取决于当前活跃的界面、信息屏显或应用的模式改变。

图83A-83D示出了示例性界面，其显示在评价周期中活动点数的累积量。活动追踪界面8300可包括多个标示，包括活动点数追踪器8301、图形化剩余评价时间标识8303、文本化剩余评价时间标识8305、以及可能传输包括进度水平在内的各种信息的信息部分8307。图形化剩余时间标识8303可包括圆形轨道，其随着评价时间周期的倒数而渐进地改变外观（例如，以特定的颜色或外观填充）。也可显示出文本/数字信息标识8305，以提供详细的计时。可使用各种其他的图形化标识，以标示完成的时间的量和/或在评价周期中剩余的时间的量。活动点数标识8301可向用户提供诸如他或她已经累积的活动点数的信息。活动点数标识8301可实时、基本实时、按需、周期地、非周期地和或基于其他特定的日程或规则更新。上更新可包括将数据和可佩戴装置同步。在一个或多个示例中，活动点数计数的更新可由移动装置的移动或从睡眠状态至活跃或待机状态的转变触发。附加地或替换地，可将更新标识8309用于识别数据从可佩戴装置何时同步或以其他方式更新至移动应用。在一些布置中，可提供选项（未示出）以请求活动点数数据的更新或同步。

可将信息部分8307用于传输背景信息。例如，在评价周期的开始部分期间，信息部分8307可表明可佩戴装置处在评价用户（如图83A和83B所示）的初步阶段中。随着评价周期的进行，消息可变动以表明用户已经完成评价周期的一半，如图83C所示。当用户接近于完成评价周期时（例如，在5%、10%、15%、25%等之内时），消息部分8307可向用户表明这样的状态，如在图83D中所示。

在一些情形中，执行活动追踪应用的移动装置可进入待机状态（例如，显示屏被关闭并启动按键锁定或输入锁定）。当装置进入待机状态时，使用移动装置的底层操作系统的告示可产生并显示出。告示可表明朝向评价周期完成的进度，即使当应用不活跃或装置不活动地显示活动追踪应用时。

图84A-84C示出了一组示例性告示界面，其可在评价周期中的多个时刻处显示。在一些布置中，该告示可显示在触摸输入锁定屏幕的顶部上。因此，用户可仍然和告示交互，但可被限制和装置界面的任意其他部分交互，直至输入锁定被中止。当应用在后台执行(例如，不在操作系统的前台显示或执行）时，也可产生和显示这样的告示。因此，如果用户通过其他应用检查email或收听音乐，活动点数追踪告示可仍然显示出，即使活动点数追踪应用不在前台或不被活动地显示出。

Petitioner Samsung Ex-1004, 0187

图84D-84F示出了另一组示例性告示界面，其可在检测到各种触发事件之后提供至用户。图84D-84F中示出的告示可以下拉菜单提供，而初始告示标识显示在界面的头部空白中。可将活动追踪告示和来自其他应用的告示一起显示，或可独立于其他告示分立地显示。告示系统可由底层操作系统提供，且由活动追踪应用唤醒（例如在后台运行）。

在完成评价周期后，应用可显示完成信息，如图85A所示。在评价期间累积的活动点数的量之外，应用还可显示一选项，以同步来自可佩戴活动追踪装置的活动数据。在一些情形中，在应用中追踪的活动点数量一直延续到最后同步的日期。因此，如果数据被连续地同步或实时同步，则活动数据可为即时的。在一些情形中，显示的活动点数量可能不是准确的，取决于何时进行最后的更新或同步。因此，在选择同步选项8503后，可从可佩戴装置接收附加或不同的数据。

同步过程可包括同步界面8510，其配置为随着同步的进行显示如图85B所示的进度条8511以及活动点数的变动的总量。例如，活动点数数目屏显可随着从可佩戴装置接收附加的活动数据而变动（例如，累积）。同步界面8510还可标示在同步过程中剩余的时间的量（例如，经由进度条8513）。

一旦评价周期已经完成且评价周期活动数据已经和应用以及移动装置同步，则应用可提供关于评价周期中用户活动的更详尽的信息。例如，用户的活动可以更多的间隔尺度以及附加的分析显示出。

图86示出了示例性界面，其提供在评价时间周期中进行的活动的总结。例如，应用可确定和识别最高活动周期，以及其中用户为活跃的时间周期的百分比。该总结还可将用户的表现和其他用户的均值进行比较。在一些布置中，该均值可为特定类型的用户的均值。例如，均值可为全部男性的均值，年龄在18-25的全部用户的均值，居住在特定州、邮编区域、地区等的全部用户的均值、使用特定类型的活动追踪装置的全部用户的均值、具有特定身高或体重的全部用户的均值和/或以上的组合。

图87A和87B示出了其他示例性信息屏显，用于观察和分析评价周期活动数据。在图87A中，可传输活动点数的量、消耗的卡路里的数量和进行的步数的数量的总结8701。其他指标也可按照需要或需求包括在内，或由用户、由活动追踪服务或其他个体可配置。图87A的屏显还可包括用于显示关于在评价周期中进行的活动的附加信息或细节的选项8703。

在选择附加信息选项后，可将评价周期活动的更详尽的视图如图87B所示地显示。例如，可显示随时间进行的用户活动水平的图8711，以帮助用户识别高或低活动的时间。附加地，可显示分析信息，其包括最活跃小时、每日（或其他评价时间周期)中用户活跃的百分比，以及相同时间周期中用户的活跃点数和平均用户活跃点数的比较。可将活跃限定为由可佩戴装置检测或记录的任意数量的活动。在其他示例中，可基于检测到的移动或活动的阈值水平限定活跃度或活跃。例如，如果基于步数检测活动或移动，用户可能需要在5秒内进行至少2步，以将在5秒视作活跃时间。在其他示例中，由可佩戴装置检测到的移动可记录为具有幅度或大小的信号。在这样的情形

Petitioner Samsung Ex-1004, 0188

中，可佩戴装置仅可记录具有至少阈值幅度或大小的信号。因此，用户只可在表现出阈值幅度或大小的移动后才可被视作为活跃的。

从详尽的信息屏显，用户可选择目标设置选项8713。目标可对应于特定的时间量，诸如一天、一个小时、一周、一个月等。在一些布置中，目标时间周期可对应于评价时间周期。例如，如果评价时间周期是1天，则目标时间周期可限定为1天。替换地，用户可限定他或她的自身的目标时间周期。

在选择目标设置选项8713（图87B）后，应用还可显示如图88A所示的目标设置菜单8801。在目标设置菜单8801中，用户可提供有多个预定的选项，用于设置目标。预定目标可基于评价施加周期中记录的活动数据产生。例如，选项可包括在评价时间周期中超过记录的活动以特定的量或百分比，将目标设定至等于评价之间周期中记录的活动，或将目标设定至较在评价时间周期中记录的活动小的特定的量或百分比。目标可由由可佩戴装置测量和记录的任意指标限定，包括活动点数、消耗的卡路里、进行的步数等。在一些布置中，可为不同指标中的每一个规定不同的目标。例如，用户可规定他或她希望达到1200活动点数并消耗700卡路里。在另一示例中，用户可设置目标以达到1500活跃点数和进行15000步数。

在用户已经选择一个预定的目标后，用户可具有微调目标的选项。图88B示出了示例性目标微调界面，其可在用户在目标菜单8801（图88A)选择目标后显示出。在图88B中，用户可滑动条8803，以调节预定的目标。滑条8803可仅允许用户将预定的目标降低或增加一特定的量或百分比。在其他布置中，可不限制用户降低或增加预定目标的能力。在完成后，用户即继而通过选择选项8805保存目标。目标可继而为该目标时间周期设置。该目标时间周期可立刻开始或可在将来的时刻开始（例如，后一天、用用户选择的时刻、在选择触发事件之后等）。触发事件可包括用户在可佩戴装置上选择按键，以启动时间周期、检测超出预定时间量（例如5分钟、30秒、1分钟、1小时、30分钟、10分钟等）的持续活动等和/或以上的组合。

可基于特定的目标或独立于目标追踪活动。在其中基于目标追踪活动的情形中，用户可以多种方式观察他或她的当前进度。如本文所述，活动追踪应用可包括档案界面、活动观察界面和主页界面。这些界面中的每一个可提供涉及用户朝向目标的当前进度以及进行的活动的量的信息。不同的界面可提供不同的细节水平、不同的指标、不同的活动数据分析、和当前进度信息一起显示的不同类型的附加信息等。

图89A示出了示例性主页界面，其中活动点数的累积量（例如，赚取或检测到的量）可相对于目标被追踪。在特定的示例中，目标可为每日活动点数目标。目标可可视化为具有透明或半透明外观的形状或物体8901。随着用户累积活动点数，形状或物体8901可开始改变外观。例如，可改动形状的一个或多个部分以显示颜色。在一些情形中，被改动的物体的部分可对应于诸如标识8903的进度条或标识。被改动的形状的量可对应于已经完成的目标的量或百分比。因此，如果用户已经完成目标的25%，目标形状可被25%着色且为75%的透明。可将其他视觉效果或视觉标识用于区分仍待实现的目标的量和已经完成的目标的量。

Petitioner Samsung Ex-1004, 0189

诸如进度条/标识8903的完成的目标的量的视觉标示还可包括代表距离目标的距离的图样、颜色或其他视觉效果。例如，红色可代表朝向目标的最低进度（例如，0-10%进度），而黄色可代表中等进度（例如，40-60%进度）。绿色可代表显著的进度（例如，80%以上的进度）。可使用其他颜色来代表其他进度水平（例如百分比）。在图89A中示出的示例中，目标进度谱图可由色谱（例如，从红色至绿色的颜色范围）代表。在一些布置中，进度条可以单色显示，其中颜色可取决于完成的目标的量（例如，当用户已经完成目标的至少75%时为绿色的，而如果用户已经完成目标的少于15%则为红色的等）。在其他布置中，如在图89A中，进度条或标识8903可以多个颜色示出，其中每一个颜色代表和形状8901的对应部分以及进度标识8903相关联的进度水平。

附加地，可将各种其他指标和进度信息显示在界面中，包括消耗的卡路里、个体已经为活跃的时间的量、进行的步数和/或行进的距离。应用还可提供各种信息至用户，包括激励信息、指导信息（以改进活动水平）、信息消息（例如，完成目标所需要的活动点数的量）、杂项信息等。指标可由应用或装置确定（例如，计算），其中应用在该装置上执行，或由可佩戴活动监测装置确定。类似地，消息可由应用或可由可佩戴活动监测装置产生或选择。

图89B示出了可显示其他和/或附加类型的活动信息的示例性活动界面。替代显示目标信息或附加于其上，界面8920可显示报告用户在一天、一周、一个月、一年和/或其他限定或定制的时间周期中的活动的活动总结信息。在总结界面8920中，用户的活动可以预定的时间周期（诸如天、小时、周、月、年等）分割。在一个示例中，预定时间周期可取决于被选择的视图。在特定的示例中，如果日视图被选择，则用户的活动可以小时分割，而如果周视图被选择，则用户的活动可以天分割。

可以多种方式将用户的活动水平可视化，包括使用图表，诸如条状图8921。该周中的每一天可由图8921中的活动条代表，且每个条可被颜色编码，以代表目标完成的水平。例如，如果用户在一天或多天上完成每日目标，对应于这些一天或多天的条可以诸如绿色的第一颜色示出。但是，如果用户未能达到目标的第一阈值量（例如25%），对应的条可以诸如红色的另一颜色显示。如果用户达到第一阈值，但未能达到第二阈值，对应的条可以此外的其他颜色（诸如黄色）显示。可限定任意数量的阈值，且可使用任意数量的颜色。在特定的示例中，也可限定超出目标的阈值，且可由颜色或图样或视觉效果代表。例如，如果用户超出目标以特定的量（例如10%），活动条可以火焰或黑色显示。如果用户超出目标一甚至更大的量（例如，25%），活动条可以例如冰块显示。可使用其他基于视觉、文本或图像的标示来表示对应的目标的完成水平，包括图标、动画、图样、透明水平等和/或以上的组合。

总结部分8923还可显示由用户在显示的时间周期（例如，一周）中赚取的活动点数总量。附加地，界面8920可表示达到的目标的数量。在示出的示例中，用户完成了7个每日目标中的4个。界面8920还向用户提供了一能力，以选择一个或多个活动条，从而观察关于该天的更详尽的信息，包括在该天上赚取的活动点数的数量、为该天设置的目标等。附加地或替换地，界面8920也可显示用于该显示的时间周期的各个指标。

Petitioner Samsung Ex-1004, 0190

图89C显示了另一示例性界面，其中可显示活动点数信息。特别地，界面8930可包括用户档案的屏显，其包括累积的活动总量（例如，对于所有时间）、均值、活动计时周期的数量（例如，天、周、月、小时等）、以及此处所述的最近活动和记录的标示。用户可选择任意这些信息来观察附加的细节。例如，选择最佳每日记录可显示基于小时的在该天上的用户的活动水平的图表。细节还可包括为该天以及该天上进行的活动的统计指标或指标（例如，消耗的卡路里、移动的距离、进行的步数、平均速度等）限定的目标。

根据一个或多个方面，活动追踪视觉效果和界面可自动地基于显示装置的取向变动。例如，如果显示装置被以竖向取向保持，则界面可如图89A所示。但是，在一些情形中，如果显示装置切换至以横向取向保持，则界面可如图89D所示。在图89D中，界面可提供在特定的时间单位（例如每小时、每分钟、每秒等）上赚取的活动的图。因此，横向视图可提供关于该天或其他活动追踪时间周期的活动点数累积的进一步水平的细节。产生和显示的数据或界面的类型可取决于显示屏的尺寸，包括在当前取向中的宽度和高度。例如，当显示屏处在宽度小于图的宽度的取向中时，具有特定宽度的图可能不被选择或显示。附加地或替换地，图89D中显示的视图可也可在竖向取向中被选择。例如，用户可选择一选项，以观察赚取的活动点数的小时或分钟区间，而不论显示屏或显示装置的取向。

如此所述的，用户可限定用户的活动与之比较的目标。在一些布置中，一旦设置目标，用户可为相同的时间周期或另一时间周期（例如，下一天、下一周、周末等）改动目标或设置另一目标。例如，在一天或其他时间周期的过程中，用户可意识到他或她即将超过当前设置的目标。因此，用户可能希望改动其目标至更具挑战性的设置。在另一示例中，如果用户意识到他或她不太可能完成当前设置的目标，用户可以将该目标改动至具有较少挑战。用户也可被允许设置附加的目标，而不需要等待当前目标或目标时间周期过期。例如，当在活动的第一天中休息时，用户可设置下一天或下一周等的目标。

图90A示出了示例性界面，通过其用户可激活目标改动或设置功能。用户可通过选择显示的选项和/或通过以特定的方式和显示装置交互而激活目标选项菜单9001。例如，用户可能需要将按键按压一预定的时间量以激活目标选项菜单9001。在另一示例中，用户可通过在触摸敏感显示装置上输入手势而激活目标选项菜单9001。目标选项菜单9001可包括改动当前目标或设置未来目标的选项。装置可基于目标尚未被限定的第一时间周期自动地选择用于未来目标的时间周期。例如，如果已经为后续的两天的每一天限定了目标，则装置和/或应用可在被引导至第三天时限定未来目标选项9003。在一些布置中，活动监测和追踪可被挂起，而目标改动菜单9001是活跃的。在其他布置中，活动监测和追踪可为连续的，即使当目标改动菜单9001是活跃的时。

可改动目标以反映不同的指标。例如，如果基于活动点数限定当前目标，用户可改动该目标至对应于消耗的卡路里的数量或进行的步数的数量。附加地或替换地，目标进度（例如，检测到或累积的活动数据）可在设置新的当前目标之后被重置。在其他布置中，如果用户切换用于当前目标的指标，现

Petitioner Samsung Ex-1004, 0191

存的目标进度可基于特定的转换系数转换成新的指标。在一些构造中，可使用多个指标检测和追踪（例如，由可佩戴装置和/或由移动应用装置）活动。因此，装置可当目标的指标被改动时恢复不同组的指标。

移动应用、活动追踪可佩戴装置和/或活动追踪服务上的目标改动和设置功能可仅对已经完成初始评价周期的用户可用。该要求可允许可佩戴装置、活动监测应用和/或活动装置站点在用户着手目标之前更佳地对用户定制目标建议、产品、指导提示等。附加地或替换地，评价周期可通过校准其传感器和用于活动检测和测量的算法允许可佩戴装置提供更准确的测量和追踪。

在选择目标改动或设置功能后，用户可被提供有用于限定目标的界面。在一个示例中，界面可和图88B中示出的目标设置/改动界面类似。也可使用其他类型的目标改动/设置界面、交互元件、目标视图等。

图90B示出了目标设置菜单的另一示例，且可当观察目标追踪界面时被唤醒。

图90C示出了另一示例性目标改动界面，其可包括更新目标选项按键。

在一些情形中，用户可限制至特定范围的可能目标。例如，目标设置/改动功能可能仅允许用户设置目标至等于或大于最小阈值，或至小于或等于最大阈值。阈值可定义为当前目标的百分比、基线活动水平的百分比（例如，如在评价周期中确定的基线）、绝对量、最大活动水平的百分比（例如，曾经赚取或记录的活动点数的最大值）等。

图91示出了可在用户尝试设置低于最低阈值的目标后显示至用户。

图92示出了可响应于用户尝试设置位于最大阈值之上的目标而显示至用户的示例性告示。在一些情形中，图91和92的告示可分别在目标被设置至最小或最大阈值后显示。

即使在用户已经完成当前设置的目标之后也可进一步改动目标。目标增加可被手动地触发（例如，通过用户的选择）或可在用户达到当前设置的目标之后由移动应用自动地建议或推荐至用户。允许用户增加当前目标（即使在完成后）可允许用户进一步挑战他或她自身，而不是允许用户在完成目标之后几乎不记录活动。在一个示例中，改动当前完成的目标可限制为增加目标，且可限制至一定的百分比（例如，当前目标或基线活动水平的百分比）或绝对量。在其他布置中，目标设置/改动可能不受限。

图93示出了可提供至用户的示例性提醒或告示，以邀约用户通过增加他或她的完成的目标而进一步挑战自己。还可提供图93中示出的提醒来在用户选择希望的改动后的目标好确认用户在完成的目标中的增加量。

Petitioner Samsung Ex-1004, 0192

图94A和94b示出了附加的示例性界面和功能，通过其用户可改动目标。在一些情形中，目标改动选项可在回顾一段时间周期上用户的表现之后在移动应用中产生并提供至用户。例如，在图94A中，用户在最近3天内的活动的均值可和为该3天设置的均值目标进行比较。如果用户在该时间周期上的平均实际活动高于设置的均值目标或高于均值目标以特定的量，应用可建议或提供选项9401以升高用户的每日目标。选项9401仅可在特定的条件下被提供。例如，选项可在用户确定用户满足了最近X个目标时间周期中的每一个的目标之后、用户超出设置的均值目标以特定的量（例如，10%、20%、25%、50%等）、用户在最近的X个目标时间周期上满足了至少一个目标、用户超出每一个满足的目标的平均量满足或超出特定的阈值等和/或以上的组合时为用户触发。

在另一方面，如果用户的最近的X个目标时间周期的平均活动水平低于均值目标水平或低于均值水平以特定的量时，用户被提醒或提供有选项9411以降低他或她的目标时（如图94B所示)。和选项9401（图94A）一样，可限定各种规则（包括和上述的那些类似的规则），以确定选项9411何时由应用产生并提供至用户。

用户可以多种方式在目标时间周期中进一步回顾他或她的表现，且在目标时间周期中采集的信息可被传输，以提供附加的背景。图95A-95C、96A-96C和97A-97C示出了用于显示在目标时间周期上累积的活动量的各种动画。例如，在图95A-95C中，目标物体的外观的改变可实质为动画的，以增加用户关于最终活动总量的预期，并向用户提供增加的成就感。目标时间周期的动画或活动总结可在多个时刻传输给用户，包括在目标时间周期完成后、在将来自活动追踪装置的活动数据同步后、在用户选择选项以回顾他或她关于特定的目标时间周期的活动水平后、响应于用户完成目标（例如，如果用户未完成该目标时间周期的目标可能不显示动画或评论）、响应于用户达到除目标自身之外的里程碑或成就。

图95C示出了一界面，其中目标时间周期的活动回顾（或其动画）完成。界面可显示一信息，展示是否达到、未达到、超过目标和/或超过目标的量。界面还可包括分享关于该时间周期记录的活动的选项，如将在下文中详述的。

图96A-96C和97A-97C示出了可在多种情形中显示的其他示例性动画和活动回顾界面。例如，如果用户超出目标以不同的量、如果用户未达到目标和/或如果用户达到目标但未超过过目标以特定的量，则进度条的动画和/或进度条的外观可不同。例如，在图96A-96C中，进度条可以冰状外观显示，以代表用户超出该时间周期的目标20%。动画的其他属性也可不同，包括进度条9601成长的速率、背景颜色、图案、动画或主题、从属于进度条9601的成长的附加的动画（例如，从进度条9601落下的冰块或冰条）等。

在图97A-97C中，在确定该时间周期的目标被超出50%之后，可以火焰外观显示进度条9701。

Petitioner Samsung Ex-1004, 0193

尽管活动追踪应用配置为追踪个体目标时间周期以及这些个体目标周期的完成(或未完成），活动追踪应用还可提供涉及多个目标时间周期的反馈和回顾信息。在一个示例中，活动追踪应用可追踪和监测活动串。串可包括对应于多个连续的目标时间周期的多个目标的完成。串可仅当用户已经完成X个连续目标时间周期时被认可，其中X可为大于1的任意数字（例如，大于或等于2）。串的追踪和识别可向用户提供进一步的激励因素，以保持和/或提高他或她的活动水平以及满足全部目标。串可激励可导致采取更健康或更活跃的生活方式的连贯性。用户可被奖励以奖励或多种类型的认可，包括折扣券、免费产品、虚拟品（包括服饰、图标、图像等）、服务、入场券等。在一些示例中，奖励可包括解锁新的颜色或图像以在活动追踪装置或移动应用中使用。附加地或替换地，当用户已经实现了一串时，串和/或奖励的标示可传输至通过其追踪活动的可佩带装置。

图98A示出了示例性活动追踪界面部分，其中显示了多个目标时间阶段9801的每一个的目标完成状态。完成状态可由诸如图标9803和9805的标识或图标代表。图标9803可表示针对该目标时间周期完成了目标，而图标9805可表明该目标未被完成。串标识部分9807还可传输至用户用户是否在串上、开始一串、刚结束一串等。在一些示例中，部分9807可提供开始或继续串的鼓励信息。将发生的目标时间周期可以此外的另一视觉化方式显示。在一个示例中，当前目标时间周期可不同于完成的目标时间周期以及将发生的目标时间周期而显示出。在一个示例中，串的开始可对应于其中用户的当前完成的活动目标是两个连续的目标完成事件周期中的第二个，且连续目标完成周期（其中当前完成活动目标是其一部分）的数量等于2。另一方面，断开串可对应于第一目标时间周期，其中用户没有完成在至少两次其中活动目标被完成的连续的目标时间周期之后连续地发生的目标。

当用户第一次完成特定的串（例如，3天）时，应用可提供祝贺或认可，如图98B所示。里程碑或成就的祝贺可进一步激励用户继续串，以获得对于更长的串的更多的认可。可提供串成就作为奖励或荣誉，而认可还可以多种方式分享，包括通过email、社交网络消息、短消息等和/或以上的组合。图98C示出了用户完成当前目标时间周期的目标并完成3天的串之后的串标识部分9807。可在活动追踪界面中提供分享和标签选项，如此处进一步示出的。

图99示出了用户可被认可的另一示例性串成就。特别地，超出用户的现有最佳（例如最长的）串可设置为成就，且新的最佳（例如最长的）串可被认可。串可在每次串被延长或在用户打破串之后被针对最佳串进行评价。可按需由活动监测服务、用户和/或其他实体限定各种其他串评价规则。

如上所述，用户可使用各种信息来标签他或她的活动。标签可提供一种方式，其中用户将各种情绪、位置信息、装备信息、天气信息、地形信息、活动搭档信息等和特定的活动时间周期相关联。标签信息可由用户标明、由移动装置自动检测、由可佩戴活动追踪装置自动检测和/或从其他装置获取。在一个示例中，可佩戴装置和/或移动装置可包括诸如GPS装置或蜂窝网络三角测量模块的位置确定构件。在这样的示例中，可佩戴装置和/或移动装置可在用户希望标签记录的活动时自动地预填位置信息。在另一示例中，位置的天气信息可从天气数据库自动地获取。

Petitioner Samsung Ex-1004, 0194

图100A示出了一界面，通过其用户可使用用户的情绪、态度、或对活动进程的主观感受和/或进行的活动的类型标签活动进程。情绪或态度可指定至在活动进程中进行的活动，或可总体地关联至该时间周期。

图100B和100C示出了各种感情、情绪或态度选项菜单，其中各种图标或图像10001可代表不同的感情、情绪或态度。在一些示例中，选择图标或图像10001中的一个可使得预定的文本输入文本框10003中。用户可被允许编辑输入框10003中的文本，或该文本可为不可编辑的。在其他示例中，选择图标或图像10001中的一个可能不包括预定的文本的自动预填。而是，文本输入框10003可保持空白且是可编辑的。文本输入框10003可允许用户记录关于活动时间周期和/或在该时间周期中进行的活动的更多的感想或感受。一旦用户选择保存信息（例如，选定的代表图像、输入的文本等），则标签信息可和活动时间周期以及关于该时间周期记录的活动数据关联地被存储。和诸如情绪、心情或态度的主观感受相关联地或分立地，用户可使用照片对活动施加标签。照片可传输关于活动的附加的主观或客观的信息，包括位置、天气、用户在该特定的天或时刻的情绪等。标签可专用于总体的目标时间周期、特定的时间、特定活动进程、时间的特定范围等。

在标签之外，用户可通过各种渠道和其他人分享活动信息。在一个示例中，活动信息可发布至活动追踪服务站点的用户档案或账户。在其他示例中，活动信息可通过内部或外部社交网络系统发布。图101示出了示例性分享菜单10101，其提供了多个渠道，通过其活动信息可和其他用户分享。

在一个示例中，发布至FACEBOOK账户可包括自动产生模板或标准发布的应用，如图102A所示。柱可包括预定的语言和图像10201以及指定用户的活动数据，其包括目标信息、用户是否完成目标和/或水平（例如，超过目标以50%）。该发布还可包括用于追踪活动的装备的标示。这可帮助鼓励其他用户增加他们的活动水平且识别用于实现此的产品和服务。用户还可在区域10203中输入意见或其他信息，并经由选项10205提交发布。

图102B示出了示例性发布，其可在提交图102A中示出的发布至FACEBOOK后出现在用户的FACEBOOK主页上。在一些布置中个，发布至用户的FACEBOOK账户的消息可包括至活动追踪服务站点上的用户档案和/或至活动追踪产品和服务信息页面的链接。

图103A和103B分别示出了示例性TWITTER发布界面和产生的TWITTER发布。

用户活动水平的可视化外观可帮助传输关于活动水平的各种信息和消息至用户。如此所述，可使用不同的颜色来代表目标完成或未完成的不同水平。图104A-104C示出了示例性界面，其显示目标时间周期的活动水平图。在活动水平在时间上的图之外，界面还可包括总结部分10401，其中显示了赚取的活动点数的量以及示出用户是否完成目标的标识10403。标识10403的颜色可传输附加的细节。特别地，标识10403的颜色可代表和目标相差的量。例如，以红色出现的标识10403可表示用户仅实现了目标的25%或以下，而如果标识10403以黄色出现，用户可识别出他们完成了目标的超过25%，

但低于100%。图形10407中的线10405的外观可采用类似的颜色主体以及视觉化标识。也可使用其他视觉化特性、动画、听觉标识（包括透明水平、高亮、亮度和大小，标识或图表元素的大小、动画的速度、动画的类型、听觉信息等）以传输附加的活动数据。

图105示出了用于多个活动时间周期的示例性活动总结。在代表每个活动时间周期的条之外，总结10500还可包括标明目标的标识10501。标识10501可用于传输目标被超过或用户未完成的目标的量。

图106A和106B示出了示例性界面，其中可为多个活动时间周期显示标签以及特别是主观感受标签。也可分享这些主观感受（例如，情绪、态度、其他主观感觉）。

图107A和107B示出了示例性界面，通过其活动信息和事件可被传输和观察。例如，图107A和107B示出了以列表格式显示活动水平以及诸如成就（例如，串、里程碑、记录等）、标签等的其他数据的活动反馈的部分，其中该列表格式根据活动时间周期（例如，天）组织。活动反馈可提供一种方式给用户，通过单个界面或屏显对多次活动时间周期的消息进行摘要。在一些布置中，用户可基于其具体的兴趣配置包括在活动反馈中信息的种类。

图108A和108B示出了示例性用户档案或账户界面，通过其可传输用户的活动信息。在一个或多个布置中，用户档案可包括里程碑或成就追踪器10801（如图108A所示）。里程碑追踪器10801可用于追踪跨多个时间周期或在时间上不受限（例如，针对该目的没有具体的终结时间）的目标或成就。例如，用户可在达成多次终生总活动点数后接受里程碑奖励或认可。因此，可将追踪器10801用于标明用户朝向这样的成就或里程碑的进度。在一些示例中，也可将里程碑或成就追踪器10801显示在其他界面上，包括其中追踪每日活动水平和目标的主页界面、其中可回顾为单个或多个时间周期记录的活动的活动回顾界面等。

图108B示出了用户档案界面的另一部分，其中可显示记录和荣誉。荣誉可包括代表特定的成就或里程碑的图像、图标、虚拟物件等。在一些示例中，荣誉也可显示具有优胜或达成的次数，以向用户提供多次达到相同的里程碑的激励。

可将移动应用配置用于追踪此外的其他类型的活动数据，包括时间周期种类的最佳活动时间周期。在图109A和109B中示出的示例中，每一个活动周期可对应于一天。因此，活动时间周期可组合成一周里的天，且被分析，以确定针对该周里的每天的最佳活动时间周期。信息可继而被传输至用户，并辅助确定活动需要被改进的天。活动时间周期的分类或组合也可对应于月、年、每天中的时间（例如，下午、晚间、上午）、用户限定分组（例如，用户可手动地将活动时间周期分配给不同的预定或用户创建分组）、用于检测或记录活动的装置的类型、活动的位置、活动的类型、教授者（例如，用于运动活动课）、活动搭档、每年里的时间（秋、春、冬、夏)等。最佳活动时间周期可以多种方式限定，包括最高活动点数总量、在特定的子时间周期中累积的最多点数（例如，在8AM至8PM之间）、在此前的时间周期（即，

Petitioner Samsung Ex-1004, 0196

紧靠的前一时间周期）之上的最大进步、记录的活动超出目标的最大量(例如，当目标因时间周期而异时）。

附加地或替换地，可为每个分组或每个种类产生其他种类特定的统计值，包括该种类的活动均值、最高以及最低活动水平、最活跃子时间周期等。子分组或分类也可限定在每个种类或分组中。例如，活动周期可由一周里的天初始地分组。一周里的每天的分组还可由一天里的时间或一年里的时间和/或等分类。因此，不但可以确定种类特定的统计值和信息，还可以产生子种类特定的统计值和数据。子种类的其他水平也可被限定或按需使用。

此外，多种触发事件可使得移动应用产生至用户的告示信息。信息可立刻显示至用户，而不需要用户请求或提醒，或可存储以供用户回顾。例如，在图110A和110B中，主页界面11001和档案界面11003可都显示标示可用告示和多个告示的标识11005。标识11005可在界面11001和11003的元件上重叠，通过其用户必须交互，以观察或以其他方式取回告示信息。

图111示出了可提供至用户的示例性告示信息。

图112A-112C、113A-113C、114A、114B、115A和115B示出了其他的示例性界面，其可产生且显示用于传输各个里程碑、成就和/或其他奖励。例如，图112A-112C示出了用于达到最佳一日标记的界面，而图113A-113C示出了用于超过过一周里的最佳天的界面。图114A和114B示出了用于达到终生活动点数标记（例如，25000）的示例性界面。图115和116示出了标示用户已经赚取了特定数量的天或时间周期的活动点数的示例性界面。这些成就、奖励和荣誉可被如此处所述地共享。

活动追踪应用可包括用于定制应用功能的各种设置。图117示出了示例性设置菜单11701，其可用于改动用户的档案、每日目标、显示特征、通信偏好以及共享选项。在一个示例中，用户可登录诸如FACEBOOK以及TWITTER的一个或多个共享站点或服务或以其他方式为其标明授权信息。应用可继而使用授权信息或登录，以在这些服务上和用户的账户交互。

图118A-118C示出了示例性账户设置界面。在希望的测量单位和用户的高度、体重和性别之外，账户设置界面11801（图118A）还可包括用户照片选项11803以及选项11805，以从可佩戴活动追踪装置同步数据。选择档案图片选项11803可提供诸如图118B中示出的那些的多个图片设置选项。例如，用户可从库选择照片或图像，以使用移动装置的摄像头拍摄照片。在一些示例中，档案照片或图像也可通过诸如互联网的网络从远端站点取得。在特定的示例中，用户可从他或她的社交网络账户获取图像。在其他的示例中，用户的社交网络账户上的档案图像可作为活动追踪应用中用户的档案图像和/或对应的活动追踪服务和站点上的用户的账户中的用户的档案图像自动地预填。在选择或采集了用户档案的图像后，用户可被提供有诸如图118C所示的图像编辑界面。用户可具有在将图像设置为他或她的档案图片之前对图像裁剪、改变大小、旋转、缩放和进行图像编辑的选项。附加地或替换地，通过应用输入的档案设置可和对应的活动追踪服务以及站点同步，且上传至用户账户。因此，在移动应用上进行的用户档案的任意改变也可自动（或以

Petitioner Samsung Ex-1004, 0197

按需的方式）反映至远端网络站点上的用户账户。

在一些布置中，不论进行的活动的类型，活动可被检测且活动点数可被累积。在其他布置中，活动可和进行的活动的类型一起被追踪。图119A和119B中示出了示例性活动追踪界面，其配置为追踪由用户进行的活动的总量以及活动的类型。例如，可将选项11901用于选择活动类型。附加地或替换地，选项11901可用于分组在离散的进程中检测到的活动。进程可小于、大于或等于目标时间周期或其他总体预定的活动周期。例如，用户可将一天中进行的活动的部分标签为"健身房时间"或"工作后时间"。在另一示例中，用户可表明对应于休假时间周期的活动的周。可按照希望或需求使用其他活动或事件周期安排。

图120A-120C示出了示例性位置标定界面，其可由用户使用来表明完成活动进程后的锻炼位置。例如，在图120B中，位置可由系统基于检测到的坐标信息以及对应于这些坐标的建筑或位置的数据库自动地限定。用户可能能够通过选择不同的建议或匹配的建筑或位置来编辑该特定位置，例如图120C中所示的。在经纬度坐标之外，建筑或地点可通过名字、街道名、地址或其他标示来标明。

图121A-121C示出了表现追踪应用记录由用户采用的路径的能力。该路径可显示在地图上，且各个标识可显示在路径上。例如，图121C中示出的标识可标示靠近或沿用户路径的特定的已知的位置。路径的颜色也可表明消耗的卡路里的数量、速度、速率、用户情绪、地形类型（例如，石子地、碎石地、沥青地、上坡、下坡、平地等）和/或以上的组合。悬停在任意标识或路径的部分上可提供进一步的信息，诸如位置的名字、在该点处进行的运动活动的量、地形类型、用户情绪、速度等。

在完成运动锻炼时，或在运动锻炼中或之前，用户可指定曾进行、正在进行或将进行的活动的类型。这可允许应用更佳地校准传感器数据和算法，以度量表现。例如，加速度器信号可取决于活动的类型（例如，自行车相对壁球）而不同地出现。相应地，可将不同的数据处理算法用于将数据和用户的实际活动量（例如，进行的步数、消耗的卡路里、跑动或移动的英里）更靠近地匹配。

图122A-122C示出了示例性界面，通过其用户可选择活动类型。在选择活动类型之后，应用可自动地识别并使用对应的算法，以处理传感器数据。识别的活动类型还可和在活动进行期间采集的活动数据关联地存储。活动表型的开始和结束可由用户标示或标明，或可基于检测到不活跃周期达到特定的阈值而自动地标示或标明。

附加地或替换地，活动监测应用可自动地建议位置和/或活动类型。图123A和123B示出了应用界面，通过其确定了建议的位置和活动类型。位置可基于此前的活动位置或由其他用户使用的锻炼位置的数据库或由坐标限定的位置和地点的通用数据库确定。另一方面，可基于将传感器信号和已知活动的信号匹配而确定活动类型。如果在待定信号和预定活动的信号之前存在基本的相似性，应用可建议用户的活动为预定的活动，或将用户的活动限

Petitioner Samsung Ex-1004, 0198

定为预定的活动。在其他示例中，可通过将活动类型和位置相关联而自动地建议或确定活动类型。位置可能已经由用户事先存储，或活动的类型可已经此前和位置相关联（例如，由用户进行）。例如，用户可能已经表明他或她在高中跑步。因此，如果用户的位置被确定为在该高中，则应用可自动地建议跑步活动类型。在其他示例中，应用可通过在线目录或网络数据库（诸如在线商务列表等）识别商务类型或位置。应用可继而基于商务类型或位置推断用户在进行的活动的类型。例如，如果用于位于对应于瑜伽房的地址，则应用可建议活动类型对应于瑜伽。也可使用其他方法和技术来确定活动类型。

图124A-124C示出了示例性活动追踪界面，其中标明了活动类型。例如，在图124A中，对活动总量有贡献的活动类型使用图像或图标12403在部分12401中表明。图标12403可代表活动的类型，诸如跑步、有氧运动、自行车、举重等。图124B示出了其中标示了多种活动类型的界面。

图124C示出了示例性分解视图，其中检测到/记录的活动被分成有贡献的活动类型。例如，自行车、步行和跑步活动类型中的每一个和对应的进行的该活动类型的活动的量一起显示。图12411可通过类型相对时间而示出活动的量。对应于每一活动类型的活动的量可以各种方式区别，包括使用不同的颜色、图案、形状、大小、透明度、颜色或灰度梯度等以及以上的组合。

图125A-125C、126A-126C、127A-127C、128A-128C、129A-129C、130A-130C、131A-131C、132A-132C、133A-133C和134A-134C示出了活动追踪界面的附加的示例，在该界面中活动类型可用于将进行的活动分类或分组。例如，在图126C中，每个弧形部分12601a、12601b和12601c可对应于不同的活动。在每一个弧形部分12601a、12601b和12601c中填充的部分可对应于活动进行时的一天里的时间。

在其他示例中，图134C可示出形为互锁形状或块13401的用户活动。块的不同形状或块的不同颜色可对应于活动类型。附加地或替换地，形状的尺寸可对应于进行的该类型的活动的量。可将可视化或图像标示的其他变动用于在同一图像中或使用不同图像代表活动类型、该活动类型的活动的量和/或该活动类型的活动进行的时刻。活动可按照需要根据替换性的或附加的分类和分组总结，且该分类也可视觉地反映和传输。

图135A-135D示出了一系列界面，通过其用户可使用朋友信息标示活动进程。例如，用户可通过搜索通过好友列表或通过定义新的好友而添加好友至活动进程。该信息可继而被和该特定的进程关联地存储。恰当地或需要地，可将多于一个好友添加至活动进程。

图136A-136C示出了示例性界面，用于显示和好友进行活动的合计的活动信息。可将好友根据和该好友总体地（图136A）或针对该特定的活动类型（图136B)进行的活动的量而组织。如图136C所示，选择好友可显示用户的档案以及共同的活动兴趣和/或分享的活动位置。

Petitioner Samsung Ex-1004, 0199

图137A和137B示出了当用户选择和好友竞赛时可显示的示例性比赛或竞赛界面。该界面也可用来提供由用户进行的运动活动的量和由另一用户进行的运动活动的量之间的比较。因此，用户可选择和其比较运动活动的任意好友或用户，如图137B所示。可继而显示图表，如图137A所示，示出运动活动的比较。可使用多种图表和比较格式。

图138A和138B示出了一系列界面，通过其用户可访问标明用户在全部好友或用户或分组中所处的位置的记分牌。用户可通过诸如矩形外框或高光的标识被高光示出。

图139A和139B示出了示例性成就界面，该界面配置为向用户提供激励或一些成就的标示（诸如新的个人最佳（例如，对于1英里跑步）或目标的完成（例如，第一次跑步10英里））。

图140A和140B示出了示例性界面，该界面提供至事件或位置的特殊访问。该界面可包括扫描编码或图案14001，其可被事件或位置工作人员扫描（在屏幕上），以确定授权和准入。这样的界面也可包括对产品、服务、食品项等提供的折扣或其他特别的促销。

根据另一方面，可将结合部或多用户目标限定为提供面向团队的活动。在一个示例中，可为一组用户限定总体目标，其中每个用户被要求完成总体目标的一部分。超出一个用户的部分的活动可能不能应用至总体目标，或不能对目标的其他用户的部分的完成有所贡献，从而每个用户必须完成他或她的各自的部分。这可鼓励用户由于同伴压力或如果总体目标未达成的责任感而进行活动。在其他布置中，一个用户的超出的活动可能对另一用户的目标部分的完成有所贡献。可设置活动的量可对其他用户的目标部分有所贡献的限制。在此外的其他示例中，多用户目标可能不包括预定的用户部分。因此，用户可对总体目标贡献他们所希望的量。

多用户目标可包括在完成后祝贺目标成就的视觉化效果或用户界面元件。例如，总体目标可由一组保龄球瓶代表。每个用户可负责通过完成总体目标的他或她的部分而击倒他或她的瓶。在用户完成他或她的目标部分后，对应的保龄球瓶的外观可改变至看上去被击倒。一旦全部用户完成他们的目标部分，则可显示祝贺信息、视觉效果或其他标识。

图141示出了用于多用户目标的另一示例性视觉效果。在该示例中，两个用户可联合地尝试实现累计6000活动点数的目标。第一用户的进度14101可由一保龄球代表，而第二用户的进度14103可由一组保龄球瓶代表。为了虚拟地击倒保龄球瓶，用户可能需要移动他们的进度条至保龄球和保龄球瓶将相遇的中间部分。因此，用户可能需要完成他们自身的部分以达成该目标。如所示，目标的部分被均匀地分割。但是，目标部分可能不被均匀地分割，且可能需要一个用户较另一个用户进行更多的活动。可使用各种目标分割和/或各种目标分割可由用户、教练、活动追踪服务等选择。

按照需要，装置10或装置4300（图43）能够和另一装置10交互。因

Petitioner Samsung Ex-1004, 0200

此，佩戴装置10的第一用户可将他们的活动和佩戴第二装置10的第二用户的活动进行比较。装置上的标示系统20可表示第一用户的第一活动水平，而也表明第二用户的第二活动水平。类似地，第二装置上的标示系统20可表示第二用户的第二活动水平，而也表明第一用户的第一活动水平。其他用户的活动数据可经由无线通信从移动装置或远端站点通信至其他装置。在该构造中，相应的标示系统的多个灯可被视作被分割成第一段和第二段。第一段可包括第一组10个灯部件，而第二段可包括第二组10个灯部件。因此，第一用户活动水平显示在标示系统的第一段上，而第二用户活动水平显示在标示系统的第二段上。当用户按压输入按键以检查每个用户活动水平的进度时，标示系统可点亮。在在两个用户之间的竞争的这个方面中，不存在终结目标。如果一个用户达到标示系统上的完全的计量限制，则系统将增加上限，并调节每一个用户的进度水平。

在另一方面中，第一用户和第二用户可以"拔河"比赛进行竞争。每一个用户的相应的标示系统显示两个用户的活动水平。例如，第一用户的活动水平以第一颜色显示，而第二用户的活动水平以第二颜色显示。在比较各自的活动水平时，每一个用户都尝试通过增加其相应的活动水平而占据另一用户的标示系统，其中标示系统更多的灯部件以其相应的颜色点亮。

在另一方面中，装置10可编程为将活动水平以特定的颜色显示一设置的时间阶段。例如，用户可能为了慈善进行活动并赚取活动点数。在这样的情形中，标示系统可以诸如白色的分配的颜色点亮全部灯部件。而且，如果用户参与特定的被赞助的事件，涉及该事件的活动可以另一分配的颜色显示。

在另一方面中，人们可提供激励信息给用户，从而该信息经由显示屏或标示系统传输。例如，可由第一用户将鼓励信息加载至远端站点上并引导至第二用户。消息可加载在第二用户的装置上，例如当第二用户将装置插入计算机中时。消息可下载至存储在其中的第二用户装置10。第二用户可能不能立刻得知消息被接收。鼓励消息可由诸如当第二用户达到目标时的事件触发。在触发事件后，第二用户装置的标示系统可以特定的方式点亮，诸如全部灯部件闪烁。也可提供可听见的声音或在显示或标示系统上提供其他动画的发光特征。还将理解触发事件可基于诸如时间的其他参数，或鼓励消息可在传输至装置后立刻被提供。最终，将理解鼓励消息可无线地传输至装置10。还将理解信息可传输至装置，以供用户为了该消息而检查相关联的移动装置。

在另一方面中，警告信息可传输至装置10，其中标示系统可以特定指定的方式点亮。警告信息可以此处所述的任意方式传输和触发。警告信息可表示用户应该为了更多的信息而访问远端站点或查看用户移动装置上的信息。在一个示例性实施例中，警告信息可表示对在特定的时刻处进行的活动可能进行奖励。

在另一方面中，装置10可基于不活跃或非活跃周期提供信息。如果装置10感知用户已经在非活跃（例如，低活跃度）状态一预定量的时间，警告信息可传输至标示系统或显示屏以提醒用户变得更活跃。警告信息可以此处所述的任意方式传输。低活跃度状态的阈值和不活跃时间也可变动并由用

Petitioner Samsung Ex-1004, 0201

户单独地设置。

在一些布置中，可能检测到用户非活跃或不活跃，并影响用户朝向活动目标的完成的进度。例如，当用户未在特定的时间量上表现出特定水平的移动或移动的种类、用户未表现出至少阈值水平的心率、用户未在一段时间量上移动足够量的距离等和/或以上的组合时，检测到不活跃。对于其中用户累积活动点数以达到活动点数目标的布置，当检测到非活跃度（例如不活跃或不活动状态）的量时，点数或值可从用户的活动点数或其他活动指标总量推导出。可使用各种转换率以将非活跃换转成活动点数扣除。在特定的示例中，10分钟不活跃可对应于5分的扣除在另一示例中，30分钟不活跃可对应于100分的扣除。活动点数的损失或扣除可为线性的或非线性的，例如，为指数的、抛物线的等。

用户的非活跃时间可包括不活跃时间和静止时间。非活跃和静止时间可由不同的移动、心率、步数或其他阈值限定，或可使用相同的阈值限定。在一个示例中，静止时间可具有比非活跃阈值更高的阈值（例如，需要更高水平的活动）。即，个体可被视作静止的，而不是不活跃的。非活跃阈值可对应于静止阈值或更高的阈值，如果需要的话。替换地，不活跃阈值可较静止阈值更大。可存在多个静止阈值、不活跃和/或非活跃阈值（例如，静止阈值和不活跃阈值中的一个可为非活跃阈值）。也可在多个阈值或几乎没有活动的水平（例如，不活跃）之间限定不同的点数扣除或点数扣除的速率。例如，用户可由于不活跃而每小时损失50点，并由于静止活动而每小时损失30点，或与此相反。此外，活动点数扣除可取决于用户是否是不活跃的或静止的而在不同的时刻处触发。例如，用户可在30分钟不活跃或45分钟静止之后开始损失活动点数.还可限定附加的阈值（例如，多于2个阈值）以及相应的活动点数损失速率。

在一些布置中，可将各种传感器用来检测非活跃时间周期。如上所述，可基于心率、移动信号的幅度、步速（例如，每分钟小于10步）等来限定非活跃时间周期。替换地或附加地，可基于物理位置、本体位置、本体取向、本体姿态或由个人进行的活动的类型而测量不活跃和静止时间阶段。各个物理地不活跃或静止身体位置或取向的有害的影响也可不同。因此，30分钟斜靠可能造成和45分钟坐立相同的健康危险。健康危险的可能性也可为时间相关的。因此，特定范围的长度和在特定的时间范围中的不活跃（例如，睡眠）可能不引入健康危险。在一个示例中，在9PM和9AM之间睡7-9个小时可能不引入致命的健康危险，且由此，不对活动点数或其他活动指标值扣除有所贡献。实际上，在一些示例中，特定范围的长度和/或在特定范围的时间的不活跃（诸如睡眠）的确实可能被视作对用户的健康是有害的。因此，可在这些时间中以较慢的速率扣除或累积活动点数。

替换地或附加地，可基于一日中的时间、用户的地址、用户的物理位置、非活跃水平等确定活跃指标的值（例如活动点数）降低的量。例如，用户可在下午较在晚间损失更大的活动指标值和/或以更快的速率损失活动指标值。在另一示例中，如果用户在健身房，其可较用户在家损失更少的活动点数或其他活动指标和/或以更少的速率损失活动点数或其他活动指标。

为了计入非活跃类型的变化（例如在活动被视作活跃的必需水平之下），

Petitioner Samsung Ex-1004, 0202

系统可区分物理本体位置或取向，包括例如睡眠、斜靠、坐立和站立。区别不同的物理本体位置和取向可包括将传感器布置在用户本体的不同位置，以检测每个身体部分各自的位置。用户的物理本体位置可继而基于本体部分相对于彼此的相对位置被确定。例如，当膝部位置传感器处于腰部或胸部传感器的第一阈值距离中时，系统可确定用户正在坐着。如果膝部位置传感器位于第一阈值距离之外，系统可确定用户正在站立。在上述示例中，系统可使用诸如垂直距离的距离的一部分。通过单独或与绝对距离（例如，2个传感器之间的直线距离）组合地使用垂直距离，系统还可区别用户何时躺下以及站起。例如，躺下位置可对应于膝部传感器和胸部或腰部传感器之间的非常低的垂直距离，即使绝对距离可能更大。站立位置可对应于膝部传感器和腰部或胸部传感器之间的更大的垂直距离，但展现出类似的绝对距离。在其他示例中，由各个传感器形成的角度可用于确定个体的位置。附加地或替换地，用户的各个身体部分的位置可结合加速度器或移动数据评价，以确定用户是否正在移动或进行特定水平的移动（例如，位于该水平处、位于其上、位于其下）。

在活动点数扣除之外，系统可向用户警告不活跃，以鼓励活跃的生活方式。在一个示例中，系统可在特定量的不活跃（诸如2分钟、5分钟、30分钟、1小时等）后通过在诸如此处描述的可佩戴装置的装置上显示信息或标识而警示用户。不活跃时间的量可在不连续的时间周期上可加和。连续的不活跃时间的量可替换地或附加地被追踪。例如，如果用户在10:15和11:00AM之间不活跃，然后再次在2：00和2:30PM之间不活跃，非活跃时间的总量可为1小时15分钟。不活跃的消息或标示可在扣除活动点数之前作为警示提出。例如，消息可标示如果用户不在约定量的时间（例如，30分钟、5分钟、10秒、30秒、1小时、2小时等)内表现出足够水平的活动，则将扣除X量的活动点数。因此，装置可包括不活跃计时器，以确定用户不活跃的量。附加地，信息可提供用户应进行以抵消由不活跃引起的任意风险的活动类型的建议。例如，系统可建议用户以每英里10分钟的速度步行1小时。当用户已经抵消或解决检测到的不活跃时间量的风险或负面影响时，可提供祝贺消息或其他标识。

如果用户在退出不活动或不活跃模式的特定的时间量中返回至不活动或不活跃模式，则可提供警告、点数扣除和/或其他的告示。例如，用户可锻炼或进行足够水平的活动以10分钟的阶段，以退出静止或不活跃模式。但是，系统或装置可能需要至少30分钟的活动来避免诸如1小时、2小时、3小时等的时间周期的此外的警告。例如，警告可包括用户未在充分量的时间上、或以充分的活跃水平、或以上的组合进行活动。附加地，短的时间量中的多个静止阶段（例如，时间的阈值量）可能需要更高或附加水平的活动来抵消包括健康危险等在内的可能的静止影像。在特定的示例中，用户可能需要进行高水平的活动以中断点数扣除。

装置或其他系统还可告知用户在负面健康影响可能发生之前允许的不活跃时间的量。在一个示例中，装置或系统可包括倒计时，其标示在可能的健康风险可能开始生效之前允许的不活跃时间的剩余量。可基于进行的活动的量赚取或累积允许的不活跃时间的量。因此，装置还可提供建议或推荐，关于为了赚取特定量的不活跃时间（例如，看1小时电视）而可进行的活动的类型和/或长度。不同类型的不活跃或静止活动可能需要不同类型或量的活动。例如，1小时倚靠可能相较于1小时坐着需要更艰苦或更长的锻炼。在另一示例中，编织时坐立1小时可能较看电视时坐立1小时需要较不艰巨或

Petitioner Samsung Ex-1004, 0203

较少量的锻炼或活动。根据一个或多个布置，可基于实验数据和/或预定的编程以及数据表格产生推荐，所述表格说明活动的类型和/或长度以及允许的不活跃的对应的量。

装置或活动追踪系统还可基于历史记录推荐活动。例如，装置或追踪系统可确定用户在过去进行的活动，并基于这些活动的类型产生推荐。附加地或替换地，装置或追踪系统可产生用于由用户在过去进行的具体的锻炼的推荐。例如，用户可能需要进行消耗500卡路里的活动来抵消2小时的电视观看。在这样的情形中，系统可推荐由用户在过去进行的特定的锻炼，其中用户消耗了500卡路里。可将历史活动类型和特定的历史锻炼的组合用于产生推荐。在一个示例中，系统可基于用户表现为偏好的锻炼的类型而推荐用户在过去进行的两种锻炼中的一种。该偏好可基于用户进行的每种种类的锻炼的次数而确定。也可基于位置和时间推荐锻炼或活动类型。例如，如果用户此前在同一位置和/或相同的时间进行了特定活动种类或特定的锻炼路径，则系统可推荐该活动种类或锻炼路径。也可使用其他的推荐算法和因素。

如此所述，脊柱部件24提供支撑装置10的各个构件的底盘部件。将理解在其他示例性实施例中脊柱部件24可去除，或可和其他构件结合。挠性PCB部件可设置具有局部加强部件。附加的构件附连至挠性PCB部件。在该构造中，未使用脊柱部件24。在引入该装置时，可在注射成型过程中形成外壳部件的内部部分，且随后挠性PCB部件附连至该内部部分。外壳部件的剩余外部部分形成在PCB部件上。

在另一示例中，装置10可包括基本为圆的的壳体。该壳体可具有大致圆形的横截面，且具有管状构造。壳体可具有上述的类似的特征，其中显示屏和/或标示系统通过管状的外壳部件可见。每一个壳体都可采用成干涉配合的协作部件，且在一个装置中包括数据传输部件。该数据传输部件可具有上述的任意形式，诸如micro USB部件，且可包括至完全USB连接器的另外的适配器部件。装置可包括整合的PCB部件和LED/光管组件，以及亦可为三轴加速度器的微压电加速度器。加速度器感知活动，且LED/光管组件可基于感知的活动点亮。可按需将上述的其他特征并入该实施例。

该装置还可并入其他特征和替换性结构。显示和/或标示系统可使用电泳墨水装置。显示和/或标示系统也可采取其他的形式，诸如电荧光/磷光带显示屏，电-铬墨水装置、电湿润装置、或光纤显示屏。加速度器可具有多种形式，包括压电加速度器或纳米加速度器。采用的电池可为任意的锂离子电池电芯，且可具有和其他类型的电源一样的管状构造。壳体可包括多个可延展的互连链接部，其中一些链接部可包括位于其上的显示段。链接可经由具有导电线路的弹性缆线互连。壳体也可使用双电容触摸传感器以激活显示和/或标示系统。显示屏还可采用触摸激活屏幕的形式。壳体还可并入使用电致变色聚合物、并具有多个引线或管的显示屏。每一个管都被线连至电极且接收电致变色聚合物，继而当电流变动从控制器施加时变动颜色。壳体还可采取细长条的形式，其可被缠绕，以调节装置的周界。

装置10提供多项益处。装置具有紧凑的设计，其易于在任意时间由用户佩戴。装置并入形为USB连接器的可靠的数据传输装置，以方便地将数据传输至装置和从装置传输出。装置还能够和其他移动装置交互，且远端站

Petitioner Samsung Ex-1004, 0204

点提供增加用户的活动和表现的增强的用户体验。装置还能够追踪多种类型的活动，且还可在一天的大部分的周期中追踪用户的活动，以及每天在完整的24小时周期中追踪用户的活动。标示系统提供方便的和增强的方法来将活动信息通信至用户。经由装置10通信的信息向用户提供增加总活动和提供更健康的生活方式的激励。该装置结构还提供了显著的益处。壳体具有允许从用户的腕部方便地移除以及布置在用户的腕部上、而同时提供足够的刚度以保护由壳体支撑的构件的挠性区域。间隔器部件允许方便的尺寸调节。

结论

尽管已关于包括用于实施本发明的当前优选实施例在内的特定示例对本发明进行了描述，本领域技术人员将理解存在有对上述系统和方法的多种变化和置换。例如，本发明的各个方面可以不同的组合使用，且本发明的方面的各个不同的子组合可在单个系统或方法中使用，而不背离本发明。在一个示例中，此处描述的软件和应用可实现为存储在计算机可读取介质中的计算机可读取指令。而且，上述的各个元件、构件和/步骤可发生变动、变动顺序、略去和/或可添加附加的元件、构件和/或步骤，而不背离本发明。因此，本发明应如所附的权利要求所阐明的，被宽泛地理解。

相关申请的交叉引用

本申请要求2011年11月1日提交的美国专利申请No.61/409，082的权益，并为其部分连续申请，其通过引用在此并入。该临时美国专利申请No.61/409，082在2011年11月1日转为非临时美国专利申请。

Petitioner Samsung Ex-1004, 0205

Espacenet

Claims: CN103403627 (A) — 2013-11-20

Wearable device assembly having athletic functionality

Claims of CN103403627 (A)

A high quality text as facsimile in your desired language may be available amongst the following family members:

CA2815432 (A1) JP2013544140 (A) KR20130111569 (A) US2013110264 (A1) WO2012061438 (A2) CA2815518 (A1) JP2014500740 (A) KR20130111570 (A) WO2012061440 (A2)

- Original claims
- Claims tree

The EPO does not accept any responsibility for the accuracy of data and information originating from other authorities than the EPO; in particular, the EPO does not guarantee that they are complete, up-to-date or fit for specific purposes.

1.一种可佩带装置，其配置为由人员佩带，该组件包括：

壳体，其具有第一端和第二端，第一端能与第二端可释放地接合；

由壳体支撑的控制器，该控制器具有与其操作地相关联的传感器，其中该传感器检测该人员的活动；

由壳体支撑的显示屏，该显示屏操作地连接至控制器；

由壳体支撑的标示系统，该标示系统操作地连接至控制器，其中该标示系统能发光以标示人员的活动水平。

2.如权利要求1所述的装置，其中显示屏和标示系统包括多个可发光灯部件。

3.如权利要求2所述的装置，其中至少一个灯部件能显示不同的颜色的光。

4.如权利要求2所述的装置，其中标示系统的可发光灯部件能显示至少红色、黄色和绿色。

5.如权利要求1所述的装置，其中显示屏被定位为靠近壳体的中央部分且标示系统被定位为靠近壳体的中央部分且大致邻近于显示屏。

6.如权利要求5所述的装置，其中壳体具有成斜面的边缘，其中标示系统位于该成斜面的边缘中。

7.如权利要求6所述的装置，其中标示系统具有布置为大致线性构造的多个灯部件。

8.如权利要求1所述的装置，其中显示屏沿第一方向投射光，标示系统沿不同于第一方向的第二方向投射光。

9.如权利要求1所述的装置，其中标示系统具有第一段和第二段，该第一段能基于传感器感测的该人员的活动水平而发光，且其中控制器能接收关于第二人员的活动水平的信息，第二段能基于第二人员的活动水平而发光。

10.如权利要求1所述的装置，其中标示系统包括位于壳体的一侧上的多个第一灯部件和位于壳体的相对侧上的多个第二灯部件。

11.如权利要求1所述的装置，其中壳体具有内脊柱部件，其支撑控制器、显示屏和标示系统，其中壳体进一步具有弹性体部件，该弹性体部件绕内脊柱部件、控制器、显示屏和标示系统定位。

12.如权利要求1所述的装置，其中壳体具有内脊柱部件，该内脊柱部件具有至少一个基本刚性部分和至少一个挠性区域，刚性部分能绕挠性区域枢转。

13.如权利要求12所述的装置，其中基本刚性部分包括基本刚性中心部分、第一基本刚性段和第二基本刚性段，且其中挠性区域包括第一挠性区域和第二挠性区域，第一挠性区域连接该中心部分的第一端和第一段且第二挠性区域连接中心部分的第二端和第二段。

14.如权利要求13所述的装置，其中中心部分和第一段及第二段大致限定第一厚度，且其中挠性区域具有小于第一厚度的第二厚度。

15.如权利要求13所述的装置，其中第一挠性区域是凹形形状的且第二挠性区域是凹形形状的。

16.如权利要求13所述的装置，其中第一挠性区域是凹形形状且第二

Petitioner Samsung Ex-1004, 0207

挠性区域是凹形形状，其中每个凹形形状的基体部分具有比该凹形形状的其余部分的厚度更小的厚度。

17.如权利要求13所述的装置，其中控制器具有沿脊柱部件的长度连接的挠性电路部件，显示屏和标示系统被操作地连接至该挠性电路部件。

18.如权利要求13所述的装置，其中壳体进一步包括外壳部件，该外壳部件绕控制器、显示屏和标示系统定位。

19.如权利要求18所述的装置，其中外壳部件是聚合材料。

20.如权利要求18所述的装置，其中外壳部件是热塑性弹性体部件。

21.如权利要求1所述的装置，其中显示屏和标示系统在发光时能通过壳体看到。

22.如权利要求1所述的装置，其中壳体具有大致环形形状，其尺寸设置为被佩戴在用户的手腕上。

23.如权利要求1所述的装置，其中壳体具有内脊柱部件和绕该内脊柱部件定位的热塑性弹性体部件，其中控制器、显示屏和标示系统被包含在热塑性弹性体部件内。

24.如权利要求23所述的装置，其中壳体进一步具有输入按键，该输入按键操作地连接至控制器，该输入按键具有整体地连接至挠性帽的刚性基部部件，其中弹性体构件邻接刚性基部构件的周界边沿。

25.如权利要求1所述的装置，其中壳体包括内脊柱部件，该内脊柱部件具有凹陷隔室，控制器具有位于该凹陷隔室中且操作地连接至控制器的电池。

26.如权利要求26所述的装置，其中凹陷隔室由触变模制部件和定位在该触变模制部件上的金属闭合部件形成。

27.如权利要求25所述的装置，其中电池隔室包括金属壳。

28.如权利要求13所述的装置，其中第一段具有曲线构造且限定第一凹陷隔室，第二段具有曲线构造且限定第二凹陷隔室，第一凹陷隔室由触变模制部件和第一金属闭合部件形成，该触变模制部件接收操作地连接至控制器的第一弯曲电池，该第一金属闭合部件定位在第一电池之上，第二凹陷隔

Petitioner Samsung Ex-1004, 0208

室由触变模制部件和第二金属闭合部件形成，该触变模制部件接收操作地连接至控制器的第二弯曲电池，该第二金属闭合部件定位在第二电池之上。

29.如权利要求28所述的装置，其中第一凹陷隔室具有开口，第一电池具有支撑触点的第一弹性部件，其中该触点定位在该开口中且连接至控制器，且其中第二凹陷隔室具有开口，第二电池具有支撑触点的第二弹性部件，其中该触点定位在该开口中且连接至控制器。

30.如权利要求1所述的装置，其中第一突起部件连接至第一端，且第二接收器部件连接至第二端，第一突起部件具有操作地连接至控制器的USB连接器，USB连接器能被与第二接收器部件可释放地接合。

31.如权利要求30所述的装置，其中USB连接器具有位于第一侧上的引线和位于与第一侧相对的第二侧上的凹部，第二接收器部件限定开口且枢转地支撑指针，其中在栓锁位置中，USB连接器由第二接收器部件接收，其中指针被接收在该凹部中，且在非栓锁位置中，指针从USB连接器枢转开，其中USB连接器能从第二接收器部件移除。

32.如权利要求31所述的装置，其中凹部限定接合表面，其中在闩锁位置中指针接触该接合表面。

33.如权利要求1所述的装置，其中第一端具有USB连接器，USB连接器操作地连接至控制器。

34.如权利要求30所述的装置，包括延展元件，其连接在壳体的第二端和第二接收器部件之间。

35.如权利要求34所述的装置，其中延展元件具有本体，该本体的一端附连至壳体的第二端，该延展元件还具有支撑在本体中的旋转棘爪，该旋转棘爪具有凸轮表面，且其中第二接收器部件具有叉形件，该叉形件具有凸轮表面和槽，且其中当叉形件插入延展元件的本体中时，各凸轮表面旋转棘爪，其中当叉形件进一步插入本体中时，旋转棘爪被接收在槽中，其中延展元件被附连至第二接收器部件。

36.如权利要求30所述的装置，其中USB连接器具有刚性本体，该刚性本体具有多个引线，其中该引线彼此均匀地间隔开。

37.如权利要求30所述的装置，其中USB连接器具有刚性本体，该刚性本体限定顶表面，USB具有凹陷在该刚性本体内的多个引线，每个引线具有靠近顶表面定位的凸起棱纹。

38.如权利要求1所述的装置，其中控制器被配置为响应于检测用户的

活动预定量而点亮标示系统。

39.如权利要求1所述的装置，其中控制器被配置为响应于检测用户的未活动的预定量而点亮标示系统。

40.如权利要求1所述的装置，其中传感器是三轴加速度计，其能感测活动以提供用户消耗的能量和进行的步数、速度、距离中的至少一个。

41.如权利要求1所述的装置，其中控制器被配置为在移动装置上提供显示消息的标识。

42.如权利要求1所述的装置，其中控制器包含活动目标，且其中标示系统具有多个段，其中每个段代表朝向活动目标的特定进度量。

43.如权利要求42所述的装置，其中进度的标识基于进度量而被颜色编码。

44.如权利要求1所述的装置，其中控制器被配置用于无线通信。

45.如权利要求1所述的装置，其中壳体的第一端具有数据传输部件，其操作地连接至控制器。

46.如权利要求1所述的装置，其中显示屏在发光时能通过壳体看到。

47.如权利要求1所述的装置，其中标示系统在发光时能通过壳体看到。

48.如权利要求1所述的装置，其中显示屏仅在发光时能通过壳体看到。

49.如权利要求1所述的装置，其中标示系统仅在发光时能通过壳体看到。

50.一种可佩带装置，其配置为由人员佩带，该组件包括：

壳体，其具有第一端和第二端以及位于它们之间的大致挠性中间部分，第一端能与第二端可释放地接合；

由壳体支撑的控制器，该控制器具有与其操作地相关联的加速度计，其中该加速度计检测该人员的活动；

由壳体支撑的显示屏，该控制器操作地连接至控制器；

Petitioner Samsung Ex-1004, 0210

由壳体支撑的标示系统，该标示系统操作地连接至控制器，其中该标示系统能发光以标示人员的活动水平。

51.一种可佩戴装置，包括：

配置为由人员佩戴的壳体，该壳体在其中支撑控制器，该控制器具有传感器，该传感器能检测人员的活动，该壳体具有操作地连接至控制器的可发光部分，其中该可发光部分基于传感器检测的活动水平而发光。

52.如权利要求51所述的装置，其中可发光部分包括由壳体支撑的显示屏，该显示屏操作地连接至控制器。

53.如权利要求52所述的装置，其中显示屏包括第一显示屏和第二显示屏，第二显示屏由壳体支撑，第二显示屏操作地连接至控制器，其中第二显示屏能发光以标示人员的活动水平。

54.如权利要求51所述的装置，其中壳体是环形腕带，其配置为被佩戴在人员的手腕上。

55.如权利要求51所述的装置，其中壳体具有内脊柱部件，其支撑控制器、第一显示屏和第二显示屏，其中壳体进一步具有弹性体部件，该弹性体部件绕内脊柱部件、控制器、显示屏和标示系统定位。

56.如权利要求55所述的装置，其中内脊柱部件包括基本刚性中心部分、第一基本刚性段和第二基本刚性段，且其中第一挠性区域连接该中心部分的第一端和第一段且第二挠性区域连接中心部分的第二端和第二段。

57.如权利要求56所述的装置，其中第一挠性区域和第二挠性区域是凹形形状的。

58.如权利要求56所述的装置，其中脊柱部件具有第一厚度，其中第一挠性区域和第二挠性区域的相应基部具有比第一厚度小的第二厚度。

59.如权利要求55所述的装置，其中第一显示屏和第二显示屏在发光时能通过弹性体部件看到。

60.如权利要求56所述的装置，其中第一段具有曲线构造且限定第一凹陷隔室，第二段具有曲线构造且限定第二凹陷隔室，第一凹陷隔室由触变模制部件和第一金属闭合部件形成，该触变模制部件接收操作地连接至控制器的第一弯曲电池，该第一金属闭合部件定位在第一电池之上，第二凹陷隔室由触变模制部件和第二金属闭合部件形成，该触变模制部件接收操作地连

Petitioner Samsung Ex-1004, 0211

接至控制器的第二弯曲电池，该第二金属闭合部件定位在第二电池之上。

61.如权利要求60所述的装置，其中第一凹陷隔室具有开口，第一电池具有支撑触点的第一弹性部件，其中该触点定位在该开口中且连接至控制器，且其中第二凹陷隔室具有开口，第二电池具有支撑触点的第二弹性部件，其中该触点定位在该开口中且连接至控制器。

62.如权利要求51所述的装置，其中壳体具有第一端和第二端，其中第一突起部件连接至第一端，且第二接收器部件连接至第二端，第一突起部件具有操作地连接至控制器的USB连接器，USB连接器能被与第二接收器部件可释放地接合。

63.如权利要求62所述的装置，其中USB连接器具有位于第一侧上的引线和位于与第一侧相对的第二侧上的凹部，第二接收器部件限定开口且枢转地支撑指针，其中在栓锁位置中，USB连接器由第二接收器部件接收，其中指针被接收在该凹部中，且在非栓锁位置中，指针从USB连接器枢转开，其中USB连接器能从第二接收器部件移除。

64.如权利要求63所述的装置，其中凹部限定接合表面，其中在闩锁位置中指针接触该接合表面。

65.如权利要求63所述的装置，包括延展元件，其连接在壳体的第二端和第二接收器部件之间。

66.如权利要求65所述的装置，其中延展元件具有本体，该本体的一端附连至壳体的第二端，该延展元件还具有支撑在本体中的旋转棘爪，该旋转棘爪具有凸轮表面，且其中第二接收器部件具有叉形件，该叉形件具有凸轮表面和槽，且其中当叉形件插入延展元件的本体中时，各凸轮表面旋转棘爪，其中当插入件进一步插入本体中时，旋转棘爪被接收在槽中，其中延展元件被附连至第二接收器部件。

67.如权利要求51所述的装置，其中传感器是三轴加速度计，其能感测活动以提供用户消耗的能量和进行的步数、速度、距离中的至少一个。

68.一种可佩带装置，其配置为由人员佩带，该组件包括：

壳体，该壳体具有内脊柱部件，该内脊柱部件具有基本刚性中心部分、第一基本刚性段和第二基本刚性段，第一段通过第一挠性部件而被附连至中心部分的一端，第二段通过第二挠性部件而被附连至中心部分的另一端，壳体进一步具有绕内脊柱部件定位的弹性体部件，其中第一段和第二段相对于中心部分是挠性的；和

连接至内脊柱部件的控制器，该控制器具有与其操作地相关联的传感器，其中该传感器检测该人员的活动。

Petitioner Samsung Ex-1004, 0212

69.如权利要求68所述的装置，进一步包括操作地连接至控制器的显示屏，该显示屏能基于用户的活动水平而发光。

70.如权利要求69所述的装置，其中显示屏在发光时能通过弹性体部件看到。

71.如权利要求70所述的装置，其中显示屏包括第一显示屏和第二显示屏，第二显示屏邻近第一显示屏定位，第二显示屏能基于用户的活动水平而发光。

72.如权利要求71所述的装置，其中壳体具有大致平面部分和成斜面边缘，第一显示屏能通过平面部分看见，第二显示屏能通过成斜面边缘看见。

73.如权利要求68所述的装置，其中第一挠性部件具有凹形形状且第二显示屏具有凹形形状。

74.如权利要求73所述的装置，其中第一挠性部件具有在凹形形状的基部处的减薄部分，第二挠性部件具有在凹形形状的基部处的减薄部分。

75.如权利要求68所述的装置，其中控制器具有挠性电路部件，其沿内脊柱部件的长度附连至该内脊柱部件。

76.如权利要求68所述的装置，其中第一段具有曲线构造且第二段具有曲线构造。

77.如权利要求76所述的装置，其中第一段限定第一电池隔室，该第一电池隔室具有接收在其中的第一弯曲电池，第二段限定第二电池隔室，该第二电池隔室具有接收在其中的第二弯曲电池。

78.如权利要求77所述的装置，进一步包括位于第一电池之上且连接至脊柱部件的第一金属闭合部件，以及位于第二电池之上且连接至脊柱部件的第二金属闭合部件。

79.一种可佩带装置，其配置为由人员佩带，该组件包括：

壳体，其具有第一端和第二端，第一端可释放地与第二端接合，壳体具有内脊柱部件，该内脊柱部件具有至少一个基本刚性部分和至少一个挠性区域，该刚性部分能绕该挠性部分枢转；

由壳体支撑的控制器，该控制器具有与其操作地相关联的传感器，其中

Petitioner Samsung Ex-1004, 0213

该传感器检测该人员的活动；

由壳体支撑的显示屏，该显示屏操作地连接至控制器且配置为显示与人员的活动相关的标识。

80.如权利要求79所述的装置，其中基本刚性部分包括基本刚性中心部分、第一基本刚性段和第二基本刚性段，且其中挠性区域包括第一挠性区域和第二挠性区域，第一挠性区域连接该中心部分的第一端和第一段且第二挠性区域连接该中心部分的第二端和第二段。

81.如权利要求80所述的装置，其中第一挠性区域是凹形形状的且第二挠性区域是凹形形状的。

82.如权利要求81所述的装置，其中刚性部件具有第一厚度，第一挠性区域和第二挠性区域具有比第一厚度小的第二厚度。

83.一种可佩带装置，其配置为由人员佩带，该组件包括：

内脊柱部件，其具有第一端和第二端以及位于它们之间的大致曲线段，第一端能与第二端可释放地接合；

控制器，其具有挠性电路部件和操作地与其关联的传感器，其中传感器检测人员的活动，挠性电路部件沿脊柱部件的长度附连；

连接至电路部件的显示屏，控制器能点亮该显示屏，该显示屏能发光以标示人员的活动水平；

热塑性弹性体部件，其沉积在控制器、显示屏和脊柱部件上，其中显示屏在发光时能通过弹性体部件看见。

84.一种可佩带装置，其配置为由人员佩带，该组件包括：

壳体，其具有第一端和第二端以及位于它们之间的中间部分，第一端能与第二端可释放地接合；

由壳体支撑的控制器，该控制器具有与其操作地相关联的传感器，其中该传感器检测该人员的活动；

由壳体支撑的显示屏，该显示屏操作地连接至控制器，其中该显示屏能发光以标示人员的活动水平；

连接至第一端的第一突起部件和连接至第二端的第二接收器部件，该第一突起部件具有USB连接器，该USB连接器具有位于第一侧上的引线和位于与第一侧相对的第二侧上的凹部，第一接收器部件限定开口且枢转地支撑指针，其中在栓锁位置中，USB连接器由第二接收器部件接收，其中指针被接收在该凹部中，且其中在非栓锁位置中，指针从USB连接器枢转开，其中USB连接器能从第二接收器部件移除，其中第一突起部件可释放地与第

二接收器部件接合。

85.一种紧固机构，其被用于配置为由人员佩戴的可佩戴装置，该装置具有控制器和配置为检测人员的活动的传感器，该装置具有第一端和第二端，该机构包括：

配置为连接至第一端的第一突起部件和配置为连接至第二端的第二接收器部件，该第一突起部件具有配置为操作地连接至该装置的USB连接器，该USB连接器具有位于第一侧上的引线和位于与第一侧相对的第二侧上的凹部，第一接收器部件限定开口且枢转地支撑指针，其中在栓锁位置中，USB连接器由第二接收器部件接收，其中指针被接收在该凹部中，且其中在非栓锁位置中，指针从USB连接器枢转开，其中USB连接器能从第二接收器部件移除，其中第一突起部件可释放地与第二接收器部件接合。

86.如权利要求85所述的紧固机构，进一步包括延展元件，该延展元件具有本体，该本体的一端配置为附连至所述第二端，该延展元件还具有支撑在本体中的旋转棘爪，该旋转棘爪具有凸轮表面，且其中第二接收器部件具有一对叉形件，每个叉形件具有凸轮表面和槽，且其中当叉形件插入延展元件的本体中时，各凸轮表面旋转棘爪，其中当叉形件件进一步插入本体中时，旋转棘爪的端部被接收在每个叉形件的相应槽中，其中延展元件被附连至第二接收器部件。

87.一种可佩带装置，其配置为由人员佩带，该组件包括：

壳体，其具有内脊柱部件，该内脊柱部件具有第一端和第二端以及位于它们之间的中间段，中间段具有中心部分和连接至中心部分的第一曲线段和连接至中心部分的第二曲线段，第一曲线段限定第一凹陷隔室，第二曲线段限定第二凹陷隔室；

位于第一凹陷隔室中的具有曲线形状的第一电池，和位于第二凹陷隔室中的具有曲线形状的第二电池；

控制器，其连接至脊柱部件且操作地连接至第一电池和第二电池，控制器具有与其操作地相关联的传感器，其中传感器检测人员的活动；

由壳体支撑的显示屏，该显示屏操作地连接至控制器且配置为显示与人员的活动相关的标识。

88.如权利要求87所述的装置，其中第一凹陷隔室具有金属部件和连接至脊柱部件的第一金属闭合件，以给第一电池提供第一金属壳，第二凹陷隔室具有金属部件和连接至脊柱部件的第二金属闭合件，以给第二电池提供第二金属壳。

89.如权利要求88所述的装置，其中第一电池具有由第一弹性罩部件支撑的触点，其中当第一金属闭合件连接至脊柱部件时，电池触点被偏压在操作地连接至控制器的触点上。

Petitioner Samsung Ex-1004, 0215

90.一种可佩戴装置，包括：

配置为由人员佩戴的腕带，该腕带支撑其中的控制器，控制器具有能检测人员的活动的传感器，该腕带进一步具有操作地连接至控制器的标示系统，该标示系统具有第一段和第二段，第一段能基于传感器检测的人员的活动水平而发光，且其中控制器能接收关于第二人员的活动水平的信息，第二段能基于第二人员的活动水平而发光。

91.一种可佩带装置，其配置为由人员佩带，该组件包括：

脊柱部件，其具有第一端和第二端及位于它们之间的中间部分，脊柱部件具有大致曲线构造，脊柱部件具有基本刚性中间部分和通过具有凹形形状的第一挠性部分连接至中心部分的端部的第一基本刚性段，该脊柱部件还具有通过具有凹形形状的第二挠性部分连接至中心部分的另一端的第二基本刚性段，第一基本刚性段限定包括触变模制部件的第一凹陷隔室，第二基本刚性段限定包括触变模制部件的第二凹陷隔室；

控制器，其具有沿脊柱部件的长度附连的挠性电路部件，控制器具有与其操作地相关联的三轴加速度计以检测用户的活动水平；

显示屏，其连接至电路部件且邻近脊柱部件的中心部分定位；

标示系统，其连接至电路部件且邻近显示屏定位，其中标示系统能基于加速度计检测的用户的活动水平而发光；

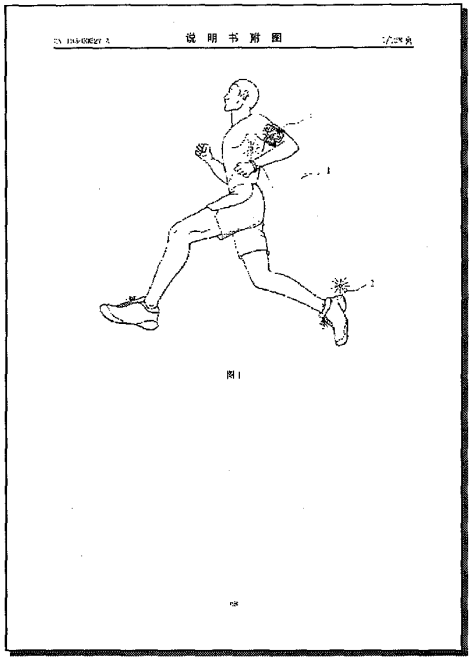
输入按键，其邻近显示屏定位且操作地连接至电路部件；

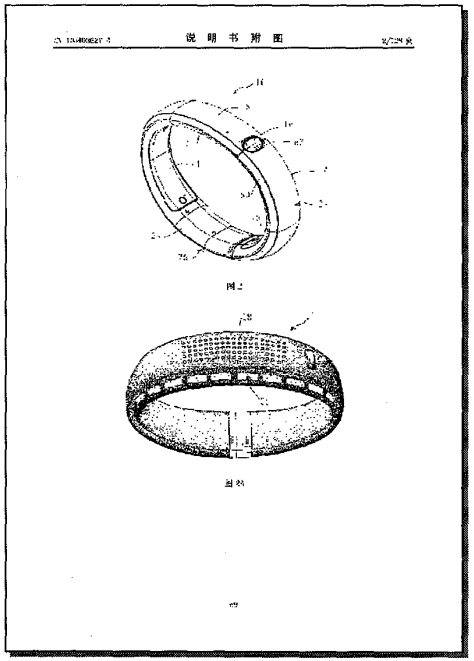
外热塑性弹性体部件，其绕脊柱部件、控制器、显示屏和标示系统定位，该弹性体部件接合输入按键的周边，该弹性体部件具有与第一凹陷隔室相通的第一开口且具有与第二凹陷隔室相通的第二开口；

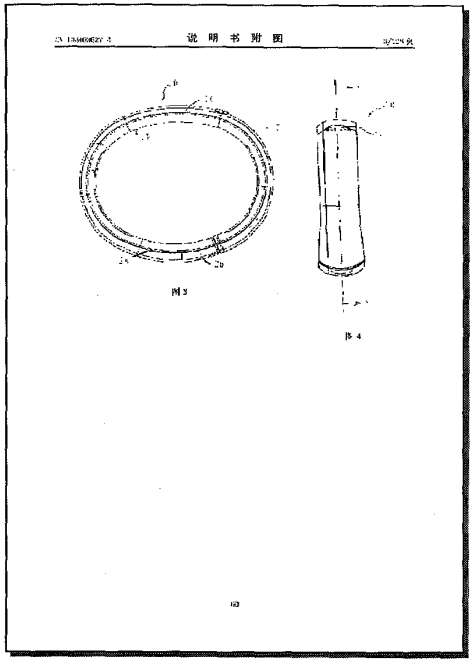
第一电池，其位于第一凹陷隔室中且操作地连接至控制器，第一金属闭合件位于第一电池上且连接至脊柱部件，第二电池，其位于第二凹陷隔室中且操作地连接至控制器，第二金属闭合件位于第二电池上且连接至脊柱部件；和

栓锁机构，其具有连接至脊柱部件的第一端的突起部件，该突起部件的第一端包括操作地连接至控制器的USB连接器，USB连接器具有包括多个引线的第一侧和具有凹部的第二侧，该栓锁机构还具有连接至脊柱部件的第二端的第二接收器部件，该第二接收器部件具有位于其中的枢转指针，其中当USB连接器插入第二接收器部件中时，指针被接收在凹部中。

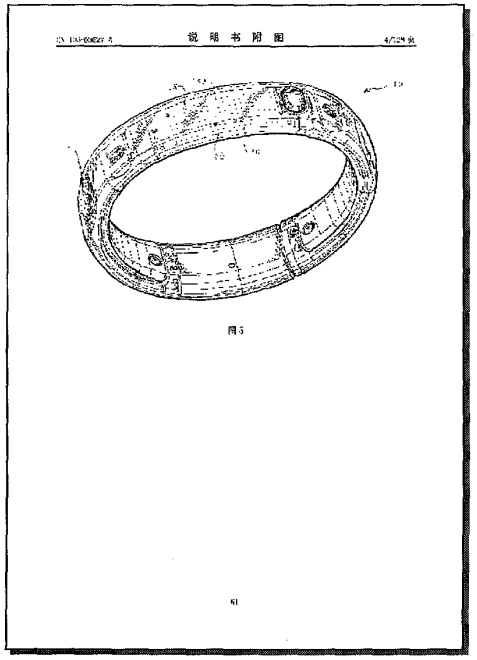
Petitioner Samsung Ex-1004, 0216

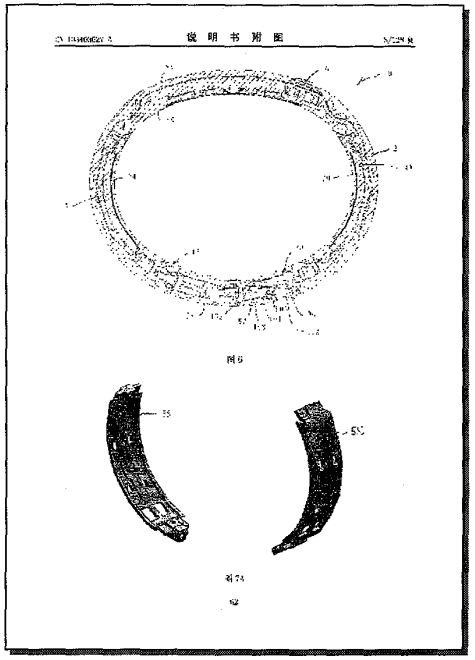


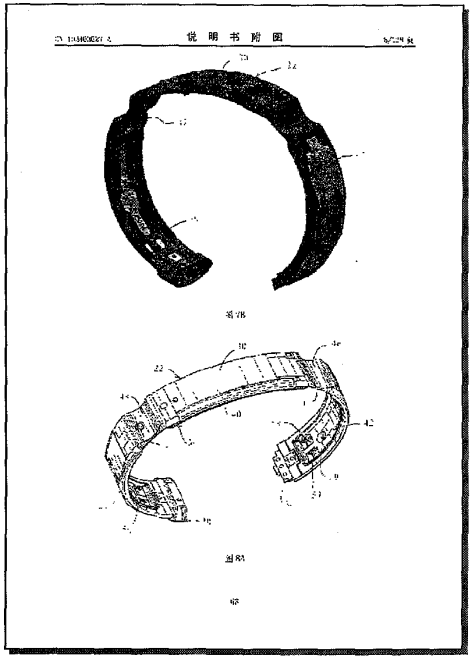




Drawing pages of CN103403627 A







Petitioner Samsung Ex-1004, 0217

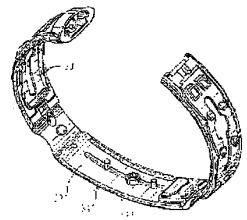


图 8B

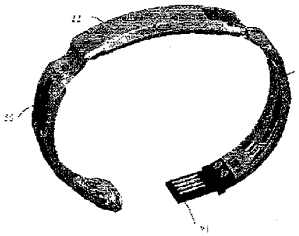


图 9

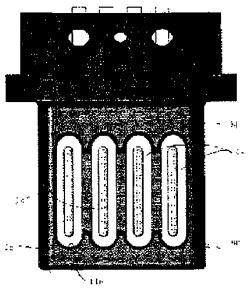


图 10A

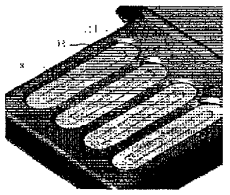


图 10B

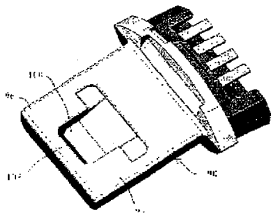


图 10C

Drawing pages of CN103403627 A

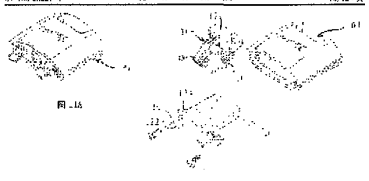


图 11A

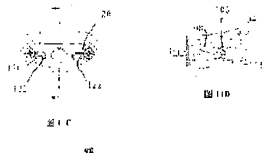


图 11B

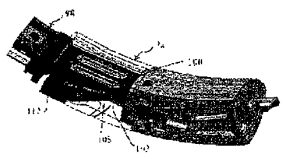


图 11C

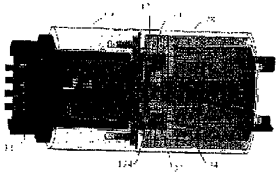


图 11D



图 12A

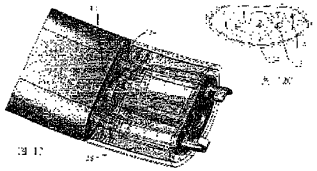


图 12

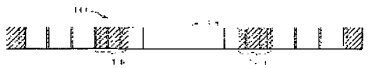


图 13

Petitioner Samsung Ex-1004, 0218

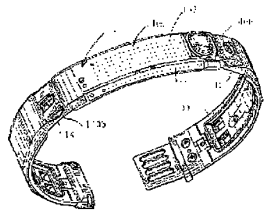


图 15



图 16

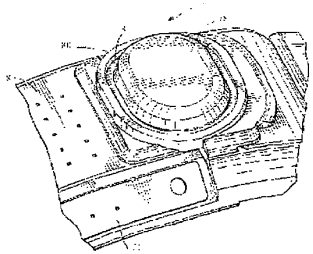


图 17

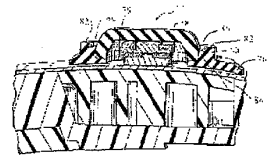


图 18

Drawing pages of CN103403627 A

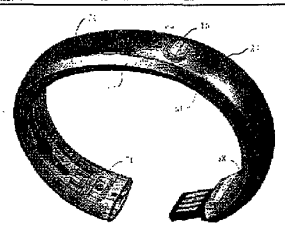


图 19

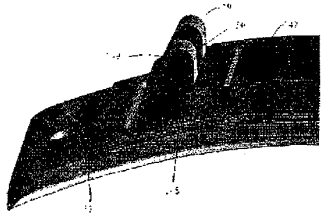


图 20

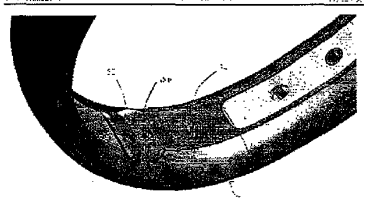


图 193

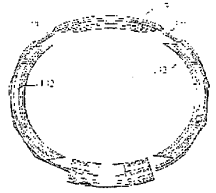


图 21A

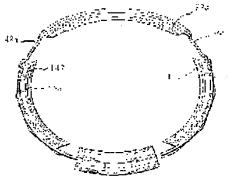


图 21B

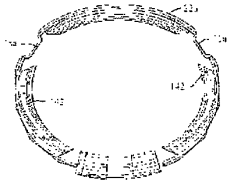


图 21C

Petitioner Samsung Ex-1004, 0219

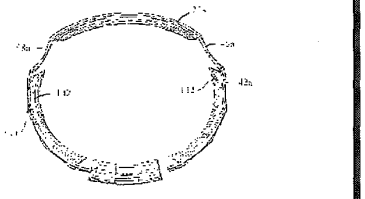


图210

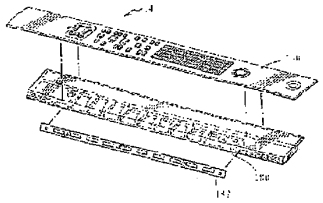
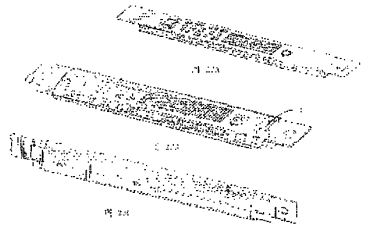


图22



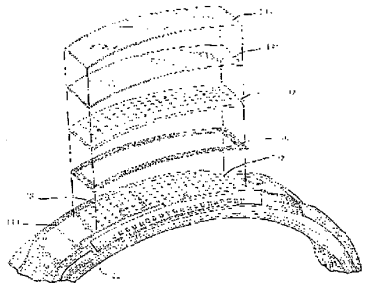


图24

Drawing pages of CN103403627 A

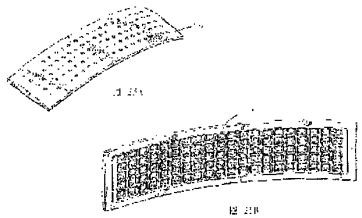


图26

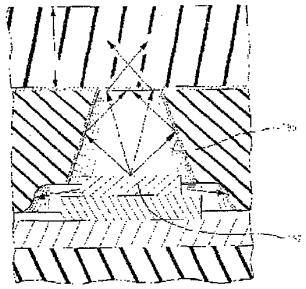


图27

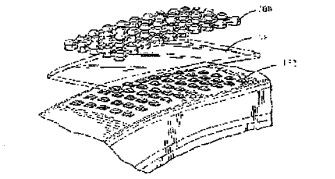


图28

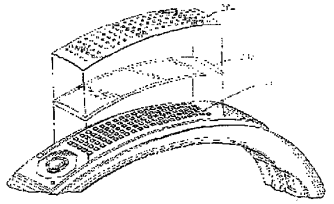


图29

Petitioner Samsung Ex-1004, 0220

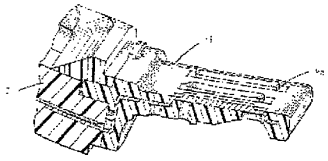


图 30

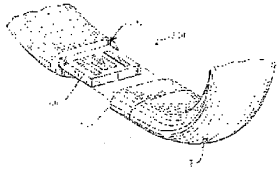


图 31A

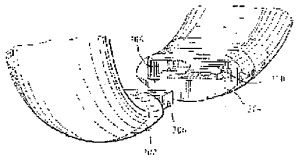


图 31B

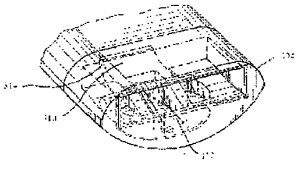


图 32A

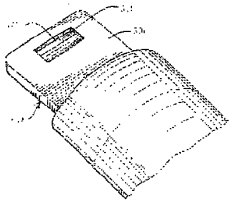


图 32B

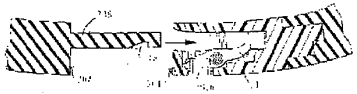


图 33A



图 33B



图 33C



图 33D

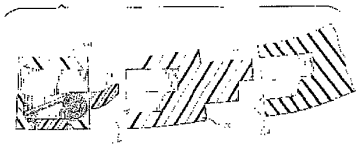


图 34A



图 34B

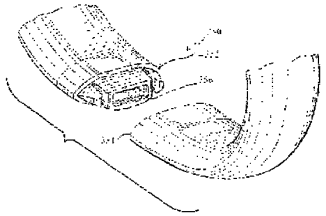


图 34C

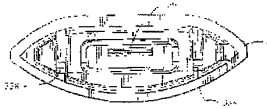


图 35D

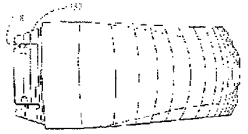


图 35C

Drawing pages of CN103403627 A

Petitioner Samsung Ex-1004, 0221

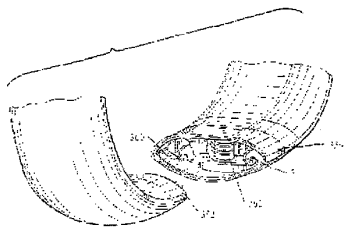


图 36A

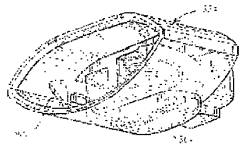


图 36B

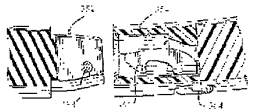


图 37A



图 37B



图 37C



图 37D

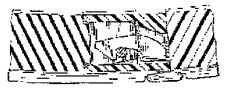


图 37E



图 38A



图 38B

Drawing pages of CN103403627 A

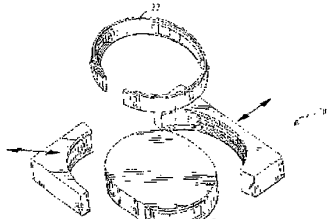


图 39

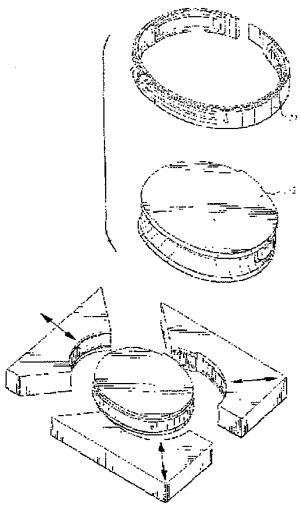


图 40

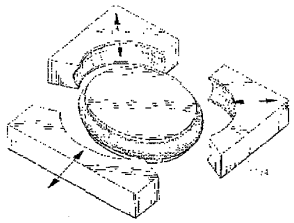


图 4

Petitioner Samsung Ex-1004, 0222

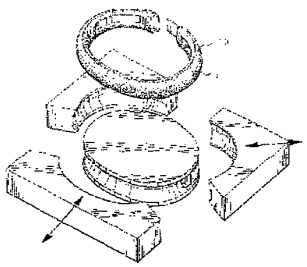


图 42

图 43

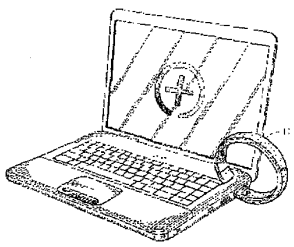


图 44

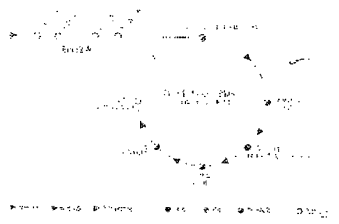


图 45

Drawing pages of CN103403627 A



图 46

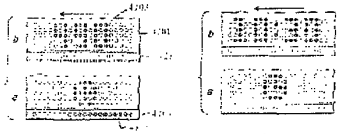


图 47A

图 48

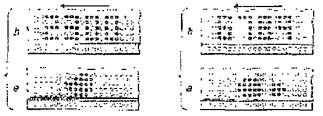


图 49

图 50



图 51

图 52

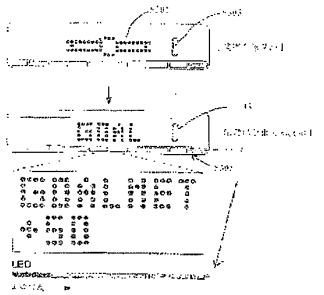


图 53

Petitioner Samsung Ex-1004, 0223

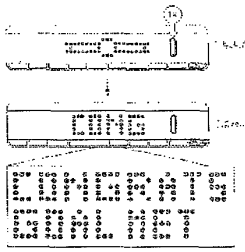


图 55

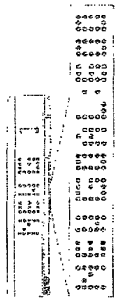


图 56



图 57

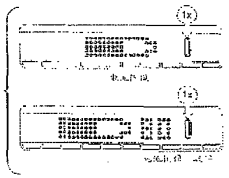


图 57A

Drawing pages of CN103403627 A

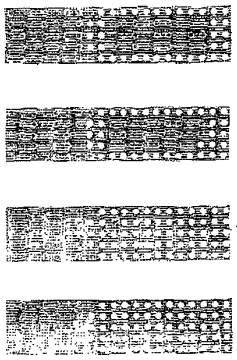


图 57B

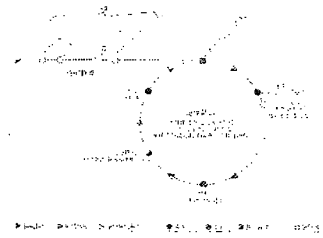


图 58

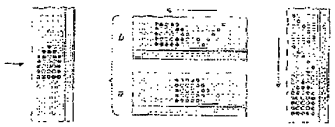


图 59A 图 59B 图 59C

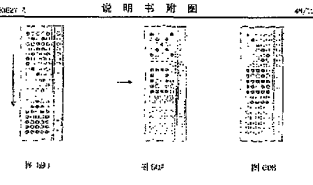
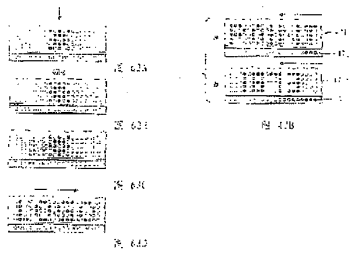
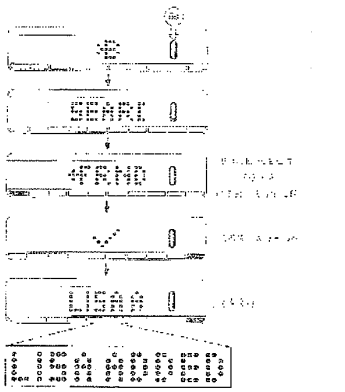


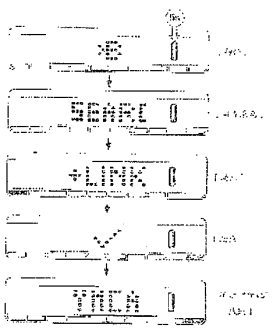
图 60A 图 60B 图 60C



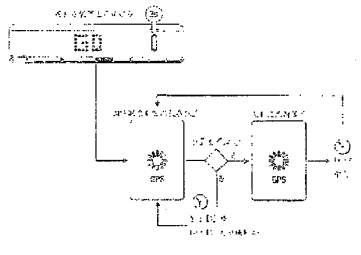
Petitioner Samsung Ex-1004, 0224

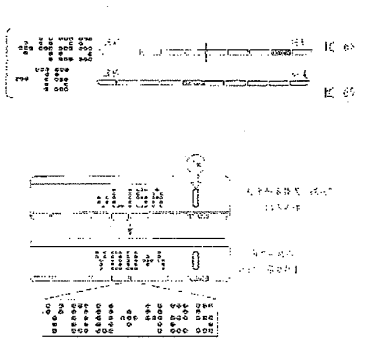


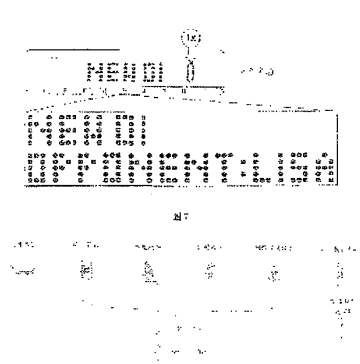




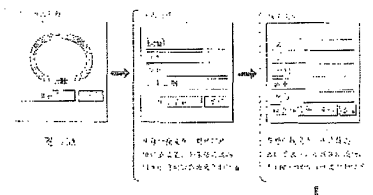
Drawing pages of CN103403627 A

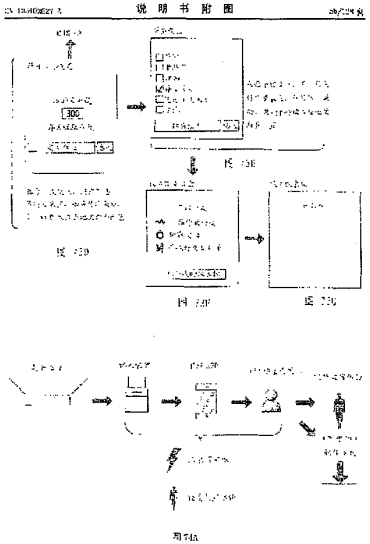


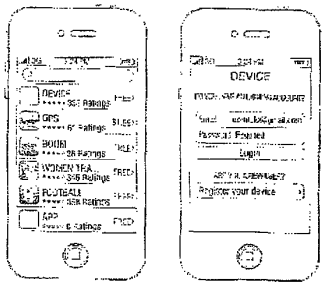




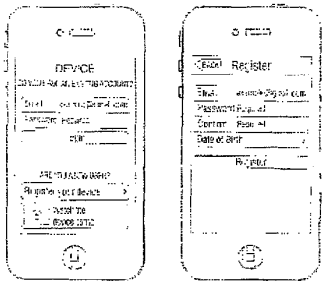
Petitioner Samsung Ex-1004, 0225

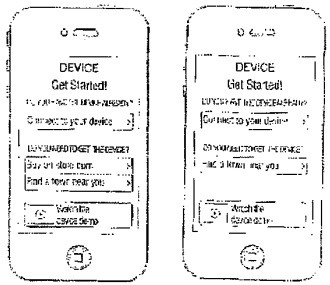


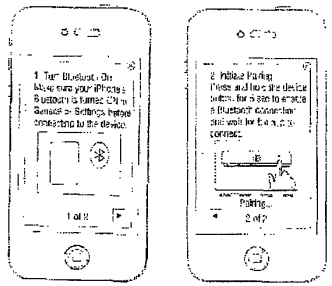




Drawing pages of CN103403627 A







Petitioner Samsung Ex-1004, 0226

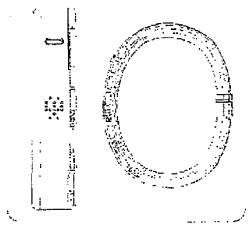


图 74L

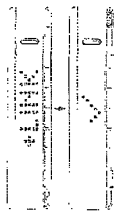


图 74R

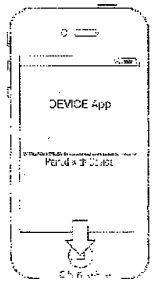


图 74L

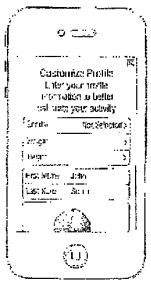


图 74R

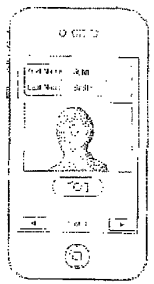


图 74R



图 74R

Drawing pages of CN103403627 A

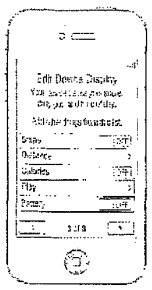


图 74 I

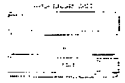


图 75



图 76

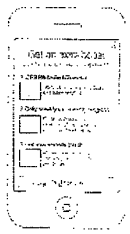


图 77

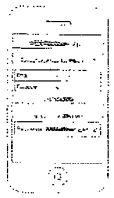


图 78A

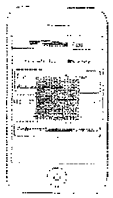


图 78B



图 78C

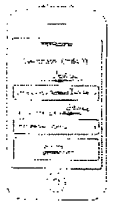


图 78D

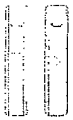


图 78E



图 78F

Petitioner Samsung Ex-1004, 0227

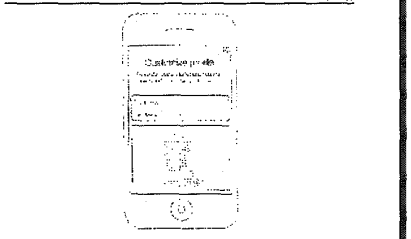


图7NG

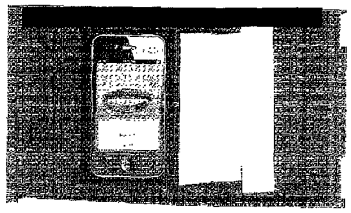
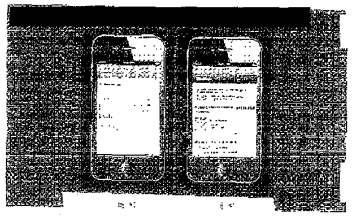
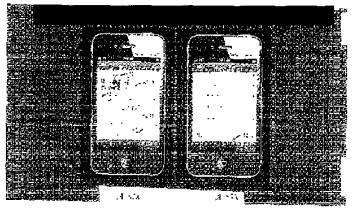


图7H





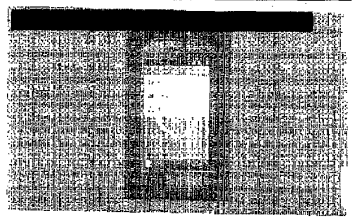


图8JG

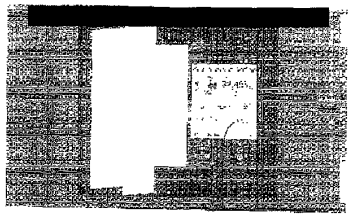
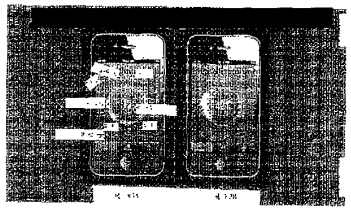
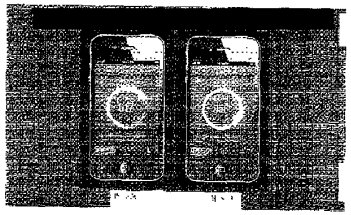
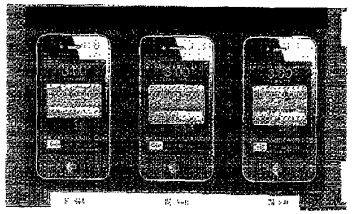


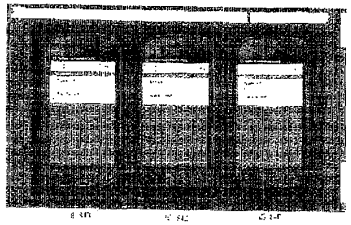
图8JD

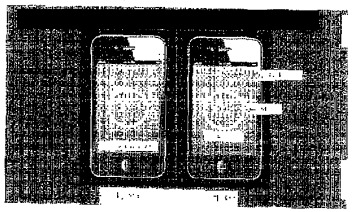
Drawing pages of CN103403627 A











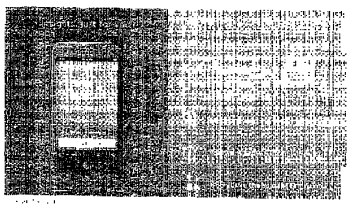
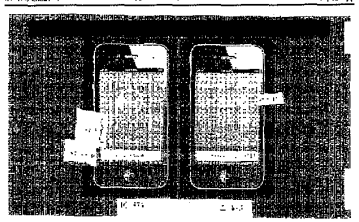


图8E

Petitioner Samsung Ex-1004, 0228



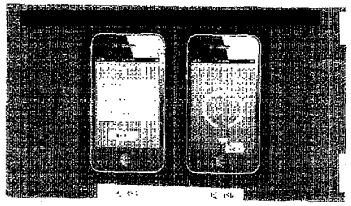
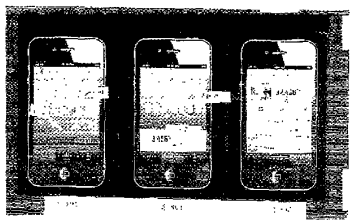


图 8B



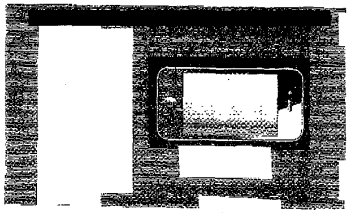


图 8D

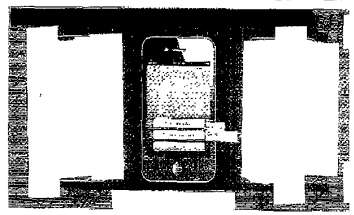
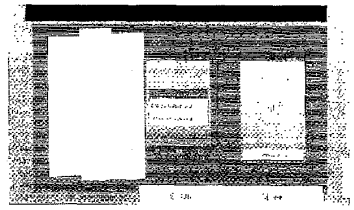


图 9A



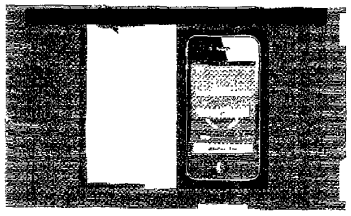


图 9

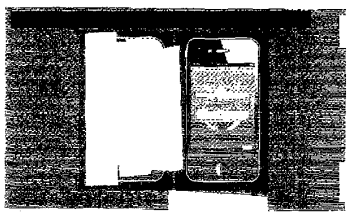


图 9A

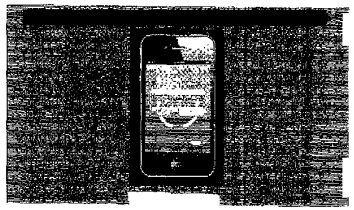
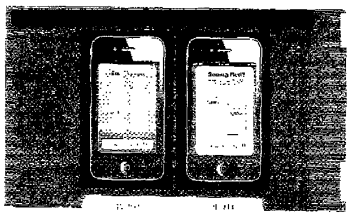
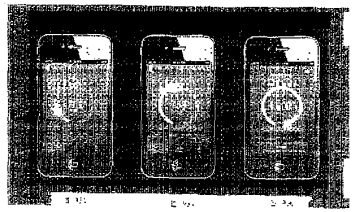
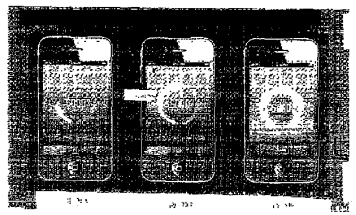


图 9C







Drawing pages of CN103403627 A

Petitioner Samsung Ex-1004, 0229

Drawing pages of CN103403627 A

Drawing pages of CN103403627 A

Drawing pages of CN103403627 A

Drawing pages of CN103403627 A

Drawing pages of CN103403627 A

Drawing pages of CN103403627 A

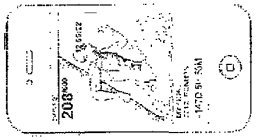


图 13-B



图 13-C

172



图 13-D

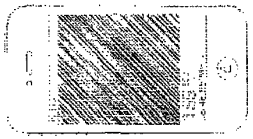


图 13-E

173



图 13-F

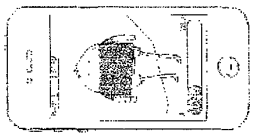


图 13-G

174

Drawing pages of CN103403627 A

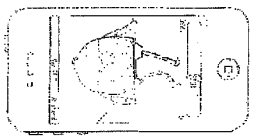


图 13-H

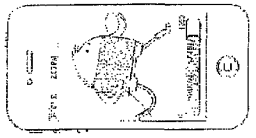


图 13-I



图 13-J

175

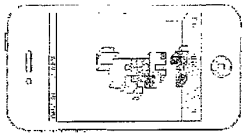


图 13-K

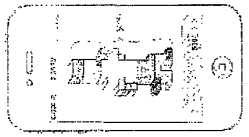


图 13-L

176

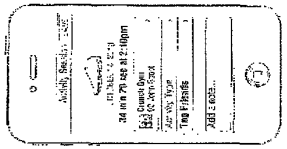


图 13-M

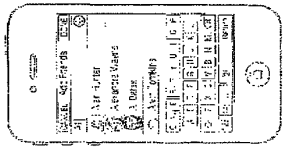


图 13-N

177

Petitioner Samsung Ex-1004, 0236

Drawing pages of CN103403627 A

Drawing pages of CN103403627 A

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 June 2013 (27.06.2013)

WIPO | PCT

(10) International Publication Number
WO 2013/093638 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/IB2012/003048

(22) International Filing Date:
21 December 2012 (21.12.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/578,837 21 December 2011 (21.12.2011) US

(71) Applicant: **MASHINERY PTY LTD.** [AU/AU]; Unit 7, 24 Hickson Road, Miller Point, NSW, 2000 (AU).

(72) Inventors: **BEADLE, Henry, William Peter**; c/o Mashinery PTY LTD., Unit 7, 24 Hickson Road, Miller Point, NSW, 2000 (AU). **DENTON, Matthew, Charles**; c/o Mashinery PTY LTD., Unit 7, 24 Hickson Road, Miller Point, NSW, 2000 (AU).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

(54) **Title**: GESTURE-BASED DEVICE

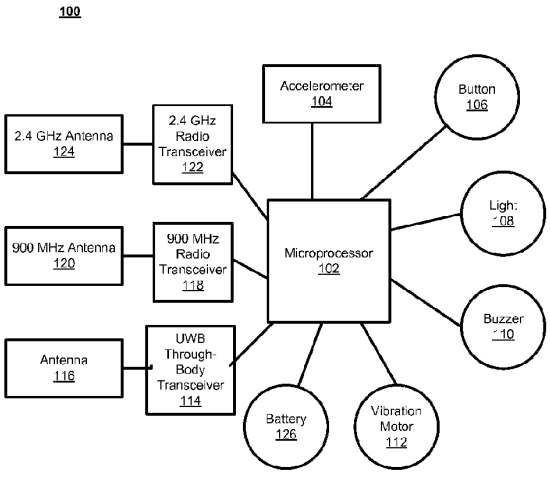


Fig. 1

(57) **Abstract**: The use of gestures on a user device to interact with and obtain functionality from remote communication hub devices is disclosed. A user device includes an accelerometer or other motion detection device and a wireless communications capability. The device is small enough to be placed conveniently about the person and communicates with a communication hub device to perform context-dependent actions. A user makes a gestural command to the device. The device interprets the gesture and undertakes activity. The gestural sensing device may be a motion switch, a multi-axis accelerometer, a video camera, a variable capacitance device, a magnetic field sensor, an electrical field sensor etc. When combined with business logic running on a remote computer system, the device can be used to implement a range of applications and services.

WO 2013/093638 A2

Petitioner Samsung Ex-1004, 0239

GESTURE-BASED DEVICE

BACKGROUND

Field of the Invention

Described embodiments relate generally to a human-computer interaction device that detects a sequence of input gestures and selects actions based on a combination of the gestures, application, a current location, and the co-location of other users and objects.

Description of the Related Art

[0001] With the increasing importance of electronic modes of conducting personal and business affairs and increasing popularity of electronic entertainment, the instances of an individual needing to enter details into an electronic system in a structured way for transmission to another device or storage are increasing.

[0002] To use online shopping as an example, to use an online shopping service one typically must register with the website by providing identification, billing and delivery data for storage and later use by the merchant, or provide this data each time a transaction is performed. Even if the data is stored by the merchant, the user will need to go through a login process, entering her username and password, each time they access the site. This can be quite burdensome or boring for the person providing the data. Moreover with the popularity of portable computing devices, many of which do not have full-sized keyboards, this task requires some dexterity to perform. The result is that many users of online shopping services abandon their purchases, leading to lost sales by the merchant.

[0003] The online shopping paradigm also impacts how people conduct shopping in retail environments, and existing methods of payments centered around a single cash register may soon become outdated. Current payment methods using physical credit cards presented at point-of-sale (POS) terminals are not uniform and often not secure.

Petitioner Samsung Ex-1004, 0240

SUMMARY

[0004] Disclosed embodiments include devices and methods for using gestures on a user device to interact with and obtain functionality from remote communication hub devices. In various embodiments a user device includes an accelerometer or other motion detection device and a wireless communications capability. The device is small enough to be placed conveniently about the person or unobtrusively attached to an object, and is configured to communicate with a communication hub device in order to perform context-dependent actions.

[0005] In operation the user makes a gestural command to the device (for example by tapping it twice in quick succession). The device using an internal processor (or an external processor connected by a wireless link) interprets the gesture and undertakes some activity on the user's behalf because of the gesture. The gestural sensing device may be a motion switch, a multi-axis accelerometer, a video camera, a variable capacitance device, a magnetic field sensor, an electrical field sensor or other sensing device. When combined with business logic running on a remote computer system, the device can be used to implement a range of applications and services including information services, security services including access control, stored value or credit card electronic payment systems, points or objects in a game, remote controls for consumer electronics, retail loyalty schemes, industrial equipment and so forth.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Fig. 1 is a schematic representation of a user device in accordance with one embodiment.

[0007] Fig. 2 illustrates communication between a communication hub device and a user device in accordance with one embodiment.

[0008] Fig. 3 illustrates communication between a communication hub device and a user device in accordance with one embodiment.

Petitioner Samsung Ex-1004, 0241

[0009] Fig. 4 illustrates the sending of information from a user device to a communication hub device in accordance with one embodiment.

[0010] Fig. 5 illustrates the sending of a request message from a communication hub device to a user device in accordance with one embodiment.

[0011] Fig. 6 illustrates the sending of a request from a user device to a communication hub device in accordance with one embodiment.

[0012] Fig. 7 is a flowchart illustrating a method for gesture recognition by a user device in accordance with one embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Fig. 1 illustrates an example of a user device 100 in accordance with one embodiment. The user device 100 includes a microprocessor 102; accelerometer 104; one or more buttons 106; a light 108; buzzer 110; vibrating motor 112; 2.4 GHz radio transceiver 122 and antenna 124; 900 MHz radio transceiver 118 and antenna 120; an ultra-wideband (UWB) through-body transceiver 114 and antenna 116; and a battery 126. In alternative embodiments, some of the illustrated components are not included—for example, in some embodiments, the user device includes a light but no buzzer or vibrator. The device may be, for example, a stand-alone device with a credit card form factor; a stand-alone device with a key-fob form factor; or a stand alone device with adhesive or screw mountings designed to be permanently attached to another object. The device can also be built into another device, for example a dog lead, mobile phone or mobile data tablet. The gesture recognition system and built-in sensors and actuators are configured to execute functionality based on inputs from the user or the sensors.

[0014] The user device 100 is configured to communicate with a communication hub device, as described below with respect to Figs. 2-6. Communication is initiated by either the user device 100 or the communication hub device 202 (Fig. 2), depending on context as described further below.

Petitioner Samsung Ex-1004, 0242

[0015] The presence of multiple radio transceivers in the device (either physically or through software defined radio techniques) allows the device to adapt to the radio environment it finds itself in. A short range 2.4GHz radio can be used to indicate physical presence and interact within a small area while a longer range 900MHz radio can be used to indicate physical presence and interact within a larger area or through more obstructions.

[0016] Communication and interaction can be handed off from one radio system to another under control of the microprocessor to optimize system performance parameters including battery use, error rate and communications range.

[0017] The device forms part of a system of radio-enabled devices shown in the accompanying figures for 2.4GHz devices operating over existing wireless systems including WiFi, Bluetooth and DECT. Protocols for devices utilizing the 900MHz band are described in related United States patent application serial number 61/547,729, and PCT application PCT/IB2012/002489, each of which is incorporated by reference herein in its entirety.

[0018] Fig. 2 is an interaction diagram illustrating communication between a communication hub device 202 and a user device 100. In various embodiments, the communication hub 202 has a higher capacity power source compared to the user device 100. A communication hub device 202 may be connected to or internal to, for example, a laptop computer used by the user to access online shopping through a browser application. Alternatively the communication hub device 202 may be a point of sale terminal, an advertising poster, a retail display rack or other relatively fixed infrastructure. In this embodiment the communication hub device 202 uses a larger power source (such as a bigger battery) or mains power enabling it to perform more power-intensive radio functions more frequently.

[0019] In another embodiment the communication hub 202 is mobile and enclosed in a smaller form factor. This could be a smart phone, an external device attached to a smartphone, a small self contained portable device or other portable device.

Petitioner Samsung Ex-1004, 0243

[0020] In one embodiment, the communication hub 202 transmits a page message 204 at regular intervals, providing its device identification number, e.g., ID1. The page message 204 is transmitted to allow other devices 100 to identify the existence of the transmitting device at a particular location. A user device 100 can receive the page message 204 as a wireless communication through its radio system 114, 118, 122, and may wake up the user device microprocessor 102 and process or store the page message 204 and communication hub identification. The decision to process or store can be based, for example, on the application that is being implemented using the communication hub and user devices, such as a stored value card, a point collection system for a game, or the implementation of a consumer product information collection system. The communication hub device 202 may also store the responses from the user device 100, which may contain information about the user device 100.

[0021] In one embodiment the ID and associated information is automatically collected and stored as the device 100 moves into and then stays within proximity of the communication hub 202, for example when browsing at a retail location.

[0022] An input gesture from the user device 100 may flag the stored ID and associated information as important or particularly relevant to the user, for example when collecting product information from a product on display at a retailer.

[0023] In another embodiment the device 100 being within proximity of the communication hub device 202 authenticates the user to access the communication hub device 202 to access the user's account, for example on an online banking portal or an online shopping portal.

[0024] Alternatively, an input gesture from the user device 100 can provide a final level of authorization to an application being executed on the communication hub device 202 allowing the user to access the user's account on the communication hub device 202, or complete a transaction in an online shopping transaction on the communication hub device 202.

Petitioner Samsung Ex-1004, 0244

[0025] Storage in various embodiments is to memory in the user device 100, typically implemented as EEPROM or flash memory. Upon receipt of the page message 204 the user device 100 knows that it is within range of the communication hub 202. In various embodiments, the user device 100 provides a signal to the user to indicate that the device 100 is in communication with the communication hub 202. This may include, for example, a flash of light from light 108, a buzz from buzzer 126 or a vibration from vibration motor 112.

[0026] Fig. 3 illustrates an embodiment in which the user device 100 responds to the page message 204 and sends an acknowledgment message 306 to the communication hub 202. The communication hub 202 responds with a session key and time to live message 308 to be used to disambiguate future communications. The session key is valid for the amount of time in the time to live field. The communication hub 202 may perform other actions based upon the receipt of the acknowledge message 306, such as initiating a transaction in a retail system, performing a database lookup, unlocking the user device 100, logging into the user's account being accessed by the browser running on the user device 100, and recording the presence of the user device 100 in proximity to the communication hub in a loyalty card application. The user device 100 has a number of sensors and actuators integrated with one or more radio transceivers 114, 118, 122. It can be used to provide user interaction to multiple applications where the application (business) logic is implemented on a computer system remote to the user device 100. In such embodiments, performing a gesture such as a double tap (tap-tap), pushing a button 106 or simply being in a particular place or combination of place and time can cause the business logic to implement a particular action which is dependent on the user, the location, the gesture performed, the date and time and the presence or absence of other co-located users. The business logic is responsible for determining and implementing the required action based on the collection of information including, for example, the location, the gesture performed, the date and time and the presence or absence of other co-located users, collectively called the users context.

[0027] Fig. 4 illustrates an embodiment in which the user device 100 explicitly sends information 410 to the communication hub 202. This may be in response to a user gesture

Petitioner Samsung Ex-1004, 0245

command, for example. The communication hub 202 may then act on the information 410 in some way. In one embodiment, the communication hub 202 explicitly acknowledges receipt or the information with an acknowledge message 412.

[0028] This example illustrates the use of sequence numbers, which in one embodiment are monotonically increasing numbers generated by both sides of the communication starting with the user device 100 in the initial acknowledge message 306. Sequence numbers are used to detect lost messages. The user device 100 or the communication hub 202 maintains records of the last sequence number transmitted to and the last sequence number received from the other party. If the series of monotonically increasing sequence numbers is broken then the party identifying the break knows that a message has been transmitted but not received. This fact is revealed at the application layer on both devices and any corrective action is up to the application to implement. Possible corrective action could be to implement a reliable transport protocol like TCP or TP4 or to ignore the message.

[0029] Fig. 5 illustrates an embodiment in which, some time after the initial generation of a session key, the communication hub sends the user device 100 a request message 510. This could occur in a payment system where the request is a request for payment based on an out-of-band (human to human) communication. The user device 100 can choose to ignore the request if, for example, it is not addressed to it or if it is for a transaction that the user does not wish to complete; or reply to the request with an information message 512 providing the requested information. The structure of the content of the request 510 and the information messages are application dependent.

[0030] Fig. 6 illustrates a scenario where the user device 100 sends a request message 610 to the communication hub device 202. The message 610 could relate to the user device 100 approving a transaction being executed on the communication hub device. The user device 100 might continue to send this message until it received a message from the communication hub device 202 that the message had been received. Alternatively, the message could be related to a retail application and contain a request for a pre-defined order at a coffee shop. The communication hub 202 would send back a confirmation message 612 confirming the

Petitioner Samsung Ex-1004, 0246

request and optionally providing additional information. Additional information could be cost, expected wait time, advertising material about the product, loyalty points earned, etc. In some situations the communication hub may send a request 614 to the user device 100 asking for payment. The user device 100 would send back an information message 616 containing the required payment information.

[0031] In various embodiments, communication between the user device and communication hub is initiated upon user input of a gesture. In various embodiments, and referring to Fig. 7, recognizing a gesture begins with sampling 702 the parameter that the sensor measures at intervals higher than the Nyquist rate of the gesture to be captured. Device 100 then uses a dynamic time warping algorithm (DTW) to correlate 704 the samples with templates for each gesture to be recognized and determine a correlation coefficient and error value. If 706 the correlation coefficient exceeds a pre-determined threshold and the error value is below a pre-determined threshold, then the gesture is classed 708 as recognized. If 706 none of the classification tests are satisfied then further samples are taken 710 from the sensor and the process repeated until a gesture is matched.

[0032] In a microprocessor implementation, in one embodiment a wake-on-change function is used to wake up the microprocessor 102 when the sensor value exceeds a predefined value, allowing power to be conserved.

[0033] The device 100 may detect a range of different gestures for different actions, e.g., tap-tap for retail shopping transactions, a wave to auto-fill web forms, a key-unlock gesture to approve online payments or get access to secure accounts. In each case it is advantage of this invention is that a gesture can be defined which relates to the action be actuated and hence is intuitive for the user, reducing user resistance and providing them with an increased sense of security.

[0034] The device may also include other sensors for the user to provide additional input to the device, for example biometric input sensors including but not limited to fingerprint scanner, microphone with voiceprint analysis, touchpad with signature recognition, retinal scanner, etc., to further authenticate the user; or push buttons, and actuators for the device

Petitioner Samsung Ex-1004, 0247

to provide feedback to the user, for example indicator lights, auditory indicators (buzzers) and tactile indicators (vibrators).

[0035] Once a gesture has been recognized the device 100 executes its stored program logic to respond to the gesture. Operations in response to a recognized gesture may include one or more of making a noise; flashing a light or using other actuators built into the device; transmitting information through a wireless link built into the device to a person or another computer system to effect a change in the environment, for example open a door, make a payment, or to control the actuators on the device, for example flash a light, make a noise or vibrate.

[0036] The actuators can be used to provide feedback based on the use of the gesture recognition, the use of the buttons, or in response to a communication received from the wireless connection.

[0037] The device can use its radio transceiver 114, 118, 122 to send or listen for periodic beacon messages and may interact with a remote person or computer system without the need for a gesture-based trigger (the presence of the device in a particular location may be sufficient to initiate the interaction and can be considered a degenerate gesture 'do nothing').

[0038] A further aspect is the ability to disambiguate user responses in crowded environments. In retail or other environments ambiguity can arise when two or more devices are simultaneously within range of a payment terminal.

[0039] In one embodiment, when a device comes within range of a payment terminal it communicates with the terminal in response to a terminal broadcast message. The terminal responds to the device with a session key. Multiple session keys can be active for a vendor terminal and multiple devices at one time. When a payment is requested by the vendor, the vendor terminal broadcasts the request including the session key. Only the device holding that matching session key responds to authorize the payment (using an existing stored value card protocol). If a vendor cannot differentiate between several devices currently enrolled, the vendor terminal can use the instantaneous relative signal strength of the connections to

Petitioner Samsung Ex-1004, 0248

each device to determine the device closest to the vendor terminal (using an algorithm based on the distribution of relative signal strengths of all the devices with active session keys) and send the payment request using that devices session key. If there is no clear closest device then, the vendor can ask the customer currently being served to tap-tap their device, thus clearly identifying to the vendor terminal the session key associated with the transaction. The payment request can then be sent to the device with the associated session key.

[0040] In an alternate disambiguation system the payment request is sent to all devices with active session keys and only the device that corresponds to the user being served at the front of the queue responds. If the vendor terminal received multiple responses within a time window from the payment request then it disregards all responses and re-issues the payment request and repeats the process until it receives only one response within the time window. This allows for human social protocols to provide disambiguation and also allows for 'someone else to pick up your tab'.

[0041] In the case of multiple vendor terminals, multiple payment requests can be received by a single device in a small time window. The disambiguation process takes place on the device where the device looks at the relative signal strength of the connection with each vendor terminal and only responds to the payment request with the highest relative signal strength. If the relative signal strengths are similar then the device responds to none of the request and waits for the vendor terminal to re-issue the payment request. A human social protocol can then be used to remove the ambiguity (for example in a crowded market situation the vendor could ask the customer to move closer to the vendor terminal to remove the payment ambiguity).

[0042] Alternate disambiguation technologies can be used. For example biometric facial identification data can be stored on the device and transferred to the vendor terminal when an enrollment occurs. The vendor terminal uses a low cost video camera to capture the facial image of the customer immediately in front of the terminal (the one being served). The biometric is used to match with the biometric supplied by the device and the payment

Petitioner Samsung Ex-1004, 0249

request is sent with the matching session key. If no biometrics match then a potential fraud alert can be generated.

[0043] Examples of applications and services include:

[0044] Example 1

[0045] In one embodiment, a payment system includes the device 100 located in a credit card form factor with two user pushable buttons 106 on the card and an audio actuator (buzzer) 110. The first time a user goes to a retailer, she takes out the card. For the local gas station, she pushes the "Connect Pay" button 106. The cashier also pushes his Connect Pay button and completes the first time authorization. From then on, the user can use a tap-tap or other gesture on her wallet (still in her pocket or hand bag) to pay for transactions. Through-the-wallet tapping works by using an accelerometer 104 in the card stored in the wallet to detect the accelerations associated with the displacement of the wallet when tapped. The dynamic time warping algorithm is then used to match the accelerometer 104 output against a series of templates associated with different gestures (e.g. tap tap-tap, TAP-tap, tap-tap-tap, tap-tap .... tap, etc.) when a match is found a predefined (application dependent) action takes place.

[0046] In another embodiment, a user may log into their laptop and identify through a browser application certain goods that they would like to buy, at which point the application will request that they enter certain personal information such as name, address and credit card details. The user can then wave their wallet in which is held the user device 100 in a swiping gesture in order to "autofill" the personal data. The browser application will then ask the user to approve the purchase as a final check before processing payment and executing an order.

[0047] The user can then twist the hand holding the wallet in a "key-unlock" gesture as a means of approval.

Petitioner Samsung Ex-1004, 0250

[0048] In another embodiment, the user can wave the device 100 over a tablet or smartphone to provide personal information such as medical records or a history of recent personal activity such as exercise routine.

[0049] In another embodiment, the user can twist the hand holding the wallet in a "key-unlock" gesture over a laptop, smartphone or tablet as a means to further provide security information to the bank for a secure log-on or approval of a transaction. Security information may include username and password, a secure verifiable code such as a one time key, or other personal information.

[0050] In another embodiment, a user visits a café, and the first time she pushes the share button 106, a message is communicated from the user device 110 to the communication hub 202 giving the café permission to track the user's shopping while at their store, signing them up to their loyalty program. The user also has to push the Connect Pay button 106 on his device to complete the authorization process. The user can then tap-tap his wallet to pay for small transactions, plus he shares his spending and coffee preferences with the cafe, or any one of the shops in the chain. In one embodiment the user can also pre-order while waiting in the line.

[0051] Example 2: Exchanging simple information between two friendly devices.

[0052] In this example a user bumps into a colleague while out for a walk in the park and is introduced to her friend.

[0053] To share user configurable contact information the user makes a tap-tapped gesture on her purse while it is still in her bag, as does the other party. The two wireless devices in their wallets or purses discover each other and share contact information, such as social network identities, across the wireless link.

[0054] When the user arrives home, the device 100 communicates with her home computer system (the communication hub) 202 and records the contact information for later use. Her new friend does not have a home computer system—her device uses her mobile

Petitioner Samsung Ex-1004, 0251

phone to save the contact information for later use. The information is stamped with the date of the encounter and if available the location of the encounter.

[0055] Location specific information exchange

[0056] Embodiments also include the option of modifying the environment to alert users that the device 100 can be used at a particular location. Modifications include a variable message display triggered by the reception of a radio message from the device or a graphic symbol and/or words in a sign or logo.

[0057] For example, a "Tap-Tap" symbol sign in a store window or near merchandise can indicate that a gesture to the device 100 (a tap-tap) could initiate a wireless connection to a computer or person associated with the location or merchandise.

[0058] The activity associated with the gesture is dependent on the context the gesture is performed in and on pre-stored user preferences. For example a tap-tap gesture when standing near a product displaying a Tap-Tap symbol could be configured in user preferences to e-mail information about the associated product to the user for one user; for another user it could be configured to load product information immediately into the user's smart phone; for another user it could be configured to request a sales call between 3:00 PM and 5:00 PM on the following day. What it does is dependent on the business logic and on the user's preferences.

[0059] In one example a gesture may gather information from the environment about the product in close proximity to the user (using short range radio location by adjacency, GPS or some other location technology) to establish his location.

[0060] In another example a gesture may request a staff member assist a customer at a location in a busy store, queuing in the system for the next available shop assistant.

[0061] In another example the gesture may provide information to the merchant along with a request to be contacted later about the product or service. These scenarios can be generalized to the provision and/or collection of information associated with a location and

Petitioner Samsung Ex-1004, 0252

with potential additional context such as user preferences and merchant/provider preferences based on a gesture performed by the user using the device.

[0062] In another example the gesture may provide customer information to a merchant for use in a loyalty program.

[0063] Feedback

[0064] A further aspect involves using the device to provide feedback to the user based on context, user preferences and other externalities.

[0065] Example 3

[0066] When the device is used to make a payment in response to a user gesture, an audio response is provided to indicate that the payment has been successful or not successful. If successful the tone and cadence of the feedback response can be altered to indicate a low balance in the users account.

[0067] Example 4

[0068] In an industrial setting the device can be used to warn of the presence of hazardous areas by vibrating or beeping to alert the user when the user moves within a pre-determined range of a transceiver located in the environment. A gesture to the device can be used to acknowledge the receipt of the warning.

[0069] Other variations of feedback can be constructed for other applications and other feedback actuators.

[0070] The present invention has been described in particular detail with respect to a limited number of embodiments. Those of skill in the art will appreciate that the invention may additionally be practiced in other embodiments.

[0071] Within this written description, the particular naming of the components, capitalization of terms, the attributes, data structures, or any other programming or structural aspect is not mandatory or significant, and the mechanisms that implement the invention or its features may have different names, formats, or protocols. Further, the

Petitioner Samsung Ex-1004, 0253

system may be implemented via a combination of hardware and software, as described, or entirely in hardware elements. Also, the particular division of functionality between the various system components described herein is merely exemplary, and not mandatory; functions performed by a single system component may instead be performed by multiple components, and functions performed by multiple components may instead be performed by a single component.

[0072] Some portions of the above description present the feature of the present invention in terms of algorithms and symbolic representations of operations on information. These algorithmic descriptions and representations are the means used by those skilled in the art to most effectively convey the substance of their work to others skilled in the art. These operations, while described functionally or logically, are understood to be implemented by computer programs. Furthermore, it has also proven convenient at times, to refer to these arrangements of operations as modules or code devices, without loss of generality.

[0073] It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the present discussion, it is appreciated that throughout the description, discussions utilizing terms such as "selecting" or "computing" or "determining" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system memories or registers or other such information storage, transmission or display devices.

[0074] Certain aspects of the present invention include process steps and instructions described herein in the form of an algorithm. It should be noted that the process steps and instructions of the present invention could be embodied in software, firmware or hardware, and when embodied in software, could be downloaded to reside on and be operated from different platforms used by real time network operating systems.

Petitioner Samsung Ex-1004, 0254

[0075] The present invention also relates to an apparatus for performing the operations herein. This apparatus may be specially constructed for the required purposes, or it may comprise a general-purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a computer readable storage medium, such as, but is not limited to, any type of disk including floppy disks, optical disks, DVDs, CD-ROMs, magnetic-optical disks, read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, application specific integrated circuits (ASICs), or any type of media suitable for storing electronic instructions, and each coupled to a computer system bus. Furthermore, the computers referred to in the specification may include a single processor or may be architectures employing multiple processor designs for increased computing capability.

[0076] The algorithms and displays presented herein are not inherently related to any particular computer or other apparatus. Various general-purpose systems may also be used with programs in accordance with the teachings herein, or it may prove convenient to construct more specialized apparatus to perform the required method steps. The required structure for a variety of these systems will appear from the description above. In addition, the present invention is not described with reference to any particular programming language. It is appreciated that a variety of programming languages may be used to implement the teachings of the present invention as described herein, and any references to specific languages are provided for disclosure of enablement and best mode of the present invention.

[0077] Finally, it should be noted that the language used in the specification has been principally selected for readability and instructional purposes, and may not have been selected to delineate or circumscribe the inventive subject matter. Accordingly, the disclosure of the present invention is intended to be illustrative, but not limiting, of the scope of the invention.

[0078] We claim:

Petitioner Samsung Ex-1004, 0255

CLAIMS

1. A device comprising:

an accelerometer;

a microprocessor, coupled to the accelerometer, configured to identify one of a plurality of possible gestures according to data received from the accelerometer;

a button, coupled to the microprocessor, for receiving user input; and

a radio transceiver, coupled to the microprocessor, configured to communicate with a communication hub;

wherein the microprocessor is further configured to transmit an instruction via the radio transceiver to the communication hub, the instruction selected according to an identity of the communication hub and the identified gesture.

2. The device of claim 1 further comprising a light coupled to the microprocessor, and wherein the microprocessor is further configured to illuminate the light in conjunction with transmitting the instruction.

3. The device of claim 1 further comprising a buzzer coupled to the microprocessor, and wherein the microprocessor is further configured to sound the buzzer in conjunction with transmitting the instruction.

4. The device of claim 1 further comprising a vibration motor coupled to the microprocessor, and wherein the microprocessor is further configured to cause the vibration motor to vibrate in conjunction with transmitting the instruction.

5. The device of claim 1 wherein the radio transceiver is an ultra-wideband through-body transceiver.

6. The device of claim 1 wherein the radio transceiver is a 2.4 GHz radio transceiver.

Petitioner Samsung Ex-1004, 0256

7. The device of claim 1 wherein the identified gesture includes movement of the device according to a predefined pattern.

8. The device of claim 1 wherein the identified gesture includes a tapping of the device according to a predefined pattern.

9. A method for providing a service to a device, the method comprising:

receiving at a communication hub an instruction from the device of claim 1, the instruction including a request for authorization; and

responsive to the request, transmitting a response to the device authorizing the device to engage in a financial transaction using the communication hub.

Petitioner Samsung Ex-1004, 0257

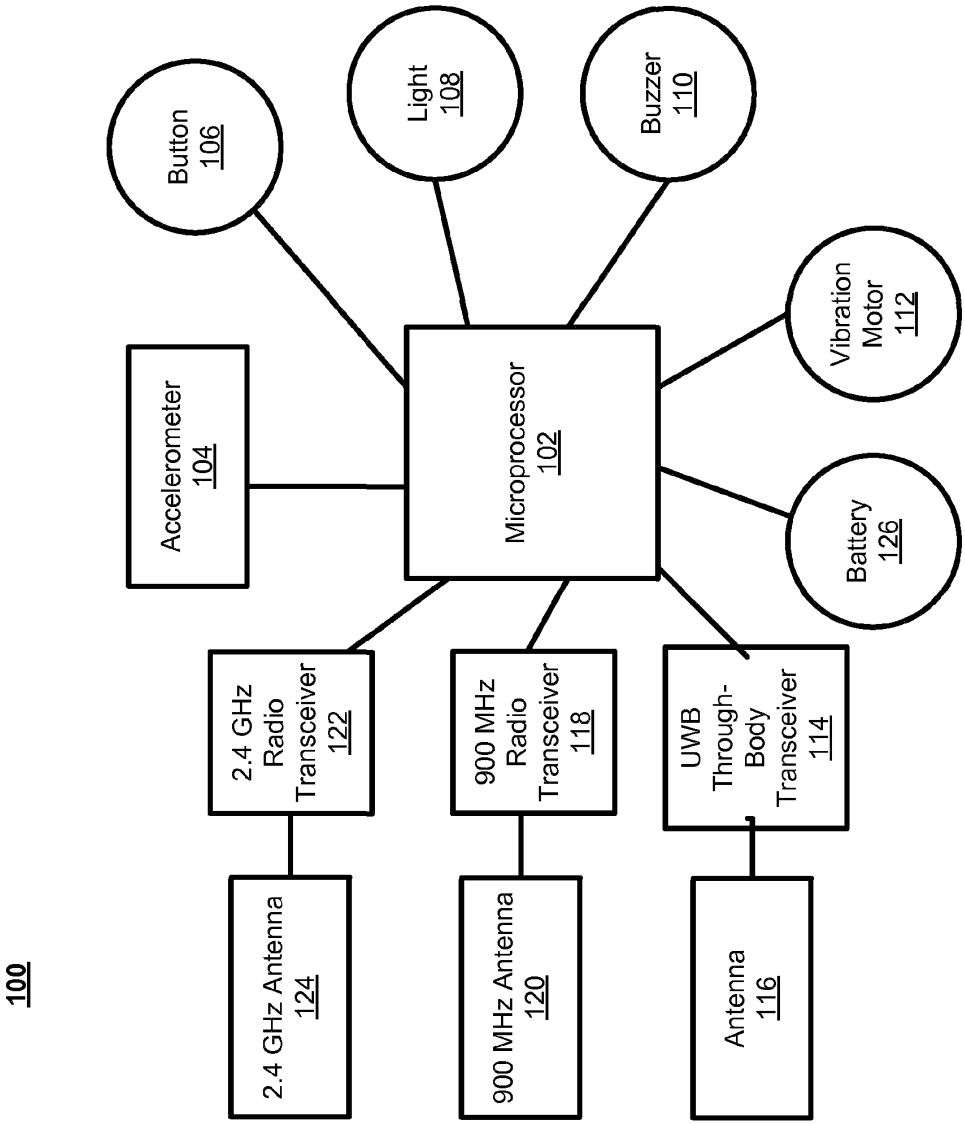


Fig. 1

Petitioner Samsung Ex-1004, 0258

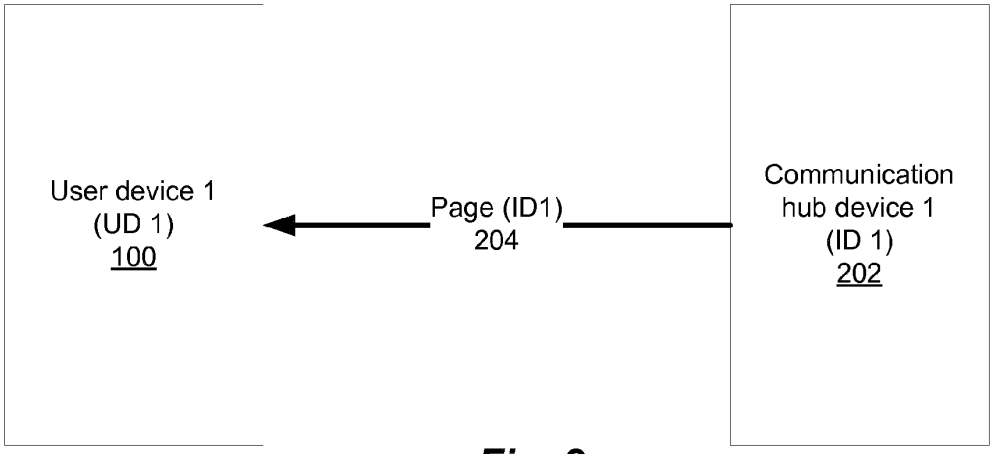


Fig. 2

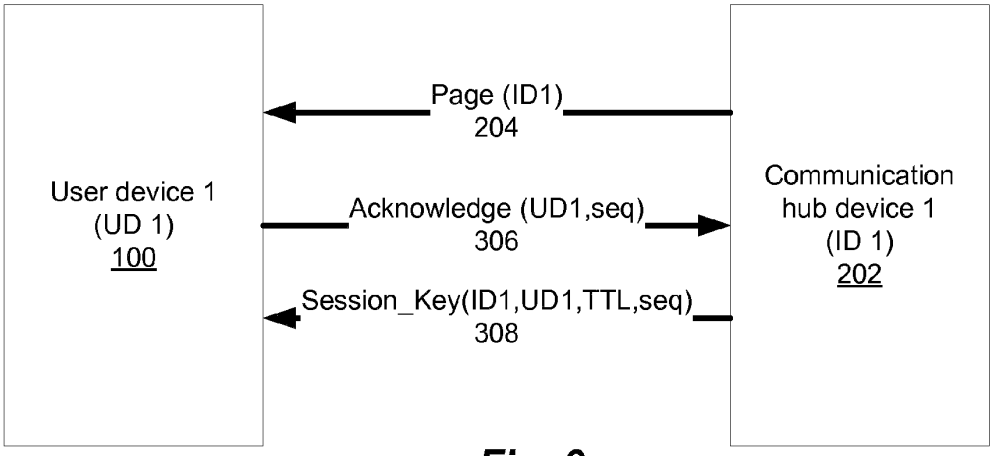


Fig. 3

Petitioner Samsung Ex-1004, 0259

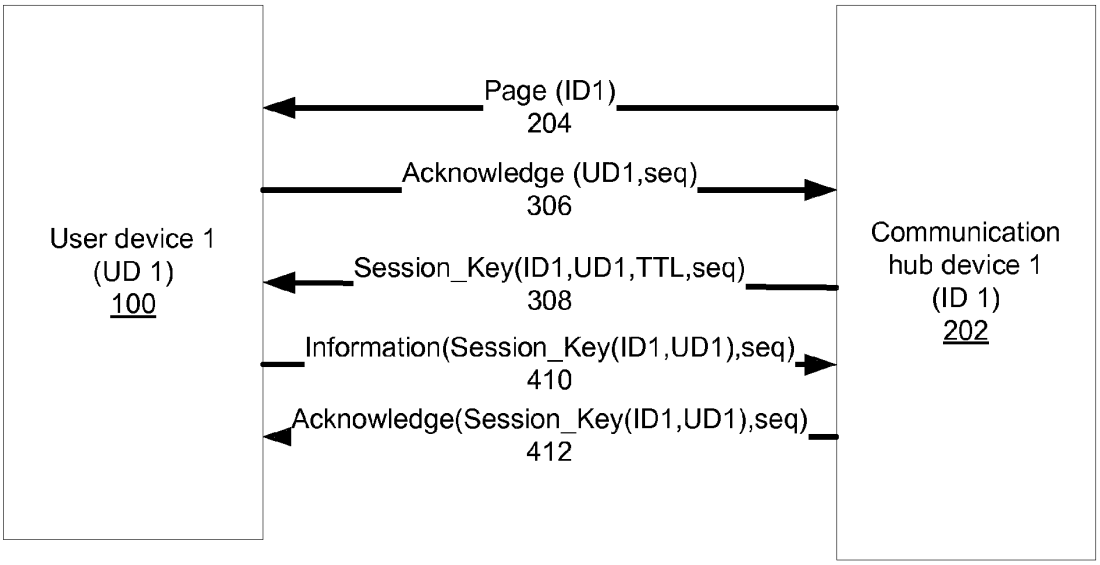


Fig. 4

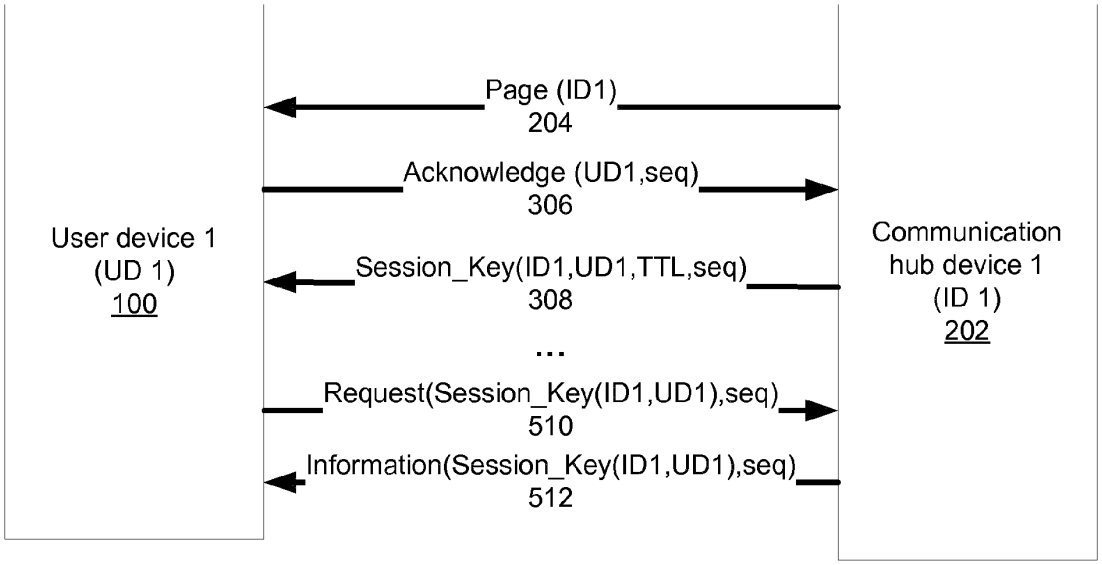


Fig. 5

Petitioner Samsung Ex-1004, 0260

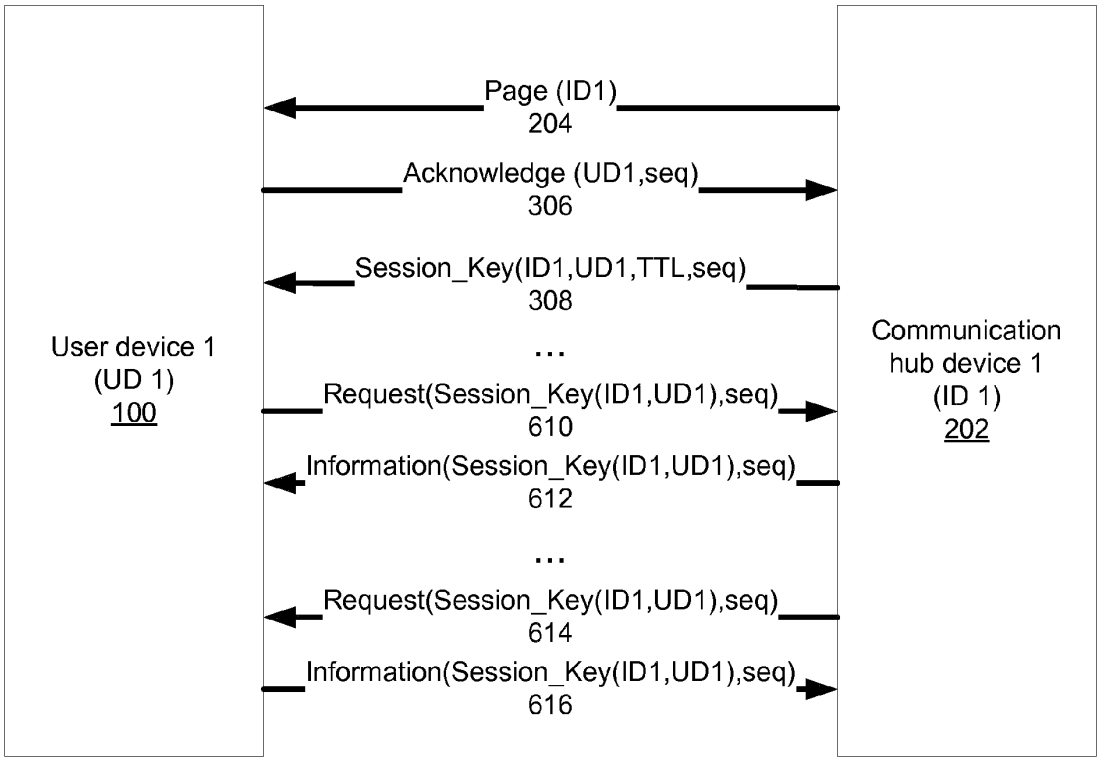


Fig. 6

Petitioner Samsung Ex-1004, 0261

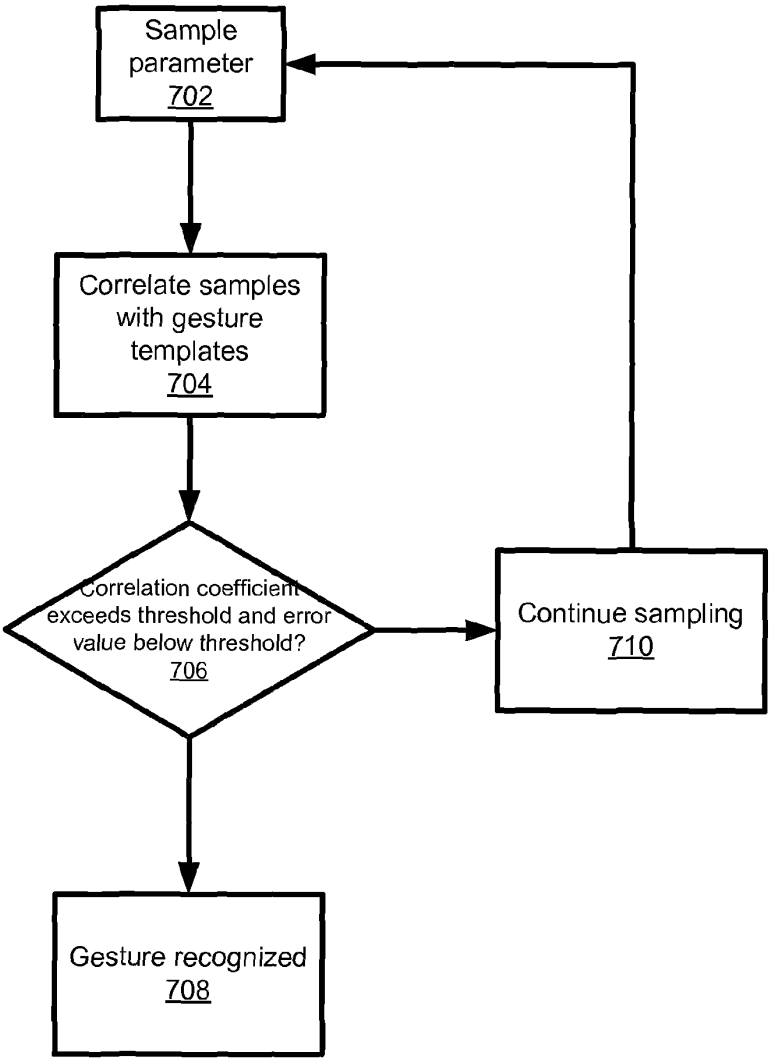


Fig. 7

Petitioner Samsung Ex-1004, 0262

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
16 September 2004 (16.09.2004)

PCT

(10) International Publication Number
WO 2004/078028 A2

(51) International Patent Classification[7]: A61B

(21) International Application Number:
PCT/US2004/006014

(22) International Filing Date: 27 February 2004 (27.02.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/451,009 28 February 2003 (28.02.2003) US
60/516,101 30 November 2003 (30.11.2003) US

(71) Applicants and
(72) Inventors: **AVICOLA, Ken** [US/US]; 1252 Arlington RD, Livermore, CA 94551 (US). **MORTON, Richard, G.** [US/US]; 17786 Aguamiel Road, San Diego, CA 92127 (US). **ROSS, John, R.** [US/US]; Po Box 2138, Del Mar, CA 92014 (US).

(74) Common Representative: **ROSS, John, R.**; Po Box 2138, Del Mar, CA 92014 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2004/078028 A2

(54) Title: FLASHING JEWELRY HEARTBEAT MONITOR WITH MULTIPLE LIGHTS

(57) Abstract: Jewelry, such as finger rings and earrings, which flash in synchronism with the wearer's heartbeat. A pulsed IR signal is directed into the wearer's tissue and a reflected or transmitted signal is monitored to determine when the wearer's heart beats at which time one or more light emitting sources in the jewelry flashes. The monitored signal is utilized to determine the wearer's heart rate. At least two light emitting sources are provided one of which flashes with each heart beat and the other flashes when the heart rate reaches or exceeds a predetermined range or increases faster than a predetermined rate. Preferred embodiments include three visible LED's (red, green and blue) and a micro-processor which calculates pulse rate and causes the red LED to blink on each pulse, the green LED to blink on each pulse when the wearer's pulse rate is greater a first threshold and the blue LED to blink on each pulse when the wearer's pulse rate is greater than a second threshold corresponding to extreme excitement. These threshold values may correspond to increased heart rates of typical persons engaged in exercise and love-making. The monitor may also be self calibrating to adjust the thresholds based on measurements of the wearer's heart rate over extended periods which would include periods of rest as well as periods of exertion or excitement. Other preferred embodiments vary the brightness of the LED's depending on the estimated blood pressure that also increases by about the same degree as pulse rate.

Petitioner Samsung Ex-1004, 0263

FLASHING JEWELRY HEARTBEAT MONITOR WITH MULTIPLE LIGHTS

This application claims the benefit of Provisional Applications SN 60/516,101 filed 11/3/2003 and SN 60/451,009 filed 2/28/2003. The present invention relates to jewelry and heartbeat monitors.

BACKGROUND OF THE INVENTION

US Patent No. 6,277,079 issued to the present inventors discloses a flashing earring heartbeat monitor. The '079 patent is incorporated herein by reference. In the background section of that patent is disclosed a well-known technique for monitoring heartbeat. Infrared light is transmitted into tissue and the reflected light is monitored to determine heart beat. This works because changing quantities of blood in the tissue with each heartbeat will affect the amount of light reflected from the tissue. In that patent Applicants described an earring (see FIGS. 1and 2, which were FIGS. 2 and 3 in the '079 patent) which used that basic technique to make an earring which would flash with each heartbeat. Applicants summarized the invention as follows:

"The ... invention provides an earring that flashes in synchronism with the wearer's heartbeat. A pulsed IR LED/photocell combination is built into an earring along with a comparator and a visible light-emitting source. The comparator determines when the heart has beat from the variation in the signal from the photocell and transmits a signal to a solid state switch to turn on the visible light-emitting source. Thus, the light emitting source flashes once for each heart beat. In a preferred use of the ... invention a lover is able to determine when his or her partner is excited by observing the rate at which the partner's earring flashes. The invention may also be used for medical monitoring of patients."

Heart rates are known to vary substantially with age and activity. Resting heart rates are typically in the range of about 50 to 70 beats per minute. A rule of thumb is: Maximum Heart Rate = 220 – Age. The range of variation gets smaller with age. The maximum heart rate ranges from about 100 to 200 for 20 year old people and from about 75 to about

Petitioner Samsung Ex-1004, 0264

150 for 70 year old people. Heart rates increase toward the maximum rates during strenuous exercise and during periods of excitement including sexual excitement. FIGS. 4A and 4B are graphs extracted from page 596 of Sexual Behavior in the Human Female by the Staff of the Institute for Sex Research, Indiana University, Alfred C. Kinsey et al Research Associates, Published by W. B. Sanders, Philadelphia. The subjects were a married couple. The graphs show heart rate ranges for the female from about 90 during the period preceding love making to 140 during lovemaking down to about 75 during sleep. For the male the corresponding ranges were about 90, 140 and 72. The female experienced four periods of extreme excitement. The male experienced only one.

Applicants have been informed that the potential market for these flashing earring heartbeat monitors may be in the many millions and that other jewelry monitoring heartbeat my also be very popular. What is needed are an improved versions of the earring described in the '079 patent and other jewelry applications of improved versions of that invention.

SUMMARY OF THE INVENTION

The present invention provides jewelry, such as finger rings and earrings, which flash in synchronism with the wearer's heartbeat. A pulsed IR signal is directed into the wearer's tissue and a reflected or transmitted signal is monitored to determine when the wearer's heart beats at which time one or more light emitting sources in the jewelry flashes. The monitored signal is utilized to determine the wearer's heart rate. At least two light emitting sources are provided one of which flashes with each heart beat and the other flashes when the heart rate reaches or exceeds a predetermined range or increases faster than a predetermined rate. Preferred embodiments utilize inexpensive off-the-shelf reflection sensors developed for card readers each of which includes both an IR emitter and a phototransistor IR detector. Preferred embodiments include a power-up-on-skin-contact feature to preserve battery power. Embodiments include a variety of color LED's and a variety of types of jewelry are proposed as heartbeat monitors. Disclosed are detailed instructions describing working prototype earrings built by Applicants and their licensees and descriptions for low cost fabrication of embodiments of the present

Petitioner Samsung Ex-1004, 0265

invention using application specific integrated circuit (ASIC) technology and surface mount technology. Preferred embodiments include three visible LED's (red, green and blue) and a micro-processor which calculates pulse rate and causes the red LED to blink on each pulse, the green LED to blink on each pulse when the wearer's pulse rate is greater a first threshold and the blue LED to blink on each pulse when the wearer's pulse rate is greater than a second threshold corresponding to extreme excitement. These threshold values may correspond to increased heart rates of typical persons engaged in exercise and love making. The monitor may also be self calibrating to adjust the thresholds based on measurements of the wearer's heart rate over extended periods which would include periods of rest as well as periods of exertion or excitement. Other preferred embodiments vary the brightness of the LED's depending on the estimated blood pressure that also increases by about the same degree as pulse rate. Also described is a special technique for providing power to the heartbeat monitor that consists of a small diameter pin for providing an electrical connection between a battery and a circuit board comprising an IR transmitter and an IR receiver and one or more LED's. The battery unit is preferably on the inside of the earlobe and the circuit board is preferably on the outside of the earlobe. Also disclosed is a technique for charging the battery unit.

BRIEF DESCRIIPTION OF THE DRAWINGS

FIGS. 1 and 2 are drawings from the '079 patent referred to above showing feature disclosed in that prior art patent.

FIG. 3 is a circuit diagram showing features of a working prototype of the present invention.

FIG. 3A is a version of FIG.3 showing sections of the circuits shown enlarged in FIGS. 3A(1) through 3A(7)

FIGS. 3A(1) through 3A(7) each show a portion of the FIG. 3 circuit.

FIGS. 4A and 4B are prior art graphs that show heart rates of a female and male human engaged in love making.

FIGS. 5A and 5B show block diagrams of control circuits and logic for controlling a three-light embodiment of the present invention.

FIG. 6 is a drawing of an inexpensive IR transmitter and detector.

Petitioner Samsung Ex-1004, 0266

FIGS. 7A and 7B discloses a battery unit for providing power for the IR transmitter and the IR receiver and for one or more LED's.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Prototype Embodiments

Applicants and their licensee have built and tested prototype-flashing earring that has demonstrated excellent performance of features of the present invention. A prototype earring was fabricated by modifying an earring having a magnetic clasp purchased from a Target department store and using inexpensive reflection IR emitter-sensors developed for card readers. Two magnets attract each other on both sides of a wearer's ear lobe. An IR transmitter, and IR receiver of the emitter-sensor and an on/off skin contact switch was mounted along with one of two magnets on one side of the ear lobe. The electronic parts for the earring are mounted on two small circuit boards contained in a heart shaped box hanging from the attaching magnetic clasps. The box has dimensions of about 1 inch X 1 inch X ¾ inch. The earring is fitted with a red Valentine shaped heart cover in which a visible light (red) emitting diode is mounted. Three hearing aid batteries also contained in the heart shaped box power this prototype earring. Only only a single battery powers other embodiments.

Circuit Diagram

An electric circuit diagram of the prototype embodiment of the present invention actually built and tested by Applicants is shown in FIG. 3. This circuit diagram is also broken into seven parts as shown in FIG. 3A and FIGS. 3A(1) through 3A(7).

As shown in FIG. 3A(1) timer integrated circuit U1 with its associated components shown at 20 produces a pulse train of 500 microseconds pulse width pulses at a 200 Hz rate. These pulses activate the switch in IC U2 (a dual analog switch) 22 which permits current to flow in IR LED 24.

As shown in FIG. 3A(2), the emitted IR pulses enter the earlobe tissue and the light scattered back into the phototransistor 26 and is detected production a pulse amplitude

Petitioner Samsung Ex-1004, 0267

modulated signal across R3 28. The network of D1, D2, C2 and R4 form a "track and hold" amplitude insulator 30.

As shown in FIG. 3A(3), integrated circuit U3 is a quad, OP Amp 32. The first amplifier is used as a voltage follower with high input impedance and a low output impedance which isolates the track and hold circuit from the following amplifier. R5 and C3 form a low pass filter 34 to reduce the high frequency noise from the pulse signal.

In FIG. 3A(4) R6 and C4 form a high pass filter 36 and OP amp 38 provides a gain of about 500 at the frequency range centered at about 2.5 Hz which is the frequency of interest. C5 along with the feedback resistor R7 forms another low pass filter 40. All the filters together form a narrow pass band filter centered at 2.5 Hz. The pass band is wide enough to detect heart rates between 40 pulses per minute and about 250 pulses per minute. The signal at pin 8 of OP amp is now the recovered heartbeat waveform.

In FIG. 3A(5) the recovered heartbeat waveform is AC coupled into the last OP Amp 42 which acts as a threshold detector. The network 44 of R10, R11and R12 sets a threshold of about 0.2V. A signal above this amplitude causes the output (pin 14) 46 to go from 5 V to 0 V.

As shown in FIG. 3A(6) the second switch in U2 48 is closed upon detection of a beat, which causes current to flow in the visible LED 50. The decoupling network 52 comprising R14, C9 and R 16, C12 isolates the LED current transmits from the 08 Am PS.

In FIG. 3A(7) U4 is a DC-DC converter 54. A 1.4 V battery 56 is converted to a regulated 5V as shown at 60 to power the circuitry. It has a shutdown feature used to automatically turn on power upon skin contact as shown at 58.

Petitioner Samsung Ex-1004, 0268

Components of Prototype Are Off-the-Shelf

All of the electronic components of the above described prototype are off-the-shelf components available from vendors such as Radio Shack and Target with many locations, Allied Electronics with offices in Fort Worth Texas and Digi-Key with offices in Thief River Falls, MN. The IR transmitter and detector in the above embodiment is a very inexpensive device used for card reading an sells for $1.37 in quantities of 100. The unit operates at a wavelength of 940 nm which scatters well in and easily penetrates tissue as thick as the earlobe. Applicants have adopted it for their monitor with excellent results. A drawing of the IR transmitter and detector is shown in FIG. 6. Other parts are also very inexpensive so that Applicants expect to be able to produce their monitor for about $20 or less in large quantities. Therefore, Applicants expect enormous markets for the products of the present invention for medical, exercise, sports of all types and many other uses. As suggested above Applicants expect that their biggest market will be lovers.

Testing

The prototype earring has been thoroughly tested by Applicants and its excellent performance has been confirmed. One of the Applicants has tested the earring at a wide range of heart rates comparing the blinking of the LED with his own pulse with perfect match throughout the range.

Types of Jewelry Other than Earrings

Experimentation by Applicants have proven that the principals of the invention claimed in the '079 patent can be extended to other types of jewelry. Applicants have determined that heartbeat rings worn at other locations of the body perform just as well or better as compared to the earlobe. Other potential locations include the fingers, belly button, nose, toes, breast, and parts of the breast. Applicants have also determined that the flashing heartbeat monitor can be attached to skin as a patch with excellent performance. For example a heart shaped patch containing the electronic components described above can be applied on a skin region corresponding to the region of a person's heart.

Petitioner Samsung Ex-1004, 0269

Miniaturization

Although the prototype version of the invention actually built by Applicants is small enough to make a practical earring having substantial appeal, Applicants expect that much smaller earrings will have much greater appeal. Therefore, Applicants expect to have the electronics described converted to an application specific integrated circuit chip (an ASIC chip). These chips can be produced in volume production for less than $2 so that the cost of the heart monitoring jewelry could be as low a few dollars. Many ASIC manufacturers/designers are available which could convert the circuit shown in FIG. 3 into an ASIC chip mass producible for less than $2. These include Intrinsix Corp with offices in Westboro, MA; System to ASIC with offices in Bothell WA ASIC Northwest with offices in Portland, OR and Arizona Microtek, Inc with offices in Mesa, AZ. Another technique to miniaturize the jewelry of the present invention is by utilizing so called "surface mounting" techniques. These components are typically only about one-tenth to one fifth the size of conventional components. Thus, the prototype earring built and tested by applicants using off-the-shelf components, which is somewhat smaller than 1 inch cube, could be reduced in size to about one tenth or one fifth this volume using these surface mount techniques. Greater reductions are possible using the ASIC techniques but the surface mount approach generally requires a smaller front-end investment. Therefore, earrings of the present invention will be in sizes that are typical for earrings currently worn.

Three-Light Model

A preferred embodiment of the present includes an earring with three visible LED's, (red, green and blue) and a micro-processor which calculates pulse rate and causes the red LED to blink on each pulse, the green LED to blink on each pulse when the wearer's pulse rate is greater than a first threshold rate (such as 115% of normal) and the blue LED to blink on each pulse when the wearer's pulse rate reaches a second threshold corresponding to extreme excitement (such as 130% of normal). These ranges would correspond to increased heart rates of typical persons engaged in exercise and love-making. In preferred embodiments the example percentages may be adjusted to span a wider range for persons such as younger persons and athletes who have a much greater

Petitioner Samsung Ex-1004, 0270

range of heart rate. The monitor may also be self calibrating based on measurements of the wearer's heart rate over extended periods which would include periods of rest as well as periods of extreme exertion or excitement. FIG. 5A is a block diagram showing additional circuitry for the green and blue lights at 50, and FIG. 5B shows a simplified block diagram of the logic 52 for turning on the green and blue lights. In another preferred embodiment the earring is programmed to turn on the blue light when the heart rate increases by at least 15 percent within a period of 3 minutes or less. The reason for this approach will be obvious to the reader from a review of FIGS 4A and 4B.

Blood Pressure Estimation and Indication

Blood pressure in humans varies in about the same degree as heart rate. Other preferred embodiments vary the brightness of the LED's (or other visible light) depending on the estimated blood pressure which also increases by about the same degree as pulse rate. In order to do this the detector monitors the intensity of measured light transmitted through tissue or reflected out of the tissue. The light transmitted or reflected is dependent on the amount of blood in the tissue which is in turn dependent on the blood pressure. In these preferred embodiment the LED will therefore not only blink with each heart beat but the intensity of the light will be roughly proportional to the blood pressure.

Battery Unit

FIGS. 7A and 7B describe a technique for providing power to an earring heartbeat monitor. A circuit board 60 comprises an IR transmitter Tx and an IR receiver Rx and one or more LED light sources 61 as described above. The board 60 includes cylindrical pin 62 comprised of cylindrical conductor 64 having a diameter small enough to fit through the pierced ear of typical persons with pierced ears. Conductor 64 is treated as ground. The pin includes central conductor 66 that is connected to the positive terminal 68 of battery unit 70 as shown in FIG. 7A. Preferably, the board unit 60 is positioned on the outside of the earlobe and the battery unit 70 is positioned on the inside of the earlobe (i.e., between the user's earlobe and her neck). The reader should note that an advantage of this design is that power is drawn from the battery unit only when the earring is being worn. When the earring is not being worn (assuming that the battery is a rechargeable

Petitioner Samsung Ex-1004, 0271

battery) the battery unit may be recharged as shown in FIG. 7B. The reader should note that the pin element could be a part of the battery unit instead of the board unit. The pin 62 could be held in place by a pressure fit or threads could be provided so that the battery unit 70 is threaded on to pin 62. Battery 69 could be a re-chargeable battery in which case a battery charge unit could be provided with a fitting similar to pin 62 for charging battery 69 with wall power as shown in FIG. 7B. Also, techniques could be added to accommodate various thicknesses of earlobes.

Although the present invention has been described in terms of particular embodiments, persons skilled in the art will recognize that many other embodiments using the principals of the invention are possible. Such variations include IR transmitters and receivers operating at different wavelengths which penetrate tissue and are absorbed in blood to a lesser or greater extent than the 940 nm light. Visible light components other than LED's could be used so long as they are small and efficient. The earring could include a tiny transmitter to transmit a signal to a nearby receiver. In a preferred embodiment the signal energizing the blue light could be transmitted to a nearby receiver that would then activate an audio receiver that would produce sounds such as church bells. Applicants have learned through testing of prototype earrings that bright sunlight adversely affects performance of the heartbeat earrings. Placing an infrared absorber between the earlobe and the clamp on the inside of the earlobe minimizes these adverse effects. Another solution to the sunlight problem is to design the earring so that the optical components of the earring are shielded from direct or reflected rays from the sun. Therefore, the scope of the invention should be determined by the appended claims and their legal equivalents.

Petitioner Samsung Ex-1004, 0272

We claim:

1. Flashing jewelry comprising:
   A) an infrared emitter positioned to emit infrared light into tissue of a wearer,
   B) an infrared detector positioned to detect infrared light emanating from said tissue,
   C) a power source for said emitter and said detector,
   D) an electrical circuit for analyzing electrical signals from said detector to detect each beat of a wearers heart,
   E) at least two visible light emitters,
   F) a first trigger circuit for initiating electrical pulses to cause one of said visible light emitters to flash once for each heart beat,
   G) a pulse rate calculation means for calculating the wearer's pulse rate, and
   H) a second trigger circuit for initiating pulses to cause a second of said visible light emitters to flash once for each heart beat when said pulse rate exceeds a first predetermined rate.
2. Jewelry as in Claim 1 and further comprising a third trigger circuit for initiating pulses to cause a third of said at least two visible light emitters to flash once for each heart beat when said pulse rate exceeds a second predetermined rate.
3. Jewelry as in Claim 2 wherein said at least two visible light emitters are three visible light emitters emitting respectively red, green and blue light.
4. Jewelry as in Claim 1 wherein said jewelry is an earring.
5. Jewelry as in Claim 1 wherein said jewelry is a finger ring.
6. Jewelry as in Claim 1 wherein said jewelry is attached to skin of said wearer by a patch.
7. Jewelry as in Claim 1 wherein said jewelry is a patch in the shape of a heart.
8. Jewelry as in Claim 1 wherein said at least one visible light emitter is three visible light emitters.

Petitioner Samsung Ex-1004, 0273

9. Jewelry as in Claim 8 wherein said three visible light emitters are red green and blue emitters and said jewelry further comprises a means to determine heart rates of said wearer.
10. Jewelry as in Claim 9 wherein said red emitter is programmed to flash with each heart beat, said green emitter is programmed to flash with each heart beat when the heart rate of the wearer is in excess of a first threshold in excess of the wearer's rest heart rate and said blue emitter is programmed to flash with each heart beat when the heart rate of said wearer is in excess of a second threshold in excess of said first threshold.
11. Jewelry as in Claim 10 wherein said first threshold is at least 115 % of the wearer's resting heart rate and said second threshold is at least 130 % of wearer's resting heart rate.
12. Jewelry as in Claim 1 wherein said electric circuit comprises and ASIC circuit.
13. Jewelry as in Claim 1 wherein said electric circuit comprises surface mounted circuit.
14. Jewelry as in Claim 3 and further comprising a transmitter for transmitting a signal to an audio device to initiate a sound when one of said thresholds are exceeded.
15. Jewelry as in Claim 14 wherein said sound is church bells.
16. Jewelry as in Claim 1 wherein said power source is a battery unit positioned on the inside of an earlobe and connected through an earlobe to a circuit board comprising said infrared emitter, said infrared detector and said at least two visible light sources

Petitioner Samsung Ex-1004, 0274



FIG. 1
PRIOR ART

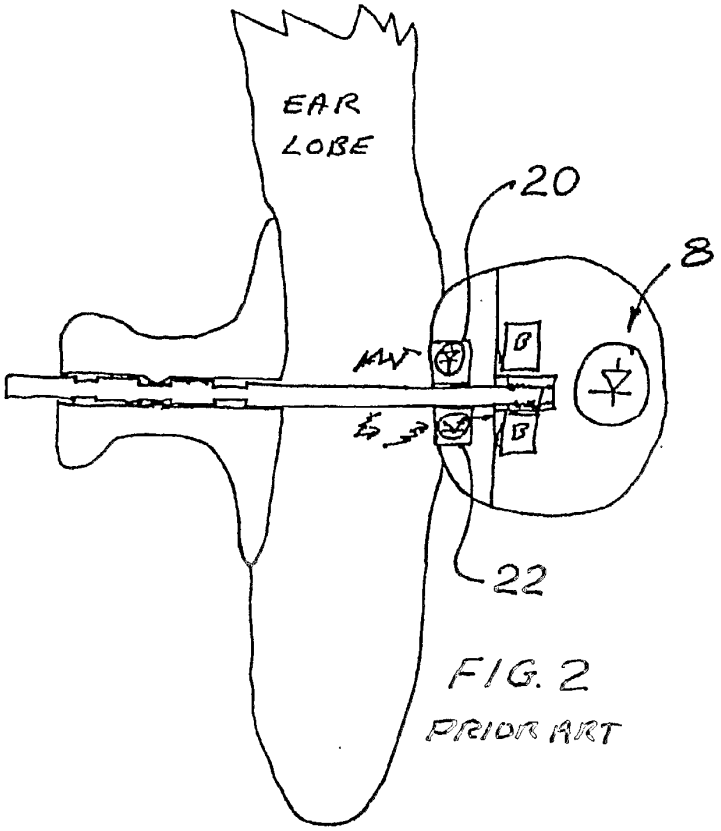


FIG. 2
PRIOR ART

Petitioner Samsung Ex-1004, 0275

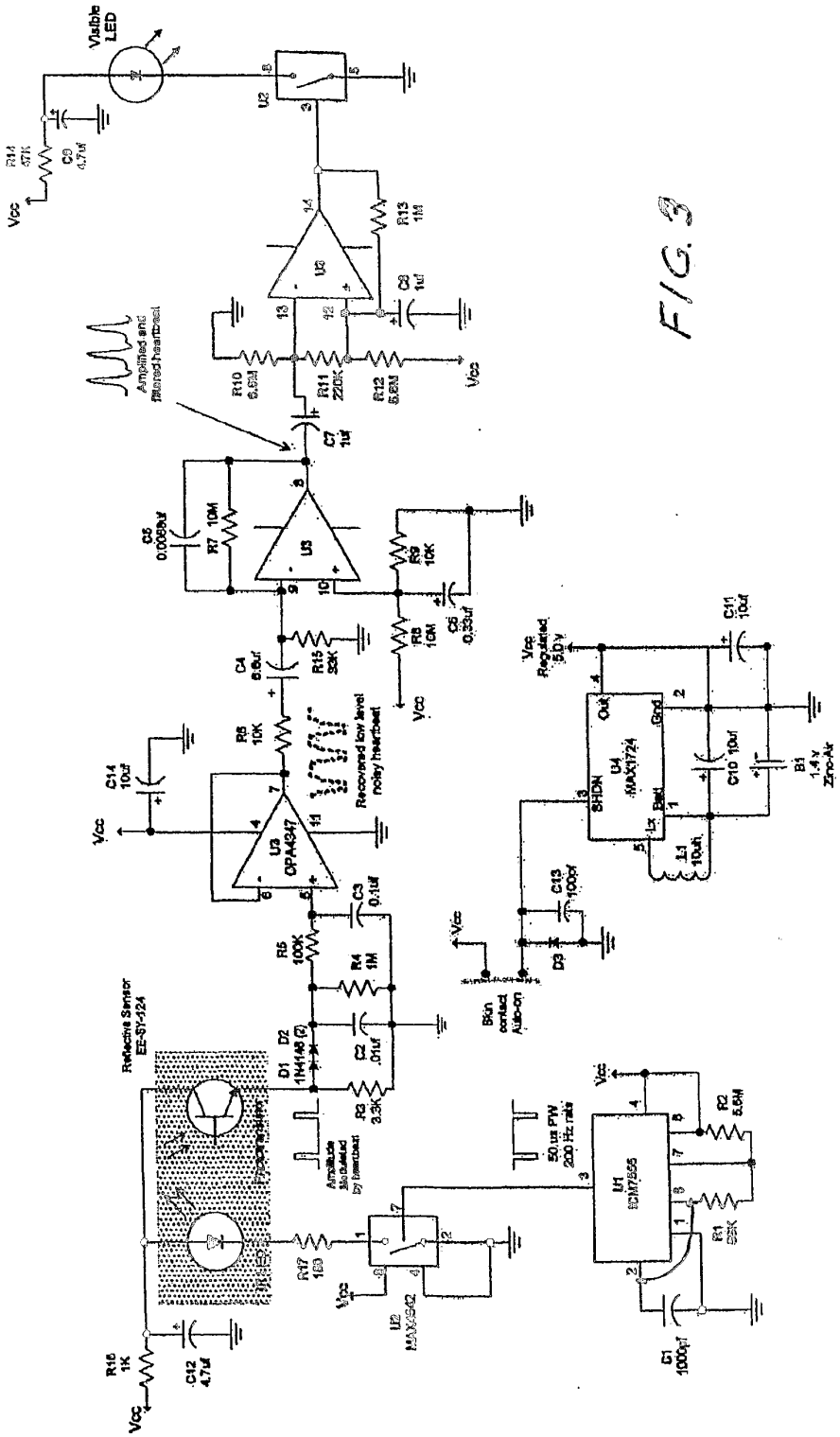


FIG. 3

Petitioner Samsung Ex-1004, 0276

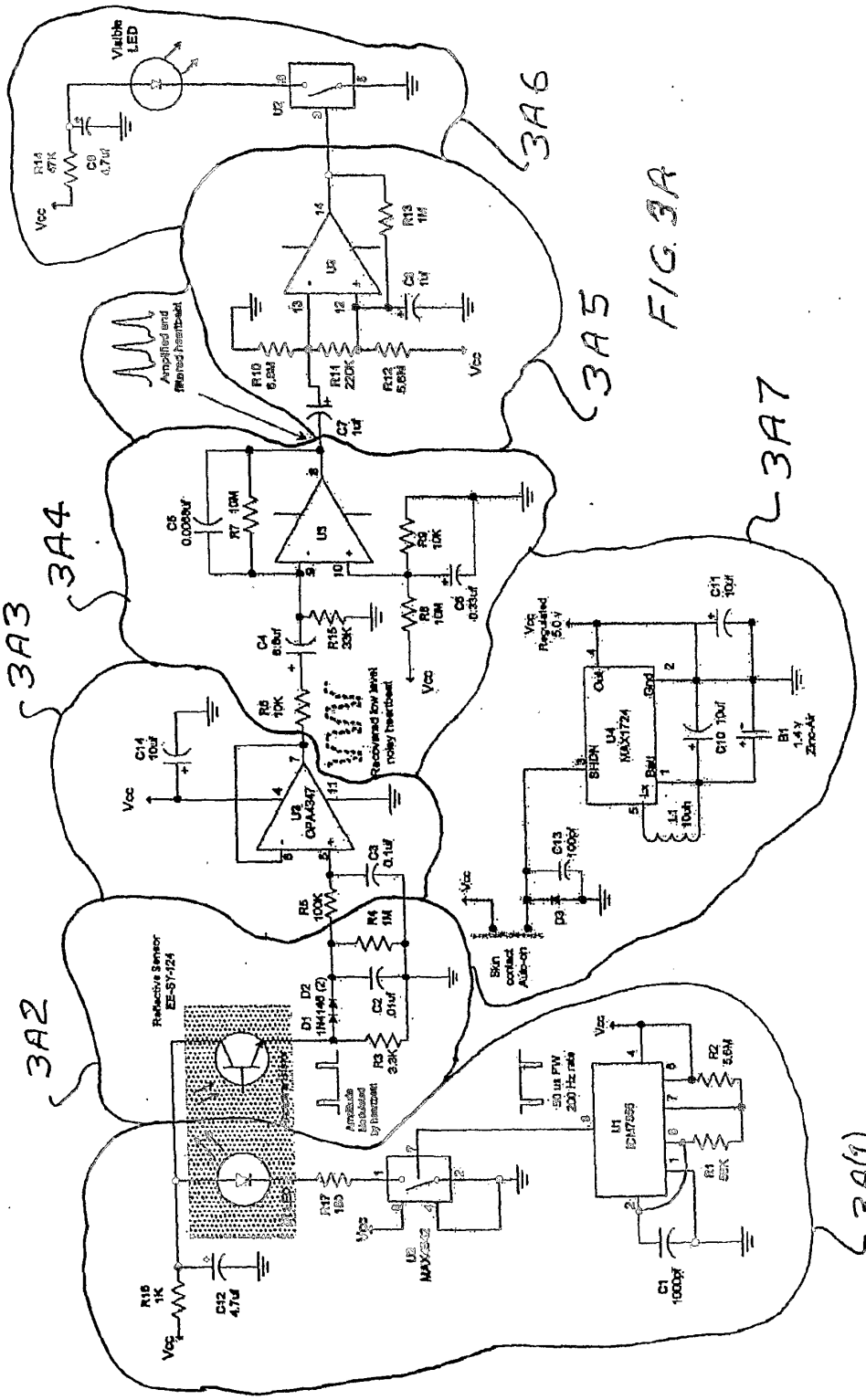
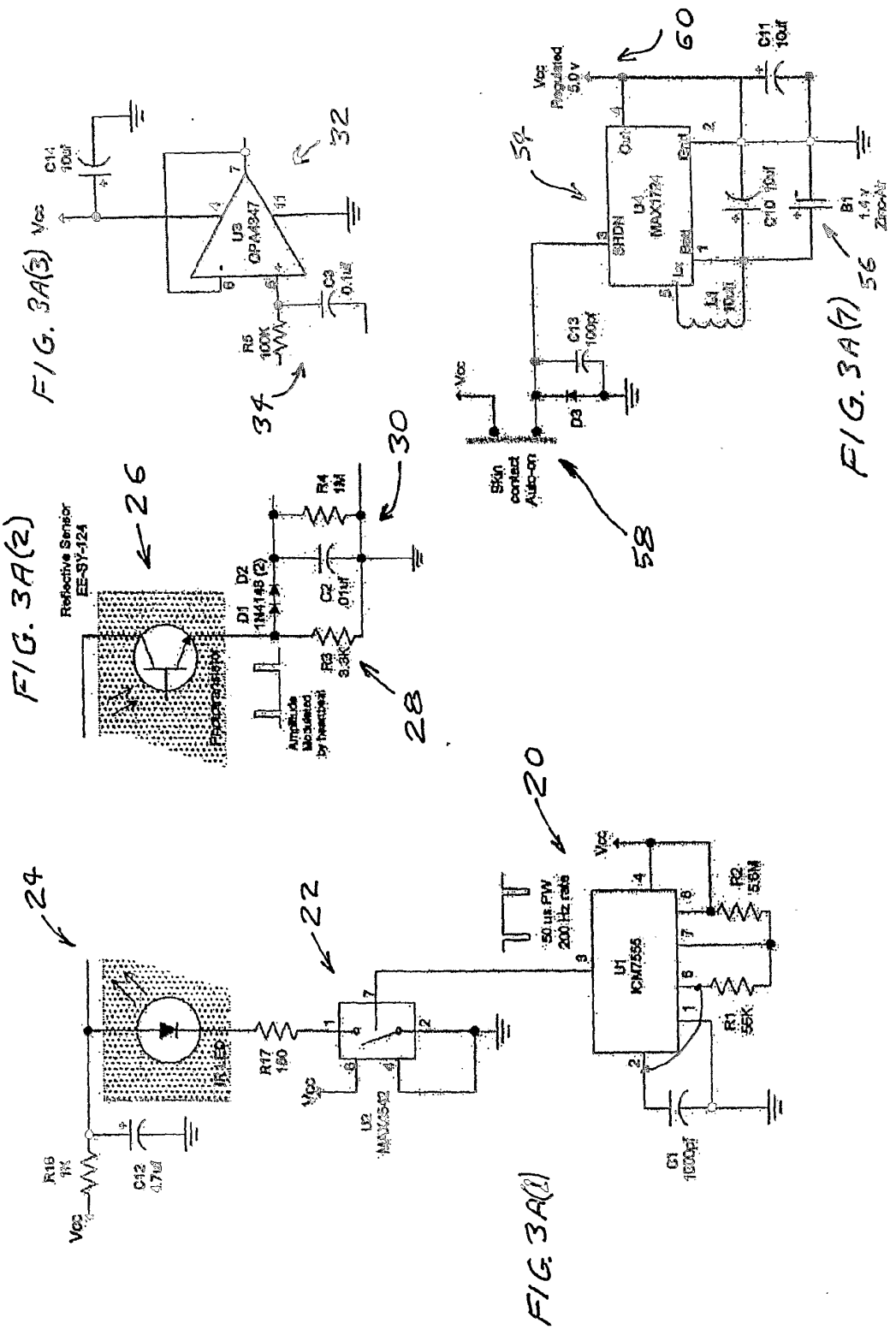


FIG. 3A

Petitioner Samsung Ex-1004, 0277



Petitioner Samsung Ex-1004, 0278

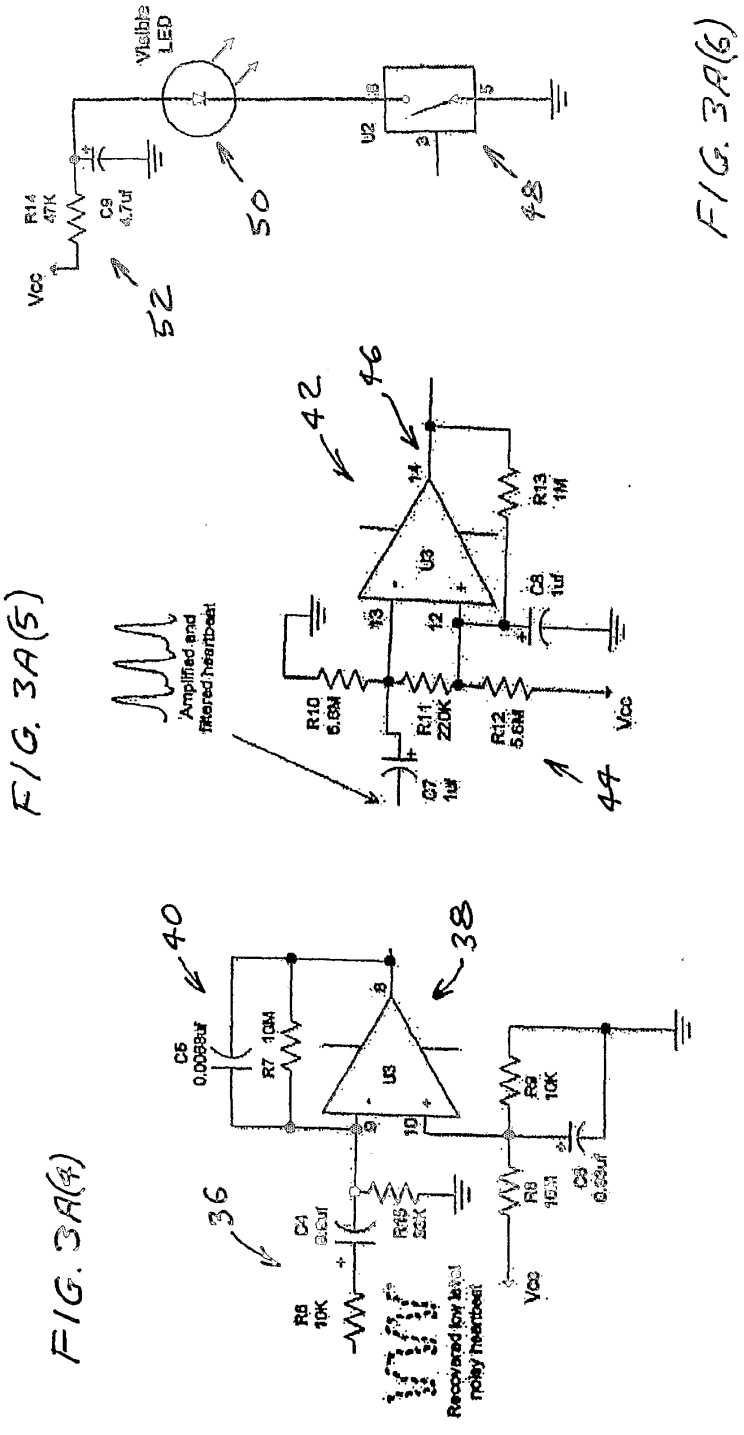
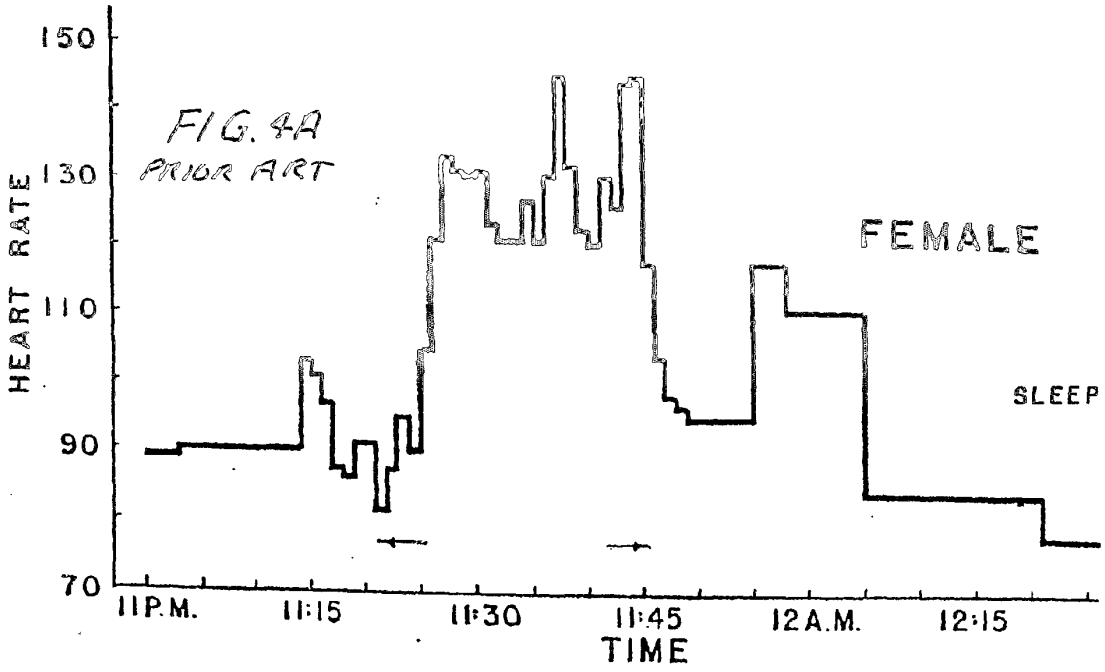


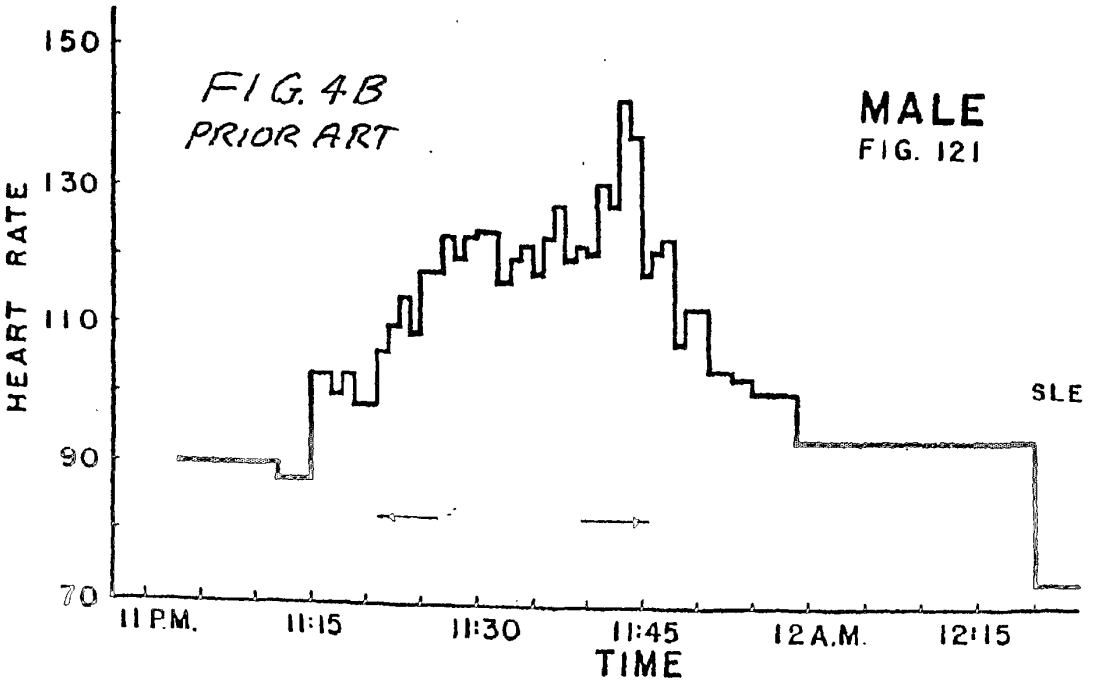
FIG. 3A(5)

FIG. 3A(6)

FIG. 3A(4)

Petitioner Samsung Ex-1004, 0279





Petitioner Samsung Ex-1004, 0280

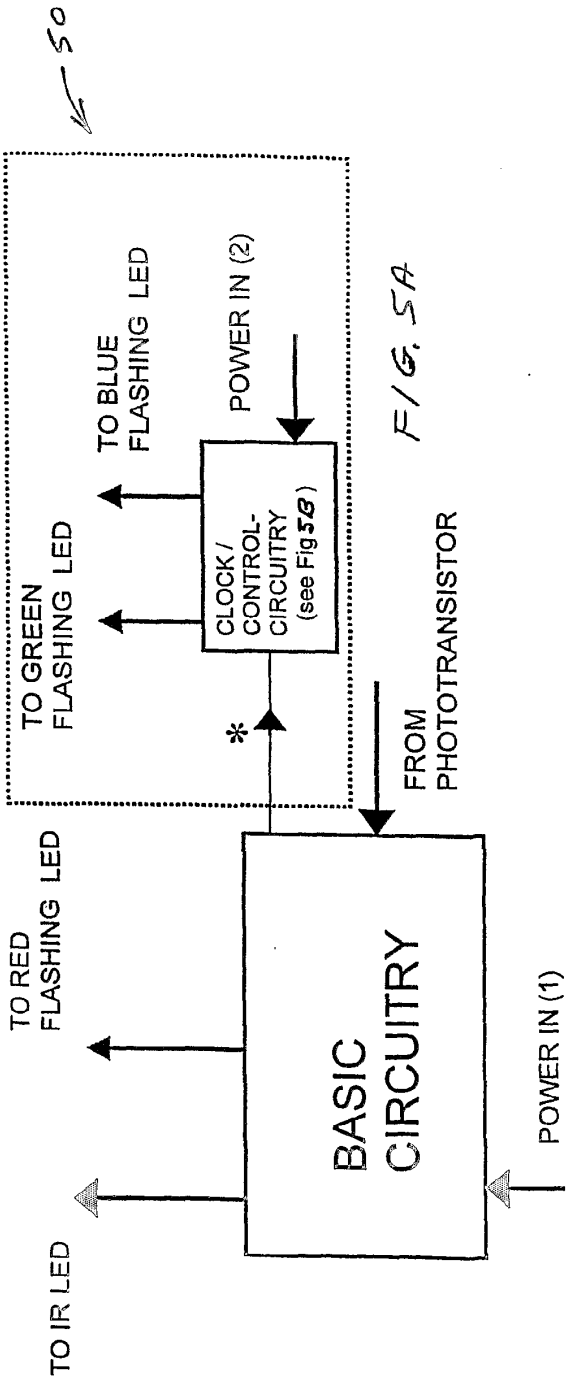


FIG. 5A

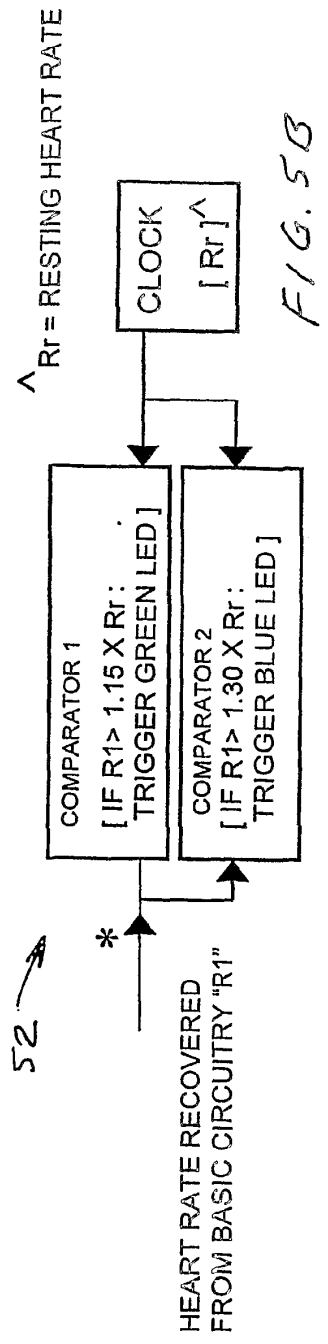


FIG. 5B

Petitioner Samsung Ex-1004, 0281

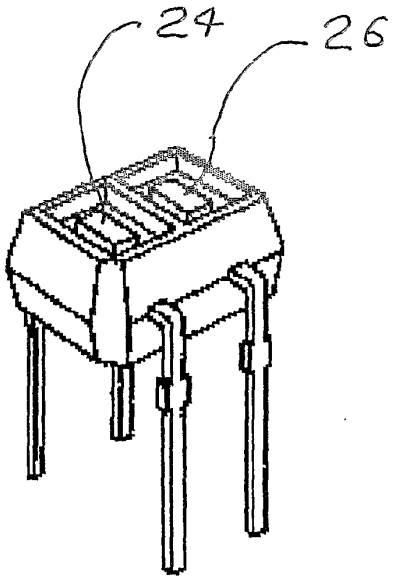


FIG. 6

Petitioner Samsung Ex-1004, 0282

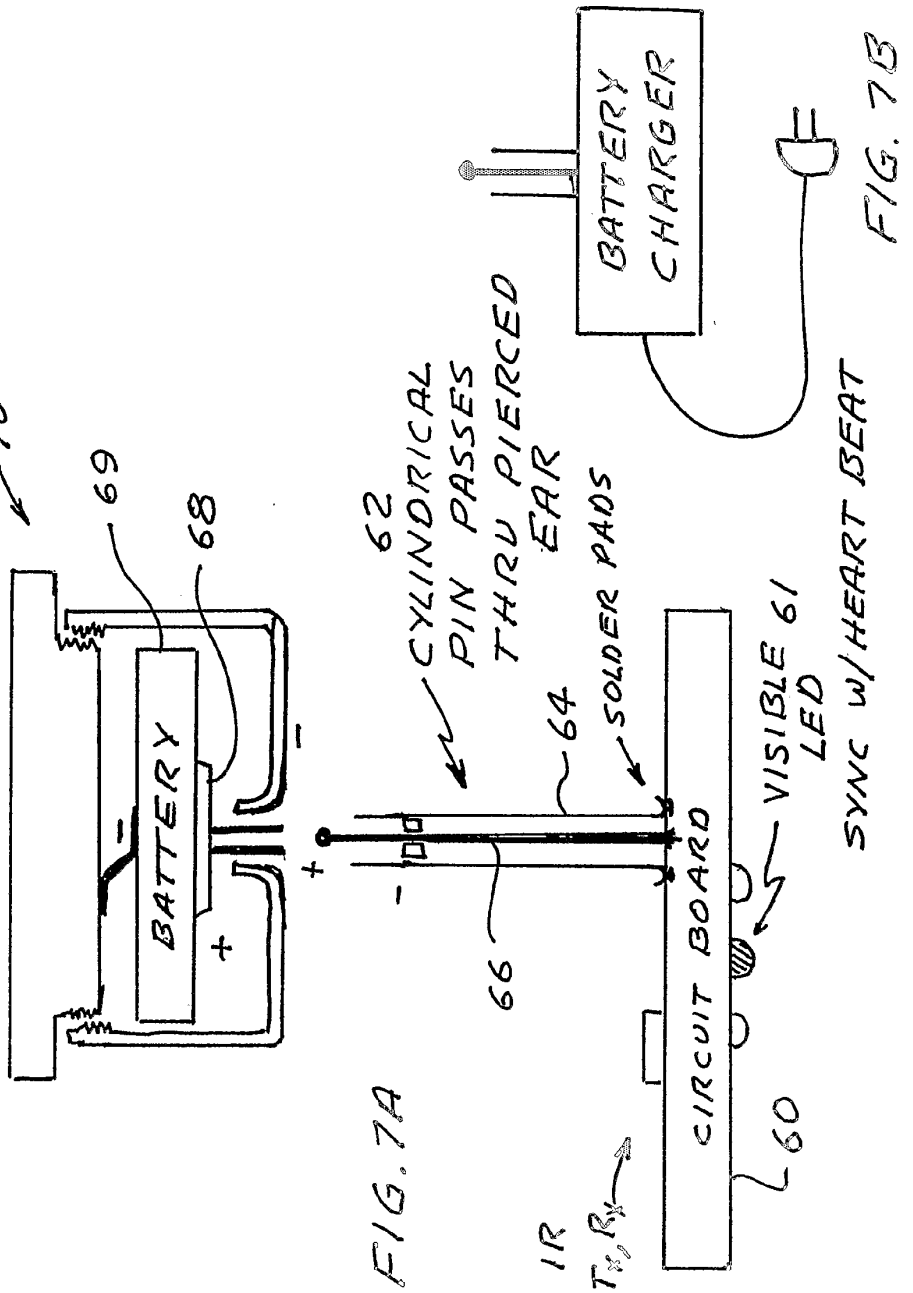


FIG. 7A FIG. 7B

Petitioner Samsung Ex-1004, 0283

Espacenet

Bibliographic data: CN103109462 (A) — 2013-05-15

Wearable motion sensing computing interface

Inventor(s): MASTANDREA NICHOLAS J; HAMMER CARL S ± (MASTANDREA NICHOLAS J, ; HAMMER CARL S)

Applicant(s): MASTANDREA NICHOLAS J ± (MASTANDREA NICHOLAS J)

Classification: - international: *H03K17/94*
- cooperative: G06F3/014; G06F3/017; G06F3/038

Application number: CN2011829020 20110418 Global Dossier

Priority number (s): WO2011US32934 20110418 ; US20100324824P 20100416 ; US20100346974P 20100521

Also published as: CA2796451 (A1) EP2559163 (A1) EP2559163 (A4) KR20130101975 (A) US2013027341 (A1) more

Abstract of CN103109462 (A)

An apparatus comprises a sensor configured to detect movement and generate movement data related to at least part of a detected movement; a messaging unit configured to create a message that is configured to include movement information based at least in part upon the movement data; a transmitter in data communication with the messaging unit and configured to transmit the message; and a housing configured to at least partially enclose at least one of the sensor, the messaging unit, and the transmitter, and including a finger grip configured to secure the housing to a human finger. Methods of using the apparatus are also provided.

Petitioner Samsung Ex-1004, 0284

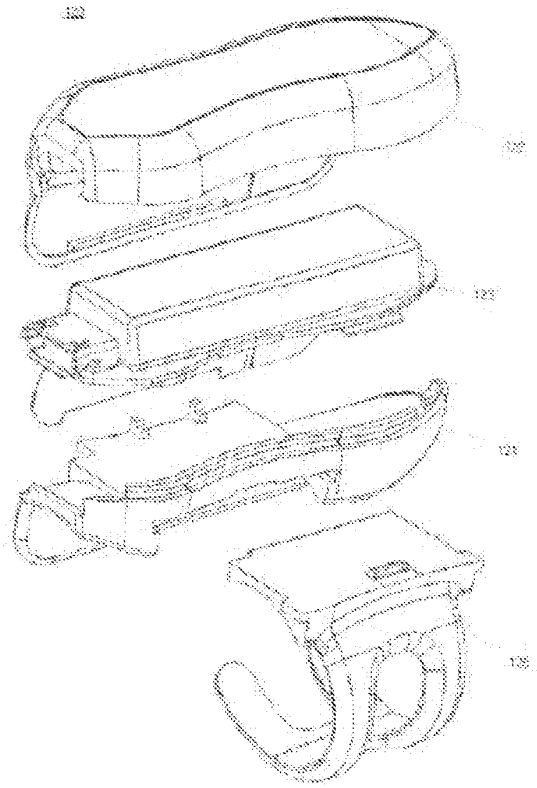


FIG. 1E

Petitioner Samsung Ex-1004, 0285

(19)中华人民共和国国家知识产权局

(12)发明专利申请

(10)申请公布号 CN 103109462 A
(43)申请公布日 2013.05.15

(21)申请号 201180029020.6
(22)申请日 2011.04.18
(30)优先权数据
61/324,824 2010.04.16 US
61/346,974 2010.05.21 US
(85)PCT申请进入国家阶段日
2012.12.12
(86)PCT申请的申请数据
PCT/US2011/032934 2011.04.18
(87)PCT申请的公布数据
WO2011/130752 EN 2011.10.20
(71)申请人 尼古拉斯·J.·马斯坦德雷亚
地址 美国俄亥俄州
(72)发明人 尼古拉斯·J.·马斯坦德雷亚
卡尔·S.·哈默
(74)专利代理机构 北京德恒律治知识产权代理有限公司 11409
代理人 章社杲 孙征
(51)Int.Cl.
H03K 17/94(2006.01)

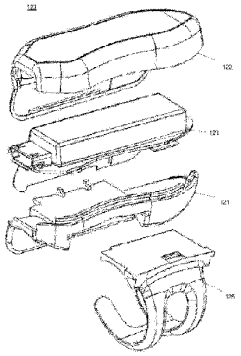
权利要求书5页 说明书19页 附图26页

(54)发明名称

可佩戴式动作感测计算接口

(57)摘要

本发明涉及一种设备，该设备包括被配置成检测移动并且生成与所检测到的至少部分移动相关的移动数据的传感器；被配置成生成被配置成包括有至少部分地基于移动数据的移动信息的消息传送单元；与消息传送单元相通信并且被配置成发送消息的发射器以及被配置成至少部分地包裹传感器、消息传送单元和传送器中的至少一个的壳体，并且该壳体包括确保包裹手指的手指握部。本发明还提供了使用该设备的方法。



CN 103109462 A

Petitioner Samsung Ex-1004, 0286

1. 一种设备，包括：

传感器，被配置成检测移动并生成与至少部分所检测到的移动相关的移动数据；

消息传送单元，被配置成生成被配置成包括至少部分地基于所述移动数据的移动信息的消息；

发射器，与所述消息传送单元进行数据通信并且被配置成发送所述消息；以及

壳体，被配置成至少部分地包裹所述传感器、所述消息传送单元和所述发射器中的至少一个，并且所述壳体包括手指握部，所述手指握部被配置成将所述壳体固定在人体手指上。

2. 根据权利要求 1 所述的设备，其中，所述手指握部与所述壳体可拆装地相连接。

3. 根据权利要求 2 所述的设备，其中，所述手指握部包括绑带。

4. 根据权利要求 3 所述的设备，其中，所述传感器包括加速计。

5. 根据权利要求 4 所述的设备，其中，所述移动信息包括所述加速计的加速度数据

6. 根据权利要求 5 所述的设备，其中，所述消息被配置成包括至少部分地基于作为手指敲击特征的移动的检测的敲击信息。

7. 根据权利要求 6 所述的设备，其中，所述加速计是三轴加速计。

8. 根据权利要求 7 所述的设备，其中，所述传感器包括陀螺仪。

9. 根据权利要求 8 所述的设备，其中，所述移动信息进一步包括所述陀螺仪的旋转数据。

10. 根据权利要求 9 所述的设备，其中，所述陀螺仪是三轴陀螺仪。

11. 根据权利要求 10 所述的设备，进一步包括：

电源，被配置成为所述发射器和所述传感器中的至少一个提供电能。

12. 根据权利要求 11 所述的设备，其中，所述电源是选自由电池、电容器和与所述设备相连接的外部电源所构成的组中的电源。

13. 根据权利要求 11 所述的设备，其中，所述电源与所述消息传送单元可拆装地相连接。

14. 根据权利要求 13 所述的设备，进一步包括：

接触传感器，包括与所述消息传送单元进行数据通信的接触面并且被配置成检测所述接触传感器的接触面上的接触。

15. 根据权利要求 14 所述的设备，进一步包括：

滑动传感器，包括与所述消息传送单元进行数据通信的接触面并且被配置成检测所述滑动传感器的接触面上的滑动接触。

16. 根据权利要求 15 所述的设备，其中，所述接触传感器和所述滑动传感器均是电容传感器。

17. 根据权利要求 16 所述的设备，其中，所述消息被配置成包括所述接触传感器的接触数据和所述滑动传感器的接触数据。

18. 根据权利要求 17 所述的设备，其中，所述消息被配置成包括头部、装置标识符和尾部。

19. 根据权利要求 18 所述的设备，进一步包括：被配置成管理验证数据的验证单元。

20. 根据权利要求 19 所述的设备，其中，所述消息进一步被配置成包括来自所述验证

Petitioner Samsung Ex-1004, 0287

单元的验证数据。

21. 根据权利要求 20 所述的设备，其中，所述消息传送单元被配置成至少部分地基于激活接触传感器来请求与远程装置建立通信信道。

22. 根据权利要求 21 所述的设备，其中，所述消息传送单元被配置成至少部分地基于选自由失去通信链接、所检测到的移动减少、检测到激活序列、计时器到时、检测到低功率条件、检测到错误条件以及接收到停止消息所构成的组中的条件来停止生成所述消息。

23. 根据权利要求 22 所述的设备，其中，所述发射器被配置成使用选自由电气与电子工程师协会 (IEEE) 协议、无线协议、IEEE 802.x 协议、红外线数据组织 (IrDA) 协议、并行通信协议、同步串行协议、异步串行协议、通用串行总线 (USB) 协议、传送控制协议 / 互联网协议 (TCP/IP) 协议、用户数据协议 / 互联网协议 (UDP/IP) 协议以及 IEEE 1394 协议所构成的组中的通信协议。

24. 根据权利要求 23 所述的设备，进一步包括：振动器，所述振动器被配置成由所接收到的消息和所述设备的状态条件中的至少一个激活。

25. 根据权利要求 24 所述的设备，进一步包括：发声器，所述发声器被配置成基于接收到消息和所述设备的状态条件中的至少一个发出声音警报。

26. 根据权利要求 25 所述的设备，进一步包括：

视觉指示器，所述视觉指示器被配置成至少部分地基于选自由通电条件、自检条件、移动、发送消息、接收消息以及建立通信道所构成的组中的条件来激活所述视觉指示器。

27. 一种设备，包括：

接收器，被配置成接收由动作感测装置发送的动作信号；

转换电路，被配置成将所述动作信号转换成与计算装置的输入接口兼容的输入消息；以及

输出接口，被配置成将所述输入消息发送至所述计算装置的所述输入接口。

28. 根据权利要求 27 所述的设备，进一步包括：

发射器，被配置成将动作信号确认发送至所述动作感测装置。

29. 根据权利要求 28 所述的设备，其中，所述接收器进一步被配置成请求再次发送所述动作信号。

30. 根据权利要求 29 所述的设备，其中，所述输入消息与选自由移动鼠标、点击鼠标、按下按键事件、松开按键事件、点击按键事件以及键盘事件所构成的组中的事件相关。

31. 根据权利要求 30 所述的设备，其中，所述接收器被配置成使用选自由电气与电子工程师协会 (IEEE) 协议、无线协议、IEEE 802.x 协议、IEEE 802.15.4 协议、IEEE 802.16 协议、IEEE 802.11 协议、红外线数据组织 (IrDA) 协议、并行通信协议、同步串行协议、异步串行协议、通用串行总线 (USB) 协议、以太网协议、TCP/IP 协议、UDP/IP 协议以及 IEEE 1394 协议所构成的组中的通信协议。

32. 根据权利要求 31 所述的设备，其中，所述输出接口选自由 USB 端口、串行端口、以太网端口、LAN 端口、卡座、总线接口卡以及无线接口所构成的组。

33. 一种方法，包括：

生成与传感器所检测到的至少部分移动相关的移动数据；

利用消息传送单元生成被配置成包括至少部分地基于所述移动数据的移动信息的消

Petitioner Samsung Ex-1004, 0288

息；以及

发送所生成的消息；

其中，所述传感器、所述消息传送单元和发射器中的至少一个至少部分地被包裹在壳体中，所述壳体包括被配置成将所述壳体固定至人体手指的手指握部。

34. 根据权利要求 33 所述的方法，其中，所述手指握部与所述壳体可拆装地相连接。

35. 根据权利要求 34 所述的方法，其中，所述手指握部包括绑带。

36. 根据权利要求 35 所述的方法，其中，所述传感器包括加速计。

37. 根据权利要求 36 所述的方法，其中，所述移动信息包括所述加速计的加速度数据。

38. 根据权利要求 37 所述的方法，其中，所述消息被配置成包括敲击信息，所述敲击信息至少部分地基于作为手指敲击特征的移动的检测。

39. 根据权利要求 38 所述的方法，其中，所述加速计是三轴加速计。

40. 根据权利要求 39 所述的方法，其中，所述传感器包括陀螺仪。

41. 根据权利要求 40 所述的方法，其中，所述移动信息进一步包括所述陀螺仪的旋转信息。

42. 根据权利要求 41 所述的方法，其中，所述陀螺仪是三轴陀螺仪。

43. 根据权利要求 42 所述的方法，进一步包括：

通过由电源提供电能来为所述发射器和所述传感器中的至少一个供电。

44. 根据权利要求 43 所述的方法，其中，所述电源是选自由电池、电容器和外部电源所构成的组中的电源。

45. 根据权利要求 43 所述的方法，其中，所述电源被可拆装地连接。

46. 根据权利要求 45 所述的方法，进一步包括：

生成与接触传感器的接触面上的接触相关的接触数据，所述接触传感器与所述消息传送单元进行数据通信。

47. 根据权利要求 46 所述的方法，进一步包括：

生成与滑动传感器的接触面上的滑动接触相关的接触数据，所述滑动传感器与所述消息传送单元进行数据通信。

48. 根据权利要求 47 所述的方法，其中，所述接触传感器和所述滑动传感器均是电容传感器。

49. 根据权利要求 48 所述的方法，其中，所述消息被配置成包括所述接触传感器的接触数据和所述滑动传感器的接触数据。

50. 根据权利要求 49 所述的方法，其中，所述消息被配置成包括头部和装置标识符。

51. 根据权利要求 50 所述的方法，进一步包括：至少部分地基于激活所述接触传感器而请求与远程装置建立通信信道。

52. 根据权利要求 51 所述的方法，进一步包括：基于接收消息和检测状态条件中的至少一个激活振动器。

53. 根据权利要求 52 所述的方法，进一步包括：基于接收消息和检测状态条件中的至少一个发出声音警报。

54. 根据权利要求 53 所述的方法，进一步包括：

至少部分地基于检测到选自由通电条件、自检条件、移动、发送消息、接收消息以及建

Petitioner Samsung Ex-1004, 0289

立通信信道所构成的组中的条件来激活视觉指示器。

55. 一种方法，包括：

接收与可佩戴式动作感测装置的至少部分移动相关的数据；

过滤所述数据，以生成所述可佩戴式动作感测装置的移动变化率；

求所述移动变化率的积分，以生成所述可佩戴式动作感测装置的测量移动；

将所述测量移动和所累积的移动加和，以生成所述可佩戴式动作感测装置的更新位置和所述可佩戴式动作感测装置的更新定向中的至少一个；以及

至少部分地基于所述更新位置和所述更新定向之一来更新计算装置的用户接口的特征。

56. 根据权利要求 55 所述的方法，其中，所述数据是来自所述可佩戴式动作感测装置的加速计的至少一个轴的加速度数据。

57. 根据权利要求 55 所述的方法，其中，所述数据是来自所述可佩戴式动作感测装置的陀螺仪的至少一个轴的角速率数据。

58. 根据权利要求 55 的方法，进一步包括：

缩放所述数据。

59. 根据权利要求 58 所述的方法，其中，通过缩放函数来执行所述缩放，所述缩放函数选自由以下缩放函数所构成的组：线性缩放函数；指数缩放函数；根据方程 $A_i' = ((4/32768)*A_i)*9.81$ 进行缩放的缩放函数，其中 A_i 是选自 x 轴、y 轴和 z 轴中的一个轴上的加速度数据；以及根据方程 Gi' = ((500dps/32786)*(pi/180))*Gi 进行缩放的缩放函数，其中 Gi 是选自 x 轴、y 轴和 z 轴的一个轴上的角速率数据。

60. 根据权利要求 55 所述的方法，其中，所述计算装置的所述用户接口的所述特征是光标位置。

61. 根据权利要求 60 所述的方法，其中，至少部分地基于经过缩放的测量移动来更新所述光标位置。

62. 根据权利要求 60 所述的方法，其中，通过所述可佩戴式动作感测装置的第二轴上的移动来生成第一轴上的光标位置变化。

63. 根据权利要求 55 所述的方法，进一步包括：

接收所述可佩戴式动作感测装置的传感器激活指示，并且

其中，至少部分地基于接收到所述传感器激活指示来更新所述特征。

64. 根据权利要求 55 所述的方法，其中，所述特征选自由点击左键、点击右键、点击应用定义键、点击用户定义键、滚动功能、放大功能、缩小功能、打开应用、关闭应用、查看邮件、编辑字符、键入字符、复制字符、删除字符、粘贴字符、选择用户可选选项、将项目发至回收站、更改音量、静音、选择多媒体项目、播放多媒体项目、暂停多媒体项目回放、改变多媒体项目回放速度、重复多媒体项目回放、快进多媒体项目回放、跳过部分多媒体项目回放、图像旋转、改变图像尺寸、缩放图像、修整图像、图像的图像处理以及电影编辑功能所构成的组。

65. 根据权利要求 55 所述的方法，其中，通过选自由平滑滤波器、高通滤波器、卡尔曼滤波器或迭代算法所构成的组中的滤波器来执行所述过滤。

66. 根据权利要求 55 所述的方法，其中，所述过滤进一步包括：

Petitioner Samsung Ex-1004, 0290

从所述数据中选择多个数据点；

计算所选择的多个数据点的平均值；

计算所选择的多个数据点的标准偏差；

将所述标准偏差与最小标准偏差相比较；以及

当所述标准偏差小于所述最小标准偏差时，从数据点中减去所述平均值，以从所述数据点中去除 DC 偏移并且生成所述可佩戴式动作感测装置的移动变化率。

67. 根据权利要求 66 所述的方法，其中，对于与加速度的轴相关的数据，所述最小标准偏差是 .03，并且对于与角速率的轴相关的数据，所述最小标准偏差是 .003。

68. 根据权利要求 66 所述的方法，其中，通过向所述数据应用窗口函数来执行选择所述多个数据点的步骤，以选择出大约 50 个数据点。

69. 根据权利要求 55 所述的方法，进一步包括：

通过测量由所述可佩戴式动作感测装置的重力所产生的加速度来确定所述可佩戴式动作感测装置的定向。

Petitioner Samsung Ex-1004, 0291

可佩戴式动作感测计算接口

[0001] 相关申请参考

[0002] 本申请要求于2010年4月16日提交的序列号为61/324,824,标题为“User Interface and Computer Interface with Accelerometer, Gyroscope andWireless Interface”的美国在先申请以及于2010年5月21日提交的序列号为61/346,974,标题为“Accelerometer-Based Computing Interface”的美国在先申请的优先权。

技术领域

[0003] 下面描述的装置、方法和系统大体上涉及计算装置领域,更具体地涉及的是用于人机互动的装置、方法和系统。

发明内容

[0004] 一种设备可以包括被配置成检测移动并且生成与所检测的至少部分移动相关的移动数据的传感器,被配置成生成包括有基于移动数据的移动信息的消息传送单元,与消息传送单元相互通信发送消息的发送器以及包裹有传感器、消息发送单元和发送器的壳体,并且该壳体具有将外壳固定至人体手指的手指握部。在多种配置中,手指握部是可从壳体上拆装下来的并且可以包括绑带。在多种配置中,传感器可以包括加速计,例如,三轴加速计,而移动信息可以包括来自加速计的加速度数据。在多种配置中,传感器可以包括陀螺仪,例如,三轴陀螺仪,而移动信息可以包括来自陀螺仪的旋转数据。在多种配置中,消息可以包括来自于指敲击移动特征检测的敲击信息。在多种配置中,该设备可以包括电源,例如,可拆装的电源、电池、电容器或与设备相耦合的外部电源,该电源为发送器和传感器提供电能。在多种配置中,该设备可以包括与消息发送单元相互通信的接触传感器,该接触传感器具有用于检测接触的接触面。在多种配置中,该设备可以包括具有用于检测接触的接触面的滑动传感器,该滑动传感器与消息发送单元相互通信。在多种配置中,接触传感器和滑动传感器是电容传感器。在多种配置中,消息包括接触传感器和滑动传感器的接触信息。

[0005] 在多种配置中,该设备进一步包括管理验证数据的验证单元,并且该消息可以包括验证数据。在多种配置中,消息传送单元可以被配置成基于接触传感器的激活而请求与远程装置的建立通信信道,并且基于以下条件生成停止消息,诸如,失去通信链接、所检测到的移动减少、激活顺序检测、计时器到时、检测到低功率条件、检测到错误条件以及接收到停止消息。在多种配置中,发射器可以使用通信协议,诸如,电气与电子工程师协会(IEEE)协议、无线协议、IEEE802.x协议、红外线数据组织(IrDA)协议、并行通信协议、同步串行协议、异步串行协议、通用串行总线(USB)协议、传送控制协议/互联网协议(TCP/IP)协议、用户数据协议/互联网协议(UDP/IP)以及IEEE 1394协议。该设备可以包括能够被所接收到的消息或设备状态条件激活的振动器。该设备可以包括能够发出声音报警的发声器,可以通过所接收到的消息或设备状态条件激活该发声器。该设备可以包括视觉指示器,可以通过设备状态条件,诸如,电源开启条件、自测条件、移动、传送消息、接收消息以及建立通信道来激活该视觉指示器。

Petitioner Samsung Ex-1004, 0292

[0006] 该设备可以包括被配置成接收来自动作感测装置的动作信号的接收器；被配置成将动作信号转换成与计算装置的输入接口相兼容的输入消息的转换电路；以及被配置成将输入消息发送给计算装置的输入接口的输出接口。该设备可以进一步包括被配置成将动作信号确认发送给动作感测装置的发射器。可以进一步将接收器配置成请求再传送动作信号。该输入消息可以与选自于由鼠标动作、鼠标点击、按下按键活动、松开按键活动、点击按键活动以及键盘活动所构成的组中的活动相关。可以进一步将接收器配置成使用选自于由电气与电子工程师协会（IEEE）协议、无线协议、IEEE802.x 协议、IEEE802.15.4 协议、IEEE802.16 协议、IEEE802.11 协议、红外线数据组织（IrDA）协议、并行通信协议、同步串行协议、异步串行协议、通用串行总线（USB）协议、以太网协议、TCP/IP 协议、UDP/IP 协议以及 IEEE 1394 协议所构成的组中的通信协议。该输出接口可以是选自于由 USB 端口、串行端口、以太网端口、LAN 端口、卡座、总线接口所构成的组中的输出接口和无线接口。

[0007] 一种方法可以包括生成与传感器所检测到的至少一部分移动相关的移动数据；利用消息单元生成可以被配置成包括至少部分基于移动数据的移动信息的消息；以及发送所生成的消息；其中，传感器、消息单元和发射器中的至少一个可以至少部分地包括在壳体中，该壳体可以包括被配置成将该壳体固定至人体手指的手指握部。该手指握部可以可拆装地与壳体相连接且可以包括绑带。该传感器可以包括加速计。该移动信息可以包括加速计的加速度数据。该消息可以被配置成包括至少部分地基于移动检测的敲击信息，该敲击信息可以表现出手指的点击特征。该加速计可以是三轴加速计。该传感器可以包括陀螺仪。移动信息可以进一步包括陀螺仪的旋转信息。该陀螺仪可以是三轴陀螺仪。

[0008] 该方法可以进一步包括通过从电源提供的电能来为发射器和传感器中的至少一个供电。该电源可以是选自由电池、电容器和外部电源所构成的组中的电源。该电源可以被可拆装地连接。

[0009] 该方法可以进一步包括与接触传感器的接触面上的接触相关地生成接触数据，该接触传感器与消息单元数据通信。该方法还可以进一步包括生成与滑动传感器的接触面上的滑动接触相关的接触数据，该滑动接触器与消息单元数据通信。接触传感器和滑动传感器中的每个均可以是电容传感器。该消息可以被配置成包括接触传感器的接触数据和滑动传感器的接触数据。该消息可以被配置成包括数据头和装置标识。

[0010] 该方法仍可以进一步包括请求至少部分基于接触传感器的激活而与远程装置建立通信信道。该方法还可以进一步包括基于至少一个接收消息和检测状态条件的振动器。该方法还进一步包括基于消息接收条件和检测状态条件中的至少一个发出声音警报。该方法仍进一步包括至少部分基于选自于由通电条件、自检条件、移动、消息传送、消息接收以及建立通信信道所构成的组中的条件的检测来激活视觉指示器。

[0011] 该方法可以包括接收与可佩戴式动作感测装置的至少一部分移动相关的数据；滤波该数据从而生成可佩戴式动作感测装置的移动变化率；计算测量的移动和所累积的移动之和从而生成可佩戴式动作感测装置的更新位置以及可佩戴式动作感测装置的更新方向中的至少一个；以及至少部分地基于更新位置和更新方向之一地更新计算装置的用户接口特征。该数据可以是来自可佩戴式动作感测装置的加速计的至少一轴的加速度数据。可选地，该数据可以是来自可佩戴式动作感测装置的陀螺仪的至少一轴的角速率数据。该方法可以进一步包括按比例缩放数据。可以通过按比例缩放功能来执行按比例缩放，该按比

Petitioner Samsung Ex-1004, 0293

例缩放功能选自于由以下按比例缩放功能所构成的组，即，线性按比例缩放功能，根据公式 $A_i' = ((4/32768)*A_i)*9.81$ 进行缩放的指数缩放功能且 Ai 是选自 x 轴、y 轴和 z 轴中的一个轴上的加速度数据，以及根据公式 $G_i' = ((500dps/32786)*(pi/180))*G_i$ 进行缩放的缩放函数且 G_i 是选自 x 轴、y 轴和 z 轴中的一个轴上的角速率。

[0012] 该方法可以进一步包括接收可佩戴式动作感测装置的传感器激活指示，并且其中，可以至少部分基于接收传感器激活指示而更新该特征。计算装置的用户接口特征可以是光标位置。可以至少部分地基于经过缩放的测量移动来更新光标位置。可以通过可佩戴式动作感测装置的第二轴中的移动来生成第一轴中的光标位置变化。另外，该特征选自于由点击左键、点击右键、点击应用定义键、点击用户定义键、滚动功能、放大功能、缩小功能、打开应用、关闭应用、查看邮件、编辑字符、键入字符、复制字符、删除字符、粘贴字符、选择用户可选选项、将项目发送给回收站、更改音量、静音、选择多媒体项目、播放多媒体项目、暂停多媒体项目回放、改变多媒体项目回放速度、重复多媒体项目回放、快进多媒体项目回放、跳过部分多媒体项目回放、图像旋转、改变图像尺寸、按比例缩放图像、修整图像、图像的图像处理以及电影编辑功能所构成的组。

[0013] 该方法可以进一步包括过滤，可以通过选自于由平滑滤波器、高通滤波器、卡尔曼滤波器或迭代算法所构成的组中的滤波器或算法来执行该滤波。该滤波另外可以包括从数据中选择多个数据点，计算所选择的多个数据点的平均值、计算所选择的多个数据点的标准偏差、将该标准偏差与最小标准偏差相比较以及当标准偏差小于最小标准偏差时从数据点中减去平均值；以从数据点中去除 DC 偏移并且生成可佩戴式动作感测装置的移动变化率。对于与加速度轴相关的数据而言最小标准偏差可以是 .03，并且其中，对于与角速率轴相关的数据而言最小标准偏差可以是 .003。通过向数据应用窗口函数来执行选择多个数据点的步骤，从而选择出大约 50 个数据点。该方法可以进一步包括通过测量由可佩戴式动作感测装置的重力所产生的加速度来确定可佩戴式动作感测装置的方向。

附图说明

[0014] 图 1A 是手指鼠标的分解立体图；

[0015] 图 1B 是手指鼠标的立体图；

[0016] 图 1C 是手指鼠标的立体图；

[0017] 图 1D 是手指鼠标系统的立体图；

[0018] 图 1E 是人体工学的手指鼠标的分解图；

[0019] 图 1F 是人体工学的手指鼠标的分解图；

[0020] 图 1G 是手指鼠标电路板的立体图；

[0021] 图 1H 是带有移动电源模块的手指鼠标的部分分解图；

[0022] 图 1I 是手指鼠标子板的平面图；

[0023] 图 2 是人体手部食指上的手指鼠标的立体图；

[0024] 图 3A 是人体手部食指上的手指鼠标的立体图；

[0025] 图 3B 是人体手部食指上的手指鼠标的立体图；

[0026] 图 3C 是人体手部食指上的手指鼠标的立体图；

[0027] 图 4 是人体手部两个手指上的两个手指鼠标的立体图；

Petitioner Samsung Ex-1004, 0294

[0028] 图 5A 是人体手部两个手指上的两个手指鼠标的立体图；

[0029] 图 5B 是人体手部两个手指上的两个手指鼠标的立体图；

[0030] 图 5C 是人体手部两个手指上的两个手指鼠标的立体图；

[0031] 图 6 是人体手部食指上的手指鼠标的立体图；

[0032] 图 7 是人体手部食指上的手指鼠标的立体图；

[0033] 图 8 是人体手部的立体图；

[0034] 图 9 是个人计算机系统的立体图；

[0035] 图 10 是在打字时人体手部食指上的手指鼠标的立体图；

[0036] 图 11 是敲击表面时人体手部食指的手指鼠标的立体图；

[0037] 图 12 是处理手指鼠标的移动数据的方法的流程图；

[0038] 图 13 是处理手指鼠标的移动数据的方法的流程图；

[0039] 图 14 是将手指鼠标与计算装置相连接 (interfacing) 的方法的流程图；

[0040] 图 15A 是将手指鼠标与计算装置相连接的方法的流程图；

[0041] 图 15B 是将手指鼠标与计算装置相连接的方法的流程图；

[0042] 图 15C 是将手指鼠标与计算装置相连接的方法的流程图；

[0043] 图 15D 是将手指鼠标与计算装置相连接的方法的流程图；

具体实施方式

[0044] 在本文献中所公开和描述的装置、方法和系统可以用于将动作感测装置和计算装置相连接。为了简化说明，包括在本文献中的实例专注于可以用于与计算装置的用户接口相连接的可佩戴式动作感测装置以及通信方法和协议堆栈。本领域普通技术人员通过阅读该描述将了解，所描述的装置、方法和系统可以用于或阼简单修改以用于其他类型的设备、其他协议和通信协议堆栈中的其他层。单独地作为动作感测装置和计算装置之间的直接通信链接部分的部件的说明并不意味着不能使用其他结构，诸如，以网络为基础的结构。相反地，在阅读了该文件中的公开内容之后，可能修改对本领域的技术人员而言将是显而易见的。类似的参考标号旨在涉及相同的或类似的部件。

[0045] 在整个公开中，对部件或模块的参考大体上涉及了逻辑上可被组成组从而执行一个功能或一组相关功能的项目。可以在软件、硬件或软件和硬件的组合中实施部件和模块。广泛地使用术语“软件”，其不仅包括可执行的代码，还包括数据结构、任意电子格式的数据存储和计算指令、固件以及内置软件。广泛地使用术语“信息”且该信息包括多种电子信息，包括但不限于机器可执行或机器可读的指令；内容，诸如，文本、视频数据和音频数据及其他的；以及各种代码或标记。在上下文允许时，时常可交换使用术语“信息”和“内容”。应该注意，尽管为了明确和为了理解下面所论述的一些实例可能将具体部件或功能描述为具体部件或模块的部分或生成在计算装置的具体层（例如，硬件层、操作系统层或应用层）上，但仍可以将那些部件或功能实施成不同部件或模块的部分或在不同层上实施。

[0046] 下面所论述的实例仅仅是实例并且被用于辅助解释所述的系统和方法。除非特别指出是强制性的，对于这些系统或方法中的任意一种的任意具体的实施而言，图中所示的或下面论述的任何特征或部件均不是强制性的。为了简化阅读和清楚，可以单独地结合具体视图来描述特定部件、模块或方法。任意没有具体描述的部件组合或变形均不应该理解

Petitioner Samsung Ex-1004, 0295

成示出任意组合或变形是不可能的。同样，对于所描述的任意方法而言，无论是否结合流程图描述了此方法，除非上下文另行说明或要求都应该理解为，方法执行过程中任意明确的或暗含的执行步骤顺序均不意味着必须以所示步骤执行那些步骤，而可以不同的顺序或并行地执行。

[0047] 计算系统通常具有用于允许人员访问或在计算装置内输入数据的用户接口。计算装置可以是台式计算机、笔记本电脑、平板电脑、智能手机、游戏系统、自动化亭 (kiosk) 系统、带有内置处理器的装置、汽车系统、音乐播放装置以及在其中使用人输入来控制系统或装置功能的大体上任意类型的系统和装置。结合计算系统所使用的大多数普通用户接口数据输入装置是键盘和鼠标，键盘允许用户将信息输入成文本或数字信息，而鼠标涉及的是一种类型的用户接口，在其中计算机操作者可以在2D平面视频图案屏幕（诸如，计算机400的视屏屏幕402）中操纵光标。传统的鼠标也被用作为在视屏图案屏幕上选择数据输入点和其他相关功能的导航工具。如在此所述那样，与传统的鼠标相比，手指鼠标100对用户或计算机操作者的限制更少。通过阅读该说明本领域的技术人员将意识到，在此所述的装置、方法以及系统可以应用于或简单地更改后用于其他设备。类似的参考标号旨在涉及相同的或类似的项目。

[0048] 现参考图1A、图1B和图1C，示出了手指鼠标100的视图。手指鼠标100是可以与计算装置相连接并且有助于人机互动的动作感测装置。手指鼠标100包括底部壳体101、顶部壳体102、包括RF收发器105的刚性电路板103、至少一个轴的加速计106、作用在至少二个轴（俯仰 (pitch)、偏航 (yaw)、滚转 (roll)）中的陀螺仪107，可以感测包括按键、滑杆或这两者的区域的电容感测电路108、电池109、视觉指示器110（例如，发光二极管 (LED)）以及可以包括电容感测按键111、112、113或接触传感器、滑杆或触觉按键的柔性电路104。

[0049] 在一些配置中，刚性电路板103可以是柔性的或可以包括两个或多个分离的电路板。在其他配置中，刚性电路板103和柔性电路104可以是单个柔性电路。在另外的其他配置中，RF收发器105、加速计106、陀螺仪107、电容电路108、电池109、视觉指示器110以及柔性电路104可以与刚性电路板103相分离并且通过总线或引线（未示出）与其电连接。在可选的配置中，手指鼠标100可以仅包括所列举的部件的一个子集。例如，陀螺仪107可以具有少于三个轴，或者刚性电路板103可以不包括视觉指示器110。

[0050] 在可选的配置中，正如本领域的技术人员所理解的那样，各个部件可以是相结合的或是相分离的。例如，加速计106和陀螺仪107可以是单个部件或芯片，或加速计106和陀螺仪107的每个轴均可以包括分离的离散部件。在另一个实例配置中，壳体101、102可以是单个模塑单元，该模塑单元使用例如，模塑硅、塑料、橡胶、其他化合物或他们的组合通过包围所有或部分的外部电子器件来提供保护性凹槽。在一个配置中，壳体101、102可以包括绑带115或可拆装的手指握部125并且可以是单个的材料单元，例如，模塑硅或橡胶单元，其中，刚性电路板103和柔性电路104嵌在该材料内。

[0051] 在多种配置中，手指鼠标100可以包括用于测量心率的脉搏血氧计155，该脉搏血氧计可以包括分离的装配在壳体101、102、115、125中的传感器、全球定位系统 (GPS) 156电路、无线射频识别 (RFID) 芯片154、照相机（未示出）、电荷耦合装置、对电磁辐射的各种频率敏感的焦平面阵列或线性传感器阵列（未示出）、高度计（未示出）以及磁强计，以作为额外的传感器来生成更为全面的数据组从而了解使用手指鼠标100的用户的移动、位置和

Petitioner Samsung Ex-1004, 0296

状态。利用额外的传感器输入，手指鼠标 100 可以生成更为完整、全面的用户在手指鼠标 100 方面的体验事件分析。

[0052] 手指鼠标 100 中的电源可以是电池 109。电池 109 可以是通常用于小功率电子装置的那种类型的纽扣电池。导电固定夹（未示出）既可以用于将电池 109 可释放地附接在装置上，又可以用于完成包括作为电源的电池 109 的电源电路。这种可释放结构可以用于允许为了进行替换或充电等等而去除电池 109。手指鼠标 100 要么直接通过电线或引线与外部电源（未示出）相连接，要么通过电感耦合与外部电源相连接。手指鼠标 100 可以由与手指鼠标 100 可操作性地相耦合的外部电源（未示出）供电。例如，可以通过计算机 400 利用 USB 端口 130 为手指鼠标 100 供电；计算机 400 可以是外部电源。本领域普通技术人员将从阅读本公开中意识到正如所期望的、所需要的或适合的那样，可以以不同配置使用其他类型的电池和电源（诸如，太阳能电池或超级电容器）。

[0053] 可以将指示器窗 114 放置在手指鼠标 100 外部并且可以暴露 LED 或视觉指示器 110，其可以示出多种功能、移动以及手指鼠标 100 的条件，例如，电源开启条件、自测条件和休眠模式条件。用户拇指或另一根手指的鼠标选择可以导致 LED 或视觉指示器 110 出现特定类型的闪光。在光标模式或滚动模式中手指的移动可以引起另一种类型的闪光。另一种类型的闪光可以是对手指鼠标 100 与另一个计算装置之间的有效通信的指示，例如，建立通信链接或发送消息以及从计算装置接收消息。手指鼠标 100 还可以具有振动性部件 152 和发声部件 153（见图 1I）。可以对这些部件进行编程从而使其与视觉反馈装置（未示出）上所描绘的移动一致地进行互动，例如，通过从计算装置接收消息。例如，视频屏幕 402 上的光标指示器移动和撞击视频图案屏幕的边缘可以与振动部件 152 振动相联系。触觉的使用可以有助于用户指出光标位置，或在另一个配置中接触反馈可以增强视频游戏参与者的体验。在其他配置中，来自发射器的声觉线索可以类似地相互作用，或可以基于手指鼠标 100 的内部状态，例如，电源开启或电源关闭状态。

[0054] 通信可操作地将手指鼠标 100 与计算装置相耦合。通信可以包括有线通信和无线通信。可以使用有线数据传送路径来传送可以包括来自手指鼠标 100 的包格式化数据（packetized data）、消息和信号的数据，该有线数据传送路径包括通用串行总线（“USB”）、以太网或 IEEE1394（“FireWire™”或“iLink™”）以及其他方式的具体实施方式或变形。可以使用无线数据传送或接收部件来传送手指鼠标 100 的数据。可以根据具体的通信协议来操作无线数据传送或接收部件。适当协议包括电气与电子工程协会（“IEEE”）802- 系列中的那些协议，诸如，ZigBee™（IEEE 802.15.4）、Bluetooth™（IEEE 802.16）以及 WiFi™（IEEE 802.11）及其他的。

[0055] 现参考图 14，示出了将手指鼠标 100 与计算装置相连接的方法 600 的流程图。在开始框 610 处开始执行该方法。在步骤框 620 中，将手指鼠标 100 与计算装置相关联。处理持续进行到步骤框 625，其中手指鼠标被激活来感测移动。处理继续进行到步骤框 630，其中手指鼠标 100 被初始化。处理继续进行到步骤框 640，其中感测到的移动被处理成移动数据。处理继续进行到步骤框 660，其中，数据包或消息被传送给接收器。处理然后继续进行到步骤框 670，其中，通过接收器接收数据包或消息。处理随后继续进行到步骤框 680，其中数据包或信息被格式化成用于计算装置的移动数据。处理然后继续进行到步骤框 690，其中移动数据被处理成用于计算装置的行动或计算装置的上的事件。处理然后继续进行到步

Petitioner Samsung Ex-1004, 0297

骤框 700，其中对计算装置的用户接口特征进行更新。然后，处理在结束框 710 处终止。

[0056] 现参考图 15A，示出了利用手指鼠标 100 验证用户的方法 800 的流程图。在开始框 805 处开始执行该方法。处理继续进行到步骤框 810，其中利用计算装置验证用户。处理继续进行到步骤框 820，其中配置通向计算装置的访问。处理然后在结束框 825 处终止。利用手指鼠标 100 验证 800 用户的方法可以是图 14 的步骤框 620 的部分，其中手指鼠标与计算装置相关联。

[0057] 现参考图 15B，示出了通过第一手指鼠标 100 从第二手指鼠标 100 接收移动数据 830 的方法流程图。在开始框 835 处开始执行该方法。处理继续进行步骤框 840，其中第一手指鼠标 100 从第二手指鼠标 100 接收移动数据。处理继续进行到步骤框 840，其中第一手指鼠标 100 处理来自第二手指鼠标 100 的移动数据从而生成新数据包或新消息。处理随后在结束框 845 处终止。从第二手指鼠标 100 中接收移动数据 830 的方法可以是图 14 的步骤框 640 的部分，其中手指鼠标 100 处理移动数据。

[0058] 现参考图 15C，示出了提供指示 850 的方法流程图。在开始框 855 处开始执行该方法。处理继续进行到步骤框 860，其中手指鼠标 100 向用户示出指示，例如，视觉指示、听觉指示、振动指示或任意其他类型的指示。然后在结束框 865 处结束处理。提供指示 850 的方法可以是步骤框 620、625、630、660、670 或任意其他处理框的部分，其中用户可以接收发生特定事件或用于提供与手指鼠标 100 的内部状态相关的状态的信息。

[0059] 现参考图 15D，示出了数据传送 900 的方法的流程图。在开始框 905 处开始执行该方法。处理继续进行到步骤框 660，其中将数据包或消息传送至接收器。然后，处理继续进行到步骤框 670，其中通过接收器接收数据包或消息。然后，处理继续进行到决定框 910，其中决定该数据包或消息是否是有效数据包或如果使用定序信息的话是否是下一个预期的数据包或消息。如果该决定为否的话，那么处理继续进行到步骤框 930，其中接收器要求重新传送数据包或消息。处理然后继续返回到步骤框 670。如果决定为是的话，那么处理继续进行到步骤框 920，其中数据包或消息的接收被反馈给手指鼠标 100 并且随后处理在结束框 935 处终止。数据传送 900 的方法可以是图 14 的步骤框 660 的部分，其中手指鼠标 100 利用计算装置传送和接收数据。

[0060] 继续参考图 1A、图 1B 和图 1C 并且现也参考图 14、图 15A、图 15B、图 15C 以及图 15D，示出了将手指鼠标 100 和计算装置相连接的实例方法 600。手指鼠标 100 可以通过激活 625 计算装置附近的手指鼠标 100 与计算装置相关联 620。在配置中，手指鼠标 100 可以通过激活 625 手指鼠标 100 并且例如通过使用动态主机控制协议 (DHCP) 从计算装置获得网络地址来与计算系统相关联 620。手指鼠标 100 可以通过附接至计算装置的 USB 端口和向计算装置传递配置信息而与计算装置相关联 620。在配置中，手指鼠标 100 可以请求验证方法 800。例如，如果手指鼠标 100 和计算装置使用 Bluetooth™，那么初始配对程序开始，该程序将手指鼠标 100 中的 Bluetooth™ 接口与接收装置相关联 620。在配置中，手指鼠标 100 还可以利用计算装置来验证 810 用户，例如通过以下方式：由预先与特定用户相关联的手指鼠标 100 的装置标识号码来识别特定的手指鼠标 100，或通过由用户进行的手指鼠标 100 的一系列移动或传感器激活。验证方法 800 还可以使用数字证书、加密方法或本领域公知的其他验证方法。一旦验证 810 完毕，计算装置可以为其上的用户配置 820 对文件、应用以及系统资源的适当用户入口。

Petitioner Samsung Ex-1004, 0298

[0061] 现在还参考图 1I，在配置中，手指鼠标 100 中的 RFID 154 芯片可以为手指鼠标 100 提供识别和验证信息。计算装置可以直接询问 RFID 154 芯片，或可以通过另一个装置执行询问并且通过网络将其提供给计算装置。例如，可以通过例如设置在门框中的 RFID 读取器来识别用户进入房间。手指鼠标 100 中的 RFID154 芯片，或与用户相关联的分离的 RFID 装置提供了关于用户和手指鼠标 100 的验证和识别。可以通过验证系统来验证 800 该信息，该验证系统能够利用该计算装置启动使用该手指鼠标 100。

[0062] 手指鼠标 100 将所感测到的移动处理 640 成移动数据，将移动数据格式化 650 成适用于所使用的有线或无线的通信协议的消息结构，例如，数据包，并且将消息传送 660 给接收器，诸如，计算装置。接收器接收 670 该消息，并且如果使用了适当协议，那么可以报告收到 920 该消息，并且如果协议支持消息定序信息或如果手指鼠标 100 确定消息丢失的话，那么可以请求再次传送 930 数据包。如果接收器不是计算装置，而是例如加密狗或无线适配器，那么接收器可以例如通过格式化 680、再格式化或将消息转换成适用于计算装置的协议来进一步处理该消息。在非限制性的实例中，手指鼠标 100 可以使用 ZigBee™ 协议与加密狗无线通信，并且加密狗可以使用 USB 端口与计算装置相互通信。消息中的移动数据可以受到处理 690 并且转化成移动、事件或用于计算装置的命令，例如，显示 700 给用户的计算装置上光标移动。

[0063] 如果手指鼠标 100 使用无线网络协议，那么手指鼠标 100 可以形成带有另一个手指鼠标 100 的自适应网络并且将消息路由给接收器，例如，如果用户同时使用多个手指鼠标 100 的话。在配置中，手指鼠标 100 也可以从其他手指鼠标 100 接收 840 消息，并且处理 850 发送给计算装置的新消息。这有利地要求用户仅仅需要利用计算系统验证第一手指鼠标 100，而无需利用计算系统分别验证 810 一个或多个手指鼠标 100。在一个配置中，手指鼠标 100 可以从其他手指鼠标 100 接收消息，并且处理 850 该消息从而基于来自一个或多个手指鼠标 100 的数据组合生成新消息，由此便于基于多个手指鼠标 100 的移动组合来控制计算装置的用户接口。

[0064] 在配置中，手指鼠标 100 使用互联网协议上传送控制协议 (TCP/IP)。在配置中，手指鼠标 100 使用的是互联网协议上用户数据协议 (UDP/IP)。在配置中，手指鼠标 100 使用的是适用于低功率无线传送的轻型协议。

[0065] 在非限制性实例中，手指鼠标 100 可以使用无线通信协议，诸如，TexasInstruments 的 SimpliciTI™ 协议，或另一种适合的协议。手指鼠标 100 可以在 250Hz 的数据传送率下向接收器 116 或计算装置传送数据。在一个非限制性实例中，数据包可以包括下面要素：

[0066] 0xAA, (unsigned Byte[8bit integer](0-255))/

[0067] （无符号字节 [8 字节整数](0-255))

[0068] 0x55, (unsigned Byte[8bit integer](0-255))/

[0069] （无符号字节 [8 字节整数](0-255))

[0070] 0x12, (unsigned Byte[8bit integer](0-255))/

[0071] （无符号字节 [8 字节整数](0-255))

[0072] Pccr#, (unsigned Byte[8bit integer](0-255))/

[0073] （无符号字节 [8 字节整数](0-255))

Petitioner Samsung Ex-1004, 0299

[0074] Transaction I.D., (unsigned word[8bit integer](0-255))/

[0075] (无符号字节[16字节整数](0-65535))

[0076] Capsense Data Byte, (unsigned Byte[8bit integer](0-255))/

[0077] (无符号字节[8字节整数](0-255))

[0078] Capsense Data Byte 2, (unsigned Byte[8bit integer](0-255))/

[0079] (无符号字节[8字节整数](0-255))

[0080] Ax, (word[16bit integer](-32768 to 32768))/

[0081] (无符号字节[16字节整数](-32768至3768))

[0082] Ay, (word[16bit integer](-32768 to 32768))/

[0083] (无符号字节[16字节整数](-32768至3768))

[0084] Az, (word[16bit integer](-32768to 32768))/

[0085] (无符号字节[16字节整数](-32768至3768))

[0086] Gx, (word[16bit integer](-32768to 32768))/

[0087] (无符号字节[16字节整数](-32768至3768))

[0088] Gy, (word[16bit integer](-32768to 32768))/

[0089] (无符号字节[16字节整数](-32768至3768))

[0090] Gz, (word[16bit integer](-32768to 32768))/

[0091] (无符号字节[16字节整数](-32768至3768))

[0092] 数据的前三个字节(0xAA,0x55,0x12)可以是用于核实数据包开始的开始字节。Pcor#字节可以用来使多个手指鼠标100相互配合。TransactionI.D.可以包括被传送的数据包的一个序列号,并且可以被用于数据包的并窗功能或适合地定序数据包。Capsense Data Byte(电容数据字节)可以包括光标按键激活、滑动激活以及质心定位信息。例如,字节0通常可以是1;字节1可以激活按键111或接触传感器区域129;字节2可以示出按键112、113或活动传感器区域128激活,而字节3-7可以用于按键112、113激活或活动传感器区域128中的质心定位。质心定位示出了用户手指在滑动传感器区域128内的所在位置。电容感应数字字节2可以包括充电状态和链接状态信息。例如,字节0可以足调试字节;字节1-5可以留待将来使用,例如,课外的接触传感器;字节6可以用于链接状态;而字节7可以用于充电状态,例如,如果手指鼠标100正通过USB端口130充电的话。

[0093] 在一个实例操作中,当用户接触按键111或接触传感器区域129时,手指鼠标100唤醒,将电容数据字节的字节1设定为高,并且开始将加速度数据,Ax、Ay、Az和角速率数据Gx、Gy、Gz传送给计算装置。当按键111或接触传感器区域129被触碰时,手指鼠标100还能够执行初始化630或加速度数据归零,Ax、Ay、Az和角速率数据Gx、Gy、Gz用于去除任何漂移或偏移。可以通过手指鼠标100、接收器116或装置驱动将数据转化成显示700给用户的计算装置上的光标移动,该光标移动跟踪于指鼠标100的移动。

[0094] 在配置中,仅仅当按键111或接触传感器区域129被接触时,手指鼠标100才可以将移动数据发送给计算装置,该移动数据用作激活序列。激活序列可以由用户或计算装置被配置成任意类型的移动,从而命令手指鼠标100向计算装置发送移动数据,诸如,手指鼠标100电源开启,按键11或手指鼠标100的接触传感器129的用户初始激活,手指鼠标100的滑动传感器区域128的用户初始激活,手指鼠标100的用户初始激活以及从计算装置接

Petitioner Samsung Ex-1004, 0300

收信号。当用户停止接触按键 111 或接触传感器区域 129 时手指鼠标 100 可以停止向计算装置发送消息。手指鼠标还可以基于与接收器 116 的通信链接丢失，手指鼠标 100 的移动减小，第二激活序列，激活序列被激活之后计时器到期，低电池功率状态，手指鼠标 100 的错误状态以及从计算装置接收信号而停止发送消息。

[0095] 当用户接触其他感测区域时，例如，其他按键 112、113 或滑动传感器区域 128，电容感应字节的字节 2 变高。根据质心定位数据 (Centroid PositionData，CPD)：例如，对于左侧鼠标点击而言是 (6 > = CPD < = 9)，对于中间鼠标点击而言是 (13 > = CPD < = 16)，以及对于右侧鼠标点击而言是 (22 > = CPD < = 26)，手指或拇指，指部或手指全部短暂地轻击滑动传感器区域 128 可以表现为左侧、中间以及右侧敲击。以用户可配置的时间激活滑动传感器区域 128 能够使光标无法移动并且表现为左右拖动操作。可以通过检测 CPD 中的变化来控制放大和缩小性能。用户手指在滑动传感器区域 128 上方的快速扫动导致 CPD 值迅速增大或减小。如果 CPD 中的变化发生在较短时间周期中，那么根据光标的状态和计算装置上运行的应用来激活缩放功能或轴功能。

[0096] 加速度数据 Ax、Ay、Az 和角速率数据 Gx、Gy、Gz 可以作为原始数据或处理后数据发送。软件 (例如，手指鼠标 100、接收器 116 或计算装置上的装置驱动上的算法 300) 可以处理 324 原始数据或将其转换成与位置值相应的处理后数据。下面说明的是用于将原始数据转换成位置值的算法 300 的非限制性实例。

[0097] 图 12 是用于控制手指鼠标 100 的算法 300 的流程图。在开始框 310 中开始执行该方法。在步骤框 320 处获取移动数据。处理继续进行到步骤框 330，其中按比例缩放移动数据。处理继续进行到步骤框 340，其中对移动数据进行过滤。处理继续进行到步骤框 350，其中处理该移动数据从而去除 DC 偏移。在决定框 360 处决定是否向处理后的移动数据应用增益。如果决定为是的话，那么处理继续进行至步骤框 400，其中向移动数据应用增益并且然后处理继续进行到决定框 270。如果决定为否的话，那么处理继续进行到决定框 270。在决定框 270 处做出决定，从而确定手指鼠标 100 的基线方向。如果决定为是的话，处理然后继续进行到步骤框 410，其中使用由重力产生的手指鼠标 100 的加速度来确定手指鼠标 100 的当前方向，并且随后，处理继续进行到步骤框 380。如果决定为否的话，那么处理继续进行到步骤框 380。在步骤框 380 处，处理后的移动数据被集成从而获得累积的位置或角数据。处理继续进行至步骤框 390，其中累积的位置或角数据可以被用来更新计算装置的用户接口特征。处理然后在结束框 420 处终止。

[0098] 图 13 是用于过滤和处理移动数据以去除偏移的精确控制算法 500 的流程图。除了图 12 的步骤框 340 和 350 以外或为了替代其而可以使用该精确控制算法 500。在开始框 510 处开始执行该方法。在步骤框 520 处，选择移动数据的子集。处理持续进行到步骤框 530，其中确定出移动数据子集的平均值。处理继续进行至步骤框 540，其中确定移动数据子集的标准偏差。处理继续进行至步骤框 550。在决定框 550 处决定移动数据子集的标准偏差是否超过了阈值标准偏差。如果决定为是的话，那么手指鼠标 100 的移动过大而无法用于精确控制并且在结束框 570 处终止该处理。如果决定为否的话，那么手指鼠标 100 移动地足够缓慢从而可用于精确控制并且该处理持续进行到步骤框 560。在步骤框 560 处，使用在步骤框 530 处计算出的平均值来从移动数据中去除偏移。处理随后在结束框 570 处终止。

Petitioner Samsung Ex-1004, 0301

[0099] 在用于控制手指鼠标 100 的算法 300 和精确控制算法 500 的实例中，当用户激活手指鼠标 100 时，手指鼠标 100 确定移动数据并且将其发送给装置 100、116 或运行该算法的计算装置。一旦获得 320 移动数据，可以按比例缩放 330 该移动数据。原始加速度数据 Ax、Ay、Az 和角速率数据 Gx、Gy、Gz 可以被转换或按比例缩放 330 成与实际价值相应的可用单元。例如，加速度数据可以被按比例缩放 330，从而加上或减去 4g 的比例 (scale)，例如，A_i' (m/s^2) = ((4g/32768)*A_i)*9.81，其中 i = x，y 或 z。角速率数据可以按比例缩放 330 从而加上或减去 500 度每秒 (dps) 的比例，例如，Gi'（弧度 /s) = ((500dps/32786)*(pi/180)*Gi，其中，i = x，y 或 z。

[0100] 算法 300 可以过滤 340 数据，例如，使用平滑函数或移动平均来去除瞬变现象，该瞬变现象可能导致光标在用户接口上出现不期望的大幅度移动并且阻碍用户接口上的光标的精确控制。算法也可以去除 350DC 偏移，例如，使用高通滤波器来获得仅代表手指鼠标 100 的移动中的变化的数据。为了更精确地进行控制，可以使用卡尔曼滤波器或迭代算法，例如，精确控制算法 500。例如，选择 520 数据子集并且可以确定 530 加速度和角速率的每个轴的平均值计算。可以使用窗函数来选择 520 数据子集，并且可以仅使用窗中的数据点的子集来进行确定 530 或计算。窗尺寸可以是可调的并且名义上为 50 数据点。计算 540 每个轴的标准偏差并且将其与最小标准偏差相比较 550。对于加速度而言，最小标准偏差可以是可调的，并且名义上为 .03。对于角速率而言，最小标准偏差是可调的并且名义上为 .003。当轴的标准偏差低于最小标准偏差时，那么用户的手和手指鼠标 100 对于从数据点中所减去的轴的平均值而言已足够稳定，由此去除 560 了用于生成代表实际移动的数据值的每个数据点的 DC 偏移。

[0101] 算法 300 也可以执行基线测量，从而确定 370 手指鼠标 100 的方向，例如，由于使用 410 由于重力而产生的手指鼠标 100 的加速度。算法 300 可以例如通过对表示带有累积的位置或角度数据的实际移动的数据值执行离散积分 380 而将加速度数据转换成位置数据并且将角速率转换成旋转度，从而确定手指鼠标 100 的位置和手指鼠标 100 的方向。算法 300 还可以基于角度变化再调整位置数据。算法 300 可以向代表实际移动的数据值应用增益从而控制光标加速度；该增益可以是可选的 360 并且可以是线性的、指数的或任意其他函数。该算法随后以期望的形式（例如，X，Y 光标位置）或其他形式输出位置数据，从而更新 390 用户接口的光标或任意其他特征。输出位置数据可以是 Cartesian 或 X，Y，Z 坐标系统，或可以被转换成以球体为基础的坐标系统，或任意其他所需的坐标系统。

[0102] 再次参考图 1C，示出了位于手指鼠标 100 的尖端 (tip) 处的加速度方向源点的通常方向。可以从与加速度方向源点相关的固定参考平面或浮动参考平面中选择三维框架。在固定参考平面的一个实例中，由加速计 106 和陀螺仪 107 所检测到的重力加速度和角加速度在三维空间中提供手指鼠标 100 的方向。可以在与手指尖相关的平面中插入加速计 106 的移动。如图 1C 所示，可以将各个轴的方向和 2D 参考平面固定在手指鼠标 100 本身上。通过这种方式，如果加速计 106 的 ZX 平面不再完全垂直，那么可以基于加速度和来自陀螺仪 107 的位置反馈而插入指针位置 (pointer position) 的平移面。上述控制可以归因于，无论手指鼠标 100 是笔直地向外指向还是向下指向，用户手指均执行了相同的移动。

[0103] 可以处理 640 来自手指鼠标 100 的数据或将其转换成用户接口上所显示 700 的特征，用户接口包括键盘按键、鼠标移动或使用在人机用户接口中的任何其他类型的命令。经

Petitioner Samsung Ex-1004, 0302

过处理 640 或转换成特征的手指鼠标 100 的数据可以包括下面的一种或多种 :原始加速度数据 Ax、Ay、Az 和角速率数据 Gx、Gy、Gz 形式的手指鼠标 100 的移动或处理后的位置数据以及各个按键 111、112、113,接触传感器区域 129 和活动传感器区域 128 的各种激活。经过处理 640 或经过转换的数据可以包括各个数据点,诸如,各个传感器激活或可以包括数据组。例如,手指鼠标 100 可以捕获用户的手势作为一个移动集合或多个移动集合。移动集合可以是不连续的移动,例如,可以通过以下方式由手指鼠标 100 处理得到感叹号 :将手指 100 迅速向下移动来表示竖线,然后在较短时间间隔之后通过手指鼠标 100 的向前移动来表示该竖线下面的句点。

[0104] 来自手指鼠标 100 的数据可以被处理或转换成通用的键盘或鼠标命令,诸如,光标移动、左键点击、右键点击、滚动功能、打开应用、关闭应用以及删除项目或发将项目发送给回收站。也可以将数据处理或转换成限制应用的键点击或限制用户的键点击。例如,可以使用数据来执行屏幕上窗口的放大功能或缩小功能或便于查看邮件。可以将数据用于生成文本,例如,通过提供虚拟键盘用于键入字符或将移动转换成字母和字符或用于文件编辑,例如,编辑字符串、块复制文本、粘贴文本或删除文本。命令和控制的其他非限制性实例包括控制多媒体文件回放,诸如,选择要播放的多媒体项目,更改音量或静音,暂停回放,迅速前进或倒退或在文件内的各点处开始回放。为了编辑图像,手指鼠标 100 可以提供图像的直观控制和操作,例如,旋转图像,改变图像尺寸或按比例缩放图像,修剪图像或其他图像处理特征。手指鼠标 100 还可以提供用于控制电影编辑特征的直观控制。在一个配置中,根据具体环境可以通过应用以不同方式转换数据。例如,如果用户之前正在阅读但并未编辑文件的话,那么横跨滑动传感器区域 128 地滑动手指可以用来滚动文件。然而,如果用户已经对文件进行了编辑的话,那么横跨滑动传感器区域 128 滑动手指可以选择文本。具体的环境可以取决于用户之前的移动,或可以例如,通过应用的中心 (focus)(例如,是整个窗口的中心或与窗口内的文本区域相关的中心) 来确定。

[0105] RF 收发器 105 可以直接与具有兼容的无线接口的计算装置相通信。RF 收发器 105 还可以通过接收器 116 与计算装置相通信。现参考图 1D,接收器 116 可以具有 :用于与手指鼠标 100 通信的 RF 收发器 105,可以是处理器或微控制器的控制器 117,用于与计算装置通信的 USB 收发芯片 131,用于连接计算装置的 USB 端口的公 USB 连接件接口 118,并且可以具有位于 RF 收发器 105 和 USB 连接件接口 118 之间的线缆 119。在一些配置中,接收器 116 可以使用任意数量的接口与计算装置接口连接,该接口包括串行端口,该串行端口可以是异步的或同步的,以太网端口、LAN 端口、卡座,例如,PCMCIA 卡槽,总线接口卡,例如,内部 ISA 或 PCI 卡槽,并且如果分开通电的话则通过另一个无线接口。

[0106] 接收器 116 可以通过线缆 (cord)119 与计算装置相连接,从而允许接收器与计算装置相隔一段距离放置。线缆 119 有利地允许接收器 116 更接近用户地放置从而便于手指鼠标 100 和计算装置之间的通信。例如,接收器 116 可以放置在对用户而言实现清晰的位置上。更接近手指鼠标 100 地放置接收器 116 可以减少手指鼠标 100 的 RF 功率损耗。设置接收器 116 还可以控制手指鼠标的可用区域。例如,手指鼠标 100 和接收器 116 可以使用小范围 RF 协议,微微网协议或无线个人局域网 (WPAN) 协议,诸如,红外线数据组织 (IrDA) 协议,无线 USB,ZigBee™ 或通用的 IEEE802.15 协议。这些协议具有局限的范围并且可以防止来自接收器 116 和手指鼠标 100 的信号冲突,防止干扰其他用户的接收器和手指鼠标。

Petitioner Samsung Ex-1004, 0303

这在可以存在相对较近地相邻的多个用户而这些用户利用他们的个人计算装置同时使用手指鼠标 100 的公共区域或办公室隔间中是有利的。

[0107] 接收器 116 可以是不处理数据的哑接收器 (dumb receiver)，例如，插入到计算装置的 USB 端口中并且在计算装置和手指鼠标 100 之间传递数据、信号或消息的 Bluetooth™ 加密狗或 WiFi™ 无线适配器。接收器 116 也可以结合到计算装置中，例如，作为计算装置主板的部件或处在卡槽中。在这些配置中，手指鼠标 100 可以使用位于计算装置上的装置驱动，从而通过计算装置将来自手指鼠标 100 的数据、信号或消息转换成将被执行的移动，或将被执行的命令。

[0108] 在配置中，手指鼠标 100 可以执行移动数据处理，从而将移动数据处理成处理后的命令并且将该处理后的命令发送给接收器 116。然而，接收器 116 也可以是转换或处理从手指鼠标 100 中所接收到的通信的智能接收器。在配置中，接收器 116 可以保持与手指鼠标 100 的链接，从手指鼠标 100 接收通信，处理或转换来自手指鼠标 100 的通信，该通信可以包括原始数据、信号或包格式化消息，以及生成使用通向计算装置的输入接口的输出接口所输出的经过处理的消息。由于可以通过计算装置为接收器 116 供电，例如，通过使用直接来自计算装置的 USB 连接的功率，接收器 116 上的执行和处理可以最小化手指鼠标 100 上的功率损耗并且有利地延长了电池使用寿命。

[0109] 在配置中，接收器 116 或手指鼠标 100 可以通过以标准识别格式向计算装置发送消息来仿真装置，例如，计算机鼠标。例如，接收器 116 可以向计算装置发送命令和消息，计算装置的默认鼠标驱动可以识别出该命令和消息。通过这种方式，接收器 116 可以在不要求装配新装置驱动的情况下确保与各种不同的计算装置的反向兼容性。这有利地允许共同使用手指鼠标 100 和计算装置，该计算装置使用内置的处理器或运行专有软件或操作系统，在该操作系统中发展装置驱动可能没有成本效益或是不可能的。接收器 116 也可以使得手指鼠标与运行专用协议（诸如，X10 或 Z-Wave）的装置接口连接，该装置可以用于家庭自动化以及控制家庭电气装置，诸如，灯。接收器 116 的各种配置的使用允许在不需要改变手指鼠标 100 本身的情况下共同使用手指鼠标 100 和各种不同的电子装置。

[0110] 图 1C 还具有用于将手指鼠标 100 与用户相附接 (attach) 的附接结构的立体图。将手指鼠标 100 固定在食指或人体手部 200 的任意其他手指上的绑带 115 可以由各种不同材料构成并且形成多种不同的款式。绑带 115 可以由柔性材料，诸如，硅树脂、橡胶、弹性纤维等构成。使用柔性材料构造绑带 115 提供了以 90％人群的手指尺寸为目标的无限尺寸 (sizing) 范围。用户可以选择最为适合的绑带 115。绑带 115 还可以由刚性材料（诸如，塑料或金属）构成。在刚性材料的情况下可以使用减小绑带 115 的内径的副绑带来完成绑带 115 的分级，这很像为手指的戒指进行分级。绑带 115 也可以是可互换的，具有多种符合相同轮廓的内径。可互换的绑带可以允许风格变化或在多个不同用户之间共用一个装置。正如本领域的普通技术人员可意识到的那样，手指鼠标 100 可以通过多种其他附接方式进行附接。

[0111] 现参考图 1G、图 1E 和图 1F，示出了人体工学的手指鼠标 120。人体工学的手指鼠标 120 包括手指鼠标 100 的一些特征和方面，但还进一步包括模塑的被配置用于保护模塑的底部壳体 121 的顶部壳体 122。当固定完毕时，模塑的顶部壳体 122 和模塑的底部壳体 121 形成了保护槽，保护电路 123 和柔性感测电路 124。用于握紧 (gripping) 手指的可拆

Petitioner Samsung Ex-1004, 0304

装手指握部 125 被配置成与模制的底部壳体 121 物理附接。同时，模制的顶部壳体 122、模制的底部壳体 121 以及可拆装的手指握部 125 包括壳体 122、121、125。可拆装的手指握部 125 可以与模塑的底部壳体 121 的弧形部分 126 共同作用，从而将人体工学的手指鼠标 120 与手指或用户的附属物相附接。可以将可拆装的手指握部 125 的尺寸设定在一定范围内，从而符合手指或拇指（整体上为手指或指部）或其他附属物，诸如，脚趾或手臂。可拆装的手指握部 125 便于在多种不同附属物尺寸下附接人体工学的手指鼠标 120，并且这是单一尺寸符合所有类型方法的一个备选。可拆装的手指握部 125 可以配置成不同几何形状从而容许设置在手指的不同部分上。例如，可拆装的手指握部 125 的尖端可以被配置成具有不同的直径或形状，这有助于将人体工学手指鼠标舒适地固定在下面的手指的骨结构上，如指骨。例如，可拆装的手指握部 125 的尖端可以具有近似锥形的几何形状从而容许将人体工学手指鼠标 120 设置在指骨的末端和中间。在另一个实例中，可拆装的手指握部 125 的尖端可以被配置成在基本上不影响指骨末端和中间的活动的情况下支持其附接在邻近的指骨上。

[0112] 模塑的顶部壳体 122 可以与模塑的底部壳体 121 相连接，从而形成用于柔性感测电路 124 的保护槽。模塑的底部壳体 121 的户型部分 126 可以作为柔性感测电路 124 的支撑面。模塑的顶部壳体 122 中的弧形感测区域 127 可以为柔性感测电路 124 提供保护性覆盖。弧形的感测区域 127 也可以提供通过升高、下降或在用户以其手指所接触的位置上生成视觉标记来提供接触传感器区域 129 的视觉指示。接触传感器区域 129 设置在柔性感测电路 124 被配置成记录手指接触的区域上方。弧形感测区域 127 可以类似地提供滑动传感器区域 128 的视觉指示，下面的柔性感测区域 124 被配置成记录滑动传感器区域 128 内的一个或多个手指位置。例如，柔性感测电路 124 可以被配置成记录滑动移动，例如，横跨滑动传感器区域 128 的表面的手指的平移，或滑动传感器区域 128 内的一个或多个手指触碰位置。

[0113] 模塑的顶部壳体 122 可以与模塑的底部壳体 121 相连接，从而为电路 123 形成保护槽。继续参考图 1G、1E 和 1F 并且现参考图 1H，示出了电路 123。电路 123 包括 USB 连接件 130、USB 收发芯片 131、微控制器 132、电容感测芯片 108、陀螺仪 107、加速计 106、用于连接柔性感测电路 124 的挠性连接件 (flex connector) 136、电池模块 138 以及第二挠性连接件 137。电容感测电路 108 通过挠性连接件 136 监控柔性感测电路 124。

[0114] 将电池模块 138 与电路 123 相分离提供了多种优点。这样允许使用更大的电池，其原因在于通过将电池设置电路 123 上的电池固定件中，用于电池的空间不再是强制性的。这样还允许电池模块 138 根据应用具有不同的几何形状，例如，为了更低重量的薄的节省空间的几何形状或为了更长电池使用寿命的更厚的几何形状。另外，这可以使得电池模块 138 更容易替换，例如，为了维修和保养工序。

[0115] 继续参考图 1G 并且现在还参考图 1I，示出了子板 150。子板 150 包括收发模块 148、RF 天线 151、振动部件 152、发声部件 133、RFID 154 电路、脉搏血氧计电路 155 以及 GPS 156 电路。在一些实施例中，除了图 1G 中所示出的一些部件以外，或替代这些部件，子板 150 可以具有高度计（未示出）或磁强计（未示出）。子板 150 可以通过第二挠曲连接件 137 与电路 123 相连接。振动部件 152 可以是具有不规则不平衡的负载或凸轮的小电动机。第二发声部件 153 可以是压电装置。可以使用其他振动部件 152 或发声部件 153。在

Petitioner Samsung Ex-1004, 0305

不同的配置中，子板 150 可以被配置具有或不具有振动部件 150，并且具有或不具有发声部件 153。振动部件 152 和发声部件 153 也可以设置在电路 123 上或电池模块 138 上。RFID 154 电路、脉搏血氧计电路 155 以及 GPS 156 电路可以如上所述那样提供关于用户和用户环境的额外信息。脉搏血氧计电路 155 可以与装配在绑带 115 中的传感器（未示出）、可拆装的手指握部 125 或壳体 101、121、141 相连接或分离地附接在用户上。

[0116] 在配置中，RF 收发模块和 RF 天线 151 可以设置在电路 123 或电池模块 138 上。在图 1I 中，子板 150 上示出了 RF 收发模块和 RF 天线 151。移动 RF 接收模块 148 和 RF 天线 151 离开电路 123 减少了电路 123 所需的 RF 屏蔽和其他隔离措施。通过使 RF 接收模块 148 与电路 123 相分开能够在不改变电路 123 的硬件的情况下，改变人体工学手指鼠标 120 上的无线接口的类型。例如，可以程序化相同的电路 123，从而使其以 ZigBee™ RF 收发模块、Bluetooth™ 收发模块或 WiFi™ RF 收发模块进行工作。在不同的配置中，可以为电路 123 预装入 RF 接收模块的特定类型所用的一个驱动，或为电路 123 预装入 RF 接收模块的多种不同类型所用的多个驱动。当电路 123 预装入了多个驱动时，电路 123 可以自动确定 RF 收发模块的类型，或可以通过软件，例如，通过所用户或在初始化步骤过程中配置电路 123。

[0117] 再次参考图 1G，USB 连接件 130 可以被配置成允许与计算机 400 的 USB 端口相连接。与 USB 连接件 130 相连接的 USB 接收芯片 131 可以接收数据或将数据从人体工学手指鼠标 120 发送给计算机 400。USB 收发芯片 131 有助于将原始配置输入至人体工学手指鼠标 120，例如，配置无线通信参数。USB 收发芯片 131 还有助于更新人体工学手指鼠标 120 的原始软件。

[0118] USB 连接件 130 可以被配置成允许与连接了电源（未示出，例如，AC 适配器）的 USB 相连接。USB 连接件也可以与单独的电池组（未示出，例如，用户携带的电池组）相连接。除了由电池模块 138 供电以外，人体工学鼠标 120 还可以由 USB 连接件 130 供电。可以通过 USB 连接件 130 为电池模块 138 再充电。

[0119] 微控制器 132 控制人体工学手指鼠标 120 的移动和特征。微控制器 132 接收来自加速计 106、陀螺仪 107 以及电容感测电路 108 的输入，并且处理来自其输入的信息，从而生成代表一个或多个输入的至少一部分的信号。如上所述，微控制器 132 可以将来自加速计 106 和陀螺仪 107 的原始数据处理或者转换成经过处理的数据。微控制器 132 还可以处理多个按键 111、112、113、接触传感器区域 129 以及滑动传感器区域 128 的激活或将其转换成处理后数据，或仅仅将数据格式化成适合的消息格式或数据包并且将通信发送给计算装置。微控制器 132 可以通过轮询加速计 106、陀螺仪 107 和电容感测电路 108 来接收输入。除了轮询以外，可以通过中断驱动过程或通过轮询和中断两者的组合来接收输入。

[0120] 微控制器 132 可以将信号格式化成适用于通过 USB 连接件 130 传送的格式。微控制器 132 可以将信号格式化成适用于例如，通过电路 132、子板 150 或电路模块 138 中的 RF 接收器进行无线传送的格式。微控制器 132 可以运行协议堆栈，该协议堆栈能够实现适当的信号交换和链路建立、错误校正、数据包格式化以及与遥控接收器（诸如，遥控计算机 400 或智能手机（未示出））的通信的消息剖析。在一个配置中，微控制器 132 是消息单元。在一些配置中，刚性电路板 103、电路 123、子板 150 和微控制器 132 或它们的任意组合可以是消息传送单元或执行消息传送单元的功能。

[0121] 可以使用硬件部件、软件模块或它们的组合来实现微控制器 132。微控制器 132 可

Petitioner Samsung Ex-1004, 0306

以包括处理器、微处理器、电路、中央处理单元 (CPU)、专用集成电路 (ASIC)、可编程逻辑器件 (PLD)、现场可编程门阵列 (FPGA) 或任意其他类型的处理器或多种其他适当电子部件，包括但不限于晶体管、电阻器、电容器、电感器、逻辑门、寄存器、半导体器件、芯片、微芯片、集成电路、算数逻辑单元 (ALU)、芯片组、输入 / 输出 (I/O) 装置、随机存储器 (RAM)，诸如，动态 RAM(DRAM) 和只读存储器 (ROM)、数模和模数转换器 (DAC、ADC) 以及总线。微控制器 132 可以是多重处理单元、精简指令集计算机 (RISC)、具有路径或并行线程性能的处理器、复杂指令集电脑 (CISC) 或数字信号处理器 (DSP)。适当微控制器 132 的影响因素选项可以包括计算速率或处理时间、功率要求、耐热性、数据总线速度、微控制器 132 上可用输入和输出类型、输入和输入数据速率以及存储器资源。

[0122] 软件可以包括操作、代码、程序、子程序、物体、函数调用、应用程序接口 (API)、应用、程序、中间件、操作系统、嵌入码、微码以及固件。应该注意以下术语“处理”、“计算 (computing)”、“运行”、“确定”、“计算 (calculating)”以及“转换”或类似的术语涉及的是计算装置或微控制器 132 的各种操作。以上术语被作为通常通过计算装置执行的非限制性操作的实例，这些操作被用于改变、移动或另外操纵数据，无论是否以存储在各种类型的存储器中的数据结构。

[0123] 现参考图 1H，示出了带有可拆装的电源模块 140 的手指鼠标。带有可拆装的电源模块 140 的手指鼠标包括与可拆装的顶部 142 相连接的底部 141。底部 141 和可拆装的顶部 142 可以使用机械连接件 142(例如，连锁切口) 配合在一起。底部 141 和可拆装的顶部 142 可以使用磁连接件 144 配合在一起。可以使用电连接 145(例如，刚性插头和插座机构、柔性的线束、带有可移动接触件的通常出现在移动电话和移动电话电池中的电池类连接件，或引脚和电接触件的接合栅格阵列) 来电连接底部 141 和可拆装的顶部 142。可以使用电感耦合来连接底部 141 和可拆装的顶部 142。

[0124] 与人体工学手指鼠标 120 相类似，带有可拆装的电源模块 140 的手指鼠标的底部 141 可以包括弧形感测区域 127、接触传感器区域 129 以及滑动传感器区域 128。顶部 142 可以包括电池 146，一个或多个电容感测按键 147、RF 收发器 148 以及一个或多个视觉指示器 149。电容感测按键 147 也可以是滑动型的电容传感器，或是一个或多个电容感测按键 147 与一个或多个滑动型电容传感器的组合。

[0125] 在操作中，电容感测按键 147 可以用于选择哪个计算装置将与带有可拆装的电源模块 140 的手指鼠标相连接。视觉指示器 149 能够指示出哪个计算装置正与带有可拆装的电源模块 140 的手指鼠标相互通信。例如，用户能够选择电容感测按键 147 之一，以使用 ZigBee™ 连接将带有可拆装的电源模块 140 的手指鼠标与手提电脑或台式计算机 400 相连接。用户可以选择不同的电容感测按键 147 来连接带有可拆装的电源模块 140 的手指鼠标，在智能手机中使用的是 Bluetooth™ 连接。用户可以选择不同的电容感测按键 147，利用交互式网络电视 (IPTV)、网络电视 (TVoIP)、游戏系统或使用 IrDa 或 WiFi™ 连接的机顶盒来连接带有可拆装的电源模块 140 的手指鼠标。带有可拆装的电源模块 140 的手指鼠标可以被配置成支持任意数量的手指按压或电容感测按键 147 的手指按压组合来控制计算装置或与计算装置的通信链接。

[0126] 图 2 至图 7 和图 10 至图 11 示出了人体手部 200 上的至少一个手指鼠标 100 的立体图。仅仅为了简单论述的目的，这些立体图已被限制为人右手 200 的食指和 / 或中指，但

Petitioner Samsung Ex-1004, 0307

并不应该被视作是对人体手部 200 上的手指鼠标 100 的位置或使用的限制。正如本领域的技术人员可以理解的那样，尽管示出手指鼠标 100 处在一根手指上，但手指鼠标 100 仍可以例如，通过使用较大的绑带 115 设置在多根手指上或右手 200 或左手（未示出）上或其他附属物上（未示出）。用于在右手 200 的食指上设置手指鼠标 100 的基础位置可以处在图 8 所示的沿着手指长度的点 204 和 201 之间。用于在右手 200 的中指上设置手指鼠标 100 的基础位置可以处在图 8 所示的沿着手指长度的点 209 和 206 之间。可以沿着人体手部 200 的任意手指重复该基础点，从而允许出现多个手指鼠标 100 位置。手指鼠标 100 可以被固定在食指的点 203 和 202 之间，中指的点 208 和 207 之间以及拇指的点 205 和 201 之间。这种对准仅仅是实例并不用于限制手指鼠标 100 沿着右手 200 或左手（未示出）的任意手指的长度的位置。

[0127] 图 2 至图 3C 是设置在人体右手 200 上的手指鼠标 100 的立体图，示出使用手指鼠标 100 操纵光标位置的实例方法；例如，可以在 2D 平面视频图案屏幕（诸如，计算机 400 的视频屏幕）中操纵光标位置。在这个实例方法中，可以通过操纵支撑着手指鼠标 100 的食指旁的拇指接触一个或多个按键 111、112、113 从而激活手指鼠标 100 内的传感器的数据采集来实现光标移动。可以通过采集角和直线加速度数据来跟踪支撑着手指鼠标 100 的手指的移动。可以将所采集到的数据无线地传送给计算装置，例如，个人计算机 400 或智能手机（未示出），在此可以对数据进行处理。例如，在一种配置中，经过处理的数据可以调动或移动 2D 平面视频图案屏幕（诸如，计算机 400 的视频屏幕 402）中的光标。在另一个配置中，所采集和无线传送给个人计算机 400 或其他计算装置的数据可以被处理成书面文本，由此将手指鼠标 100 转换成电子书写用具。在表面或在半空中移移动为书写装置的手指鼠标 100 可以生成转录的文本和图画（例如，手写形式的签名、笔记、初稿、图画）的电子文件。光标移动可以与手指鼠标 100 的移动相关联。在配置中，可以例如，在屏幕上显示出虚拟键盘。当用户移动手指鼠标 100 并且光标进入到虚拟键盘区域中，或执行诸如，选择按键或执行敲击或系列敲击或特定手指的移动时，在虚拟键盘上将显示出虚拟手指或虚拟手。虚拟手或虚拟手指保持在虚拟键盘上方并且用户可以打字。例如，如果用户具有多个手指鼠标 100 的话，那么那些带有手指鼠标 100 的手指可以在虚拟键盘上打字，每次敲击均被记录为击键。

[0128] 在配置中，可以利用拇指和一个或多个按键 111、112、113 的互动来限制光标功能的意外激活，从而使得所有光标功能均是有意为之并且取消那些功能的意外激活。在配置中，可以通过仅仅在拇指和按键 111、112、113 的互动过程中实现光标定位功能来控制光标位移。在另一种配置中，光标控制可以被配置成通过单击或双击激活以及通过随后的单击或双击取消。

[0129] 图 4 至图 5C 是人体右手 200 食指上的手指鼠标 100 以及人体右手 200 中指上的第二手指鼠标 100 的立体图，从而演示出使用手指鼠标 100 在例如 2D 平面视频图案屏幕（诸如，计算机 400 的视频屏幕 402）中操纵光标位置的方法。在配置中，可以通过操纵支撑着手指鼠标 100 的中指旁的拇指接触一个或多个按键 111、112、113 来激活手指鼠标 100 内的传感器的数据采集来实现光标移动。在配置中，一个或多个按键 111、112 和 113 的激活可以支持以下功能，诸如，典型的媒体控制、音量、轨道、加速 (advance)、前进、倒退、单击功能和多击功能。可以通过采集角和直线加速度数据来跟踪支撑着手指鼠标 100 的手指的

Petitioner Samsung Ex-1004, 0308

移动。可以将所采集的数据无线传送给个人计算机 400 或计算装置，诸如，智能手机（未示出），在此可以对数据进行处理。处理后的数据可以用于调动或移动 2D 平面视频图案屏幕（诸如，计算机 400 的视频屏幕 402）中的光标。光标的移动可以与手指鼠标 100 的移动相关联。

[0130] 在一些配置中，可以获得非典型的鼠标控制。图 6 示出了手指鼠标在人右手 200 的食指上的配置并且示出了空中功能控制方法。根据可调节的加速度阈值，手指鼠标 100 的突然移动（诸如，迅速拉动移动）可能触发程控功能。从这种移动中所采集到的数据可以无线地传送给计算装置，例如，个人计算机 400 或智能手机（未示出），在此对该数据进行处理。由此，处理后的数据可以控制计算装置上的移动。例如，处理后的数据可以控制 2D 平面视频图案屏幕（诸如，计算机 400 的视频屏幕 402 或其上所显示的 3D 虚拟世界）中的光标。

[0131] 图 7 是人体右手 200 的食指上的手指鼠标 100 的立体图并且示出了用于检测功能控制的敲击的实施性方法。一旦达到了特定的可调加速度阈值，例如，通过将敲击指示以消息的形式发送给计算装置，附接有手指鼠标 100 的手指在物体（诸如，桌子、腿等）上的敲击可以触发程控功能。可以将所采集到的数据传送给个人计算机 400 或其他计算装置，诸如，智能手机（未示出），在此可以处理该数据。例如，处理后的数据可以控制光标在 2D 平面视频图案屏幕（诸如，计算机 400 的视频屏幕 402）中的移动。

[0132] 图 9 示出了现有技术中由 CPU 401、鼠标 404、键盘 403 以及监控或视频屏幕 402 所构成的个人计算机系统 400。图 9 进一步示出了在现有技术中当使用鼠标 404 和键盘时右手 200 是如何操作的图像。在这种系统中，为了使用鼠标和使用任何可应用的鼠标功能，用户必须将手 200 从键盘上移开。

[0133] 在鼠标 100 的一个实例应用中，可以克服为了使用鼠标而需要额外地移动手部 200 并且强行地明显降低了打字速度以及增加了手的弯曲重复的现有技术使用方式。手指鼠标优于传统鼠标 404 的优点在于在控制光标功能和位置时手部 200 可以更少从键盘上移开。减少手部的移动对减少可能造成皮管综合征的手部疲劳具有显著效果并且可以明显提高用户的互动速度。图 10 是手部 200 的一个或多个手指上的手指鼠标 100 的立体图并且示出了在打字时使用手指鼠标 100 的配置。这些配置可以通过消除为了使用鼠标而将手 200 从键盘上移开的需要来降低处理时间，为了操作鼠标类功能，将这种功能设置成用户手指不需要离开键盘 403 区域的方式。用户可以使用一个拇指来激活手指鼠标 100，同时手指仍保持在键盘上并且另一个拇指保持在空格键上。在手指不离开键盘区域的情况下直接使用鼠标功能能够明显提高打字速度并且提供更快和更接近人体工学的使用体验。

[0134] 图 11 是右手 200 的食指上的手指鼠标 100 的立体图，示出当食指敲击时手指鼠标 100 的使用性。一旦达到了特定可调加速度阈值，例如，通过将敲击指示以消息的形式发送给计算装置，手指鼠标 100 所属的手指在物体（诸如，桌子、腿部等）上的敲击可以触发程控功能。可以将在该移动开始时所采集的数据无线传送至个人计算机 400 或其他计算装置，诸如，智能手机（未示出），在此可以处理该数据。例如，处理后的数据和功能可以控制光标在 2D 平面视频图案屏幕（诸如，计算机 400 的视频屏幕 402）中的移动。

[0135] 正如本领域的技术人员可以意识到的那样，可以使用手指鼠标 100 的这些和其他配置作为当前的游戏控制器或遥控控制装置的增强。各个部件和方法的上述描述被用于示

Petitioner Samsung Ex-1004, 0309

出具体的实例以及描述制造和使用在此所公开和描述的装置的特定方式。这些说明既不旨在也不应该被用作为制造和使用这些部件的可能方式的详细清单。可以做出许多更改，其包括在两个实例之间或在两个以上实例之中的置换以及组合之中的变形。在阅读完这个文件之后，那些更改和变型对本领域的普通技术人员而言是显而易见的。

Petitioner Samsung Ex-1004, 0310

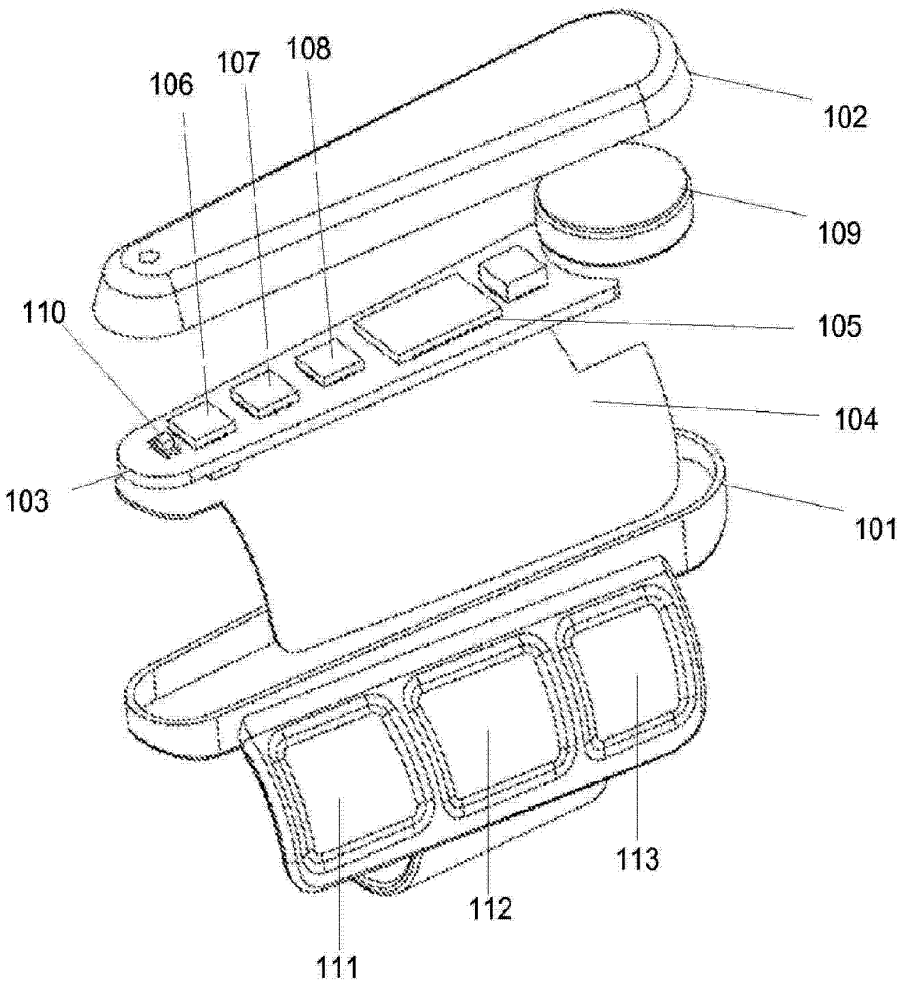


图 1A

Petitioner Samsung Ex-1004, 0311

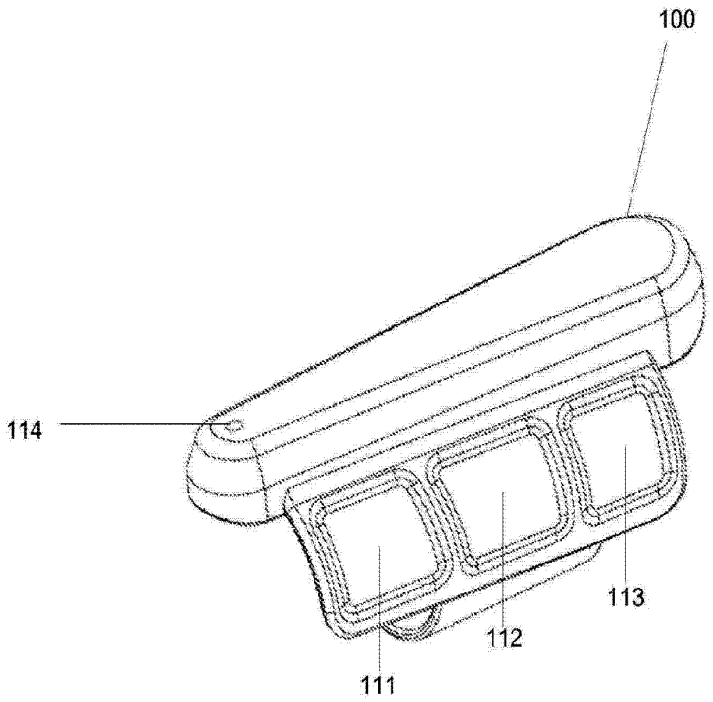


图 1B

Petitioner Samsung Ex-1004, 0312

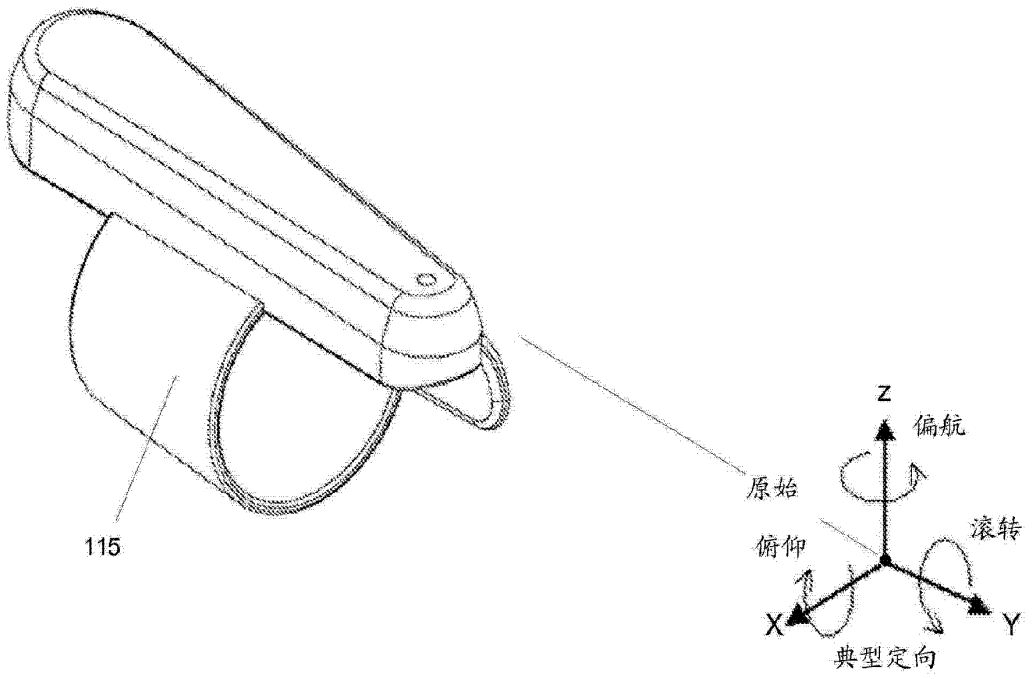


图 1C

Petitioner Samsung Ex-1004, 0313

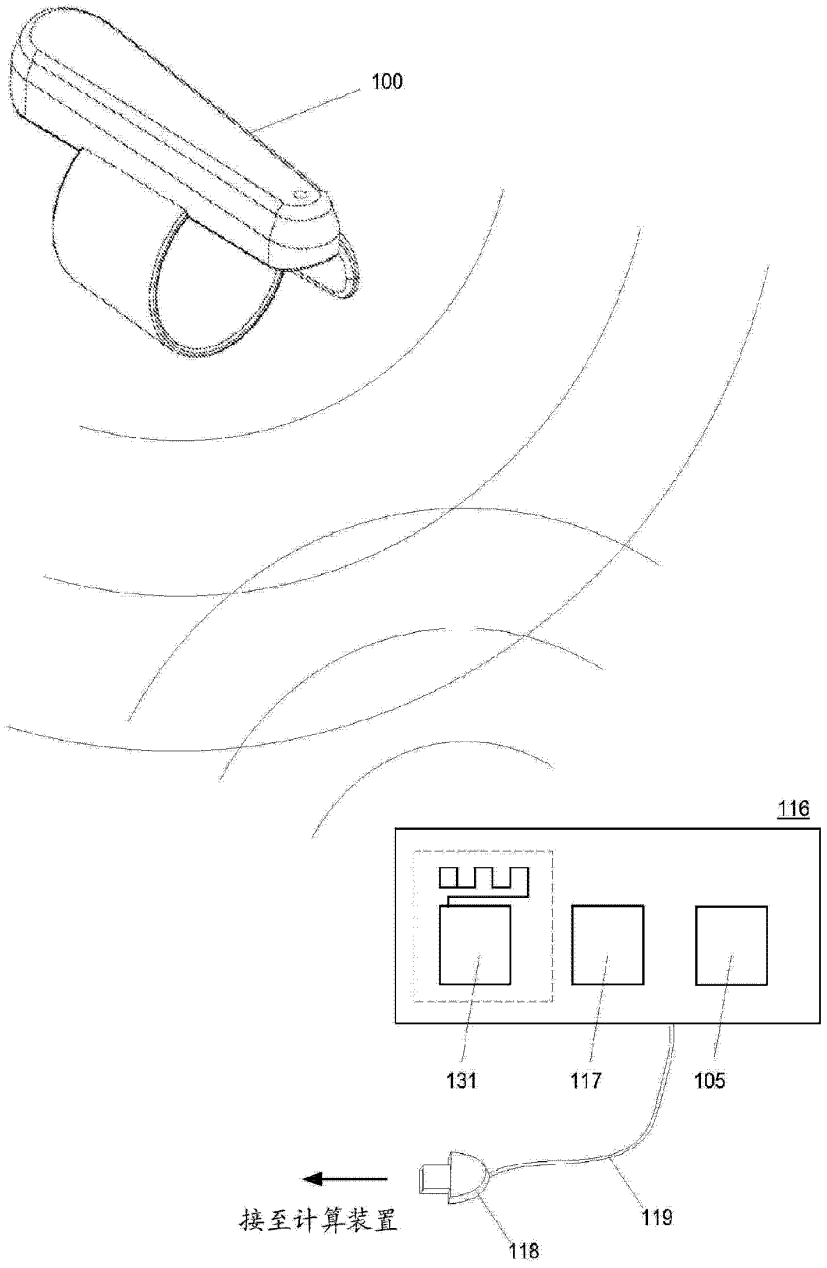


图 1D

Petitioner Samsung Ex-1004, 0314

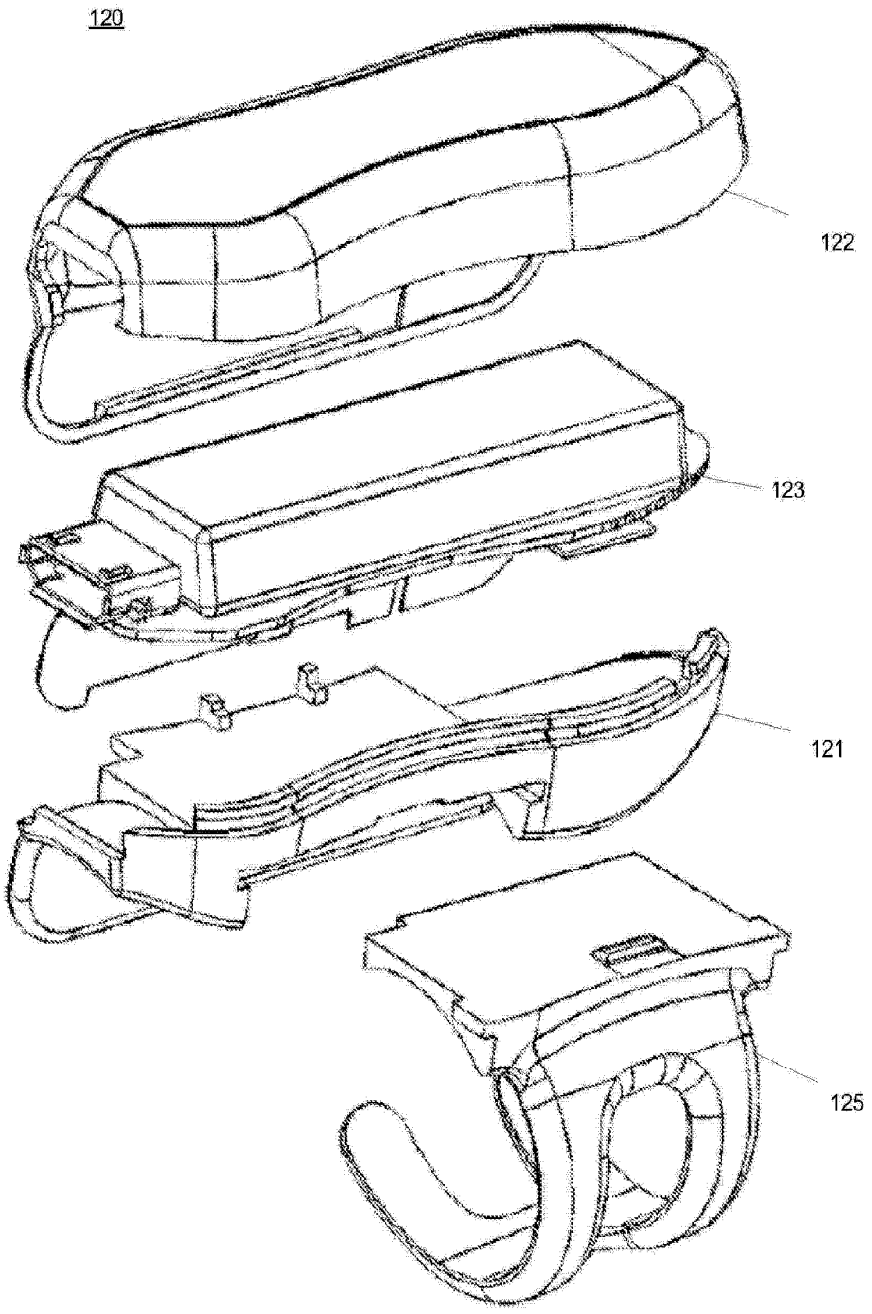


图 1E

Petitioner Samsung Ex-1004, 0315

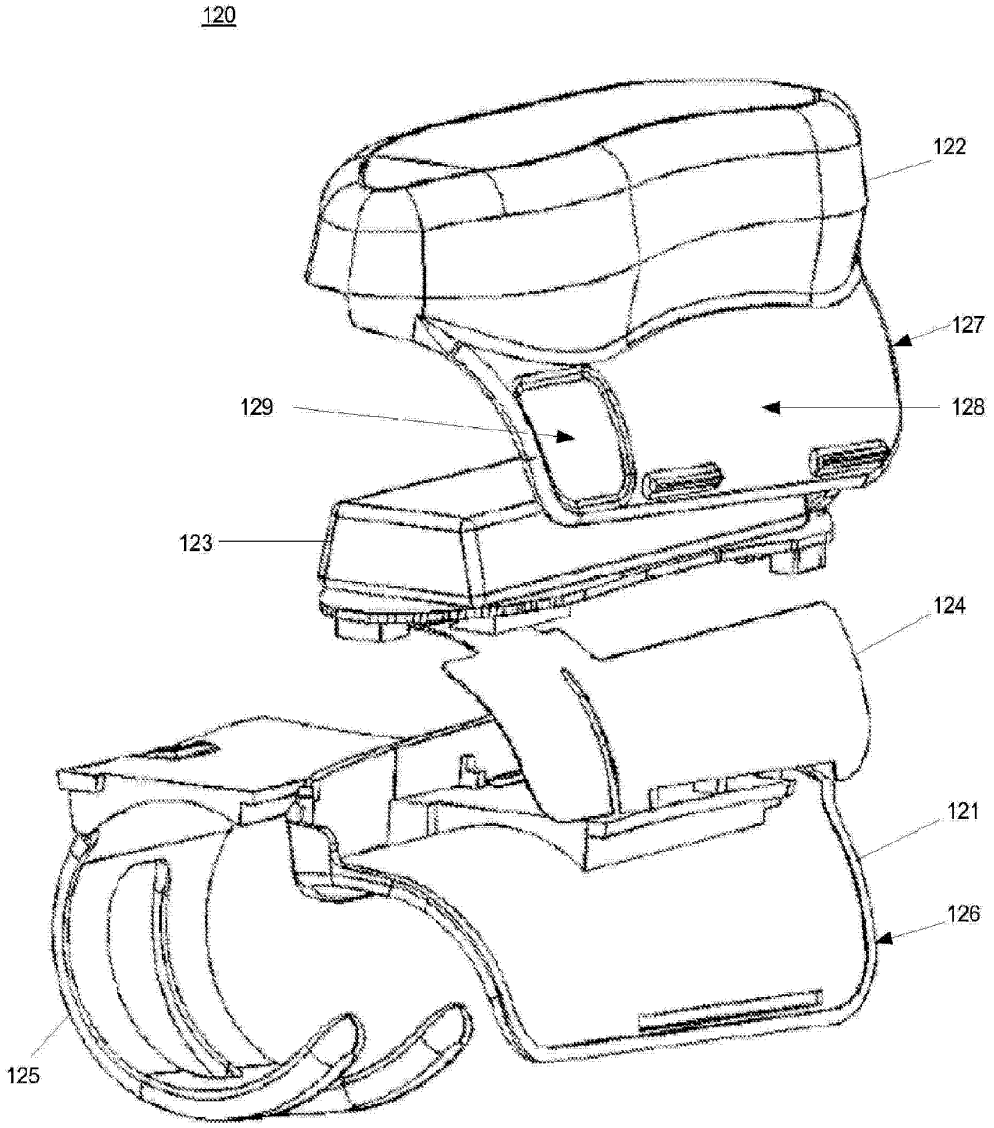


图 1F

Petitioner Samsung Ex-1004, 0316

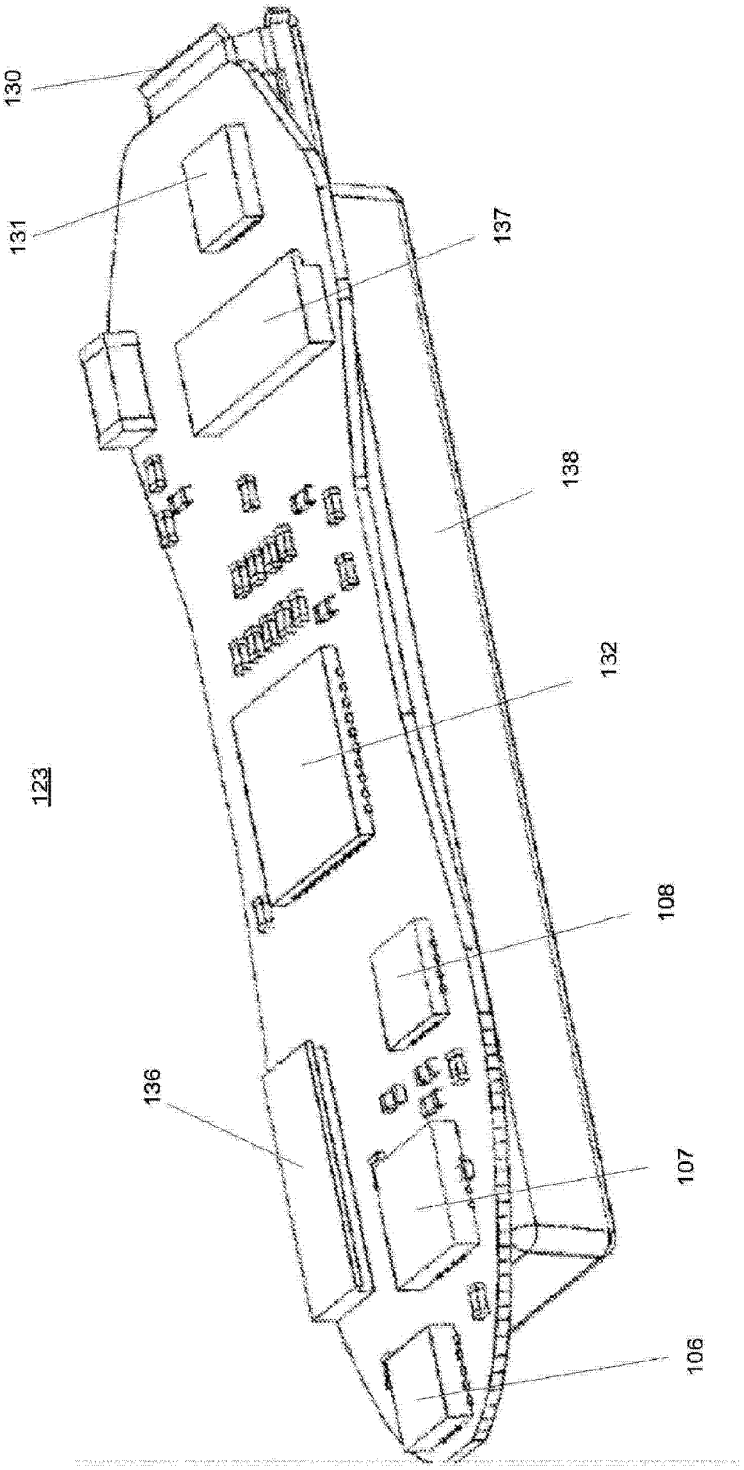


图 1G

Petitioner Samsung Ex-1004, 0317

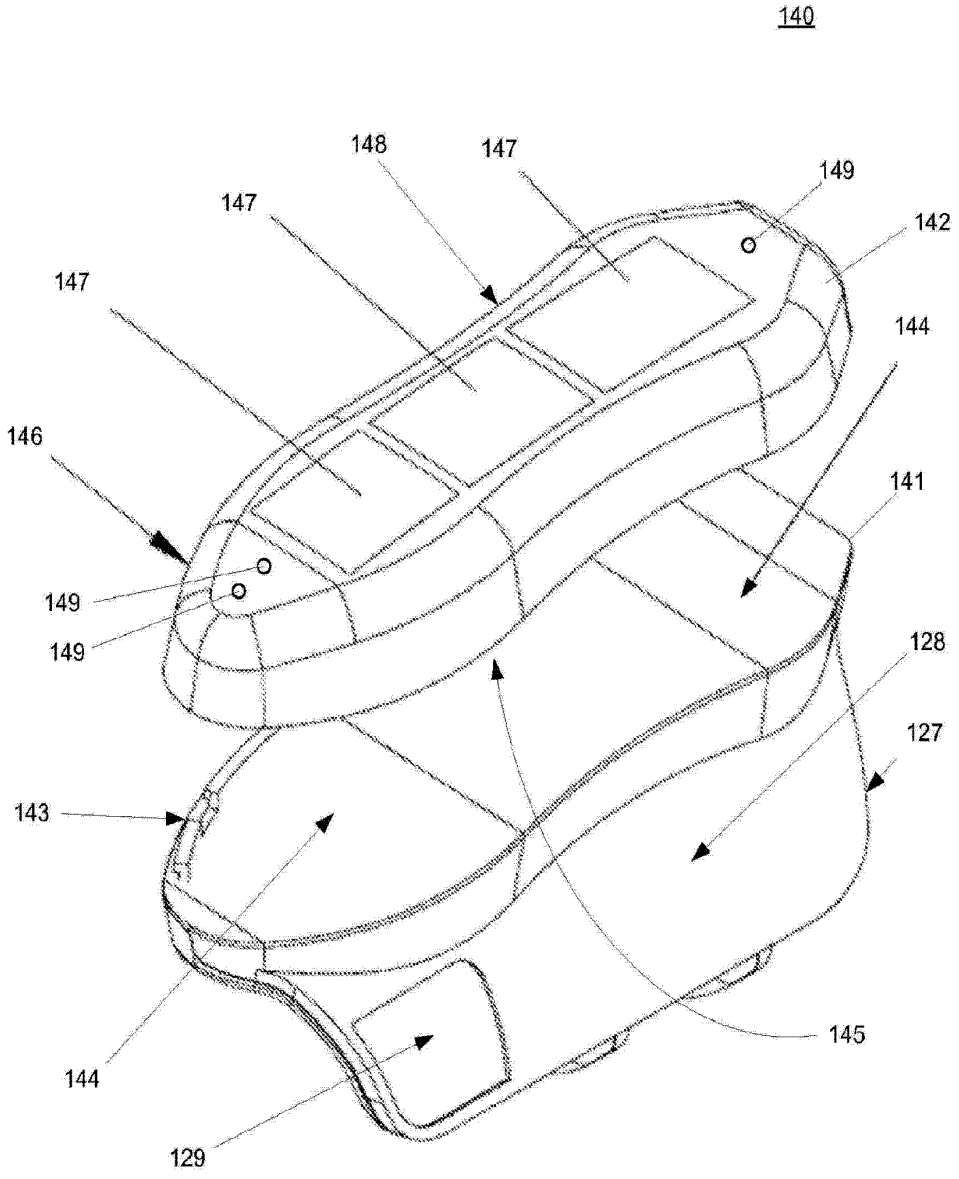


图 1H

Petitioner Samsung Ex-1004, 0318

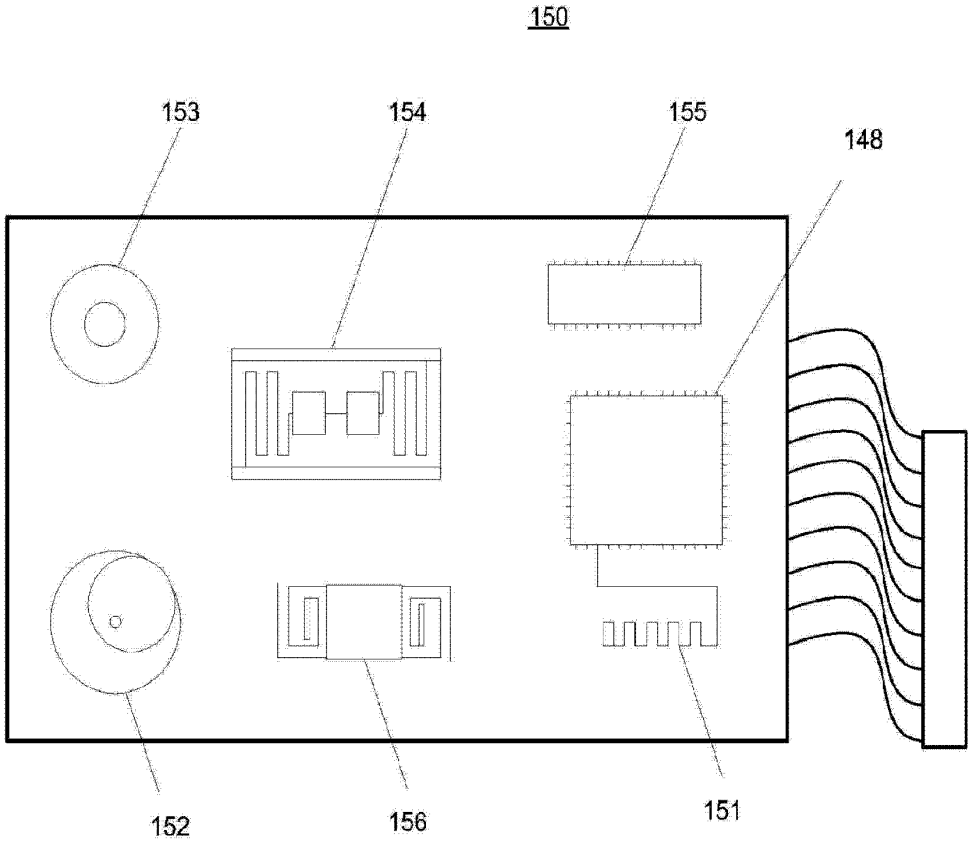


图 1I

Petitioner Samsung Ex-1004, 0319

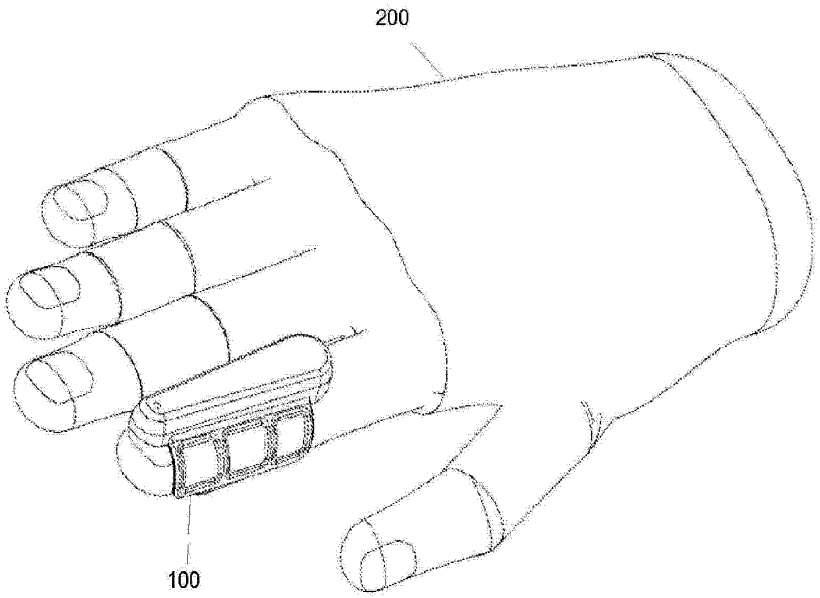


图 2

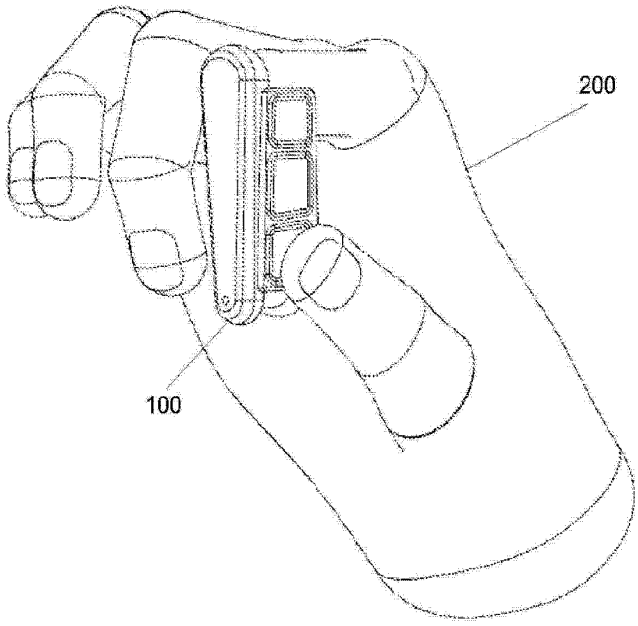


图 3A

Petitioner Samsung Ex-1004, 0320

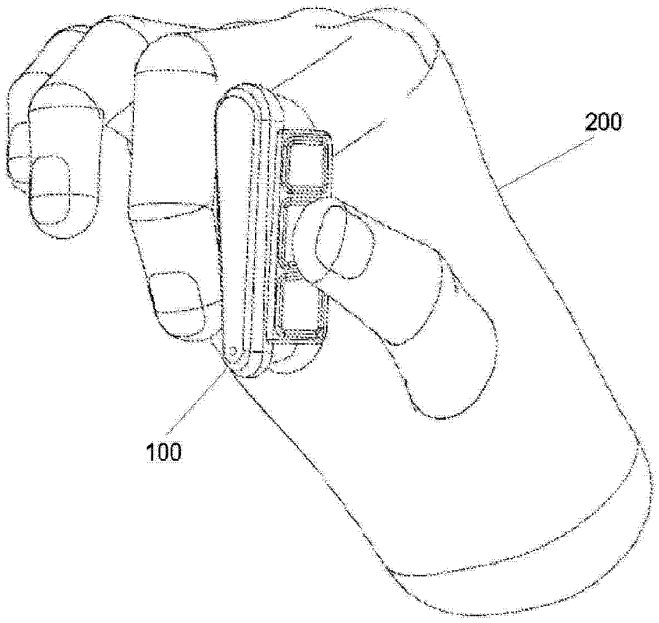


图 3B

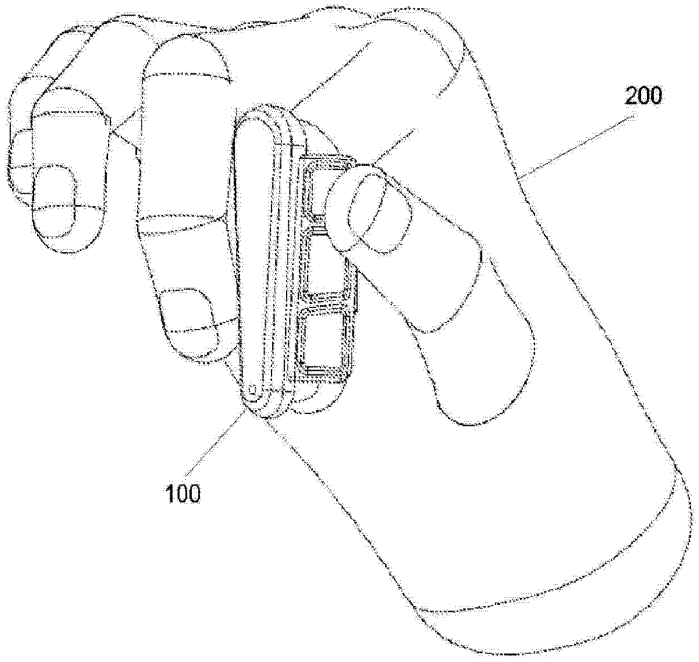


图 3C

Petitioner Samsung Ex-1004, 0321

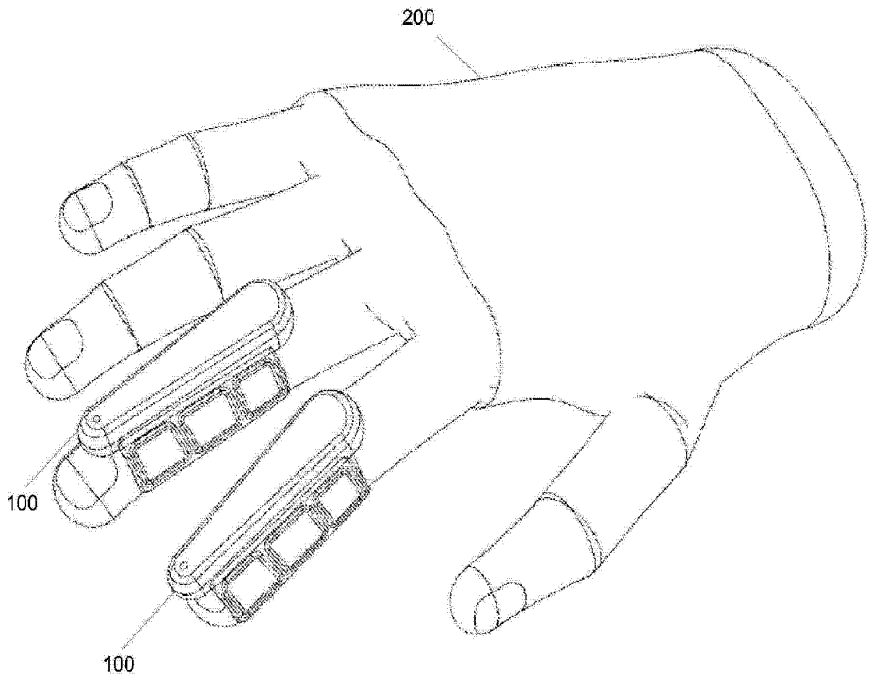


图 4

Petitioner Samsung Ex-1004, 0322

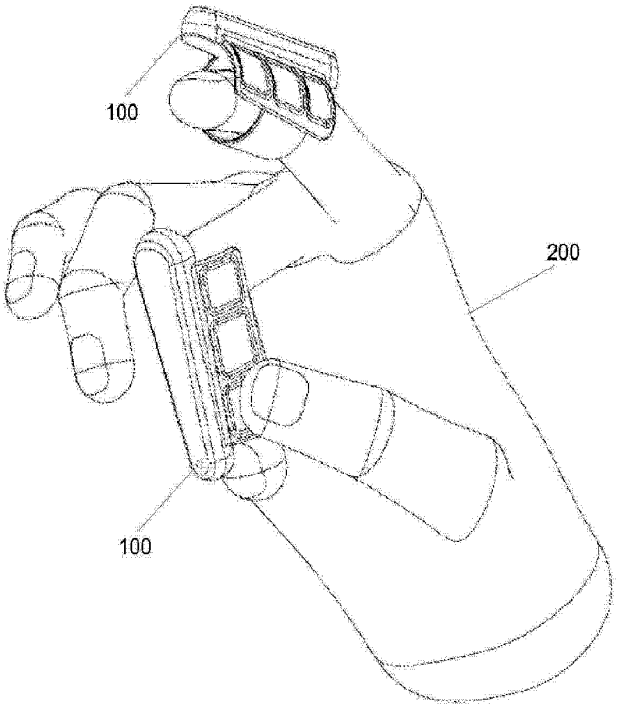


图 5A

Petitioner Samsung Ex-1004, 0323

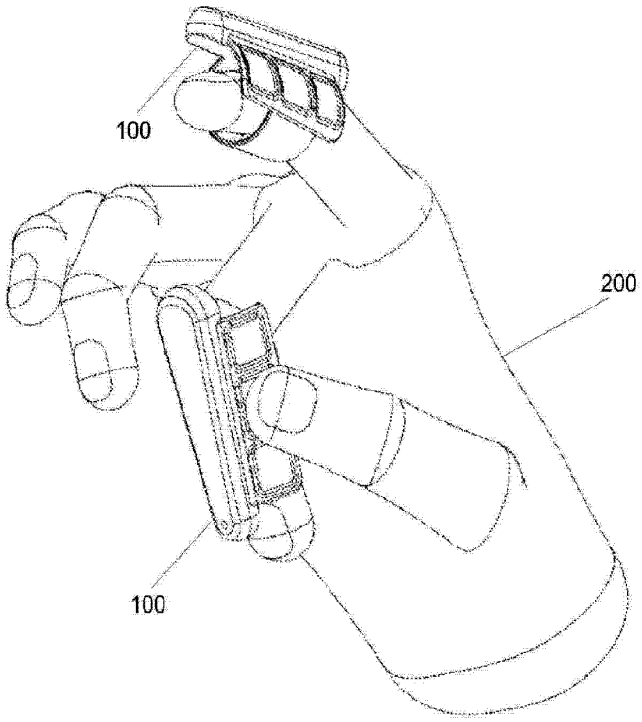


图 5B

Petitioner Samsung Ex-1004, 0324

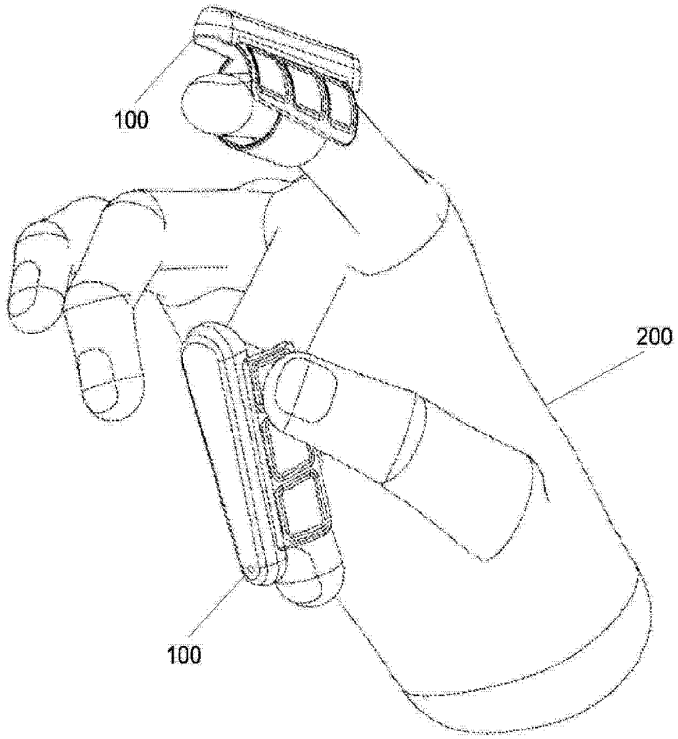


图 5C

Petitioner Samsung Ex-1004, 0325

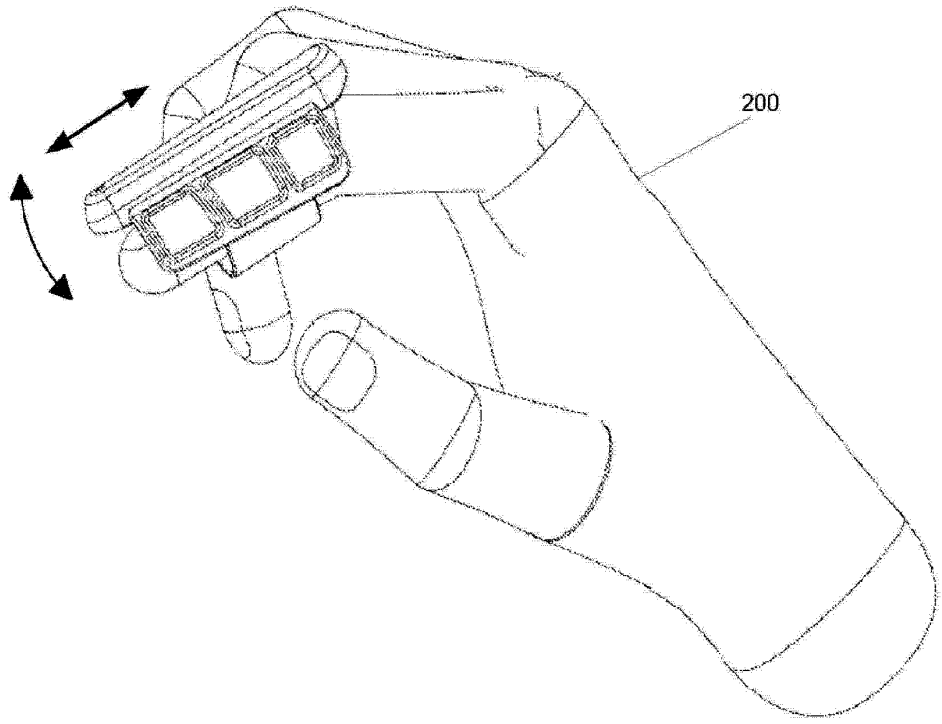


图 6

Petitioner Samsung Ex-1004, 0326

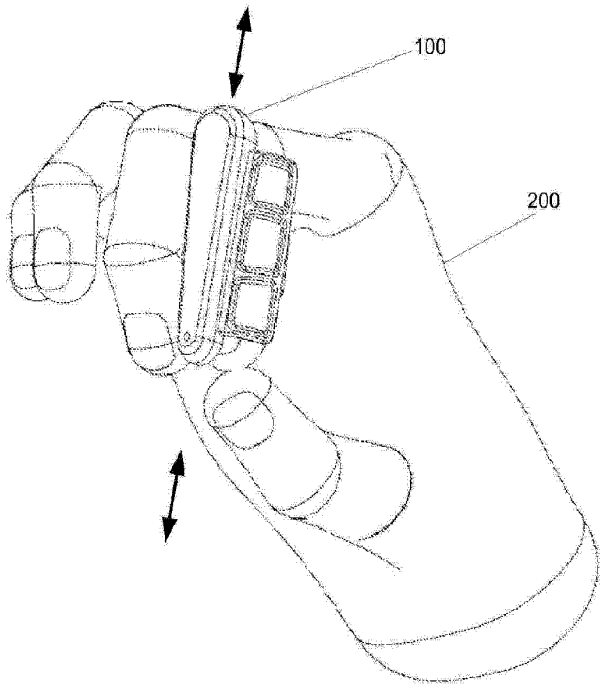


图 7

Petitioner Samsung Ex-1004, 0327

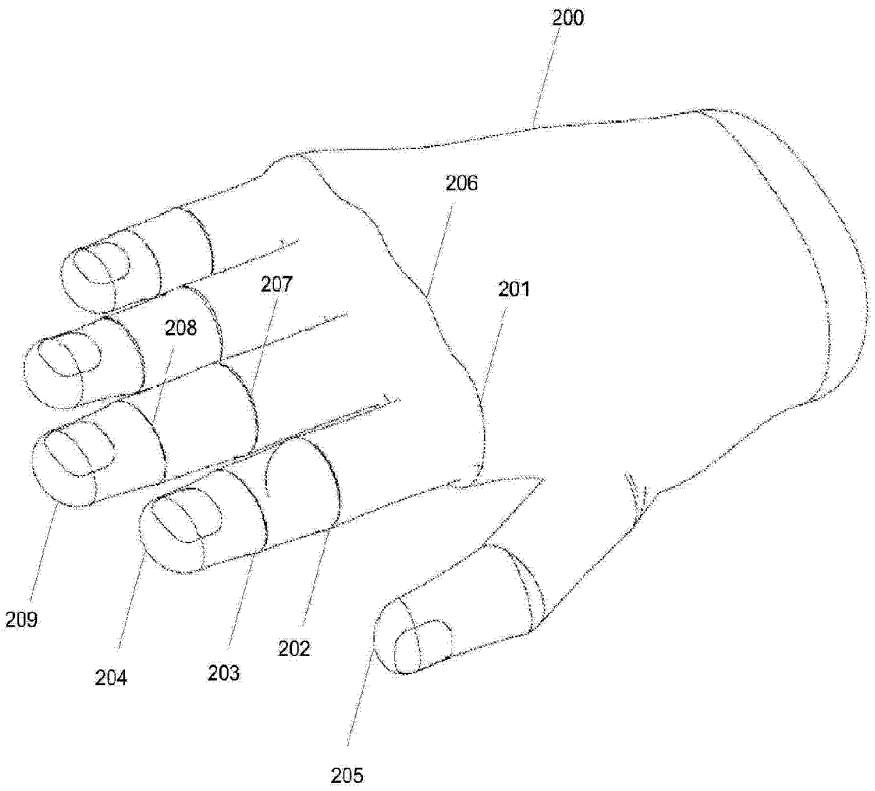


图 8（现有技术）

Petitioner Samsung Ex-1004, 0328

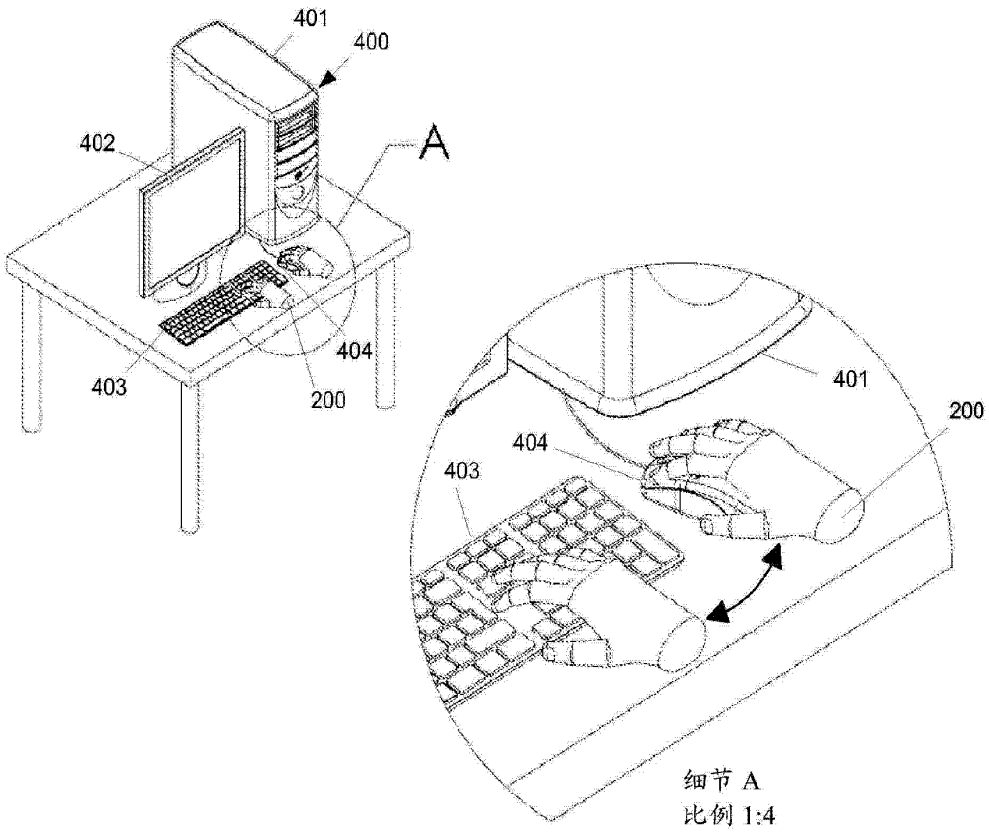


图 9（现有技术）

Petitioner Samsung Ex-1004, 0329

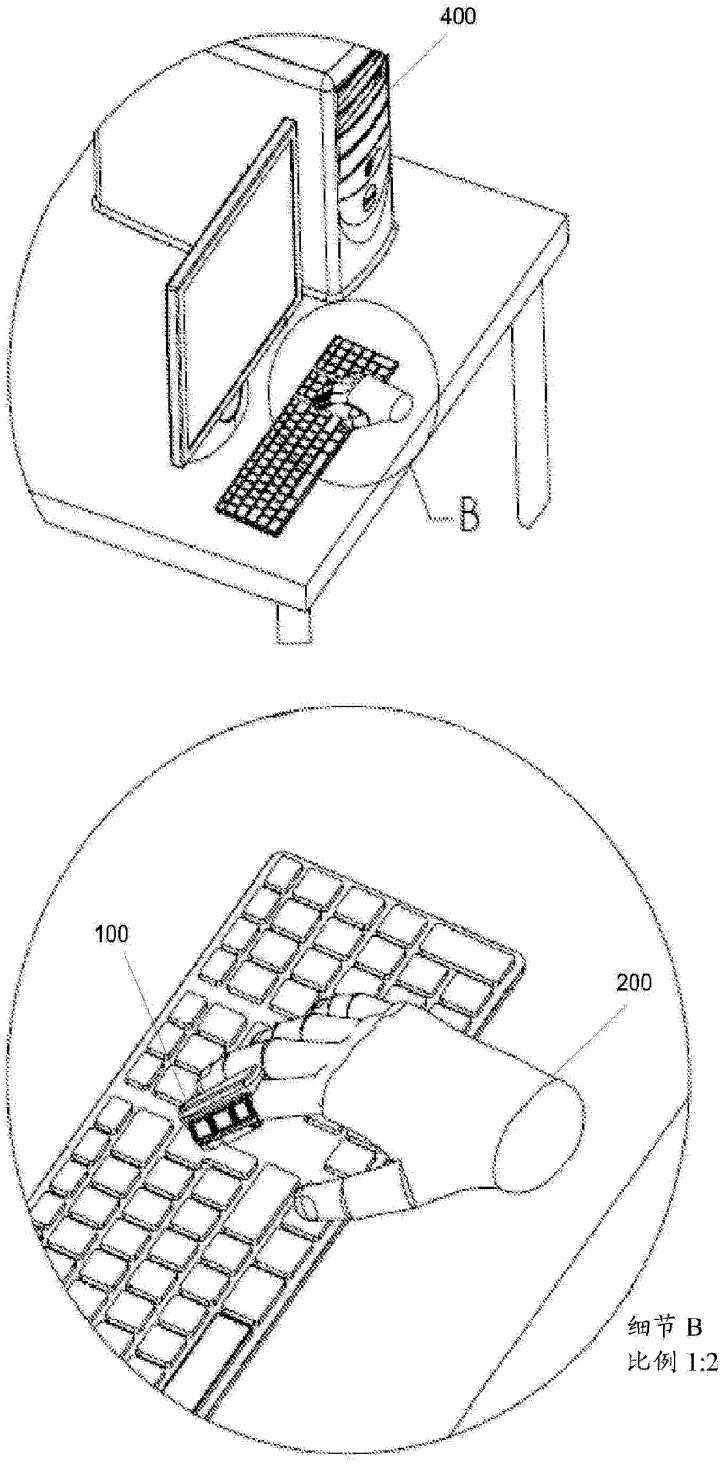


图 10

Petitioner Samsung Ex-1004, 0330

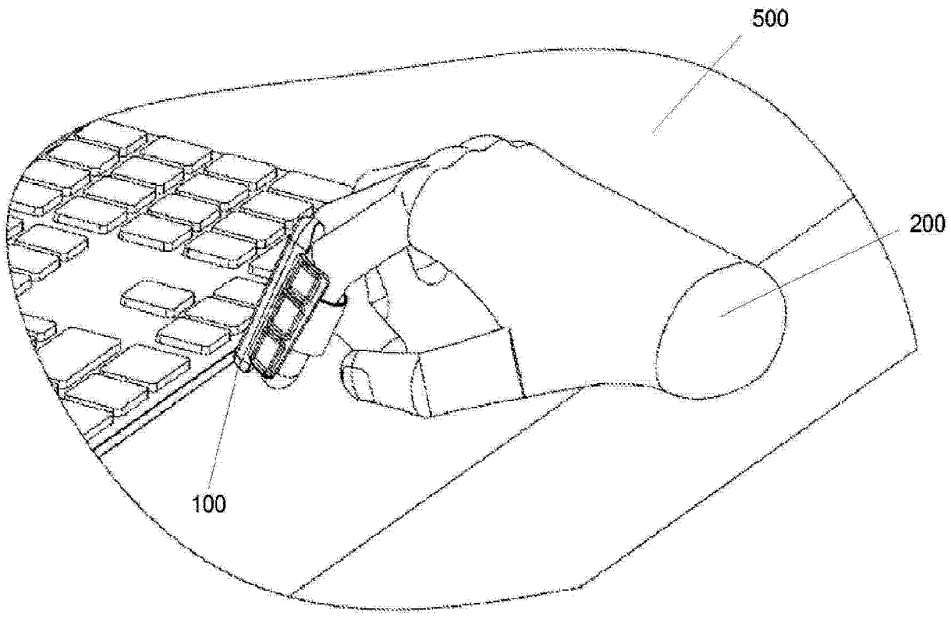


图 11

Petitioner Samsung Ex-1004, 0331

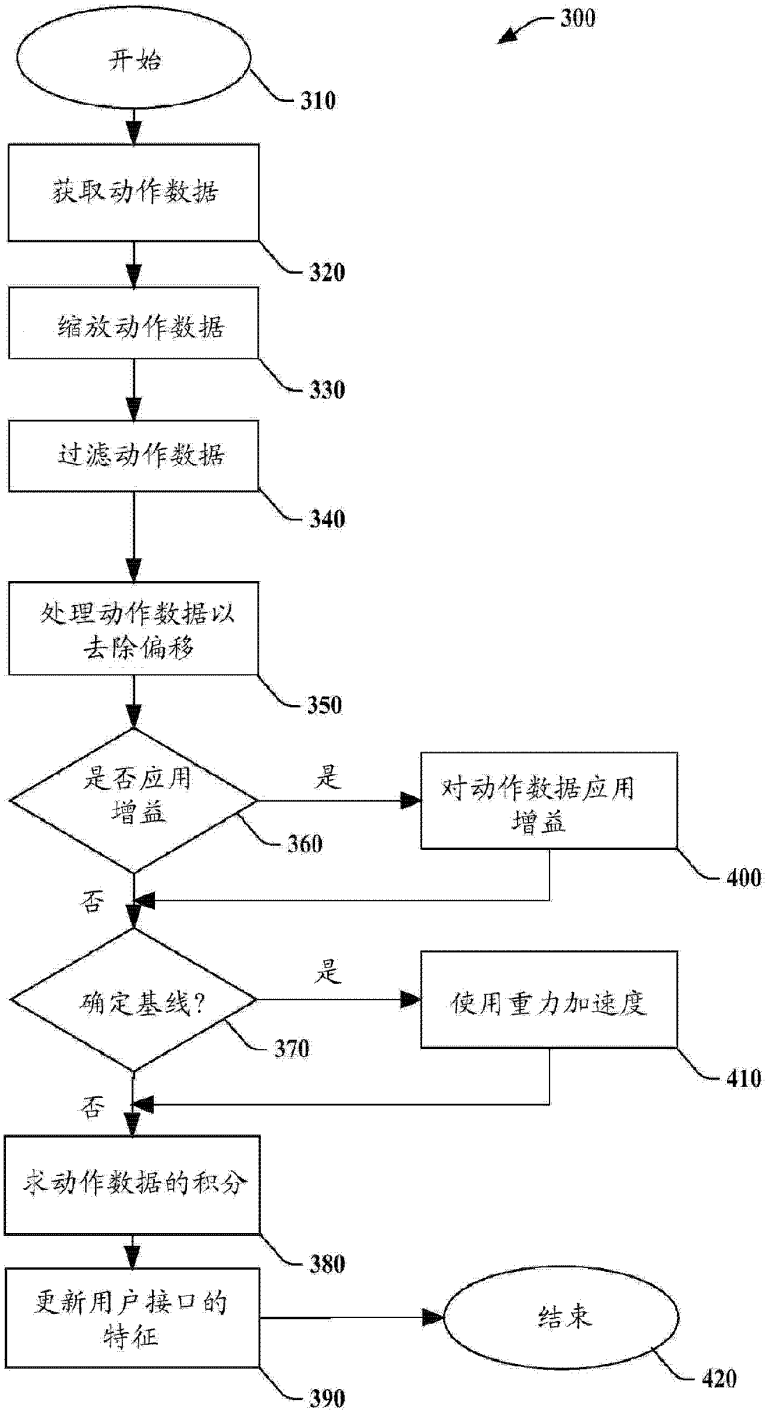


图 12

Petitioner Samsung Ex-1004, 0332

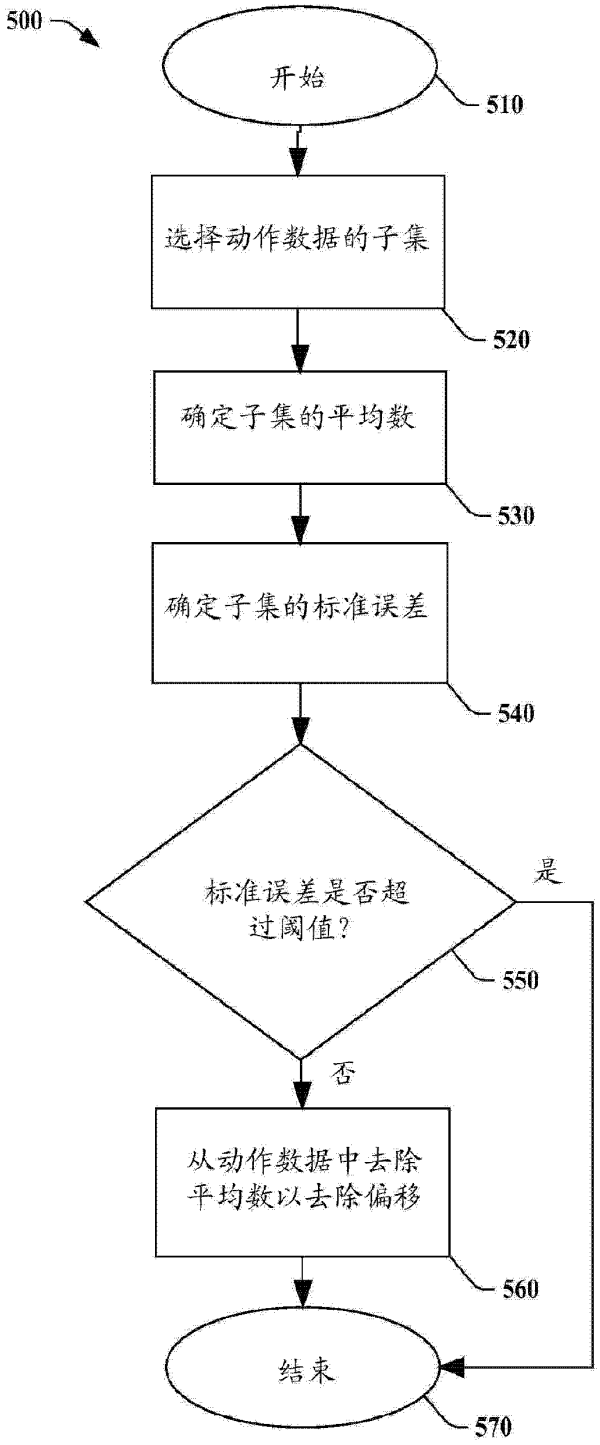


图 13

Petitioner Samsung Ex-1004, 0333

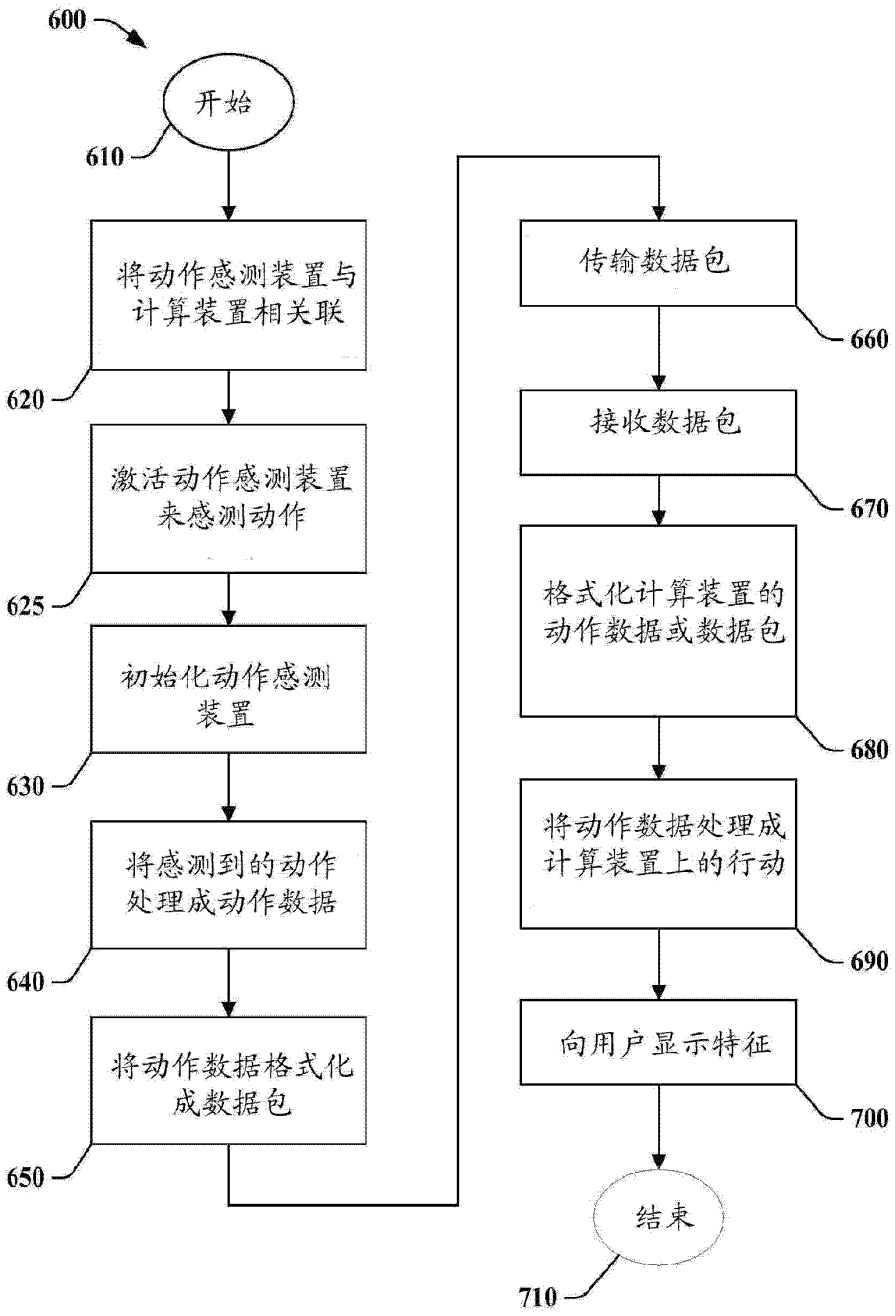


图 14

Petitioner Samsung Ex-1004, 0334

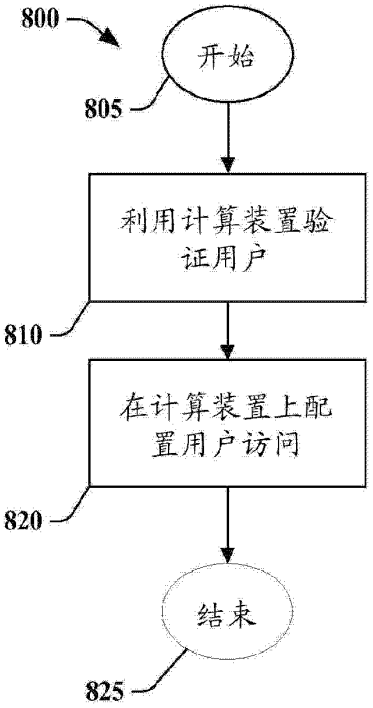


图 15A

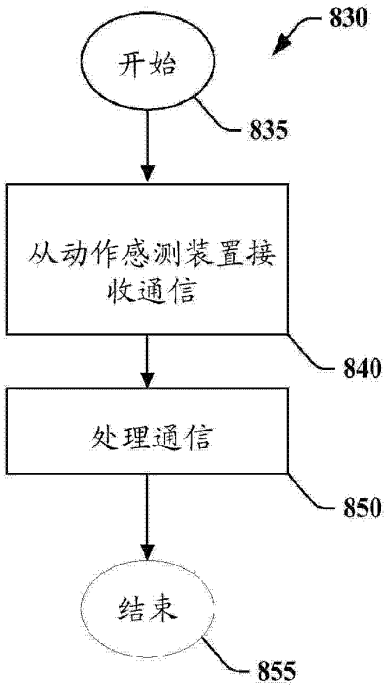


图 15B

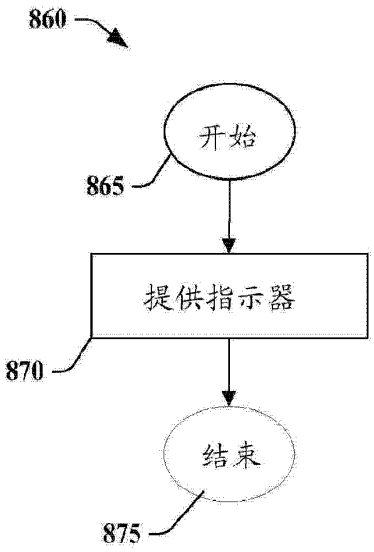


图 15C

Petitioner Samsung Ex-1004, 0335

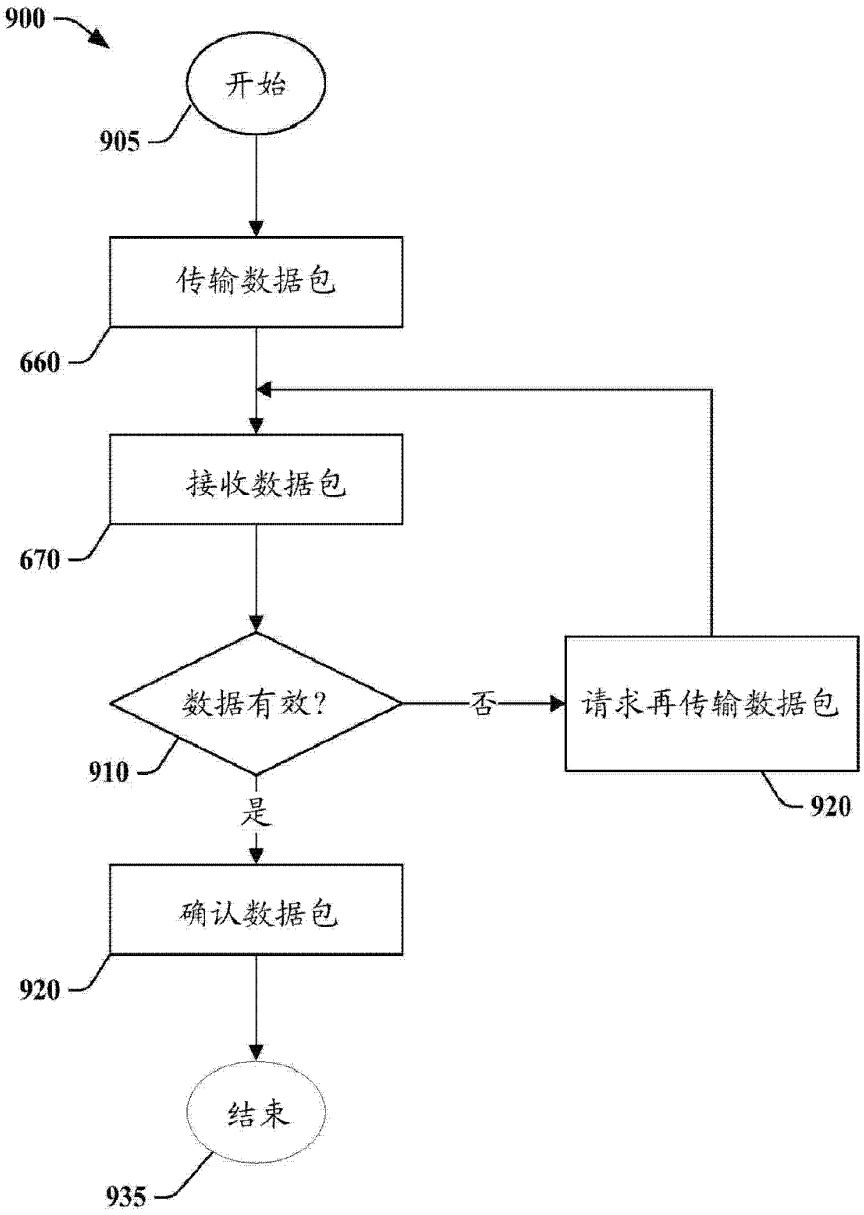


图 15D

Petitioner Samsung Ex-1004, 0336

Espacenet

Bibliographic data: CN204440426 (U) — 2015-07-01

NFC ring

Inventor(s): LYU FEI; ZHANG YULU; YAN JUNJIE ± (LYU FEI, ; ZHANG YULU, ; YAN JUNJIE)

Applicant(s): GUANGDONG SEEDCOM ELECTRICAL & LIGHTING CO LTD ± (GUANGDONG SEEDCOM ELECTRICAL & LIGHTING CO., LTD)

Classification: **- international:** ***A44C9/00; G06K17/00***
- cooperative:

Application number: CN20142835867U 20141223

Priority number (s): CN20142835867U 20141223

Abstract of CN204440426 (U)

A NFC ring comprises an inner ring, an outer ring, a side ring, an electronic assembly and a magnet. The outer ring sleeves the inner ring, a containing cavity is formed between the outer ring and the inner ring, the side ring is mounted on one end face of the inner ring, and the outer ring presses between the inner ring and the side ring. The electronic assembly is contained and fixed in the containing cavity. The side wall of the outer ring is provided with a containing groove, and the magnet is contained in the containing groove. The electronic assembly comprises a circuit board, a reed switch, a light emitting diode, a chip and an antenna, the reed switch, the light emitting diode, the chip and the antenna are arranged on the circuit board, the light emitting diode is connected with the chip to form a parallel circuit, one end of the parallel circuit is connected with one end of the antenna, the other end of the parallel circuit is connected with the other end of the antenna through the reed switch. In the NFC ring, a circuit can be opened or closed through cooperation of the magnet and the reed switch, so that an off state and an on state can be switched, the usage safety of the products can be raised, the risk that user information is stolen can be reduced.

Petitioner Samsung Ex-1004, 0337

(19)中华人民共和国国家知识产权局

(12)实用新型专利

(10)授权公告号 CN 204440426 U
(45)授权公告日 2015.07.01

(21)申请号 201420835867.4

(22)申请日 2014.12.23

(73)专利权人 广东斯科电气股份有限公司
地址 516006 广东省惠州市仲恺区惠南科技产业园华泰南路1号2号楼

(72)发明人 吕菲 张宇路 严俊杰

(74)专利代理机构 广州市华学知识产权代理有限公司 44245
代理人 蒋剑明

(51)Int.Cl.
G06K 17/00(2006.01)
A44C 9/00(2006.01)

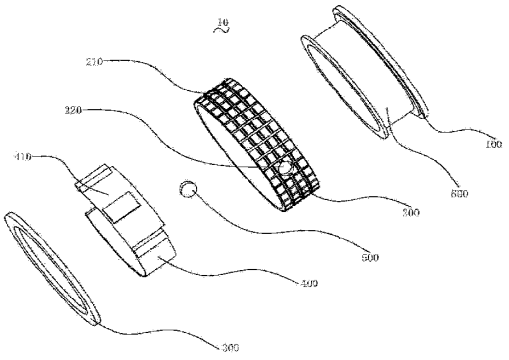
权利要求书1页 说明书3页 附图3页

(54)实用新型名称

一种NFC戒指

(57)摘要

一种NFC戒指，包括：内环、外环、边环、电子组件及磁铁。外环旋转套设于内环上，外环与内环之间形成容置腔，边环安装于内环的一端面上，外环抵持于内环与边环之间；电子组件收容并固定于容置腔内；外环的侧壁上开设有收容槽，磁铁收容于收容槽内；其中，电子组件包括：线路板、干簧管、发光二极管、芯片及天线，干簧管、发光二极管、芯片、天线布设于线路板上，发光二极管与芯片连接形成并联电路，并联电路的一端与天线的一端连接，并联电路的另一端通过干簧管与天线的另一端连接。NFC戒指通过磁铁与干簧管之间的相互配合，实现电路的断开或闭合，进而实现非工作状态与工作状态之间的切换，提高产品的使用安全性，降低用户信息被盗取的风险。



CN 204440426 U

Petitioner Samsung Ex-1004, 0338

1. 一种 NFC 戒指，其特征在于，包括：内环、外环、边环、电子组件及磁铁；

所述外环旋转套设于所述内环上，所述外环与所述内环之间形成容置腔，所述边环安装于所述内环的一端面上，所述外环抵持于所述内环与所述边环之间；

所述电子组件收容并固定于所述容置腔内；

所述外环的侧壁上开设有收容槽，所述磁铁收容于所述收容槽内；

其中，所述电子组件包括：线路板、干簧管、发光二极管、芯片及天线，所述干簧管、所述发光二极管、所述芯片、所述天线布设于所述线路板上，所述发光二极管与所述芯片连接形成并联电路，所述并联电路的一端与所述天线的一端连接，所述并联电路的另一端通过所述干簧管与所述天线的另一端连接。

2. 根据权利要求 1 所述的 NFC 戒指，其特征在于，所述外环的外侧壁上开设有防滑纹。

3. 根据权利要求 1 所述的 NFC 戒指，其特征在于，所述容置腔为环形腔体结构，所述电子组件环绕设于所述容置腔内。

4. 根据权利要求 1 所述的 NFC 戒指，其特征在于，所述干簧管及所述芯片的数量分别为两个，两个所述干簧管分别与两个芯片串联。

5. 根据权利要求 1 所述的 NFC 戒指，其特征在于，所述收容槽为圆形凹槽。

6. 根据权利要求 1 所述的 NFC 戒指，其特征在于，所述内环、所述外环、所述边环均为陶瓷。

Petitioner Samsung Ex-1004, 0339

一种 NFC 戒指

技术领域

[0001] 本实用新型涉及一种 NFC 装置，特别是涉及一种 NFC 戒指。

背景技术

[0002] NFC(Near Field Communication，近距离无线通信技术）是一种短距高频的无线电技术，其在 13.56MHz 频率运行于 20 厘米距离内，其传输速度有 106Kbit/S、212Kbit/S、424Kbit/S 三种。NFC 近场通信技术是由非接触式射频识别 (RFID) 及互联互通技术整合演变而来，在单一芯片上结合感应式读卡器、感应式卡片和点对点的功能，能在短距离内与兼容设备进行识别和数据交换。

[0003] 现有的具备 NFC 支付功能的各类产品，使用者在不注意时将此产品靠近读写器，容易导致误触发的情况发生，从而给使用者带来不必要的麻烦和财物损失。更有甚者，一些不法分子利用特制的大功率读写器，通过远距离来盗取用户信息或钱财，诸如此类情况，这给用户使用带来了安全隐患。

实用新型内容

[0004] 本实用新型的目的是克服现有技术中的不足之处，提供一种提高使用安全性的 NFC 戒指。

[0005] 本实用新型的目的是通过以下技术方案来实现的：

[0006] 一种 NFC 戒指，包括：内环、外环、边环、电子组件及磁铁；

[0007] 所述外环旋转套设于所述内环上，所述外环与所述内环之间形成容置腔，所述边环安装于所述内环的一端面上，所述外环抵持于所述内环与所述边环之间；

[0008] 所述电子组件收容并固定于所述容置腔内；

[0009] 所述外环的侧壁上开设有收容槽，所述磁铁收容于所述收容槽内；

[0010] 其中，所述电子组件包括：线路板、干簧管、发光二极管、芯片及天线，所述干簧管、所述发光二极管、所述芯片、所述天线布设于所述线路板上，所述发光二极管与所述芯片连接形成并联电路，所述并联电路的一端与所述天线的一端连接，所述并联电路的另一端通过所述干簧管与所述天线的另一端连接。

[0011] 在其中一个实施例中，所述外环的外侧壁上开设有防滑纹。

[0012] 在其中一个实施例中，所述容置腔为环形腔体结构，所述电子组件环绕设于所述容置腔内。

[0013] 在其中一个实施例中，所述干簧管及所述芯片的数量分别为两个，两个所述干簧管分别与两个芯片串联。

[0014] 在其中一个实施例中，所述收容槽为圆形凹槽。

[0015] 在其中一个实施例中，所述内环、所述外环、所述边环均为陶瓷。

[0016] 旋转外环，外环绕内环旋转，设于外环的收容槽内的磁铁随之旋转，从而实现磁铁远离或靠近位于容置腔内的干簧管。

Petitioner Samsung Ex-1004, 0340

[0017] 当磁铁远离干簧管时，干簧管上的簧片触点相互分离，此时干簧管、芯片、天线形成的电路处于断开状态；当磁铁靠近干簧管时，干簧管上的簧片触点相互接触，此时干簧管、芯片、天线形成的电路处于闭合状态。

[0018] 当干簧管、芯片、天线形成的电路处于断开状态时，芯片与天线之间断开连接，NFC戒指处于非工作状态，保证了NFC戒指的使用安全性。

[0019] 当干簧管、芯片、天线形成的电路处于闭合状态时，芯片与天线之间闭合连接，NFC戒指处于工作状态，可以进行数据传输，同时发光二极管发光指示工作状态。

[0020] NFC戒指通过磁铁与干簧管之间的相互配合，实现电路的断开或闭合，进而实现非工作状态与工作状态之间的切换，提高了产品的使用安全性能，降低了用户信息被盗取的风险。

附图说明

[0021] 图1为本实用新型一实施例的NFC戒指的结构分解图；

[0022] 图2为一实施例的干簧管、发光二极管、芯片、天线的电路连接图；

[0023] 图3为另一实施例的干簧管、发光二极管、芯片、天线的电路连接图；

[0024] 图4为磁铁远离干簧管时的状态图；

[0025] 图5为磁铁靠近干簧管时的状态图。

具体实施方式

[0026] 下面结合实施例及附图对本实用新型作进一步详细的描述，但本实用新型的实施方式不限于此。

[0027] 如图1所示，其为本实用新型一实施例的NFC戒指10的结构分解图。NFC戒指10包括：内环100、外环200、边环300、电子组件400及磁铁500。

[0028] 外环200旋转套设于内环100上，外环200与内环100之间形成容置腔600。边环300安装于内环100的一端面上，外环200抵持于内环100与边环300之间。内环100、外环200、边环300相互连接形成一环形整体结构，外环200绕内环100可旋转，边环300可从内环100上拆卸，以使得外环200可从内环100上取出。

[0029] 特别的，外环200的外侧壁上开设有防滑纹210，防滑纹210提高了外环200的防滑性能，当通过手指使外环200绕内环100旋转时，防滑纹210可增大手指与外环200之间的接触摩擦力。

[0030] 电子组件400收容并固定于容置腔600内。在本实施例中，容置腔600为环形腔体结构，电子组件400环绕设于容置腔600内。

[0031] 电子组件400包括：线路板410、干簧管420、芯片430、天线440及发光二极管450，干簧管420、芯片430、天线440、发光二极管450布设于线路板410上。请参阅图2，其为一实施例的干簧管420、芯片430、天线440、发光二极管450的电路连接图，发光二极管450与芯片430连接形成并联电路，所述并联电路的一端与天线440的一端连接，所述并联电路的另一端通过干簧管420与天线440的另一端连接。在干簧管420的作用下，干簧管420、芯片430、天线440形成的电路可以闭合或断开。

[0032] 请参阅图3，其为另一实施例的干簧管420、芯片430、天线440、发光二极管450的

Petitioner Samsung Ex-1004, 0341

电路连接图。在此实施例中，干簧管 420、芯片 430、发光二极管 450 的数量分别为两个。例如，一个干簧管 420 和一个芯片 430 的组合可以实现商务名片的数据传输，另一个干簧管 420 和另一个芯片 430 的组合可以实现移动支付功能。干簧管 420 及芯片 430 的数量不限于上述限定，还可以为多个，根据需要选择。

[0033] 还要说明的是，在电路中接入发光二极管 450，通过天线 440 切割磁力线所产生的电流来驱动发光二极管 450 发光，从而在触发芯片 430 读写的过程中可实现发光二极管 450 发光，用来指示读写工作状态，给使用者明确的互动指示。

[0034] 外环 200 的侧壁上开设有收容槽 220，磁铁 500 收容于收容槽 220 内。在本实施例中，收容槽 220 为圆形凹槽，磁铁 500 为圆形片状体。

[0035] 在本实施例中，内环 100、外环 200、边环 300 均为陶瓷。现有金、银、钛钢等金属戒指容易导致 NFC 天线读取的干扰，需加入昂贵的吸波材料来解决抗干扰问题，本实施例中通过选用陶瓷，不但解决了原来金属戒指对 NFC 信号的干扰，而且使得产品成本可以有效降低。

[0036] 请同时参阅图 4 及图 5，其分别为磁铁 500 远离和靠近干簧管 420 时的状态图。

[0037] 旋转外环 200，外环 200 绕内环 100 旋转，设于外环 200 的收容槽 220 内的磁铁 500 随之旋转，从而实现磁铁 500 远离或靠近位于容置腔 600 内的干簧管 420。

[0038] 当磁铁 500 远离干簧管 420 时，干簧管 420 上的簧片触点 422 相互分离，此时干簧管 420、芯片 430、天线 440 形成的电路处于断开状态；当磁铁 500 靠近干簧管 420 时，干簧管 420 上的簧片触点 422 相互接触，此时干簧管 420、芯片 430、天线 440 形成的电路处于闭合状态。

[0039] 当干簧管 420、芯片 430、天线 440 形成的电路处于断开状态时，芯片 430 与天线 440 之间断开连接，NFC 戒指 10 处于非工作状态，保证了 NFC 戒指 10 的使用安全性。

[0040] 当干簧管 420、芯片 430、天线 440 形成的电路处于闭合状态时，芯片 430 与天线 440 之间闭合连接，NFC 戒指 10 处于工作状态，可以进行数据传输。

[0041] 要特别说明的是，干簧管 420 为一种非接触式的密封开关，其体积小、重量轻，易于安装且不显眼，无需复杂的凸轮或曲柄，不会出现金属疲劳现象，提高了使用寿命。干簧管 420 的簧片触点 422 被密封于惰性气体中，不与外界环境接触，大大减少了簧片触点 422 在开、闭过程中由于火花而引起的氧化和碳化，并可防止外界水蒸气和灰尘等杂质对簧片触点 422 的侵蚀，提高了工作寿命长。

[0042] NFC 戒指 10 通过磁铁 500 与干簧管 420 之间的相互配合，实现电路的断开或闭合，进而实现非工作状态与工作状态之间的切换，提高了产品的使用安全性能，降低了用户信息被盗取的风险。

[0043] 上述实施例为本实用新型较佳的实施方式，但本实用新型的实施方式并不受上述实施例的限制，其他的任何未背离本实用新型的精神实质与原理下所作的改变、修饰、替代、组合、简化，均应为等效的置换方式，都包含在本实用新型的保护范围之内。

Petitioner Samsung Ex-1004, 0342

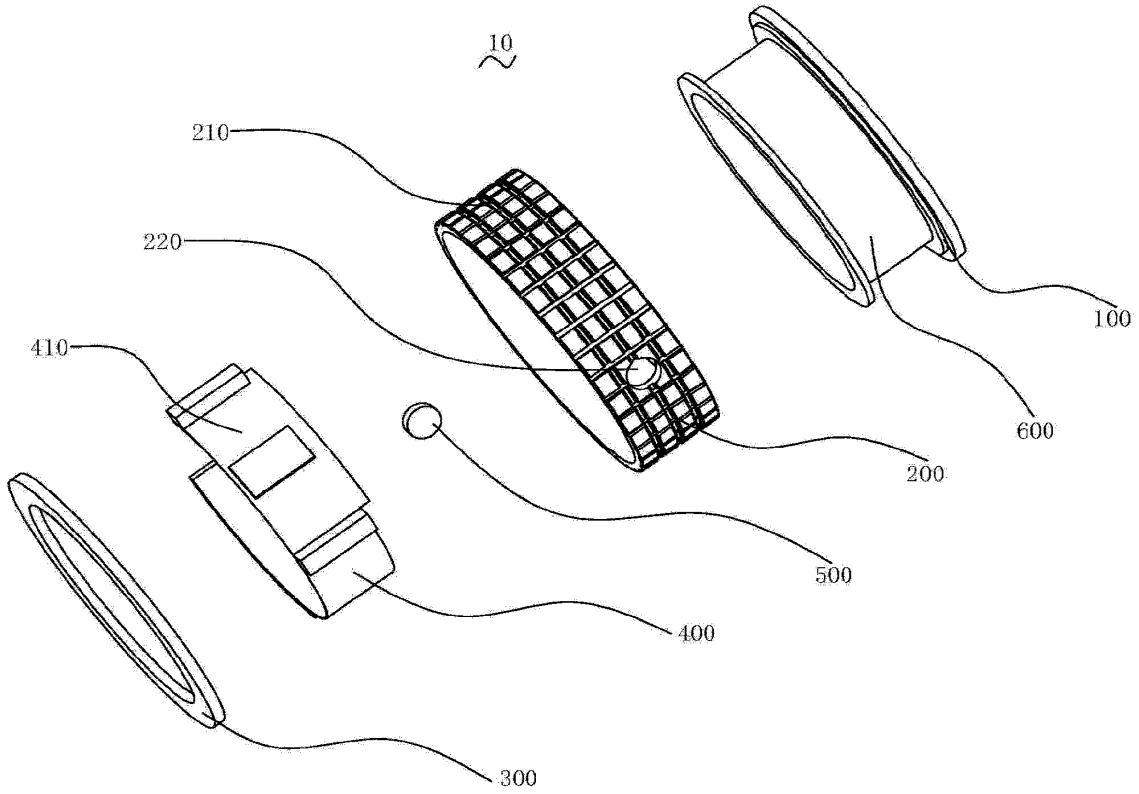


图 1

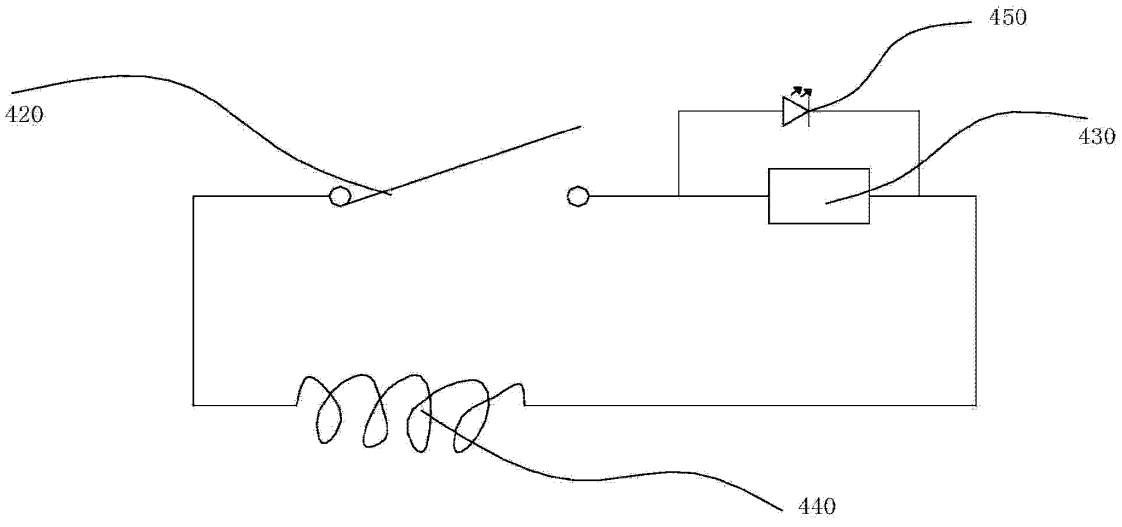


图 2

Petitioner Samsung Ex-1004, 0343

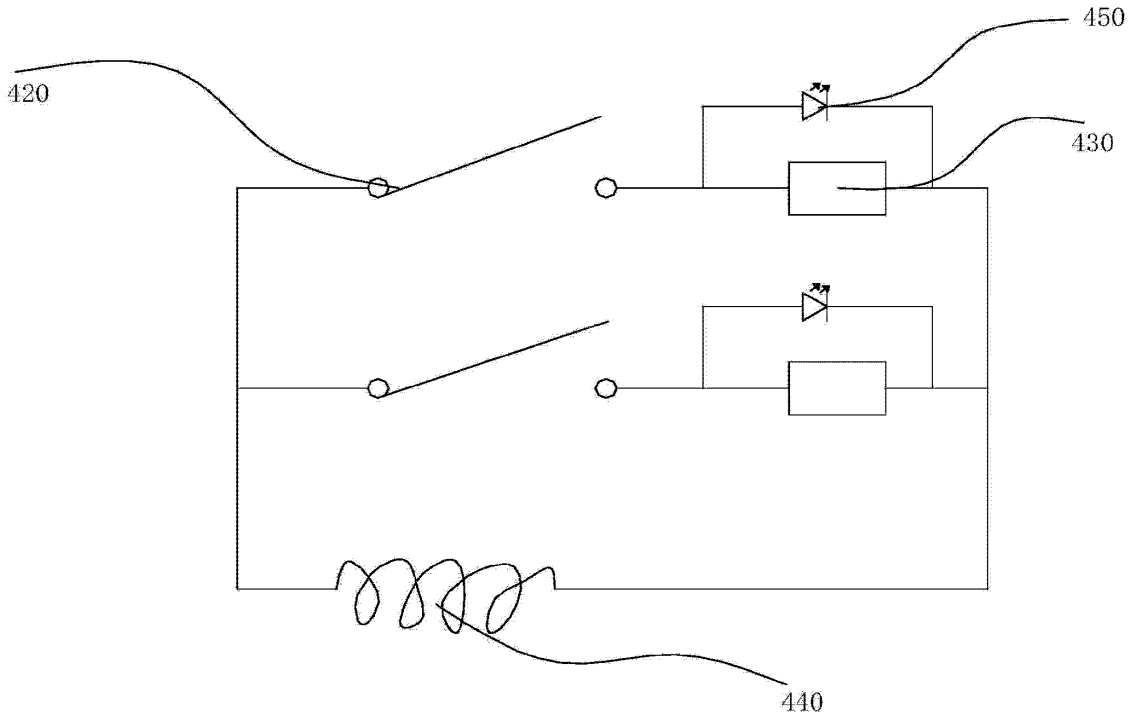


图 3

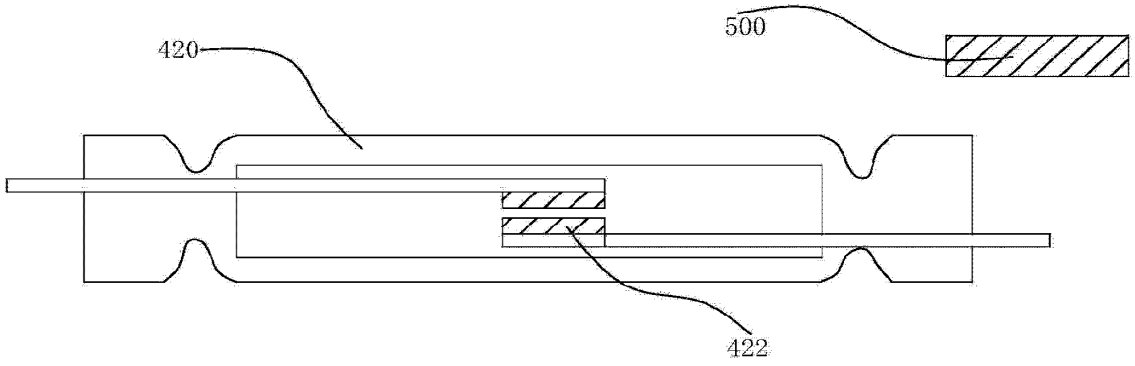


图 4

Petitioner Samsung Ex-1004, 0344

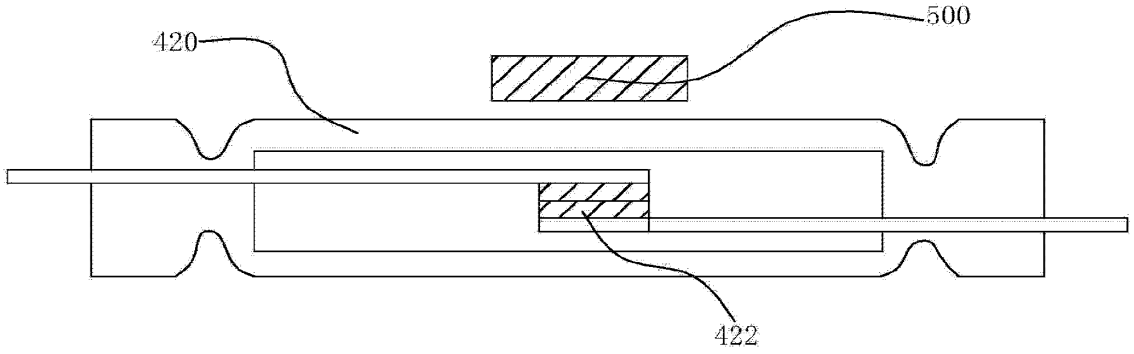


图 5

Petitioner Samsung Ex-1004, 0345

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/179,272	**04/18/2023 07:42:52 PM ET**	**984SPMO0048US13**

Title of Invention

WEARABLE COMPUTING DEVICE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	3508	FILED BY	Autumn Stoecker
PATENT CENTER #	61942951	FILING DATE	03/06/2023
CUSTOMER #	163435	FIRST NAMED INVENTOR	Curt C. von BADINSKI
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Steve Cho

Documents

TOTAL DOCUMENTS: 17

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
IDS_984SPMO0048US13.pdf	14	Information Disclosure Statement (IDS) Form (SB08)	1256 KB
BambooFlashDrive.PDF	3	Non Patent Literature	174 KB
CN204440426U.pdf	9	Foreign Reference	629 KB
CN204732935U.pdf	13	Foreign Reference	1047 KB
CN103441306.pdf	14	Foreign Reference	1226 KB
CN103109462A.PDF	53	Foreign Reference	3386 KB
CN103403627.pdf	91	Foreign Reference	10843 KB

LeefMagnetUSBFlashdrive.PDF	3	Non Patent Literature	235 KB
WO2012024889A1.pdf	18	Foreign Reference	668 KB
WO2009124076A1.pdf	33	Foreign Reference	1646 KB
EP OA for EP14866236.4.pdf	8	Non Patent Literature	1700 KB
EU SR for EP201205293.0.pdf	12	Non Patent Literature	820 KB
EP2660680.pdf	12	Foreign Reference	12272 KB
WO2013093638.pdf	24	Foreign Reference	19037 KB
WO2004078028.pdf	21	Foreign Reference	18438 KB
WO2011053235.pdf	50	Foreign Reference	2271 KB
WO2013163326.pdf	278	Foreign Reference	16083 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
IDS_984SPMO0048US13.pdf	2E94AA7C8B93CC4EB248C41898B40C44A982113545CAA0220CFE2DB2FC88118DC0864B60AEC71FE76A19F4984BA5F5A872B09595D3F265DB6CA21163591097FF
BambooFlashDrive.PDF	14035D9FEC0ACD9C4E841AA982110E98DFC0BF0A9569AA4F8D6D65D4911AF19D2810515EEB74E5274C014F592A902AA615765B68972A74D254A7221940F7672D
CN204440426U.pdf	81D6DDFC66947D1A214980A65FDF0C35A296E0345F0C080E6CBBDBC8C1C23A3CA8D10D511C15E21C239C8C3063C99C9F2FFD2225F132872FDBFAFAE3F1AF613C

CN204732935U.pdf	E286C4DDC6AA9030E8F82AF2C715E399AC16914CDC2E6435390EA6CB9518E595CFA1FAA21B9AE9D753F4B38E15BFECA3D301D9461BA96F7E7B9E594C649C66B0
CN103441306.pdf	4AC6B62D2C5EB894809387C837C8181999E48D327D03ACF5BE042C5ECF8F78E269D983EF7227F47EEDB41F037235462015543D1FF1625ABFC9743AF357FDF1CF
CN103109462A.PDF	1C32CA8492E4F922EF3FEA9D43086EC4AE4CA18D6976281FAE536D6FABA74C9E9D09DBFED7527E7237D5B959C92DC681725A538D3AFA30B6E83505454E75510D
CN103403627.pdf	FE55EB073F175205D21C0ADB21A6CA595A40C149A145BD498B20F6EBA0B365373BF34B67EAE6DA6DF5F54DD2DD879070651EA34E03B9ED98E38F64A3001EE2A3
LeefMagnetUSBFlashdrive.PDF	1B8C1C77E7362A0BA42DBAB33FCC987C6184E6064E7FB52AB5D9A05243B6959104EC4D712D8AC96583B30AC385D7C0E80399B61B9DD45862406F0C15A4310E55
WO2012024889A1.pdf	E9E25811ABEB5A6A0DF099E59B9E475AD4D05AECD1A420E9024905F0FDC4418CD2AC635429D2C1073C11E93EB1D19B18C73B374FD24C7EAEE04EEF70A73744EE
WO2009124076A1.pdf	9B4D8B9E1B423B5C7F36308BDDDC6FD6C69548579AE7F05DE74DD444C2DBC8998ECE0504DFB2E9E1E96041921290E279409A86601E331F67A504912A8BC63600
EP OA for EP14866236.4.pdf	278D3FF73634379BD1132E9F11D48D5B0E23493427F0CA5EB51554301805C59C127B13063DB7377D3B6710008325F9775BA495B66748055E07FB51060F23BABB
EU SR for EP201205293.0.pdf	E12E6FB9715C06F875579E024C3FB8C7E68F8DFCE9C209FE6C2143655973717205C80F3D0635FE92DBC675F21E8B96CC1AB92DBBEA17EA58176CA9D6B8CD2F1C
EP2660680.pdf	83899FCE42326EA5C46CC04DACFA383B84182A9CB3858AFD723928337165136D19A20320E1479E1729306411ED94F01E7BC9E4060B1DFE45A5FD2D275BF1EC7D

WO2013093638.pdf	81DC55805C71053AED8ADD4ECBFA0379F31422949D9EAF857E492E6999D4DD0CCF26DDE594CA10AE85240FDADE70AF4CEC47E3ACF4EAFF2B43B58E21DFC7A346
WO2004078028.pdf	FB7A2900CD0747EA18EEAD5CFF1F524C466EEC3C7C867AA192C17D675E8DDEC933935E48903633A40EF63BAB99A045BF59C36E3E9B2AF46E495CC1102A81554E
WO2011053235.pdf	C23C573FD5EC8745B7735126C8C0B9FF19E501FA41841A9CA7651C66D997396CCF46BDADB3F3FAF2FF94ED2FCF3AD9A88906D87C23F5EEA64F7B697C82DE57F0
WO2013163326.pdf	8CABFBA995F7303E41071AF3E5AE5A3D1160F024EA984777D8AE62B285425D13D3AD784E1B59446D85D5D6915D3CA904F02E2CE5CF489EDAFC72300384D52E0B

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国 际 局

(43) 国际公布日
2012 年 3 月 1 日 (01.03.2012)

PCT

(10) 国际公布号
WO 2012/024889 A1

(51) 国际专利分类号:
H02J 7/00 (2006.01) *H01M 10/44* (2006.01)
H01M 10/46 (2006.01)

(21) 国际申请号: PCT/CN2011/001298

(22) 国际申请日: 2011 年 8 月 8 日 (08.08.2011)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
201020503502.3 2010 年 8 月 23 日 (23.08.2010) CN

(72) 发明人; 及
(71) 申请人 : 王鸿 (WANG, Hong) [CN/CN]; 中国广东省东莞市清溪镇银坑工业区银松路一巷三号, Guangdong 523658 (CN)。

(74) 代理人: 深圳市嘉宏博知识产权代理事务所 (SHENZHEN JAHONGBO INTELLECTUAL PROPERTY AGENT OFFICE); 中国广东省深圳市福田区红荔西路鹏基上步工业厂房 302 栋第二楼东 201, Guangdong 518028 (CN)。

(81) 指定国 (除另有指明，要求每一种可提供的国家保护): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW。

(84) 指定国 (除另有指明，要求每一种可提供的地区保护): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), 欧洲 (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)。

本国际公布:
— 包括国际检索报告(条约第 21 条(3))。

(54) Title: PORTABLE CHARGER

(54) 发明名称 : 便携式充电器

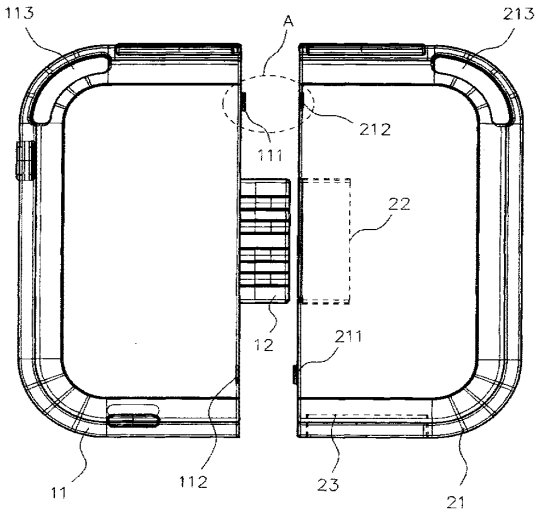


图 2 / FIG 2

(57) Abstract: A portable charger includes a first component (1) and a second component (2) capable of being separated and having internal circuits electrically connected to each other. The first component and the second component are fixed into one by a connecting device. When the portable charger is in use, the first component and the second component are fixed into one by the connecting device, and can be used for charging an electronic product; when the portable charger is not in use, the first component and the second component may be suspended from a keychain and a belt respectively or suspended from the neck through a lanyard. The portable charger is not only light and convenient for a user to use anytime, but also achieves a decorative effect.

[见续页]

WO 2012/024889 A1

Petitioner Samsung Ex-1004, 0350

(57) **摘要**:

一种便携式充电器，其包括内部电路相互电连接且可分离的第一部件（1）及第二部件（2），第一部件与第二部件通过连接装置固定为一体。便携式充电器使用时第一部件与第二部件通过连接装置固定为一体，可用于对电子产品进行充电；不使用时第一部件与第二部件可分别悬挂在钥匙扣、腰带上或通过挂绳悬挂在脖子上等，因而不仅轻便及便于使用者随时使用，而且具有装饰效果。

Petitioner Samsung Ex-1004, 0351

便携式充电器

技术领域

本实用新型涉及一种充电器，尤其是涉及一种便携式充电器。

背景技术

随着经济和科技的发展，人与人之间的活动更加频繁。此外，随着移动商务的普及，使手机、个人数字助理、数码相机及笔记本电脑等持有率大幅提高。这些移动商务工具通常都设置有提供工作电源的可充电电池，虽然电池可进行长时间供电，但随着使用时间的推移，电池电量耗尽后必须通过充电器对电池进行充电。

先前的充电器体积较大，放在衣袋或包内均不方便，为解决上述问题，专利申请号为 200720140072 的中国专利揭示了一种便携式充电器，其包括插头护罩、充电电路外壳、充电插头、电源线和电源线护罩。所述充电插头和电源插极相对嵌合，收置于插头护罩内。所述插头护罩和充电电路外壳外壁同充电插头平行方向外侧一周设有凹槽，供电源线缠绕；所述电源线护套捆绕电源线外围将其保护，从而在一定程度上可减小体积及相对便于携带。然而，现有的便携式充电器仍然不能满足需要。

实用新型内容

本实用新型是针对上述背景技术存在的缺陷提供一种不仅轻便及便于使用者随时使用，而且具有很好的装饰效果的便携式充电器。

Petitioner Samsung Ex-1004, 0352

为实现上述目的，本实用新型公开了一种便携式充电器，其包括内部电路相互电连接且可分离的第一部件及第二部件，所述第一部件与第二部件通过连接装置固定为一体。

进一步地，所述连接装置为一快速接头。

进一步地，所述连接装置可收容于所述第一部件或第二部件内。

进一步地，所述充电器的插头位于第一部件或第二部件上。

进一步地，所述插头可转动并收容于所述第一部件或第二部件内。

进一步地，所述充电器的充电插口位于第一部件或第二部件上。

进一步地，所述充电器的第一部件或第二部件上设置有可吊挂的挂件。

进一步地，所述插头的两插脚分别设置在所述第一部件或第二部件上。

进一步地，所述插脚可分别转动收纳于第一部件或第二部件内。

进一步地，高压电路及低压电路分别设置在所述第一部件或第二部件上，高压电路及低压电路电连接。

进一步地，所述第一收纳部件或第二部件内设有锂电池及电源转换开关，所述锂电池与所述插口电连接。

综上所述，本实用新型便携式充电器通过设置成内部电路相互电连接且可分离的第一部件及第二部件的形式，使用时所述第一部件与第二部件通过连接装置固定为一体，则可对电子产品进行充电；不使用时可分别悬挂在钥匙扣、腰带或通过挂绳悬挂在脖子上等，因而不仅轻便及便于使用者随时使用，而且具有很好的装饰效果。

附图说明

图 1 为本实用新型一种实施例的结构示意图；

Petitioner Samsung Ex-1004, 0353

图 2 为图 1 所示本实用新型的分解图；

图 3 为图 2 所示本实用新型的 A 区域的放大图。

具体实施方式

为能进一步了解本实用新型的特征、技术手段以及所达到的具体目的、功能，下面结合附图与具体实施方式对本实用新型作进一步详细描述。

请参阅图 1 至图 3，本实用新型便携式充电器包括一第一部件 1 及一第二部件 2。所述第一部件 1 设置有一第一绝缘壳体 11，所述第一绝缘壳体 11 内装设有高压电路及与所述高压电路电连接的一 USB 公口 12，所述 USB 公口 12 与所述第一绝缘壳体 11 活动连接，所述 USB 公口 12 延伸到所述第一绝缘壳体 11 外并可收容于所述第一绝缘壳体 11 内。

所述第一绝缘壳体 11 位于所述 USB 公口 12 的两侧分别设置有一第一扣接柱 111 及一第一扣接槽 112，所述第一扣接柱 111 的自由端的横截面积大于所述第一扣接柱 111 中部的横截面积。所述第一扣接槽 112 的远离槽口的一端的宽度大于所述槽口的宽度。所述第一绝缘壳体 11 的一端设置有一第一穿孔 113，从而使所述第一绝缘壳体 11 形成一可吊挂的挂件。所述第一部件 1 连接有一与所述高压电路电连接的插头，所述插头设置有两插脚，所述插头可转动并收容于所述第一绝缘壳体内，从而所述插脚可收纳于所述第一绝缘壳体 11 内。

所述第二部件 2 设置有一第二绝缘壳体 21，所述第二绝缘壳体 21 内装设有低压电路及与所述低压电路电连接的一 USB 母口 22 及一充电插口 23，所述 USB 母口 22 与所述 USB 公口 12 位置相对应，所述第二绝缘壳体 21 位于所述 USB 母口 22 的两侧分别设置有一第二扣接柱 211 及一第二扣接槽 212，

Petitioner Samsung Ex-1004, 0354

所述第二扣接柱 211 及所述第二扣接槽 212 分别与所述第一扣接柱 111 及所述第一扣接槽 112 位置相对。

所述第二扣接柱 211 的自由端的横截面积大于所述第二扣接柱 211 中部的横截面积。所述第二扣接槽 212 的远离槽口的一端的宽度大于所述槽口的宽度。所述第二部件 2 的一端设置有一第二穿孔 213，从而使所述第二绝缘壳体 21 形成一可吊挂的挂件。所述第二绝缘壳体 21 内装设有锂电池及电源转换开关，所述锂电池与所述低压电路及所述充电插口 23 电连接并通过所述低压电路对所述锂电池充电。所述电源转换开关作为充电模式选择开关。

使用本实用新型时，将所述第一部件 1 及第二部件 2 对应插接，即所述第一扣接柱 111 及所述第二扣接柱 211 分别与所述第二扣接槽 212 及所述第一扣接槽 112 对应插接，所述 USB 公口 12 插设在所述 USB 母口 22 上，使高压电路及低压电路实现电连接，从而组成一个功能完整的充电器。通过将所述插头与插座插接，所述充电插口 23 与手机等可充电的电子产品电连接，便可进行充电。

在本实施例中，所述所述第一扣接柱 111 及所述第二扣接柱 211 作为所述第一部件 1 及第二部件 2 的连接装置。通过设置所述锂电池及电源转换开关，因而当在旅行等出门在外时，通过将所述电源转换开关拨为锂电池向外供电的模式，从而可通过所述锂电池对手机等进行充电。

综上所述，本实用新型便携式充电器通过设置成内部电路相互电连接且可分离的第一部件 1 及第二部件 2 的形式，使用时所述第一部件 1 与第二部件 2 通过连接装置固定为一体，则可对电子产品进行充电；不使用时可分别悬挂在

Petitioner Samsung Ex-1004, 0355

钥匙扣、腰带或通过挂绳悬挂在脖子上等，因而不仅轻便及便于使用者随时使用，而且具有很好的装饰效果。

以上所述实施例仅表达了本实用新型的一种实施方式，其描述较为具体和详细，但并不能因此而理解为对本实用新型范围的限制。应当指出的是，对于本领域的普通技术人员来说，在不脱离本实用新型构思的前提下，还可以做出若干变形和改进，例如，将所述连接装置设置为快速接头等，这些都属于本实用新型的保护范围。因此，本实用新型的保护范围应以所附权利要求为准。

Petitioner Samsung Ex-1004, 0356

权 利 要 求 书

1、一种便携式充电器，其特征在于：包括内部电路相互电连接且可分离的第一部件（1）及第二部件（2），所述第一部件（1）与第二部件（2）通过连接装置固定为一体。

2、根据权利要求 1 所述的便携式充电器，其特征在于：所述连接装置为一快速接头。

3、根据权利要求 1 所述的便携式充电器，其特征在于：所述连接装置可收容于所述第一部件（1）或第二部件（2）内。

4、根据权利要求 1 所述的便携式充电器，其特征在于：所述充电器的插头位于第一部件（1）或第二部件（2）上。

5、根据权利要求 4 所述的便携式充电器，其特征在于：所述插头可转动并收容于所述第一部件（1）或第二部件（2）内。

6、根据权利要求 1 或 2 所述的便携式充电器，其特征在于：所述充电器的充电插口（23）位于第一部件（1）或第二部件（2）上。

7、根据权利要求 1 所述的便携式充电器，其特征在于：所述充电器的第一部件（1）或第二部件（2）上设置有可吊挂的挂件。

8、根据权利要求 1 所述的便携式充电器，其特征在于：所述插头的两插脚分别设置在所述第一部件（1）或第二部件（2）上。

9、根据权利要求 8 所述的便携式充电器，其特征在于：所述插脚可分别转动收纳于第一部件（1）或第二部件（2）内。

Petitioner Samsung Ex-1004, 0357

10、根据权利要求 1 所述的便携式充电器，其特征在于：高压电路及低压电路分别设置在所述第一部件（1）或第二部件（2）上，高压电路及低压电路电连接。

11、根据权利要求 1 所述的便携式充电器，其特征在于：所述第一收纳部件或第二部件（2）内设有锂电池及电源转换开关，所述锂电池与所述插口电连接。

Petitioner Samsung Ex-1004, 0358

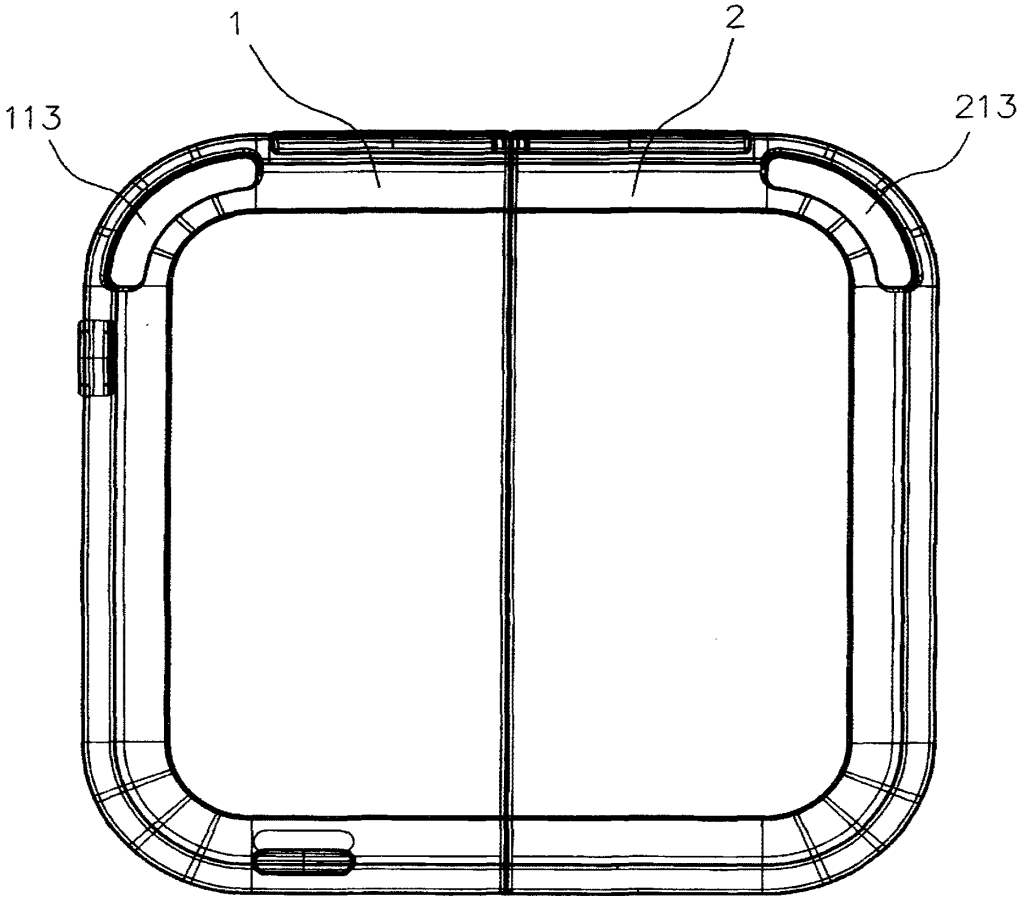


图 1

Petitioner Samsung Ex-1004, 0359

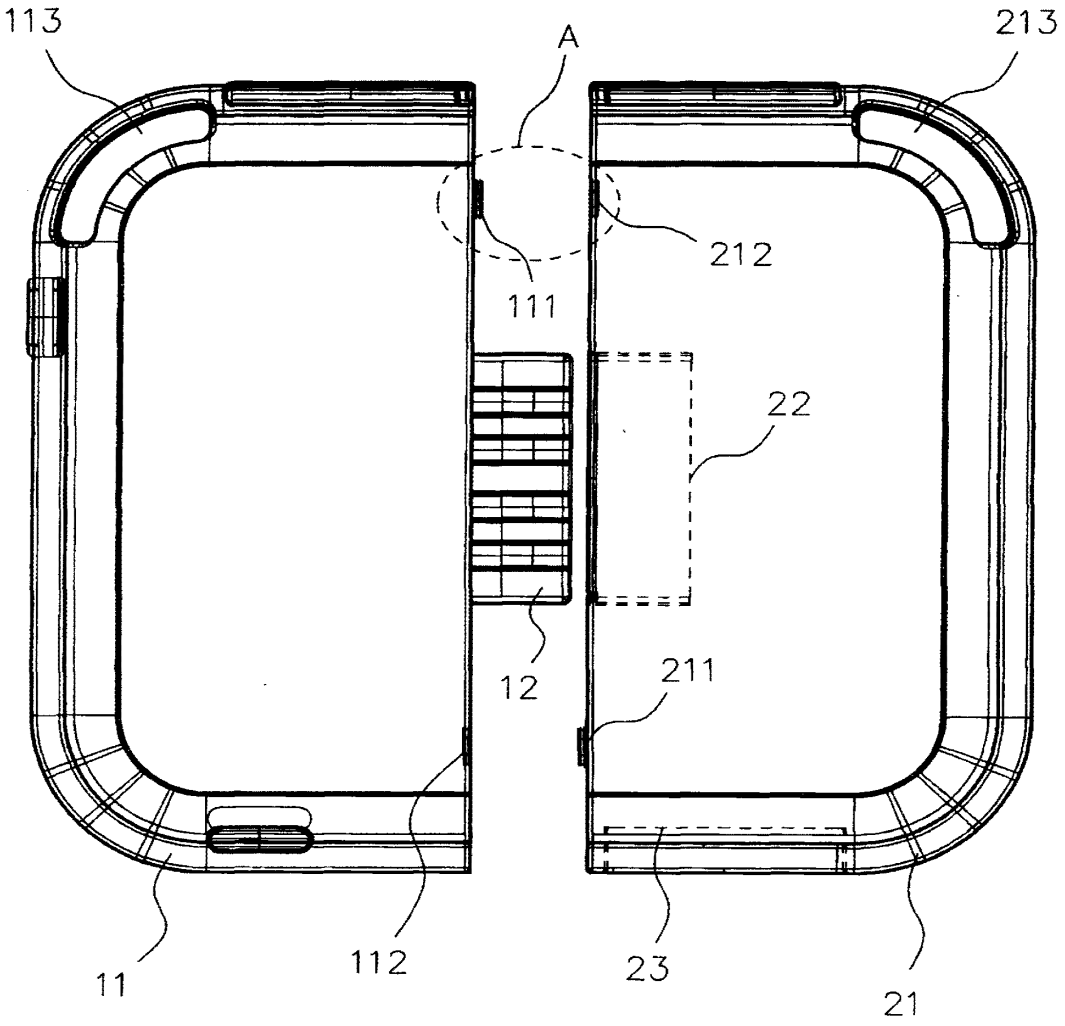


图 2

Petitioner Samsung Ex-1004, 0360

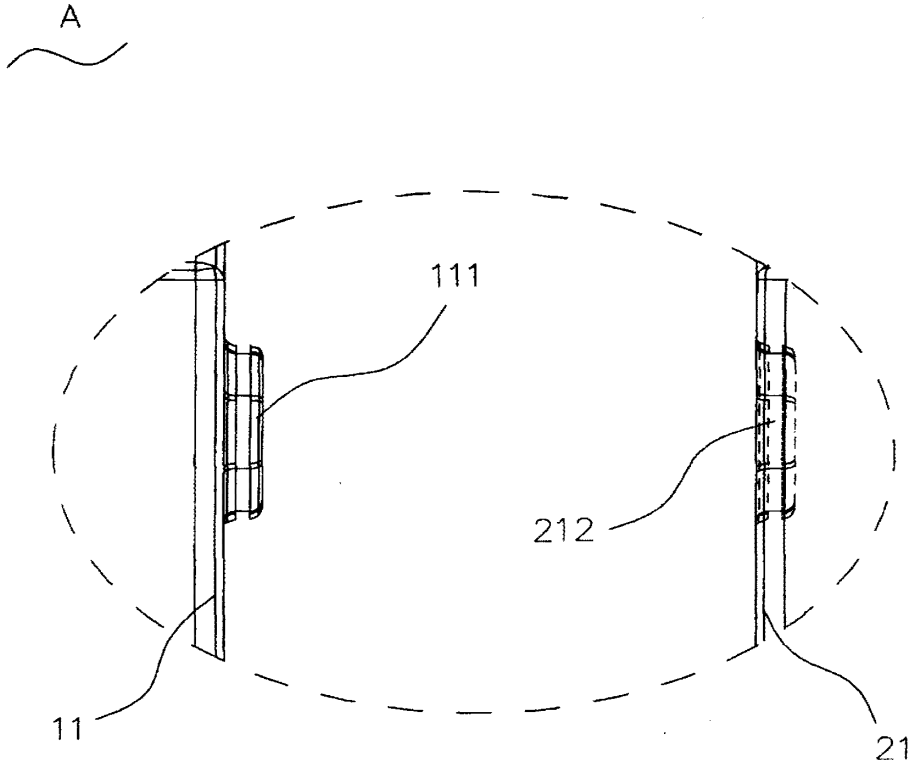


图 3

Petitioner Samsung Ex-1004, 0361

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2011/001298

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
US2004/0204177A1	14.10.2004	None	
CN201509212U	16.06.2010	None	
US4211968A	08.07.1980	CA1130375A	24.08.1982
CN101009433A	01.08.2007	JP2007-215320A	23.08.2007
		US2007/0182368A1	09.08.2007
CN201781304U	30.03.2011	None	

Petitioner Samsung Ex-1004, 0363

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2011/001298

A. CLASSIFICATION OF SUBJECT MATTER

H02J 7/00 (2006.01) i
H01M 10/46 (2006.01) i
H01M 10/44 (2006.01) i

Petitioner Samsung Ex-1004, 0364

国际检索报告

国际申请号
PCT/CN2011/001298

A. 主题的分类

参见附加页

按照国际专利分类(IPC)或者同时按照国家分类和 IPC 两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC：H02J, H01M

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

CNPAT，EPODOC，WPI，CNKI：充电，电源，供电，便携，携带，应急，备用，辅助，组合，分体，分离，拆，组装，插头，插脚，变压，转换，开关，charge, power, source, supply, portable, pocket, handy, emergency, secondary, auxiliary, combin+, detach+, remov+, assembly, plug, pin, blade, transformer, change, switch

C. 相关文件

类　型*	引用文件，必要时，指明相关段落	相关的权利要求
X	US2004/0204177A1（PORNG DA ENTERPRISE CO LTD） 14.10 月 2004 (14.10.2004) 说明书第 16－19 段，权利要求 1，图 3	1,2,4-6,8,9
Y		11
X	CN201509212U（李永恒）16.6 月 2010 (16.06.2010) 说明书第 23－35 段，图 1－6	1,3,7
X	US4211968A（GENERAL ELECTRIC CO）08.7 月 1980 (08.07.1980) 说明书第 2 栏第 17 行－第 4 栏第 10 行，图 1－8	1,10
Y	CN101009433A（祥业科技股份有限公司）01.8 月 2007（01.08.2007） 说明书第 4 页倒数第 2 段－第 7 页第 3 段，权利要求 1，图 1－9B	11
PX	CN201781304U（王鸿）30.3 月 2011（30.03.2011）全文	1-11

☐ 其余文件在 C 栏的续页中列出。　　☒ 见同族专利附件。

* 引用文件的具体类型：

"A" 认为不特别相关的表示了现有技术一般状态的文件

"E" 在国际申请日的当天或之后公布的在先申请或专利

"L" 可能对优先权要求构成怀疑的文件，或为确定另一篇引用文件的公布日而引用的或者因其他特殊理由而引用的文件（如具体说明的）

"O" 涉及口头公开、使用、展览或其他方式公开的文件

"P" 公布日先于国际申请日但迟于所要求的优先权日的文件

"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了理解发明之理论或原理的在后文件

"X" 特别相关的文件，单独考虑该文件，认定要求保护的发明不是新颖的或不具有创造性

"Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件结合并且这种结合对于本领域技术人员为显而易见时，要求保护的发明不具有创造性

"&" 同族专利的文件

国际检索实际完成的日期	国际检索报告邮寄日期
07.11 月 2011（07.11.2011）	**17.11 月 2011 (17.11.2011)**
ISA/CN 的名称和邮寄地址： 中华人民共和国国家知识产权局 中国北京市海淀区蓟门桥西土城路 6 号 100088 传真号：　(86-10)62019451	受权官员 傅琦 电话号码：(86-10) **6241 1772**

PCT/ISA/210 表(第 2 页) (2009 年 7 月)

Petitioner Samsung Ex-1004, 0365

国际检索报告
关于同族专利的信息

国际申请号
PCT/CN2011/001298

检索报告中引用的专利文件	公布日期	同族专利	公布日期
US2004/0204177A1	14.10.2004	无	
CN201509212U	16.06.2010	无	
US4211968A	08.07.1980	CA1130375A	24.08.1982
CN101009433A	01.08.2007	JP2007-215320A	23.08.2007
		US2007/0182368A1	09.08.2007
CN201781304U	30.03.2011	无	

Petitioner Samsung Ex-1004, 0366

国际检索报告

国际申请号
PCT/CN2011/001298

A. 主题的分类：

H02J 7/00 (2006.01) i

H01M 10/46 (2006.01) i

H01M 10/44 (2006.01) i

Petitioner Samsung Ex-1004, 0367

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
5 May 2011 (05.05.2011)

PCT

(10) International Publication Number
WO 2011/053235 A1

(51) International Patent Classification:
G06F 3/033 (2006.01)

(21) International Application Number:
PCT/SE2010/051167

(22) International Filing Date:
27 October 2010 (27.10.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0901401-0 2 November 2009 (02.11.2009) SE

(72) Inventors; and
(71) Applicants : **WISSMAR, Stanley** [SE/SE]; Ndamosling-gatan 1, SE-175 66 Järfälla (SE). **RAJAMSON, Henry** [SE/SE]; Sittmansvägen 11D, SE-195 48 Märsta (SE).

(74) Agent: **ALBIHNS.ZACCO AB**; P.O Box 5581, Valhallavägen 117, S-114 85 Stockholm (SE).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(54) Title: ELECTRONIC FINGER RING AND THE FABRICATION THEREOF

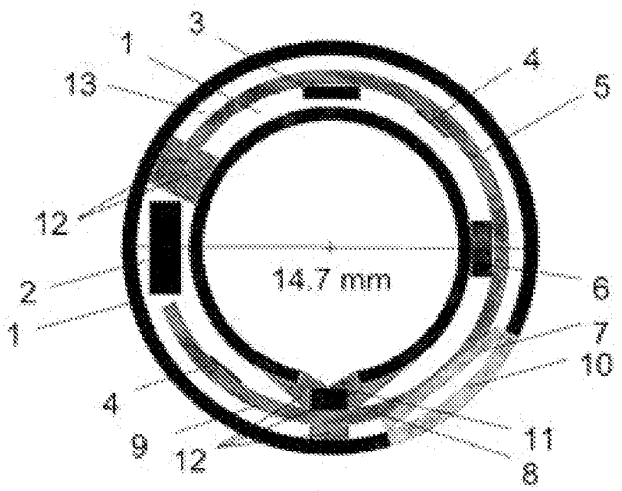


Fig. 1

(57) Abstract: The present invention provides an electronic finger ring (1) for wireless, 4-dimensional remote steering and/or monitoring. The electronic finger ring comprises electronic components packaged and integrated in different ways to obtain either omni- or unidirectional RF transmission dependent on its application, e.g. acting as a multiple steering device communicating with nearby electronic devices wirelessly or for wireless user medical diagnostics.

WO 2011/053235 A1

Petitioner Samsung Ex-1004, 0368

ELECTRONIC FINGER RING AND THE FABRICATION THEREOF

Technical Field of the Invention

The present invention relates to a toroidal finger ring, in particular to such an accessory comprising several electrical- and micromechanical components acting as a multiple sensor device communicating with nearby electronic devices wirelessly with e.g. bluetooth technology.

Background of the Invention

A computer mouse (or equivalent touchpad or touchscreen) is used as a steering device to control the two dimensional (horizontal and vertical) motion of an icon on a computer screen (stationary pc, laptop, pda). It takes up large space which limits the user's freedom of movement. Through the years several types of models has been developed and manufactured; mechanical-, optical-, laser- and inertial- computer mouses. The last mentioned using accelerometers to steer the mouse pointer in x- and y- directions.

Another application uses micromechanical accelerometers on top of a finger ring to control sound effects to an electric guitar (see www.sourceaudio.net/index.php).

On yet another application a finger ring is used for mobile voice communication where it is integrated with a microphone and speakers in order to transfer sonar vibrations from the speakers (see " A finger-ring shaped wearable handset based on bone-conduction", Fukumoto, M; Wearable Computers, Procedings, Ninth IEEE International Symposium on 18-21 Oct. 2005, pages 10-13).

U.S. Pat. No. 2003/0142065 A1 describes a ring-like device which encompasses several electronic components carried on a flexible printed circuit board (FPCB).

U.S. Pat. No. 2003/0227437 A1 describes a pointing device which is characterized by a band that is mountable on a computer user's thumb.

Petitioner Samsung Ex-1004, 0369

U.S. Pat. No. 2004/0032346 A1 describes a distancing sensing unit to function primarily as a virtual keyboard.

U.S. Pat. No. 2005/0052412 A1 describes a human interface machine interface used exclusively as a computer mouse type device.

U.S. Pat. No. 2006/0001646 A1 describes an operating device which is "C" shaped.

German Pat. No. DE102005021527 A1 describes an operating device which has electronic components embodied in a structure mounted on top of the finger ring.

U.S. Pat. No. US005638092 describes a cursor control system exclusively used in connection to a keyboard.

Summary of the Invention

It is an object of the invention to solve or at least mitigate one or more problems associated with the above mentioned devices according to prior art.

In particular, it is an object of the invention to provide a user-friendly steering device for controlling an external electronic device, such as a computer.

This object is achieved by an electronic finger ring as defined by claim 1.

This electronic finger ring offers an effective and ergonomic way of steering/controlling an external electronic device in up to four dimensions.

Specific embodiments of the invention are defined in the dependent claims, the advantages of which are apparent from the detailed description following hereinafter.

The present invention is based on the understanding that an alternative steering device design, compared to an established computer mouse, can be achieved using an electronic finger ring based on a 4-dimensional steering device control integrated in the rings interior.

Petitioner Samsung Ex-1004, 0370

According to a first aspect of the present invention, there is provided an accelerometer for motion sensing, to steer in a 3-dimensional space. There is further provided a micromechanical pressure sensor in order to steer in an additional 4th dimension, i.e. a steering device design which facilitates to additionally move/control a mouse cursor in a 4th dimension on a computer screen (or equivalent). This gives the user the ability to; for example, zoom in or out of a picture on a computer screen. Additionally custom pre-configure it to the users need in different situations dependent on application; like in a home environment: turn on or off home entertainment system in 1st dimension; change to tv- music- or movie mode in a 2nd dimension; change tv channel/music- or movie track in a 3rd dimension and start-, stop- or pause track in a 4th dimension. That the pressure sensor is adapted to allow steering in an additional 4th dimension means, at least in some embodiments of the invention, that the pressure sensor is adapted to control a function of the external electronic device not relating to steering in a 3-dimensional space.

Alternatively, the micromechanical pressure sensor may function as a finger plethysmograph providing a non-invasive measurement for changes in finger blood flow reflected by pulse wave amplitude (PWA).

The above mentioned active components are combined with mixed signal microcontrollers enabling control and signal processing of these aforementioned active components. To communicate with other, external electronic devices a radio frequency (RF) transceiver is electrically connected to the previous mentioned active components. All the aforementioned electronic components are mounted on a flexible printed circuit board (FPCB) where conductor lines electrically connect the individual components. The actual order and placement of the respective components are novel in order to obtain the desired functionality and packaging inside the toroidal shaped ring. To obtain matching currents and voltages for individual active components passive components are connected. These passive components could either be mounted on the FPCB as individual physical components or be integrated in the FPCB.

To supply power to the components, they may be connected to a battery integrated in the electronic finger ring. In one embodiment, these aforementioned components constitute the internal electronic circuit of the electronic finger ring.

Petitioner Samsung Ex-1004, 0371

An alternative to provide a source of energy is integrating the conformal coating with piezoelectric nanofibers (for example, pzt – lead zirconate titanate – or zink oxide materials), which converts mechanical energy to electrical energy, which can be placed/located on both the outer- and/or inner circumference of the fpcb and connected electrically to the fpcb to provide electricity to the electrical components.

Yet an alternative power source for powering the electronic components of the finger ring is a coil for generating induced current to the components when the ring is subject to an alternating magnetic field. Such a coil may be integrated in the ring and be used instead of, or in addition to, a battery and/or piezoelectric nanofibres.

In an embodiment of the present invention, after the electrical components are mounted and electrically connected to the FPCB they are covered with nonconductive, conformal coating.

To further reduce the RF radiation on the electrical components as well as the user's finger, the conformal coating, coated on the inner circumference of the FPCB, is mixed with cenospheres, a material which functions as a RF shielding. In one embodiment, the above mentioned piezoelectric nanofibers are integrated in the conformal coating.

A great advantage of the electronic finger ring of the present invention is that the whole ring constitutes the complete electronic circuit. That is, the complete electronic circuit is integrated in the interior of the electronic finger ring. In one embodiment in which the ring is a toroidal shaped metal ring it functions as (i). an external antenna, to obtain coarse tuning to the operational frequency, connected to the internal antenna and RF transceiver located inside the ring or as an (ii) electric ground plane to the internal antenna.

In an embodiment of the present invention, constituting the top metal layer on the interfaces of the toroidal halves is a material which has two functions, (i). to enhance the welding between the joints by its chemical, adhesive properties and (ii). enhancing the hermetic encapsulation (i.e. lowering the pressure in the sealed ring cavity) by its getter properties.

In an embodiment of the present invention, the aforementioned pressure sensor is located in a cavity within the electronic finger ring where the inlet hole geometry is

Petitioner Samsung Ex-1004, 0372

shaped as a horn cone to maximize the pressure compression ratio at the pressure sensor end.

In an embodiment of the present invention, the aforementioned cenospheres can further be deposited on the exterior of the inner circumference of the ring shell in order to reduce RF radiation on the user's finger.

In an embodiment of the present invention to adapt and optimize to different applications the antenna has different designs : (i). External, omnidirectional (ii). internal integrated unidirectional (iii). internal integrated unidirectional with extended, elevated housing (iv). Dielectric integrated with folded monopole.

An intermediate metal strip layer is designed to function as a microstrip feed (transmission) line, electrically connecting an RF transceiver with the internal antenna, preferably optimized to obtain 50 Ω matching impedance. This implies limitations in how the components, the internal antenna and RF transceiver, are placed within the toroidal shaped finger ring.

In an embodiment of the present invention, to complete the design of the aforementioned antennas they are respectively combined with a ground plane located in (i). intermediate layers in the FPCB (ii). or when a portion of the toroidal shaped ring has a dielectric part integrated with folded monopole antenna, the remaining toroidal shaped outer metallic shell functions as a ground plane.

In an embodiment of the present invention, a portion of an outer metal shell is opened to function as a window housing to allow unperturbed RF radiation either (i). having a shape which is identical to the toroidal ring or (ii). Constitute of a dielectric material in said portion of ring or (iii). have a locally extended, elevated sphere shape to minimize return losses of the RF radiation.

Another object of the invention is to provide an alternative use of a finger ring apart from being an aesthetical and/or cultural valued item.

Other objects of the invention are to address the following problems:

- how to integrate an antenna having either omnidirectional or unidirectional radiation properties in a finger ring,

Petitioner Samsung Ex-1004, 0373

- how to design an electric circuit comprising various electrical- and/or micromechanical components which can be integrated in a normally sized finger ring.
- how to manufacture a finger ring comprising integrated electrical- and/or micromechanical components.
- how to manufacture such a ring in a way that increases the lifetime and/or the performance of the ring.

Yet another object of the invention is to provide an electronic finger ring design allowing the ring to be adapted for one or more of the following applications:
(i). Steer and control the functions of electronic devices which are in the users immediate vicinity
(ii). Identification – to use instead of an ordinary security pass card
(iii). Electronic payment – to use instead of an existing credit card
(iv). For continuous measurement and diagnosis of a user's health state – A person diagnosed with Parkinson disease needs his or hers finger or hand tremor movements to be continuously monitored in order to receive proper medication or treatment by medical staff
(v). For mute persons – to improve real-time communication with people who do not understand sign language
(iv). For communication – to inform the ring user about something
(vii). Assault larm – when suspecting assault the person carrying the electronic fingering can perform an immediate action with the ring and a signal is wirelessly transmitted to his or her's mobile phone which in turn automatically sends an emergency call for help
(viii). Finger Plethysmograph - to provide a non-invasive measurement for changes in finger blood flow reflected by pulse wave amplitude (PWA) for accurate data collection technique, used for example monitoring heart periods for use in heart rate variability (HRV) calculations.

All of the above objects may be achieved according to the invention by means of a toroidal shaped finger ring hermetically encapsulating electrical components allowing the ring to communicate wirelessly with electronic devices in its immediate vicinity while at the same time having the aesthetic properties of a conventional jewellery ring.

Petitioner Samsung Ex-1004, 0374

Brief description of the drawings

The above, as well as additional objects, features and advantages of the present invention, will be better understood through the following illustrative and non-limiting detailed description of preferred embodiments of the present invention, with reference to the appended drawings, wherein the same reference numerals are used for similar elements, and in which:

Fig. 1 is a schematic profile view of the electronic finger ring where the electronic components are mounted on a flexible printed circuit board packaged inside the torus shaped finger ring with a pressure sensor facing the inner boundary of the torus in accordance with an embodiment of the present invention.

Fig. 2 is a schematic top view of the electronic components mounted on both sides of a flexible printed circuit board.

Fig. 3 is a schematic profile view zoomed on the inlet hole shaped as a horn cone to maximize the pressure compression ratio at the pressure sensor end.

Fig. 4 is a schematic profile view of the electronic components mounted on a flexible printed circuit board packaged inside a torus shaped finger ring with an alternative design having the pressure sensor being placed on the outer boundary of the torus.

Fig. 5 is a schematic profile view of the electronic components mounted on a flexible printed circuit board packaged inside a torus shaped finger ring with an alternative design having a folded monopole antenna.

Fig 6. is a schematic top view of the electronic components mounted on both sides of a flexible printed circuit board having an alternative design with a folded monopole antenna.

Fig 7 is a schematic three dimensional view of the torus shaped electronic finger ring where the outer and inner metal shells are constituted of two different metals to allow unidirectional, unperturbed RF radiation in accordance with another embodiment of the present invention.

Petitioner Samsung Ex-1004, 0375

Fig. 8 is a schematic, three dimensional illustration of the cross section of the inner and outer toroidal shells showing how the different metal layers are deposited in accordance with another embodiment of the present invention.

Fig. 9 is a schematic illustration of the top and bottom halves of the ring toroidal shell where the interface (as well as inner surface) is a titanium compound in accordance with another embodiment of the present invention.

Fig. 10 is a schematic view of an external, coarse, omnidirectional design where the whole toroidal shaped metallic shell functions as an RF antenna in accordance with an embodiment of the present invention.

Fig. 11 is a schematic view of where the internal, unidirectional antenna is located where the outer shell is opened leaving the inner shell exposed (constituted of Titanium compound) to allow unperturbed RF radiation in accordance with an embodiment of the present invention.

Fig. 12 is a schematic view of an extended, unidirectional antenna housing constituted of an integrated sphere design which has no top shell material deposited leaving the inner shell exposed (constituted of Titanium compound) to allow unperturbed RF radiation transmission in accordance with an embodiment of the present invention.

Fig. 13 is a schematic illustration of a monopole antenna design integrated in a dielectric material in accordance with an embodiment of the present invention.

Fig. 14 is a schematic illustration of a monopole antenna design which is located where an outer shell is opened leaving the inner shell exposed to allow unperturbed RF radiation in accordance with an embodiment of the present invention.

Fig 15 is a schematic view of how the ground planes on the FPCB are designed. The ground plane facing the outer circumference of the ring acts as a ground plane for the RF antenna circuitry, the ground plane facing the inner circumference of the ring acts as a ground plane and optionally also a thermal heat sink for the electronic components; in accordance with an embodiment of the present invention.

Petitioner Samsung Ex-1004, 0376

Fig 16 is a schematic view showing how the microstrip is connected to the RF transceiver with the adjacent groundplanes as intermediate layers in the FPCB. Additional conductor lines, Vcc etc. are not shown; in accordance with an embodiment of the present invention.

Fig 17 is a cross sectional view of the folded monopole antenna showing how it obtains its desired geometry after integrated in the ring in accordance with an embodiment of the present invention.

Fig 18 is a top view of the folded monopole antenna in accordance with an embodiment of the present invention.

Fig. 19 is a three-dimensional illustration view of the folded monopole antenna in accordance with an embodiment of the present invention.

Detailed description of Embodiments of the Invention

The following description is of the best mode presently contemplated for carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of describing the general principles of the invention. The scope of the invention should be determined with reference to the claims.

A toroidal shaped, electronic finger ring constitutes the complete electronic circuit. The toroidal shaped metal ring functions as either (i). an external antenna, to obtain coarse tuning to the operational frequency, which is connected to the internal antenna and RF transceiver located inside the ring or as an (ii) electric ground plane to an internal antenna.

The electronic finger ring functions as a 4-dimensional steering device where an accelerometer steers in 3-dimensional space and a pressure sensor steers in an additional 4th dimension, i.e. a novel steering device design.

With reference to Fig. 1 and 2, a first embodiment of the present invention is a toroidal shaped finger ring structure 1, constituted of two different metallic shells: (i). 1a, made of gold (Au) or silver (Ag), enclosing the major parts of the finger ring structure geometrically described as radially furthest away from the toroids centre, and (ii). 1b,

Petitioner Samsung Ex-1004, 0377

made of a titanium compound (Ti, TiW), being the metal enclosing facing the inner parts of the finger ring structure. The toroidal shaped finger ring structure 1 is comprised of different electronic components: a battery 2, a RF transceiver 3 and a micro processor 4, a microstrip line 5, an accelerometer 6, an internal antenna 7, a pressure sensor 8, all mounted on a flexible printed circuit board 9. In this embodiment, there is also an outer metal shell opening 10 serving as an RF window letting through unperturbed RF radiation. In this embodiment, at the inner boundary of the toroidal shaped finger ring structure 1 located at the pressure sensor 8 there is an inlet hole shaped as a horn cone to maximize the pressure compression ratio at the pressure sensor end 11. To permanently place the pressure sensor and one end of the flexible printed circuit board in respective places, fixtures 12, are casted as part of the metallic shell. In this embodiment, there is a protective coating layer 13 located between the outer boundary of the toroidal shaped finger ring structure 1 and the flexible printed circuit board 9, and another form of protective coating (with cenospheres) 14 located between the inner boundary of the toroidal shaped finger ring structure 1 and the flexible printed circuit board 9, as explained above. The internal antenna 7 is connected to the RF transceiver 3 by a microstrip line 5, where the design of the microstrip is optimized to obtain 50 Ω matching impedance. In the case of an external antenna option, the outer shell of the toroidal shaped finger ring structure 1 serves as a coarse antenna. In the case of using exclusively an internal antenna option, the internal antenna is located at a position along the circumference of the toroidal shaped finger ring structure 1 where there is no outer metallic shell covering 10 allowing unperturbed, unidirectional radiation.

In this embodiment, the above mentioned active components are combined with micro processor 4 enabling control and signal processing of these aforementioned active components. To communicate with other, external electronic devices an RF transceiver is electrically connected to the previous mentioned active components. All the aforementioned electronic components are mounted on a flexible printed circuit board (FPCB) where conductor lines electrically connect the individual components. The actual order and placement of the respective components are optimized in order to obtain the desired functionality and packaging inside the toroidal shaped ring. To obtain matching currents and voltages for individual active components passive components are connected (not shown). These passive components could either be mounted on the FPCB as individual physical components or be integrated in the FPCB.

Petitioner Samsung Ex-1004, 0378

To supply power to the components a battery 2 is connected. These aforementioned components comprise the internal electronic circuit of the electronic finger ring.

In this embodiment of the present invention, after the electrical components are mounted and electrically connected to the FPCB they are painted with a nonconductive and preferably conformal coating 13. Commonly used conformal coatings are silicone, epoxy, acrylic, urethane and paraxylene. The function of the coating is to (i). prevent damage from rough handling, (ii). reduction of mechanical and thermal stress as well as (iii). prolonging the lifetime of the components. Also to (iv). increase the dielectric strength between conductors lines on the FPCB enabling the design of the FPCB to be more compact and small.

As the electrical components are mounted on one side of the FPCB, the inside circumference of the FPCB, the conformal coating absorbs the stress released from forming the FPCB into a toroidal/circular shape, thus reducing the risk of the respective electrical component and FPCB losing mechanical or electrical connection to each other.

In fig. 15 and 16, to reduce RF radiation generated from the antenna circuitry the FPCB has one or several intermediate ground planes 17, which serves to (i). reflect any RF radiation directed inward (ii). function as a ground plane for the antenna circuitry reducing return losses of the RF radiation and (iii). function as a circuit ground plane for the electrical components and, optionally also as a (iv). thermal heat sink. The electrical components are placed on the inner circumference of the FPCB in such an order to minimize RF radiation generated from the aforementioned antenna. Due to the design limitations inherit in the antenna circuitry, constituted of the antenna, microstrip line, RF transceiver, the order and placement of the same in respect to the ground planes are critical in order to obtain a sufficient shielding minimizing the aforementioned RF radiation. Thus the ground planes located in the FPCB are designed to stretch at least in-between from where the internal antenna is located on the outer circumference side of the FPCB and the RF transceiver located in the inner circumference side of the FPCB.

To further reduce the RF radiation on the electrical components as well as the users finger, the conformal coating 14, coated on the inner circumference of the FPCB, can be made (mixed) with such material which functions as a RF shielding. This material can be made of cenospheres (constituted of a range of nanoparticle sized metal oxides) which reflects RF radiation.

Petitioner Samsung Ex-1004, 0379

An intermediate metal strip layer 5 is designed to function as a microstrip feed (transmission) line, electrically connecting the RF transceiver with the internal antenna, preferably optimized to obtain 50 Ω matching impedance.

The range for the width and length of the microstrip feed line must be such that each dimension of the microstrip feed line radiates only the required frequency (2.4 GHz). For a toroidal shaped antenna of this invention thus requires a microstrip feed line length, $l_{microstrip\ line}$, along the circumference of the ring described as $l_{microstrip\ line}(max) = 0.30\lambda$ and $l_{microstrip\ line}(min) = 0.20\lambda$, where λ is the wavelength to the corresponding radiation frequency (λ = 125 mm @ 2.4 GHz). In analogy, the microstrip feed line width is required to be in the range of w(min) = 0.008λ and w(max) = 0.028λ.

In fig. 3, the aforementioned pressure sensor is located in a cavity within the electronic finger where the inlet hole geometry is shaped as a horn cone to maximize the pressure compression ratio at the pressure sensor end. To optimize sensitivity the inlet hole should have a minimum aspect ratio size difference of the diameter of the narrow end, x, of the horn cone to the outer end, y as 1:10; equivalently, the total height, m, of the horn cone should have an aspect ratio size to the height of the narrow end of the horn cone, n, as 6:1.

The pressure sensor can be located in two alternative positions as seen in fig. 1 and fig. 4 to steer in a 4th dimension, the former by vertical finger movement (i.e. bending) of the finger the electronic finger ring is mounted on; the later by, for example, a finger on the other hand of the user. In Fig. 1, the pressure sensor 8 and the inlet hole are located so that the cavity housing the sensor 8 faces the inner circumference of the toroidal shaped finger ring structure 1. This location makes the pressure on the pressure sensor increase when the finger carrying the ring is bended since the tissue of the lower part of the finger then becomes compressed and expanded in its radial direction. Thus, steering an external device to which the ring is connected in a 4th dimension is easily achieved by simply bending/vertically moving the finger carrying the ring. In Fig. 4, the pressure sensor 8 and the inlet hole are located so that the cavity housing the sensor 8 faces the outer circumference of the toroidal shaped finger ring structure 1. In this case, activation of the pressure sensor and hence steering of the external device in the 4th dimension may be achieved by pressing the pressure sensor 8 with either another finger of the

Petitioner Samsung Ex-1004, 0380

hand carrying the ring, or a finger of the other hand. Preferably, in this scenario, the pressure sensor 8 is activated by using the thumb of the hand on which the ring is carried.

In fig. 8 constituting the top metal layer on the interfaces of the toroidal halves (including the intermediate metal strip layer), is a material which has two functions, (i). to enhance the welding between the joints by its chemical, adhesive properties and (ii). enhancing the hermetic encapsulation (i.e. lowering the pressure in the sealed ring cavity) by its getter properties. This material could be made of titanium (Ti) compositions. Material compositions containing Ti are well known to have a low thermal conductivity as well as good getter properties (for most commonly existing gases that are out-gassing: oxygen, water vapour and hydrocarbons). The activation of the metallic getter film is done during the welding procedure by heat transfer where the metal surface reacts with gas atoms in the newly created cavity, locking them into the getter. These trapped atoms diffuses into the getter, thereby renewing the metal surface, ready to adsorb more gas atoms and hereby reducing the pressure obtaining an hermetic seal.

In fig. 9 during fabrication of the electrical finger ring, welding the respective halves 1c, 1d of the toroidal ring, excessive heat is produced. Weld pool width is an important parameter dependent on the laser spot size. The weld absorption of the material, constituting the intermediate metal layer, is dependent on its energy transfer efficiency. During the welding procedure, melting the interfaces of the respective toroidal halves, to concurrently not damage the internal electrical components the laser pulse time must be <2.2 ms.

Concurrently, the aforementioned nonconductive, conformal coating acts as a thermal heat absorber to reduce the overall thermal stress on the electrical components during the welding procedure.

The aforementioned material used for the top metal layer on the interfaces of the toroidal halves and the nonconductive, conformal coating enables a greater freedom in design regarding the respective thicknesses and patterning chosen to optimize the hermetic encapsulation and thus increase the lifetime of the internal, electrical components.

Petitioner Samsung Ex-1004, 0381

In an embodiment of the present invention, the aforementioned cenospheres can further be deposited on the exterior of the inner circumference of the ring shell in order to reduce RF radiation on the user's finger (not shown).

In an embodiment of the present invention to adapt and optimize to different applications the antenna has different designs: (i). external omnidirectional (ii). internal integrated unidirectional (iii). internal integrated unidirectional with extended, elevated housing (iv). dielectric integrated with folded monopole.

In fig. 10 the external, coarse antenna is omnidirectional and constituted of a toroidal shaped metal ring, to obtain coarse tuning to the operational frequency. The external antenna's electrical length should be one wavelength, one half wavelength (a dipole) or one quarter wavelength with a ground plane to minimize all but real antenna impedances. It is reminiscent of a circular disc monopole (CDM) antenna but without the monopole acting as a ground plane. To obtain a coarse tuning to match 2.4 – 2.5 GHz (Bluetooth frequency range) the external antenna's diameter of the toroidal ring is calculated to 12 – 15 mm. As a coarse tuning is needed, either the outer- or inner diameters of the toroidal finger ring is sufficient to obtain matching impedance. The external antenna is connected to the internal antenna by the toroidal shaped ring by a metallic wall vertical to its circumference (not shown).

In fig. 11 the second alternative is the internal integrated unidirectional antenna. The antenna could be an Inverted-F antenna (IFA), either (i). mounted on the flexible printed circuit board or (ii). integrated/printed in the flexible printed circuit board as part of its fabrication (not shown). Any other type of unidirectional antenna can also be used. The antenna is located under the portion of the ring which has no outer shell metal deposited on the toroidal shaped ring facing outwards, geometrically described as radially away from the toroids centre. The opening is a maximum of 12 mm along the circumference functioning as a window housing made of a titanium compound to allow unperturbed RF radiation. The electronic finger ring needs only to be provided with this type of opening, or RF window, when the outer shell is completely or almost completely made of a metal having substantial adverse effects on RF radiation, such as gold or silver. There is normally no need for an RF window when the outer shell or the complete ring is made of a non-RF shielding material, such as a plastic compound. The use of an RF window, however, allows the rest of the outer shell to be made of gold, silver or any other

Petitioner Samsung Ex-1004, 0382

precious metal having adverse effects on RF radiation and thereby give the user the sensation of a conventional jewellery ring.

In fig. 12 the third alternative is a toroid shaped finger ring with a locally extended, elevated sphere shape 15 to function as a housing for the internal integrated unidirectional antenna constituted of 1b, minimizing return losses of the RF radiation. The radius of the integrated sphere shape is a maximum of 7 mm. The extended housing will make it possible to place the internal antenna further away, elevated, from the ground plane of the flexible printed circuit board; as opposed to being mounted directly on the flexible printed circuit board. This significantly reduces the return losses of the RF radiation. Concurrently, the aforementioned nonconductive, conformal coating acts in this case also as a dielectric cavity in the interspace between the antenna and the ground plane.

In fig. 13 and 19 the fourth alternative is a portion of the toroidal ring constituted of a dielectric 16 integrated with a folded monopole antenna 7a. The dielectric may for example be made of ceramic or epoxy material. The dielectric may also be the protective coating layer 13 described with reference to Fig. 1. The monopole antenna is made of a wire or a strip of conductive material which is placed in the outer boundary of the dielectric portion of the toroidal shaped ring. One end of the antenna is free inside the dielectric portion and the other is electrically connected to the RF transceiver via a feed line (not shown). Alternatively, the monopole antenna 7a is integrated on the top layer of the flexible printed circuit board (fig. 5 and 17), with one end of the antenna free inside the dielectric portion (fig. 6 and 18), the other electrically connected to the RF transceiver via a feed line. The length of the antenna is determined by a quarter wavelength of the self-resonating frequency of 2.4 GHz, which corresponds to a total length, L, of the folded wire as L = 31 mm.

In an embodiment of the present invention, to complete the design of the aforementioned antenna designs are combined with a ground plane located in either (i). in intermediate layers in the FPCB (fig. 15 and 16) or (ii). when a portion of the toroidal shaped ring has a dielectric part integrated with folded monopole antenna, the remaining toroidal shaped outer metallic shell functions as a ground plane (fig. 13).

Petitioner Samsung Ex-1004, 0383

The ground plane is designed to minimize RF losses by having a length along the circumference which results in low impedance. This implies a length $l_{ground\ plane} = \lambda/2n$, where n = 1,2,3....

The invention has mainly been described above with reference to a number of explicitly disclosed embodiments. However, as is readily appreciated by a person skilled in the art, other embodiments than the ones disclosed above are equally possible within the scope of the invention.

For example, in one embodiment of the invention the toroidal shaped finger ring structure, constituted of two torodial shaped shell halves, can alternatively encapsulate non-hermetically the electrical components by fixating their respective complementary interfaces with one or more screws in order to obtain a lower cost fabrication solution.

Another example, mounting fewer amount of components than described above (i.e. only microcontroller, bluetooth, microstrip and antenna) the components may be mounted on only one side of the fpcb along the circumference of the toroidal shaped fingering structure in order to obtain a lower cost fabrication solution. Note, in this embodiment, the electronic circuit may function passively (i.e. no battery needed) communicating with near field technology (RFID, proximity cards etc.) which transfers signal via magnetic field induction using the above described antenna design.

Another example, in one embodiment the torodial ring shell can be made of plastic instead of metal wherin the above mentioned conformal coating, coated either (or both) on the (i). inner circumference of the fpcb, or (ii). be deposited on the exterior of the inner circumference of the ring shell, mixed with cenospheres to function as a RF shielding on the users finger.

Concurrently, the plastic torodial ring shell could be made of light emitting polymers (LEP) electrically connected to the fpcb. In this embodiment the ring shell could communicate visually with its immediate vicinity by emitting electromagnetic radiation, for example a red colour, in order to communicate to other people that the user belongs to the "red" debate team just created at the college seminar course. In practice, the microcontroller may be configured to, in response to a signal received internally by the pressure- or accelerometer sensor of the ring, to send the correct current to the LEP ring

Petitioner Samsung Ex-1004, 0384

shell to obtain the desired wavelength emitted. Alternatively, the microcontroller may be configured in response to a signal received from an external unit.

For example, in one embodiment, the electronic finger ring may be used as a means of communication in order to call for the attention of the ring carrier. In this embodiment, the ring may comprise a heat generating means configured to supply heat to the finger of the user in response to reception of a signal from an external unit by the RF antenna circuitry. To this end, the microcontroller may be configured to, in response to a signal received by the RF antenna circuitry, control the heat generating means to transfer heat to the inner circumference of the ring (i.e. the surface facing the finger of the user) so that the user is notified that the signal is received by the increased temperature of the ring. For example, the external unit may be a mobile phone, or a network node forwarding a signal from a mobile phone, and the signal may be any signal intended to call for the attention of the ring user. For example, the signal may be a signal indicating that the ring user has received a text message on his/her mobile phone, or a signal originating from a communication device of a friend who wants to signal to the ring user that he/she is thinking about the ring user. The heat generating means may for example be a resistive heating film in thermal contact with a metallic shell of the finger ring facing its inner circumference and contacting the finger of the user.

In one embodiment, the ring comprises a micromechanical component as part of the electronic circuit in the form of a vibration motor by means configured to supply mechanical vibrations to the finger of the user in response to reception of a signal from an external unit. To this end, the microcontroller may be configured to, in response to a signal received by an antenna of the ring, control the magnitude or time interval (frequency) generated so that the user is notified that the signal is received by the vibrations of the ring. For example, the external unit may be a mobile phone, or computer forwarding a signal adressed from an online game the ring user is connected to, which signal indicates that he or she has been hit or touched by a gaming participant at some instance during the game.

In one embodiment, the aforementioned pressure sensor is located in a cavity within the electronic finger having the inlet hole facing the inner circumference opening optimized, as above described geometry, to function as a finger plethysmograph providing a non-invasive measurement for changes in finger blood flow reflected by pulse wave

Petitioner Samsung Ex-1004, 0385

amplitude (PWA). The end application used could either be, for example, for medical, health or dating purposes.

In one embodiment, the aforementioned pressure sensor, when located in the cavity within the electronic finger having the inlet hole facing the inner circumference opening, could be replaced by a temperature sensor sensing the temperature of the fingering user. The end application used could either be, for example, for medical, health or dating purposes.

The electronic finger ring has herein been described mainly in the context of an electronic finger ring functioning as a 4-dimensional steering device for controlling an external electronic device, such as a computer. However, it should be appreciated that many of the teachings disclosed herein are advantageous also when the electronic finger ring is adapted for other applications, such as identification, electronic payment, etc., mentioned in the summary of the invention, or for "heat- or vibration or light emitting communication" as described in the above passage.

It should also be understood that the set of electronic and/or electromechanical components integrated in the ring may be easily adapted to the intended use of the ring. For example, the electronic finger ring needs not to include an accelerometer or a pressure sensor when used for identification of the user wearing it. In this case, it may be sufficient to integrate the microcontroller (programmed with an identification number or the like) and the antenna circuitry in the electronic finger ring.

Consequently, it should be understood that the following aspects of the invention are also encompassed by this disclosure:

Aspect 1: An electronic finger ring comprising:

- a toroidal shaped finger ring structure having an outer metal shell, and
- a microcontroller and RF antenna circuitry integrated in said toroidal shaped finger ring structure for communicating with an external, electronic device,

wherein an internal antenna of the RF antenna circuitry is located under an opening in said outer metal shell serving as a window for RF radiation.

Petitioner Samsung Ex-1004, 0386

Aspect 2: The electronic finger ring according to aspect 1, wherein the internal antenna is connected to the outer metal shell which is adapted to serve as an external antenna for coarse tuning to an operational frequency.

Aspect 3: The electronic finger ring according to aspect 1 or 2, further comprising an inner shell, and wherein the opening in the outer metal shell leaves the inner shell exposed, the inner shell preferably comprising a titanium compound.

Aspect 4: An electronic finger ring comprising:

- a toroidal shaped finger ring structure having an outer metal shell, and
- a microcontroller and RF antenna circuitry integrated in said toroidal shaped finger ring structure for communicating with an external, electronic device,

wherein an internal antenna of the RF antenna circuitry is connected to the outer metal shell which is adapted to serve as an external antenna for coarse tuning to an operational frequency.

Aspect 5: The electronic finger ring according to any of the preceding aspects, wherein the internal antenna is connected to an RF transceiver of the RF antenna circuitry through a metal strip layer serving as a microstrip feed line.

Aspect 6: The electronic finger ring according to any of the preceding aspects, wherein the ring further comprises at least one ground plane for reflecting RF radiation directed inwardly, the ground plane preferably stretching at least between the internal antenna and an RF transceiver of the RF antenna circuitry.

Aspect 7: The electronic finger ring according to any of the preceding aspects, further comprising an elevated sphere shape functioning as a housing for the internal integrated antenna.

Aspect 8: An electronic finger ring comprising:

- a toroidal shaped finger ring structure having an outer shell, and
- electronic components comprising at least a microcontroller and RF antenna circuitry integrated in said toroidal shaped finger ring structure for communicating with an external, electronic device,

Petitioner Samsung Ex-1004, 0387

wherein the outer shell comprises a top and bottom half that are welded together along an interface comprising a material having getter properties to enchance the hermetic encapsulation of the printed circuit board and the electric components.

Aspect 9: The electronic finger ring according to aspect 8, wherein the material also has chemical, adhesive properties.

Aspect 10: The electronic finger ring according to aspect 8 or 9, wherein the material is a metallic getter film the getter properties of which are activated by heat transfer during the welding procedure.

Aspect 11: The electronic finger ring according to any of the aspects 8 to 10, wherein the material comprises a titanium compound.

Aspect 12: Method for manufacturing an electronic finger ring comprising the steps of:

- providing a top and bottom half of a shell of a toroidal shaped finger ring structure;
- mounting inside and along the circumference of a first of said halves a flexible printed circuit board comprising electronic components;
- integrating said flexible printed circuit board and the electronic components in a toroidal finger ring structure by welding the first and the second of said halves together along an interface between the two halves, and
- before welding the two halves together, forming said interface at least partially of a material having getter properties to enhance the hermetic encapsulation of the printed circuit board and the electric components.

Aspect 13: Method according to aspect 12, wherein said interface is at least partially formed of a material having both getter properties and chemical, adhesive properties enhancing the welding between the two halves.

Aspect 14: Method according to aspect 12 or 13, wherein the interface material is a titanium composition.

Aspect 15: Method for manufacturing an electronic finger ring comprising the steps of: fixating the respective complementary top and bottom half of the toroidal shaped shell interfaces with one or more screws in order to obtain a non-hermetic encapsulation of the electrical components.

Petitioner Samsung Ex-1004, 0388

Aspect 16: An electronic finger ring comprising:

- a toroidal shaped finger ring structure having an outer shell, and
- electronic components comprising at least a microcontroller and RF antenna circuitry integrated in said toroidal shaped finger ring structure for communicating with an external, electronic device,

the electronic components being fabricated or mounted on a flexible printed circuit board which is packaged inside, along the circumference of the toroidal shaped finger ring structure, the RF antenna circuitry comprising an internal antenna being arranged either in the flexible printed circuit board or between the flexible printed circuit board and the outer boundary of the toroidal shaped finger ring structure,

wherein the electronic finger ring further comprises RF shielding coating between the inner boundary of the toroidal shaped finger ring structure and the flexible printed circuit board to shield the user's finger from RF radiation.

Aspect 17: An electronic finger ring comprising:

a toroidal ring shell that is made of plastic instead of metal wherin the conformal coating, is either coated (or both) on the (i). inner circumference of the fpcb, or (ii). on the exterior of the inner circumference of the ring shell, and mixed with cenospheres to function as a RF shielding on the users finger.

Aspect 18: The electronic finger ring according to aspect 17 wherin the plastic toroidal ring shell is made of a light emitting polymer (LEP) electrically connected to the fpcb to optically communicate (emitting) with others in the users immediate vicinity.

Aspect 19: The electronic finger ring according to aspect 16, wherein at least one of the electronic components is arranged between the flexible printed circuit board and the inner boundary of the toroidal shaped finger ring, and wherein the RF shielding coating is provided on the inner side of the flexible printed circuit board so that the RF shielding coating shields both the user´s finger and the at least one electronic component from RF radiation.

Aspect 20: An electronic finger ring comprising:

- a toroidal shaped finger ring structure having a metal shell intended to contact a finger of a user wearing the ring, and

Petitioner Samsung Ex-1004, 0389

- electronic components integrated in said toroidal shaped finger ring structure, comprising at least a microcontroller, an RF antenna circuitry for communicating with an external, electronic device, and a heat generating means,

wherein the heat generating means is adapted to supply heat to the metal shell of the toroidal shaped finger ring structure in response to a signal received by the RF antenna circuitry from the external device.

Aspect 21: Electronic finger ring according to aspect 20, wherein the microcontroller is adapted to analyse the received signal and control the heat generating means to supply heat to the metal shell if the signal indicates that the user's attention should be called for.

Aspect 22: Electronic finger ring according to aspect 20 or 21, wherein the heat generating means is a resistive heating film arranged in thermal contact with the metal shell of the toroidal shaped finger ring structure.

Aspect 23: An electronic finger ring comprising:

- a toroidal shaped finger ring structure having a metal shell intended to contact a finger of a user wearing the ring, and
- electronic components integrated in said toroidal shaped finger ring structure, comprising at least a microcontroller, an RF antenna circuitry for communicating with an external, electronic device, and a vibrating generating means,

wherein the vibrating generating means is adapted to supply vibrations to the whole finger ring and its user in response to a signal received by the RF antenna circuitry from the external device.

Aspect 24: Electronic finger ring according to aspect 23, wherein the microcontroller is adapted to analyse the received signal and control the vibrating generating means to supply vibrations to the whole finger ring and its user if the signal indicates that the user's attention should be called for.

Aspect 25: Electronic finger ring according to aspect 23 or 24, wherein the vibrating generating means is a micromechanical vibrational motor that is connected to the electronic circuit within the toroidal shaped finger ring structure.

Aspect 26: An electronic finger ring comprising:

Petitioner Samsung Ex-1004, 0390

- a toroidal shaped finger ring structure having a metal shell intended to contact a finger of a user wearing the ring, and
- electronic components integrated in said toroidal shaped finger ring structure, comprising at least a microcontroller, an RF antenna circuitry for communicating with an external, electronic device, and a pressure sensing means located in a cavity within the electronic finger having the inlet hole facing the inner circumference opening optimized, as above described geometry, to function as a finger plethysmograph providing a non-invasive measurement

wherein the pressure sensing means is adapted to detect pressure differences from changes in finger blood flow of the user.

Aspect 27: The electronic finger ring according to any of the preceding aspects, wherein all electrical components of the electronic finger ring are fabricated or mounted on a flexible printed circuit board which is packaged inside, along the circumference of the toroidal shaped finger ring structure.

Aspect 28: The electronic finger ring according to any of the preceding aspects, wherein the electronic components of the electronic finger ring includes one or more of:

- a power source, such as a battery, an inductive coil, and/or piezoelectric nanofibers, for powering active electronic components of the finger ring;
- an accelerometer for steering the external device in a 3-dimensional space based on motions of the user's hand, and
- a pressure sensor for steering the external device in a 4th dimension.

Petitioner Samsung Ex-1004, 0391

Claims

1. An electronic finger ring for steering an external electronic device in up to four dimensions, comprising:
   - a toroidal shaped finger ring structure (1) having an outer shell (1a), and
   - electronic components comprising a micro processor (4), RF antenna circuitry (3, 5, 7), an accelerometer (6), and a pressure sensor (8), all fabricated or mounted on a flexible printed circuit board, FPCB, (9) which is packaged inside, along the circumference of the toroidal shaped finger ring structure (1).

2. The electronic finger ring according to claim 1, wherein the accelerometer (6) is configured to steer in 3-dimensional space and the pressure sensor (8) is configured to steer in an additional 4th dimension.

3. The electronic finger ring according to claim 1 or 2, wherein the pressure sensor (8) is located in a cavity within the electronic finger ring having an inlet hole.

4. The electronic finger ring according to claim 3, wherein the inlet hole is shaped as a horn cone to maximize the pressure compression ratio at the pressure sensor end (11).

5. The electronic finger ring according to claim 4, wherein to optimize sensitivity of the pressure sensor (8) the inlet hole (11) has a minimum aspect ratio size difference of the diameter of the narrow end (x) of the horn cone to the outer end (y) of the horn cone as 1:10.

6. The electronic finger ring according to claim 4 or 5, wherein the total height of the horn cone (m) should have an aspect ratio size to the height of the narrow end of the horn cone (n) as 6:1.

7. The electronic finger ring according to any of the claims 3 to 6, wherein the pressure sensor (8) and the inlet hole are located so that the cavity faces the inner circumference of the toroidal shaped finger ring structure (1) to allow pressure to be applied to the pressure sensor (8) by bending the finger carrying the ring.

Petitioner Samsung Ex-1004, 0392

8. The electronic finger ring according to any of the claims 3 to 6, wherein the pressure sensor (8) and the inlet hole are located so that the cavity faces the outer circumference of the toroidal shaped finger ring structure (1) to allow pressure to be applied to the pressure sensor (8) by using another finger not carrying the ring.

9. The electronic finger ring according to any of the preceding claims, wherein the outer shell (1a) is made of metal, and wherein the RF antenna circuitry (3, 5, 7) comprises an internal antenna (7) located under an opening (10) in the outer metal shell (1a) serving as a window for RF radiation.

10. The electronic finger ring according to claim 9, wherein the toroidal shaped finger ring structure (1) comprises a locally extended, elevated sphere shape (15) functioning as a housing for the internal antenna (7) and minimizing return losses of the RF radiation.

11. The electronic finger ring according to claim 9 or 10, further comprising an inner shell (1b), and wherein the opening in the outer metal shell (1a) leaves the inner shell (1b) exposed, the inner shell preferably comprising a titanium compound.

12. The electronic finger ring according to any of the claims 9 to 11, wherein the internal antenna (7) is connected to the outer metal shell (1a) which is adapted to serve as an external, omnidirectional antenna obtaining coarse tuning to an operational frequency.

13. The electronic finger ring according to any of the preceding claims, wherein the outer shell (1a) of the toroidal shaped finger ring structure (1) is constituted of two toroidal complementing halves (1c, 1d) which are welded together along an interface between the two halves.

Petitioner Samsung Ex-1004, 0393

14. The electronic finger ring according to claim 13, wherein the interface comprises a material having getter properties to enhance the hermetic encapsulation of the printed circuit board and the electric components.

15. The electronic finger ring according to claim 14, wherein the material also has chemical, adhesive properties enhancing the welding between the two halves (1c, 1d).

16. The electronic finger ring according to any of the preceding claims, wherein the electronic components further comprises a battery (2).

17. The electronic finger ring according to any of the preceding claims, further comprising a protective coating (14) having RF shielding properties located between the inner boundary of the toroidal shaped finger ring structure (1) and the flexible printed circuit board (9).

18. The electronic finger ring according to claim 17, wherein the protective coating (14) comprises cenospheres.

19. The electronic finger ring according to any of the preceding claims, wherein the RF antenna circuitry (3, 5, 7) comprises a microstrip feed line (5), which has a shape designed to stretch along the circumference of the toroidal shaped finger ring structure (1) and which is electrically optimized to obtain 50 Ω matching impedance.

20. The electronic finger ring according to claim 19, wherein the width and length of the microstrip feed line (5) are selected such that each dimension of the microstrip feed line radiates at 2.4 GHz.

21. The electronic finger ring according to any of the preceding claims, further comprising at least one ground plane (17) designed to minimize RF losses and having a length along the circumference of the toroidal finger ring structure (1) of $l_{\text{ground plane}} = \lambda/2n$, where n = 1,2,3....

Petitioner Samsung Ex-1004, 0394

22. The electronic finger ring according to claim 21, wherein the at least one ground plane (17) stretches at least in-between an internal antenna (7) of the RF antenna circuitry (3, 5, 7), located on the outer circumference side of the flexible printed circuit board (9) and an RF transceiver (3) of the RF antenna circuitry (3, 5, 7), located on the inner circumference side of the flexible printed circuit board (9).

Petitioner Samsung Ex-1004, 0395

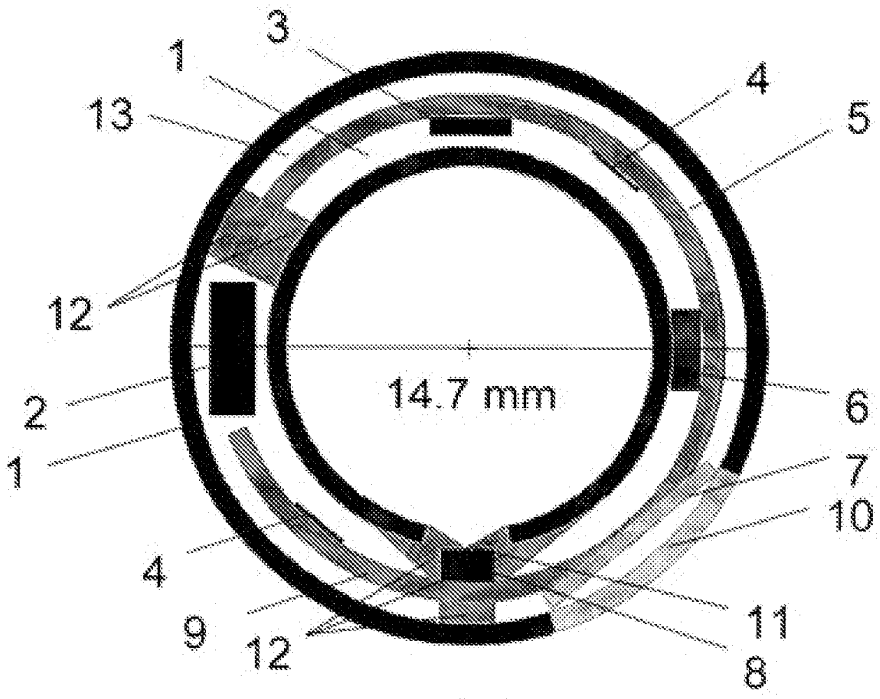


Fig. 1

Petitioner Samsung Ex-1004, 0396

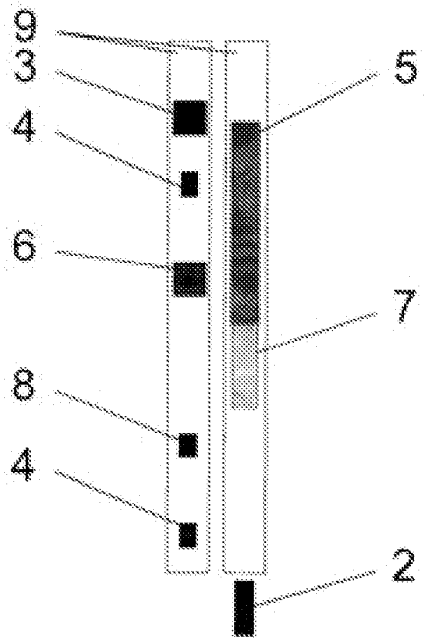


Fig. 2

Petitioner Samsung Ex-1004, 0397

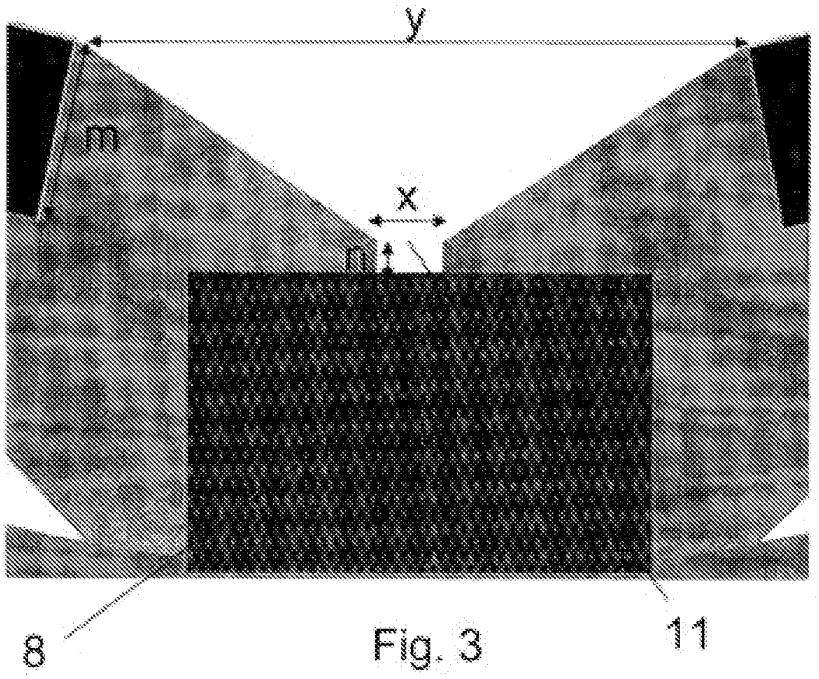


Fig. 3

Petitioner Samsung Ex-1004, 0398

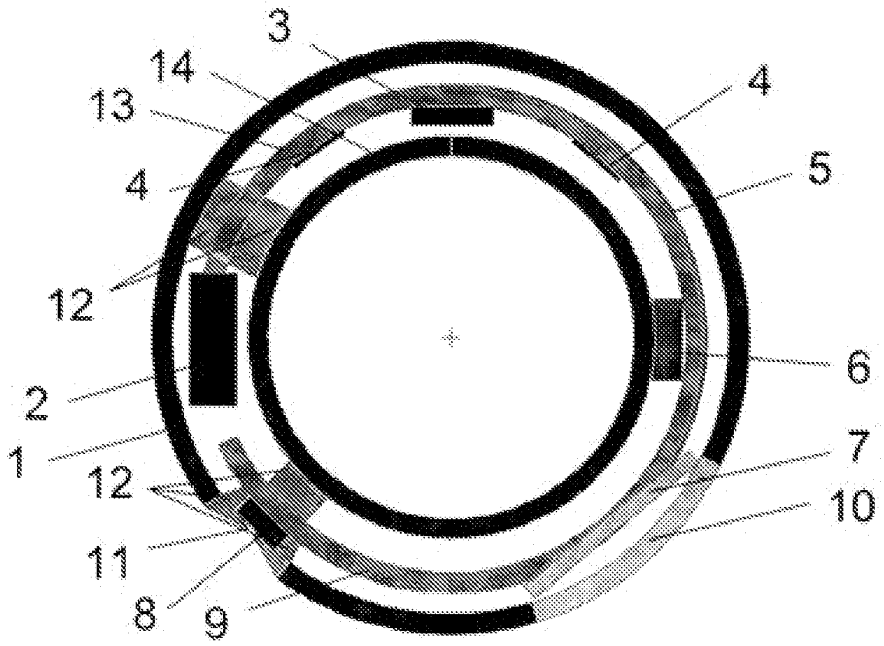


Fig. 4

Petitioner Samsung Ex-1004, 0399

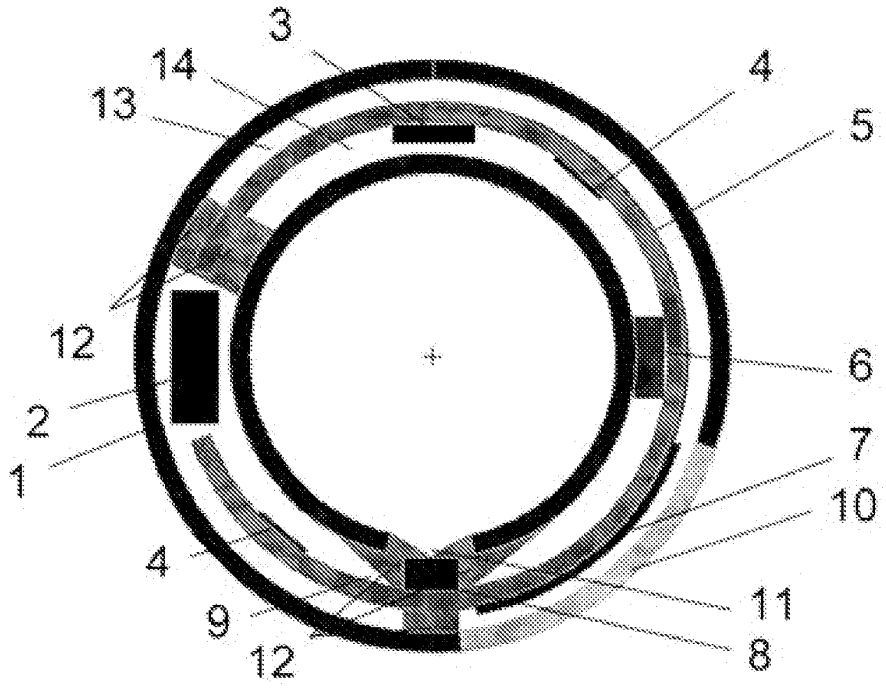


Fig. 5

Petitioner Samsung Ex-1004, 0400

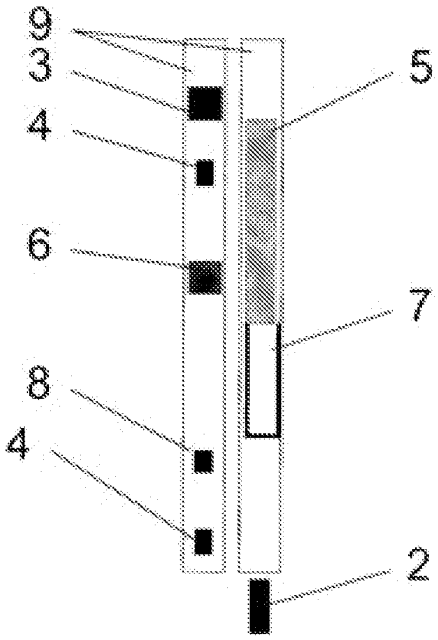


Fig. 6

Petitioner Samsung Ex-1004, 0401

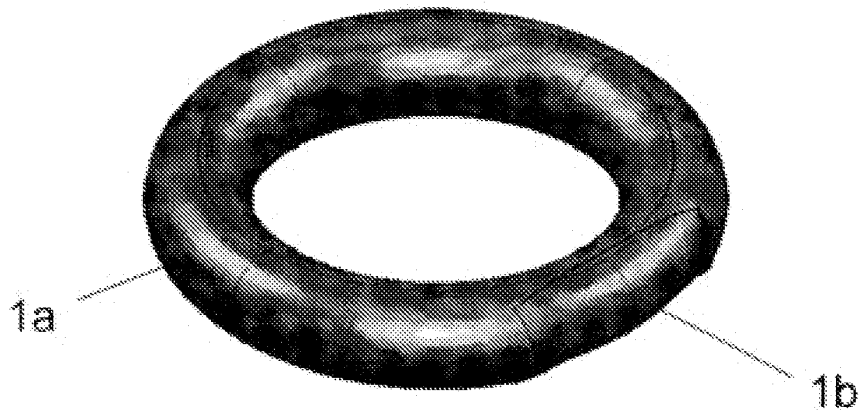


Fig. 7

Petitioner Samsung Ex-1004, 0402

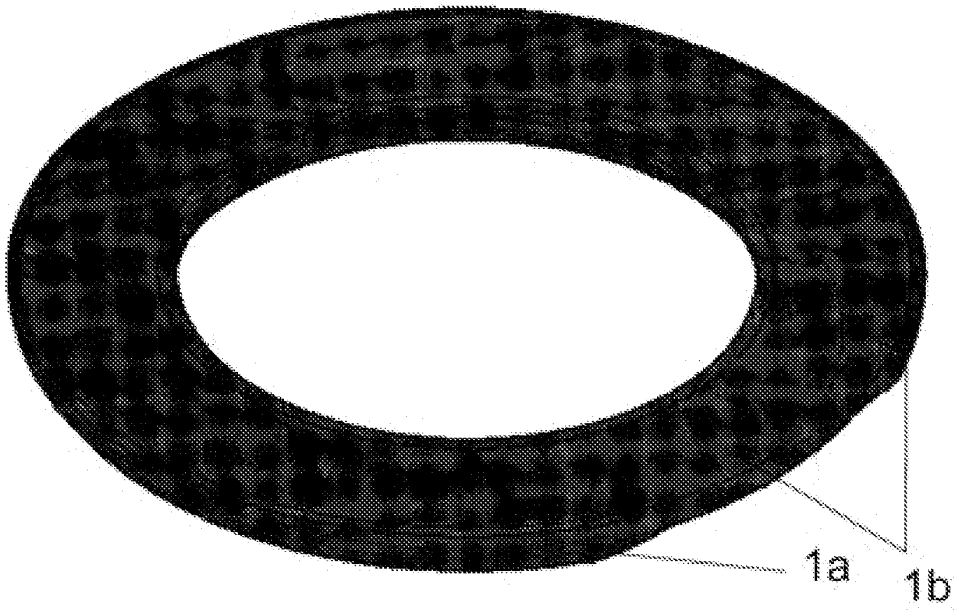


Fig. 8

Petitioner Samsung Ex-1004, 0403

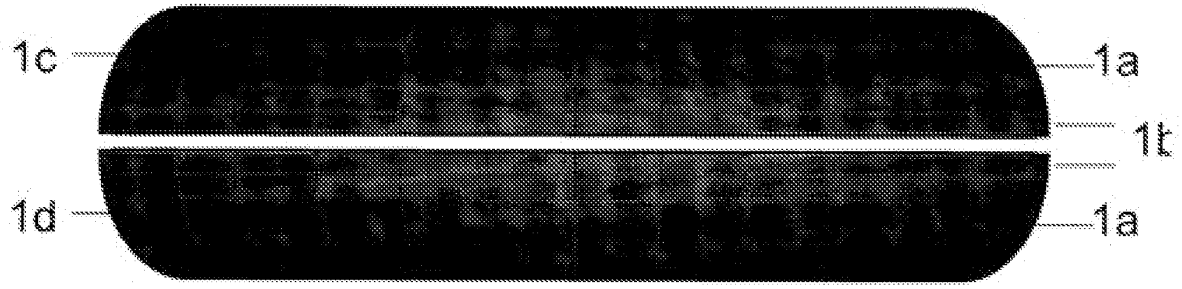


Fig. 9

Petitioner Samsung Ex-1004, 0404

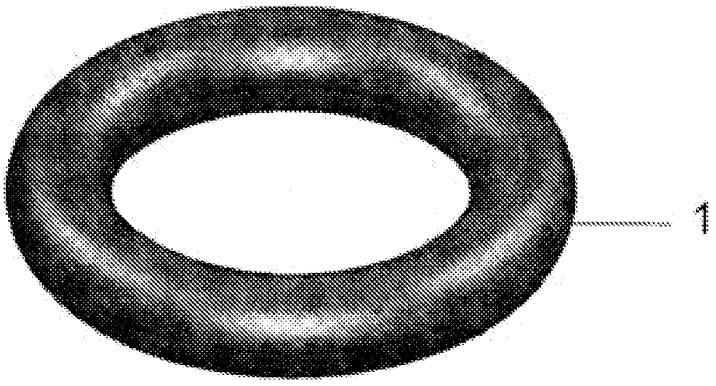


Fig. 10

Petitioner Samsung Ex-1004, 0405

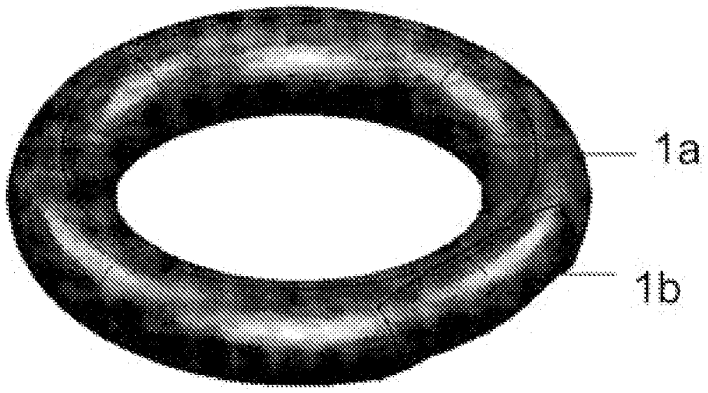


Fig. 11

Petitioner Samsung Ex-1004, 0406

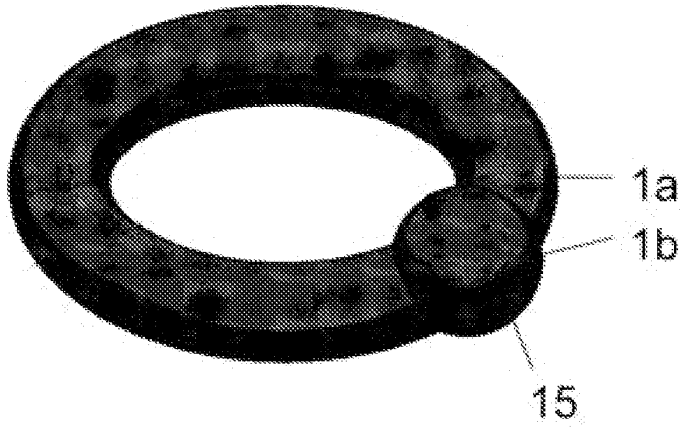


Fig. 12

Petitioner Samsung Ex-1004, 0407

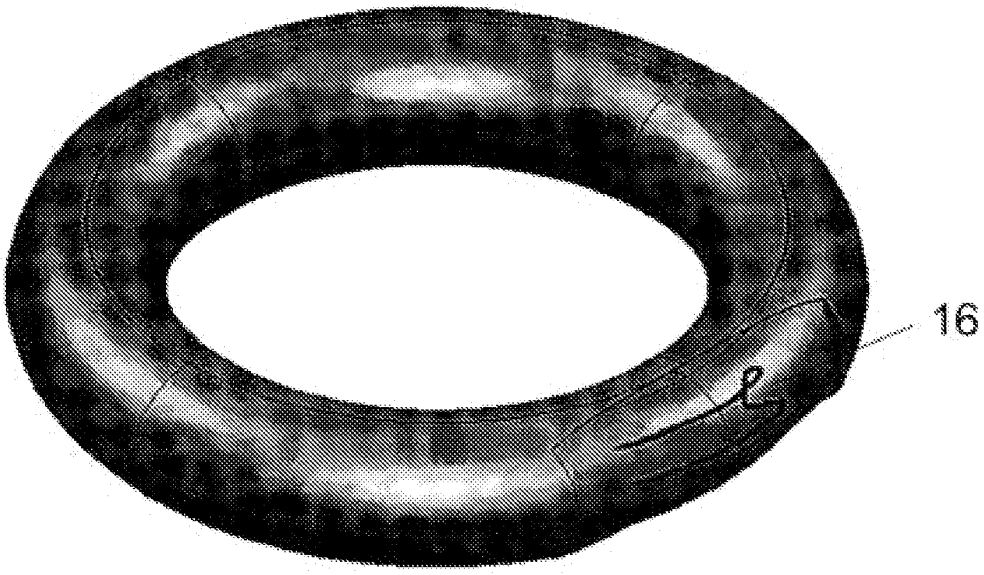


Fig. 13

Petitioner Samsung Ex-1004, 0408

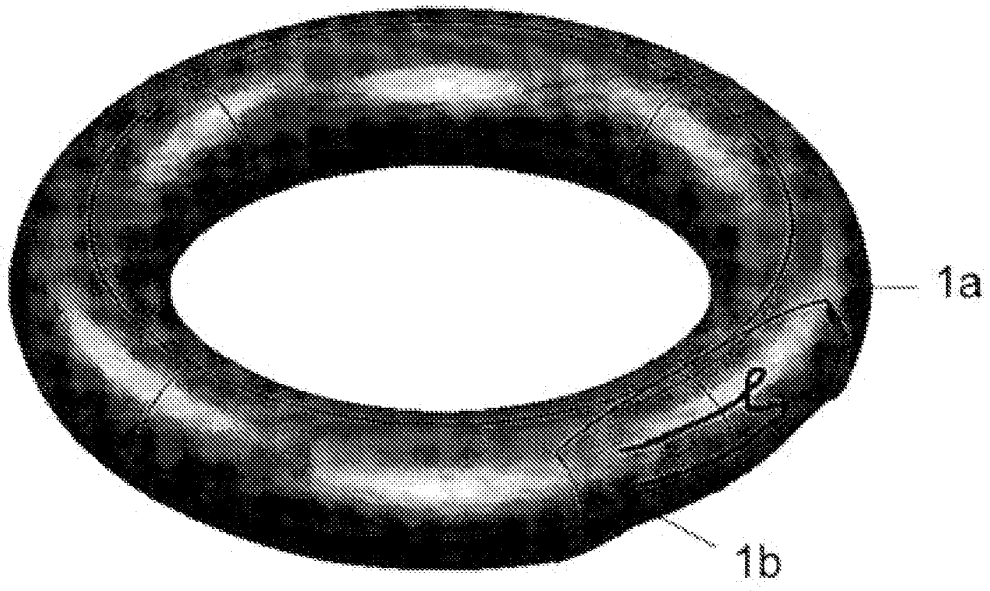


Fig. 14

Petitioner Samsung Ex-1004, 0409

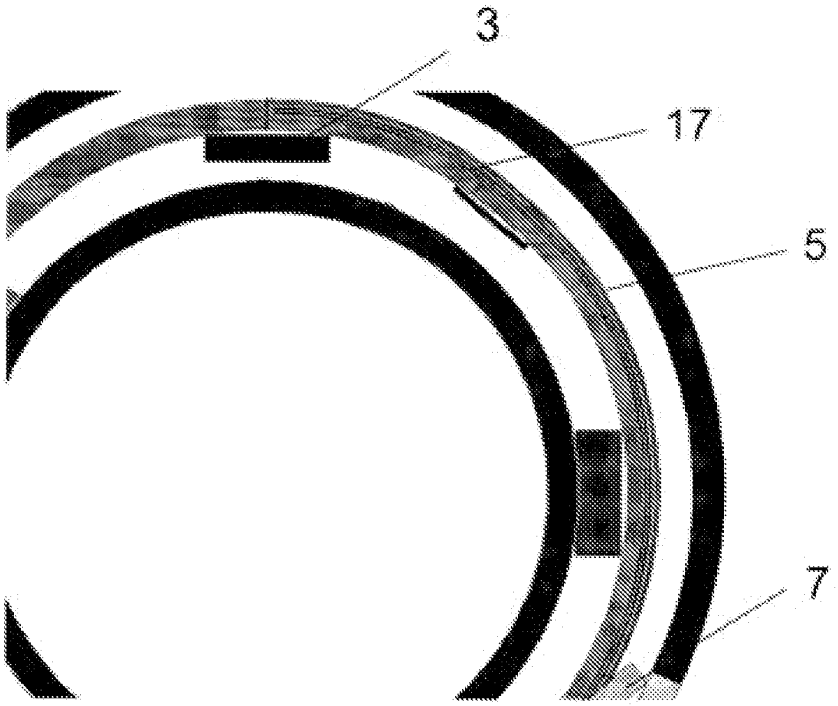


Fig. 15

Petitioner Samsung Ex-1004, 0410

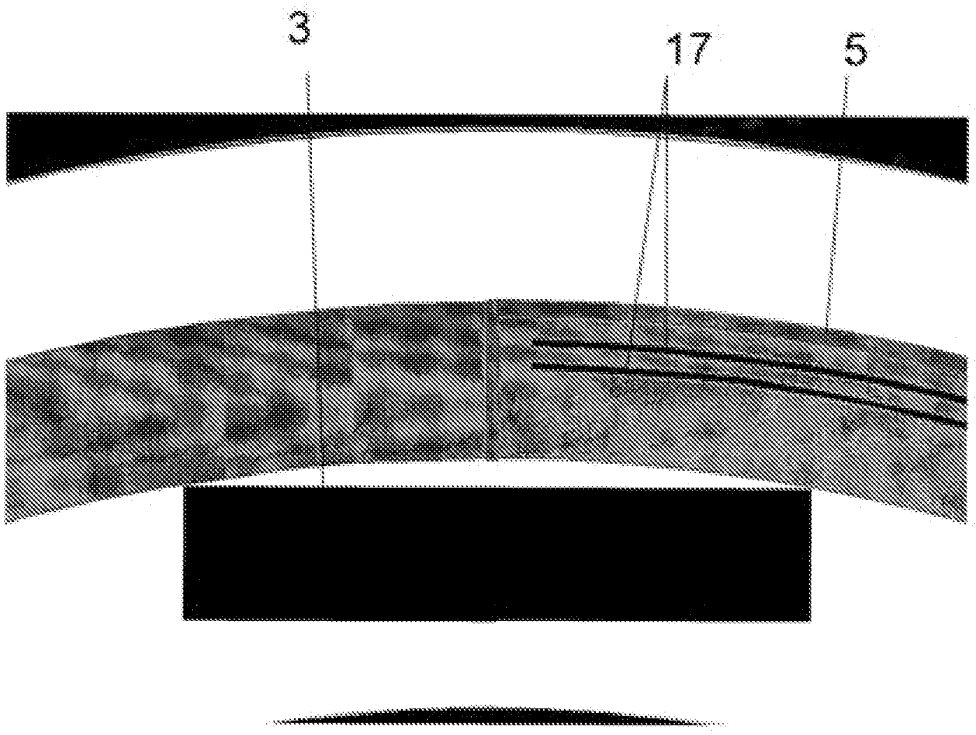


Fig. 16

Petitioner Samsung Ex-1004, 0411

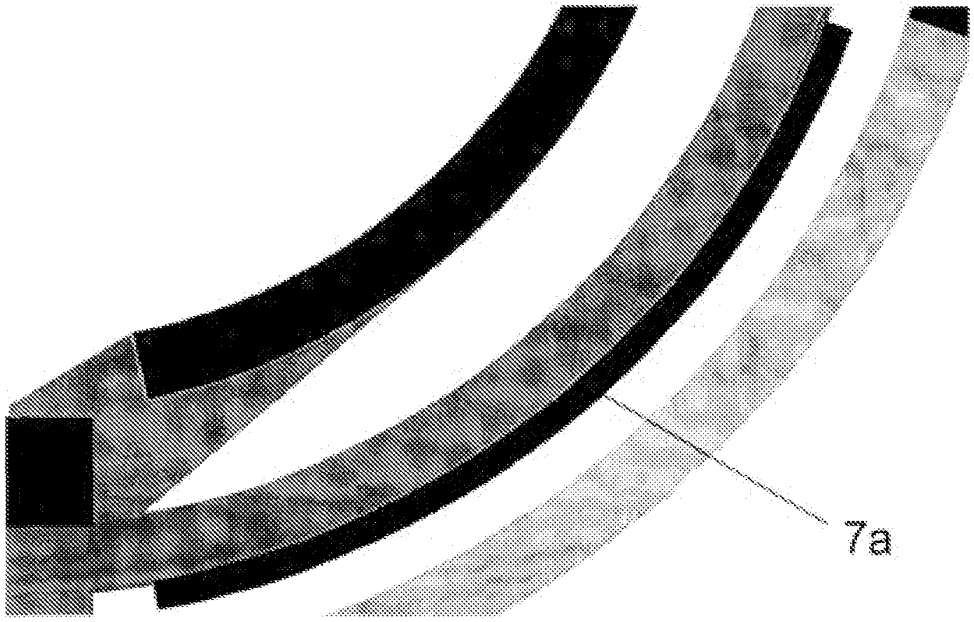


Fig. 17

Petitioner Samsung Ex-1004, 0412

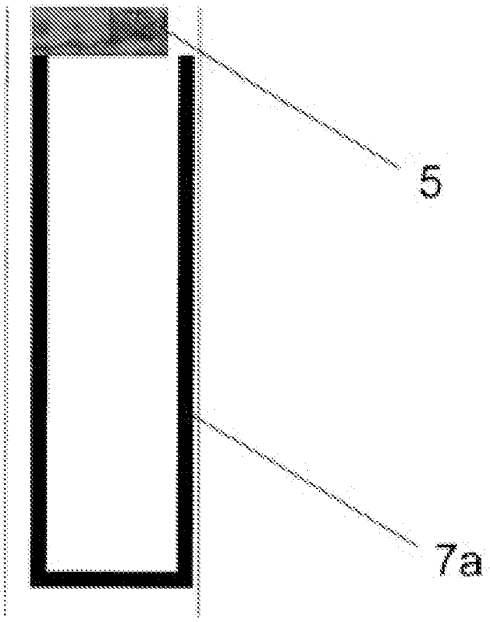


Fig. 18

Petitioner Samsung Ex-1004, 0413

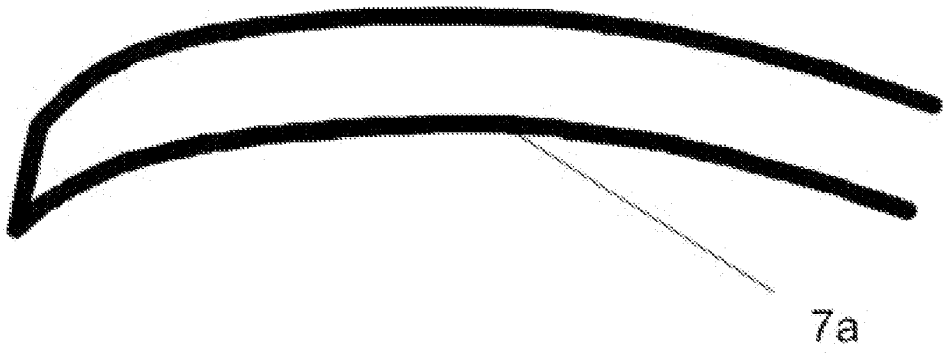


Fig. 19

Petitioner Samsung Ex-1004, 0414

INTERNATIONAL SEARCH REPORT

International application No
PCT/SE2010/051167

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F3/033
ADD.

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)
G06F

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/142065 A1 (PAHLAVAN KOUROSH [US]) 31 July 2003 (2003-07-31) cited in the application the whole document	1-3,7-22
X	US 2008/088468 A1 (KIM YONG-DUCK [KR]) 17 April 2008 (2008-04-17) the whole document	1-3, 13-16
A	US 2003/214481 A1 (XIONG YONGMING [US]) 20 November 2003 (2003-11-20) the whole document	1,2,9-22
A	WO 96/34333 A1 (INTERVAL RESEARCH CORP [US]) 31 October 1996 (1996-10-31) the whole document	1-3,7-9, 12,16

-/--

[X] Further documents are listed in the continuation of Box C. [X] 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 document 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	Date of mailing of the international search report
25 February 2011	04/03/2011

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Bravo, Piero

Form PCT/ISA/210 (second sheet) (April 2005)

Petitioner Samsung Ex-1004, 0415

INTERNATIONAL SEARCH REPORT

International application No
PCT/SE2010/051167

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2001 109569 A (NEC CORP) 20 April 2001 (2001-04-20) * abstract figures 1, 4	1-3,7,8
A	WO 03/103486 A1 (MASSACHUSETTS INST TECHNOLOGY [US]) 18 December 2003 (2003-12-18) the whole document	1-3,18
A	WO 2007/092239 A2 (XPRESENSE LLC [US]; BAUM ROBERT THOMAS JR [US]; CURRY JAMES EDWARD [US] 16 August 2007 (2007-08-16) paragraph [0039] - paragraph [0111]; figures 1-5, 7a-9c	1,9-22

1

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/SE2010/051167

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 2003142965 A1	31-07-2003	NONE		
US 2008088468 A1	17-04-2008	CN 101165642 A		23-04-2008
		KR 20080034291 A		21-04-2008
US 2003214481 A1	20-11-2003	NONE		
WO 9634333 A1	31-10-1996	AT 217986 T		15-06-2002
		AU 5027996 A		18-11-1996
		DE 69621330 D1		27-06-2002
		DE 69621330 T2		24-10-2002
		EP 0823082 A1		11-02-1998
		JP 11508382 T		21-07-1999
		US 5832296 A		03-11-1998
JP 2001109569 A	20-04-2001	NONE		
WO 03103486 A1	18-12-2003	AU 2003232450 A1		22-12-2003
WO 2007092239 A2	16-08-2007	WO 2007092238 A2		16-08-2007
		WO 2007092240 A2		16-08-2007

Petitioner Samsung Ex-1004, 0417

Espacenet

EP2660680A1 System and method for enabling collaborative gesture-based sharing of ressources between devices

Applicants: ALCATEL LUCENT [FR]

Inventors: TURKIEWICZ PIERRE [FR],KOSTADINOV DIMITRE [FR],REBIERRE NICOLAS [FR]

Classifications:

IPC ***G06F1/16; G06F3/01; G06F3/048; H04W4/21;***

CPC **G06F1/1694 (EP); G06F3/017 (EP); G06F3/04883 (EP); H04W4/023 (EP); H04W4/21 (EP);**

Priorities: EP12305497A 2012-05-03

Application: EP12305497A·2012-05-03

Publication: EP2660680A1·2013-11-06

Published as: EP2660680A1

System and method for enabling collaborative gesture-based sharing of ressources between devices

Abstract

A method for content sharing between a first user terminal (1) and at least a second user terminal (2), comprising the following steps:a) identifying a first gesture involving the first user terminal (1) ;b) identifying a content (3), comprised within the first user terminal (1), intended to be shared ;c) sending, to the at least second user terminal (2), metadata of the content (3) and metadata of the identified first gesture;d) identifying a second gesture involving the at least second user terminal (2) ;e) determining if the first gesture and the second gesture relate to a predefined interaction gesture scenario aiming at content sharing;f) triggering the content (3) sharing.

Petitioner Samsung Ex-1004, 0418

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 660 680 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.11.2013 Bulletin 2013/45

(21) Application number: **12305497.5**

(22) Date of filing: **03.05.2012**

(51) Int Cl.:
G06F 3/01 *(2006.01)* ***G06F 3/048*** *(2013.01)*
G06F 1/16 *(2006.01)* ***H04W 4/20*** *(2009.01)*

(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
Designated Extension States:
BA ME

(71) Applicant: **Alcatel Lucent**
75007 Paris (FR)

(72) Inventors:
- **Turkiewicz, Pierre**
91620 NOZAY (FR)
- **Kostadinov, Dimitre**
91620 NOZAY (FR)
- **Rebierre, Nicolas**
91620 NOZAY (FR)

(74) Representative: **Louiset, Raphael**
Dejade & Biset
35, rue de Châteaudun
75009 Paris (FR)

(54) System and method for enabling collaborative gesture-based sharing of ressources between devices

(57) A method for content sharing between a first user terminal (1) and at least a second user terminal (2), comprising the following steps:
a) identifying a first gesture involving the first user terminal (1) ;
b) identifying a content (3), comprised within the first user terminal (1), intended to be shared ;
c) sending, to the at least second user terminal (2), metadata of the content (3) and metadata of the identified first gesture;
d) identifying a second gesture involving the at least second user terminal (2) ;
e) determining if the first gesture and the second gesture relate to a predefined interaction gesture scenario aiming at content sharing;
f) triggering the content (3) sharing.

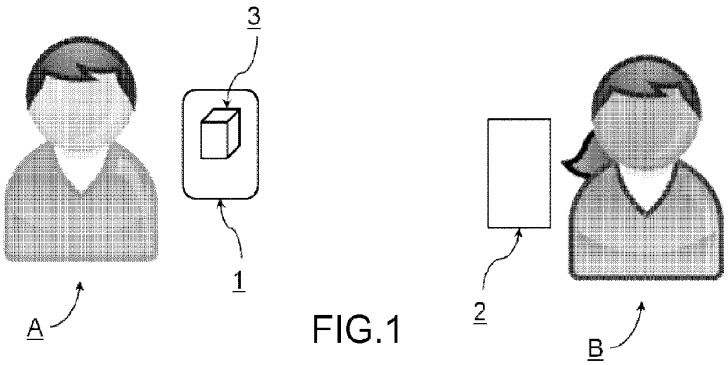


FIG.1

EP 2 660 680 A1

Petitioner Samsung Ex-1004, 0419

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a method and a system for digital contents sharing between user terminals.

BACKGROUND OF THE INVENTION

[0002] As used herein, the term "user terminal" is meant broadly and not restrictively, to include any electronic device which may interact through user-interfaces to transmit/receive data to/from another electronic device and/or a communications network. As non limitative examples of such user terminals, one can mention a smartphone; tablet PC, MP3 player, Personal Digital Assistant (PDA), laptop and the like.

[0003] Unquestionably, such user terminals, particularly handheld ones, are now increasingly common, because they are expected to provide a plurality of applications/services such as Internet browsing, phone-calling, messaging, photo-taking, localization, games, and content sharing. The "how-to-use" of these applications/services is generally inherited from earlier systems providing similar services (such as desktop computer, or wired telephone). However, the implementation of many of these services, even if it is apprehensible by users, is certainly inappropriate and inadequate for mobile devices.

[0004] In the following, content sharing service is taken as an illustrative example of the above problem. A "content" is intended to mean, here, any content/resource/information in a digital format, including but not limited to music, videos, photos, movies, ring tones, eBooks, contact details, Electronic Business Card, document, reminder, to-do list, notification, mobile applications, message, GPS location, URL.

[0005] In fact, in order to share content (a picture for example) with a peer, a user is generally constrained to:

- open the content on his/her terminal with an appropriate application (example: gallery application);
- request the sharing of the content with an interaction that varies from one application to another (for example: a 'share' menu option)
- among the many sharing services available on the device, pick one that all recipients also support (for example: email, Facebook®);
- select the recipients (examples: contacts chooser, Google circles®).

[0006] Each recipient will later:

- receive a message on his own terminal, in a way that is specific to the chosen sharing service(for instance, a notification for an incoming email);
- extract the content from the message (example: "save attachment as" function) before consumption.

[0007] Accordingly, for sharing content with a peer, the user experience is often complex: both the senders and the recipients need to perform a sequence of actions. Further, quite often a shared third party service provider needs to be involved.

[0008] Slightly less constraining known approach for content sharing are as follow:

- choosing a sharing service on the device that the recipients also support (example: start the Facebook® application)
- with an interaction specific to the sharing service, selecting the content to be shared (example: choose the pictures to share with the gallery);
- with an interaction specific to the sharing service, requesting the sharing of content with the chosen recipients.

[0009] From the recipient side, steps cited above are unchanged.

[0010] Accordingly, existing solutions remain of excessive complexity because they require many interactions from each participant: selection of the content, selection of the sharing service, and selection of recipients. Another problem arises in the prior art with regards to the quality of human communications through electronic devices. In fact, during known content sharing methods, users interact with their respective personal devices as if they were on remote locations, without any consideration of the quality of human communication and interaction. In other words, content sharing according to known solutions is performed in almost pure human-machine interactions without any consideration of user-friendly and human-centric.

[0011] It happens that the selection step of recipients for the sharing is simplified, as it is proposed by Bump@ application (bu.mp). In fact the Bump@ application lets two users shake their mobile phone together. Based on the location of users and other information from the devices' sensors, the Bump@ service establishes a peering between users within which information assets can be shared.

[0012] Nonetheless, Bump@ solution remains partial as it requires that each user terminal is connected to the Internet. Such drawback prevents information assets sharing where this is insufficient radio coverage, or when users choose to disable data (for cost reasons when traveling abroad for example). Yet another drawback of this solution is that the chosen interaction (i.e. shake devices simultaneously) between users is not intuitively associated with the sharing.

[0013] One object of the present invention is to make sharing as simple as a natural interaction gestures.

[0014] Another object of the present invention is to make sharing of information assets between mobile devices easier, funnier, and more intuitive, thereby enhanc-

Petitioner Samsung Ex-1004, 0420

ing the human communication between sharing users (typically, body language and emotional display).

[0015] Another object of the present invention is to find "natural" and easy-to-use user interface for content sharing among mobile user equipments.

SUMMARY

[0016] Various embodiments are directed to addressing the effects of one or more of the problems set forth above. The following presents a simplified summary of embodiments in order to provide a basic understanding of some aspects of the various embodiments. This summary is not an exhaustive overview of these various embodiments. It is not intended to identify key of critical elements or to delineate the scope of these various embodiments. Its sole purpose is to present some concepts in a simplified form as a prelude to the more detailed description that is discussed later.

[0017] Various embodiments relate to methods for content sharing between a first user terminal and at least a second user terminal, comprising the following steps:

- identifying a first gesture involving the first user terminal;
- identifying a content, comprised within the first user terminal, intended to be shared;
- sending, to the at least second user terminal, metadata of the content and metadata of the identified first gesture;
- identifying a second gesture involving the at least second user terminal;
- determining if the first gesture and the second gesture relate to a predefined interaction gesture scenario aiming at content sharing;
- triggering the content sharing.

[0018] Various embodiments relate to systems for content sharing between a first user terminal and at least a second user terminal, comprising

- means for identifying a first gesture involving the first user terminal;
- means for identifying a content, comprised within the first user terminal, intended to be shared ;
- means for sending, to the at least second user terminal, metadata of the content and metadata of the identified first gesture;
- means for identifying a gesture involving the at least second user terminal;
- means for determining if the first gesture and the second gesture relate to a predefined interaction gesture scenario aiming at content sharing;
- means for triggering the content sharing.

[0019] Various embodiments further relate to a computer program product for performing the above methods.

[0020] While the various embodiments are susceptible to various modification and alternative forms, specific embodiments thereof have been shown by way of example in the drawings. It should be understood, however, that the description herein of specific embodiments is not intended to limit the various embodiments to the particular forms disclosed.

[0021] It may of course be appreciated that in the development of any such actual embodiments, implementation-specific decisions should be made to achieve the developer's specific goal, such as compliance with system-related and business-related constraints. It will be appreciated that such a development effort might be time consuming but may nevertheless be a routine understanding for those or ordinary skill in the art having the benefit of this disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The above and other objects and advantages of various embodiments will become apparent from the detailed description of preferred embodiments, considered in conjunction with the accompanying drawing, in which

- Fig.1 is a schematic diagram illustrating the context of content sharing;
- Fig.2 is a schematic diagram illustrating components of one embodiment;
- Fig. 3 is a schematic diagram illustrating steps of a content sharing according to one embodiment.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0023] With reference to figure **1**, a first user **A** provided with a user terminal **1** is willing to share a content **3**, held on his/her user terminal **1**, with a second user **B** provided with a user terminal **2**.

[0024] The act of sharing is to be understood, here, broadly to include sending/transferring/communicating content **3** (with or without leaving a copy of this content **3** in its original location) from one user terminal **1** to one or more other user terminals **2**.

[0025] To that end, each of the user terminals **1-2** comprises an intuitive gesture-based sharing system **20** (figure 2) enabling content sharing on the basis of natural interaction gesture of users **A** and/or **B**.

[0026] A natural interaction gesture is considered, here, as a gesture involving real-life artifacts and having a generally accepted meaning in a given context. As non exhaustive examples of such interaction gestures, one can mention

- pouring, by a first person (sender), water from a bottle into a glass of a second person (receiver), wherein water (a content) is transferred (shared) from the bottle to the glass;
- throwing (share), by a first person (sender), an apple/

Petitioner Samsung Ex-1004, 0421

ball/key (content) to a second person (receiver) willing to catch it;
- giving (share) for a while, by a first person (sender), an object (content) to a second person (receiver), then get back it;
- picking up an object (content) from one's bag and filing it (share) in the bag of the interlocutor (receiver);
- knocking marbles (content) from a first person (sender) container toward a second person container (receiver).

[0027] An interaction gesture may be identified on the basis of a combination of

- a sampling of sensors values on user terminals **1-2;**
- an optional gesture filter (set of applicable gestures/ scenario patterns with parameters for example);
- optional information about the proximity between user terminals **1-2;**
- optional sets of capabilities of user terminals **1-2** (supported communication channels, touch screen, accelerometers for example).

[0028] The gesture-based sharing system **20,** embedded on the platform **29** of the user terminal **1,** is configured to detect/track and to identify, with appropriated sensors **23,** interaction gestures involving the user terminal **1,** in order to control collaborative workflows on the basis thereof. In fact, when the gesture-based sharing system **20** recognizes/determines an interaction gesture, it, subsequently, organizes/triggers the sharing of the content **3** between user terminals **1-2** that are involved in the detected interaction gesture.

[0029] Sensors **23** are configured to capture user interaction events involving the user terminal **1,** such as touches on the sensitive screen, bring the user terminal **1** at a given speed/acceleration to a given point, maintaining the user terminal 1 in a given orientation/position/ height, a speech/gesture intended for the user terminal **1.** Examples of such sensors **23** are accelerometer, GPS (position, latitude, longitude, and height), gyroscope (pitch, roll, azimuth for example), microphone, camera, touch & multi-touch screen.

[0030] Sensors **23** are configured to communicate with the local gesture detection component **24** which is responsible for detecting fragments of local gestures based on inputs from sensors **23** (such as, the user is shaking his user terminal, a finger pick up against the screen of the user terminal, the user terminal is held in an oblique position and in a given orientation, the phone is quickly brought forward with a sudden stop). A collaborative gesture detection component **25** is programmed for

- sharing local gestures fragments detected by the local gesture detection component **24** of each participating user terminal **1-2** (i.e. participants) ; and for
- determining from the received fragments (fragments received from the local gesture detection component **24** and those shared from neighboring user terminals **2)** an interaction gesture aiming at content sharing such as

○ "a pinch-in gesture on a icon" (received from the local gesture detection component **23),** and "a pinch-out gesture against the screen of user terminal **2"** (these associated gestures are supposed to relate to an interaction gesture scenario aiming at content sharing) ;
○ "a file is selected", "the user terminal **1** is held in an oblique position and oriented to the ground at one meter height" (gesture fragments received from the local gesture detection component **23),** "a folder is selected on user terminal **2",** "the user terminal **2** is held in an approximately horizontal plane at eighty centimeter height", "the user terminals **1** and **2** are less than forty centimeter from each other" (gestures involving user terminal **2).** These associated gestures are supposed to relate to an interaction gesture scenario aiming at content sharing, in a similar way to pouring water from a bottle into a glass.

[0031] Moreover, a gesture may include the explicit selection of the content to be shared (example: touch on the icon), or the selection may be implicit for that gesture (example: last photo sequence).

[0032] It is to be noted that some gestures may be reserved for the control of the gesture-based sharing system **20.** For example, when detecting such gestures, the collaborative gesture detection component **25** can update the user preferences (for example, add the gesture of a given participant to a white-list or to a privileged user group).

[0033] Detected user events by sensors **23** as well as derived gesture by the collaborative gesture detection component **25** are handled by a workspace **21** so as to control

- the process of content sharing, between users **1-2,** through a content sharing module **27;** and
- the feedbacks provided to users regarding the progress/state of the sharing, via output and feedback means **22** (such as a display, audio output, haptic device for example). Output and feedback means **22** are configured for displaying information on the user terminal screen, or for generating an audio output, or any other feedback (such as vibrations).

[0034] The workspace **21** is also configured to enable users to organize the access to key content with shortcut icons. Accordingly, the workspace **21** may, further, comprise, among others, a content management user interface to take into account user preferences and configuration parameters (sensors **23** configuration, black-list of user terminals for example).

[0035] The content sharing module **27** is in charge of the sharing of a content **3** from a user **A** (a sender) to

Petitioner Samsung Ex-1004, 0422

one or several users **B** (receivers). The content sharing module **27** determines the appropriate sharing method, such as copy of the content **3** between user terminals **1-2,** transmit a pointer to the content **3** (which may be retrieved from another source), or order a third party to deliver to the user terminal **2** the content requested to be shared.

[0036] The content sharing module **27** relies on the user terminal **1** communications interface **28** for communicating with the other user terminals **2** involved in the sharing.

[0037] Advantageously, the communications interface **28** is further configured to control/take care of the authorization (digital rights management), and of content adaptation/translation (such as changing technical formats/quality level, media re-encoding with different parameters or technology that better suit recipients' capabilities), as needed.

[0038] The communications interface **28** provides an abstraction layer on top of the various communication channels **281-282** available between two user terminals **1-2.** Communications channels **281-282** may comprise

- IP network interfaces **281** for conveying data over general purpose IP networks to which the user terminal **1** connects with Wi-Fi or cellular data protocols (such as 3G, 4G);
- short-range communications interfaces **282** for conveying data over short-range communication channels (such as Bluetooth or NFC).

The communications interface **28** is in charge of establishing communication channels with other mobiles participating in the sharing, further called "participants". The selection of participants may be made on the basis of proximity (as detected with sensors **23** (location), or using information from short-range communication interfaces **282** such as Bluetooth or NFC) as well as user preferences (such as white-list, black-list, user groups).

[0039] Accordingly, the sharing may take place for instance with a direct transfer of the content **3** over a short range communication network (e.g. Bluetooth, Wi-Fi, ad-hoc for example), or a public wireless data network (3G, 4G). Alternatively, the sharing may take place with the transfer of information allowing the recipient (user terminal 2) to obtain the resource from a third party service provider, or with the transfer of information allowing the recipient to order the copy of the content **3** from one third party provider to another.

[0040] The content sharing module **27,** further, relies on a content manager **26** which is configured to provide an abstraction layer for the various classes of resources **261-264** such as: contacts **261**, files **262**, applications **263,** or shortcut to external resources **264.**

[0041] As an illustrative implementation of the above described gesture-based sharing system **20** and method, consider, with reference to figure 3, the case of a user **A** willing to share a mobile application **3** with a user **B**, both users **A-B** being located within the range of Bluetooth coverage and having established (step **30** in figure 3) a trusted communication channel linking their respective user terminals **1-2.** Accordingly, the user **A**

- performs (step **31** in figure 3) a **2**-finger pick gesture (pinch in) against the screen **23** of its user terminal **1** over the application 3 to be shared with the user **B** provided with user terminal **2;**
- the local gesture detection component **24** of user terminal **1** identifies (step **32** in figure 3) a pinch-in gesture from the data of sensors **23** (multi-touch screen);
- the collaborative gesture detection component **25** identifies (step **33** in figure 3) the local gesture as an intent to select a local content **3,** to possibly share it with a neighboring user terminal;
- the workspace **21** identifies (step **34** in figure 3) the content **3** targeted by the local gesture as a mobile application **3;**
- the workspace **21** updates (step **35** in figure 3) the display to show that the mobile application **3** picked by the **2** fingers-gesture has been picked ;
- the content sharing module **27** prepares (step **36** in figure 3) metadata for the selected content, to be transferred to the neighboring user terminal **2;**
- the communications interface **28** sends (step **37** in figure 3) metadata relative to the content (name, reference, type, source, size for example) and metadata relative to the local gesture to the neighboring user terminal **2** over the already established Bluetooth communication channel.

[0042] On the receiver side (i.e. user terminal **2),**

- the communications interface **28** of the user terminal **2** receives (step **41** in figure 3) the remote content and gesture metadata from the sender (i.e. user terminal **1);**
- the content sharing module **27** of the user terminal **2** handle (step **42** in figure 3) the received content metadata into;
- The user **A,** or **B** performs (step **43** in figure 3) a **2**-finger drop gesture (pinch out) against the screen of the user terminal **2;**
- the local gesture detection component **23** (i.e. that of the user terminal **2)** identifies (step **44** in figure 3) a pinch-out gesture from the sensors' data;
- with reference to predefined interaction gesture scenarios aiming at content sharing which are known by the gesture-based sharing system **20** (for example, stored within a local database), the collaborative gesture detection component **25** determines/recognizes (step **45** in figure 3) the local gesture as related/associated to the previously remote gesture (in other words, the local gesture matches with the remote gesture), and derive a request to handle a content **3** shared by the user terminal **1** ;

Petitioner Samsung Ex-1004, 0423

- triggered by the workspace component, the content sharing module **27** of the user terminal **2** retrieves (step **46** in figure 3) from the sender (through its communications interface **28)** additional data associated to shared content **3** by the user terminal **1**;
- the workspace component updates (step **47** in figure 3) the user terminal **2** display (output and feedback means **22)** to show the icon of the shared content at the location where the **2**-fingers pinch-out local gesture occurred.

[0043] Consequently, the content **3** (a mobile application in the above example) is shared from user terminal **1** to user terminal **2** through pick-and-drop. A notification message may be notified to user **A** and/or **B**, via output and feedback means **22**, informing him/her about the success/failure of the sharing.

[0044] Alternatively, the sharing interactions between user terminals may be performed according to any of the followings interaction gesture scenarios (in form of couples of gestures involving sender and recipients):

- sharing a content from one device to a neighboring device through drag-and-drop, using
  - ○ a point-and-slide finger gesture against the user terminal screen of the sender; and
  - ○ a slide-and-raise finger gesture against the user terminal screen of the receiver ;
- sharing of an application from one user terminal to several neighboring user terminals, using a
  - ○ pouring gesture with the sender's user terminal; and
  - ○ a give-me gesture with the receiver user terminal (palm extended forward upwards while holding the user terminal oriented facing up, and opening and closing fingers or moving hand forward-backward).

[0045] Further, a gesture may specify the location on recipients user terminal wherein a shortcut to the content will be created (on the "home screen" for example);

- establishment of a trusted communication channel between 2 user terminals, using a waving gesture while holding each user terminal;
- release of a trusted communication channel between 2 user terminals, using a waving gesture while holding each user terminal.

[0046] Representation of contents (typically icons) may be transmitted in anticipation to potential recipients so it is possible to render animations on the recipients' devices during the execution of a gesture.

[0047] Advantageously, the above described method and system reduce the number of interactions required to share a digital content between mobile devices and make it more intuitive, pleasant and user-friendly.

Claims

1. A method for content sharing between a first user terminal **(1)** and at least a second user terminal **(2),** said method comprising the following steps:

   a) identifying a first gesture involving the first user terminal **(1)** ;
   b) identifying a content **(3),** comprised within the first user terminal **(1),** intended to be shared ;
   c) sending, to the at least second user terminal **(2),** metadata of the content **(3)** and metadata of the identified first gesture;
   d) identifying a second gesture involving the at least second user terminal **(2)** ;
   e) determining if the first gesture and the second gesture relate to a predefined interaction gesture scenario aiming at content sharing;
   f) triggering the content **(3)** sharing.

2. The method of claim 1, wherein the identification of a first gesture involving the first user terminal **(1)** includes a sampling step of sensor values comprised within the first user terminal **(1).**

3. The method of claims 1 or 2, further comprising a controlling step for authorizing the sharing.

4. The method of any of the preceding claims, further comprising an adaptation step of the content **(3)** to be shared.

5. The method of any of the preceding claims, wherein the triggering step include ordering a third party to deliver the content to the at least second user terminal **(2).**

6. The method of any of the preceding claims, wherein the first gesture involving the first user terminal **(1)** is a pinch-in gesture, and the second gesture involving the at least second user terminal **(2)** is a pinch-out gesture.

7. The method of any of the preceding claims, wherein the metadata of the content and the metadata of the identified first gesture are sent over an established communication channel linking the first user terminal **(1)** to the second user terminal **(2).**

8. The method of claim 7, wherein the communication channel is a short-range communication channel.

9. A system for content sharing between a first user terminal **(1)** and at least a second user terminal **(2),**

Petitioner Samsung Ex-1004, 0424

said system comprising

a) means for identifying a first gesture involving the first user terminal **(1)**;
b) means for identifying a content **(3)**, comprised within the first user terminal **(1)**, intended to be shared ;
c) means for sending, to the at least second user terminal **(2)**, metadata of the content **(3)** and metadata of the identified first gesture;
d) means for identifying a second gesture involving the at least second user terminal **(2)**;
e) means for determining if the first gesture and the second gesture relate to a predefined interaction gesture scenario aiming at content sharing;
f) means for triggering the content **(3)** sharing.

10. The system of claim 9, wherein the means for identifying a first gesture involving the first user terminal **(1)** include at least a sensor **(23)** configured to capture user interaction events involving the user terminal **(1)**.

11. The system of claim 10, wherein the means for identifying a first gesture involving the first user terminal **(1)**, further, include a local gesture detection component **(24)** configured to detect fragments of local gestures based on inputs from the at least sensor **(23)**.

12. The system of claims 10 or 11, wherein the means for identifying a first gesture involving the first user terminal (1), further, include a collaborative gesture detection component **(5)** configured to determine from gesture fragments an interaction gesture aiming at content sharing.

13. The system of any of claims 9 to 12, wherein the sending means include a short-range communications interface **(282)**.

14. The system of any of claims 9 to 13, wherein the sending means further include an IP network interface **(281)**.

15. A computer program including instructions stored on a memory of a dedicated system for content sharing between a first user terminal **(1)** and at least a second user terminal **(2)** wherein said computer program is adapted to perform the method as claimed in any of claims 1 to 8.

Petitioner Samsung Ex-1004, 0425

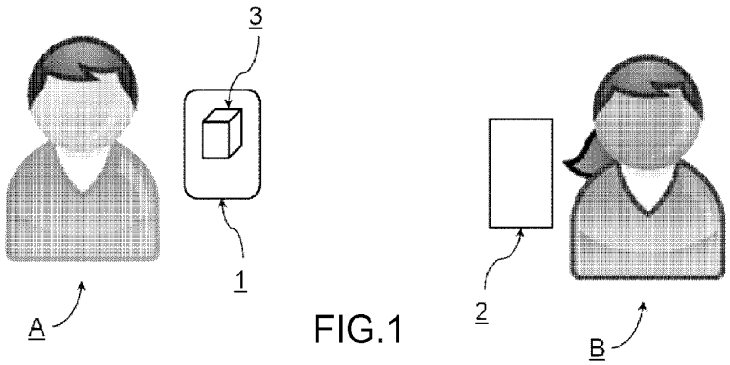


FIG.1

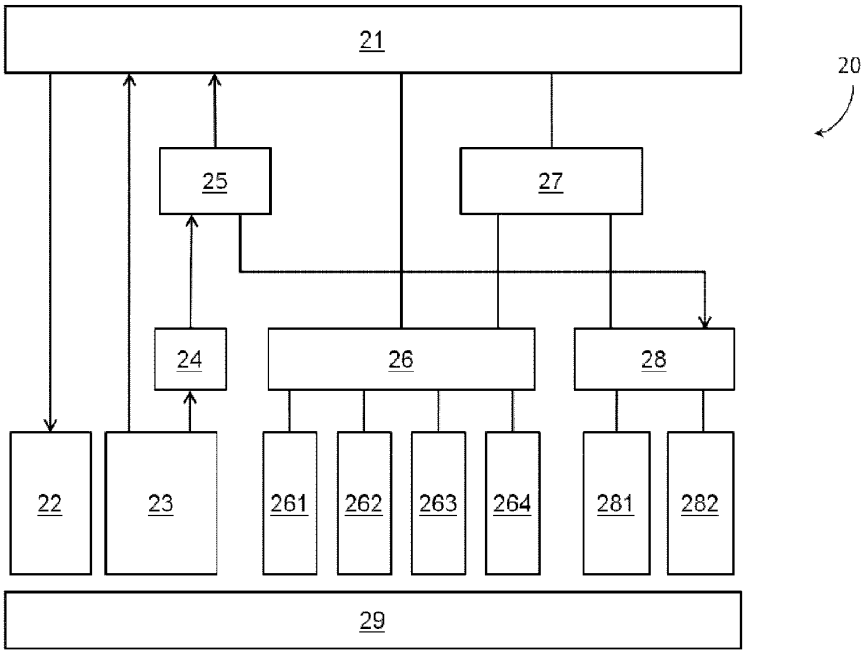


FIG.2

Petitioner Samsung Ex-1004, 0426

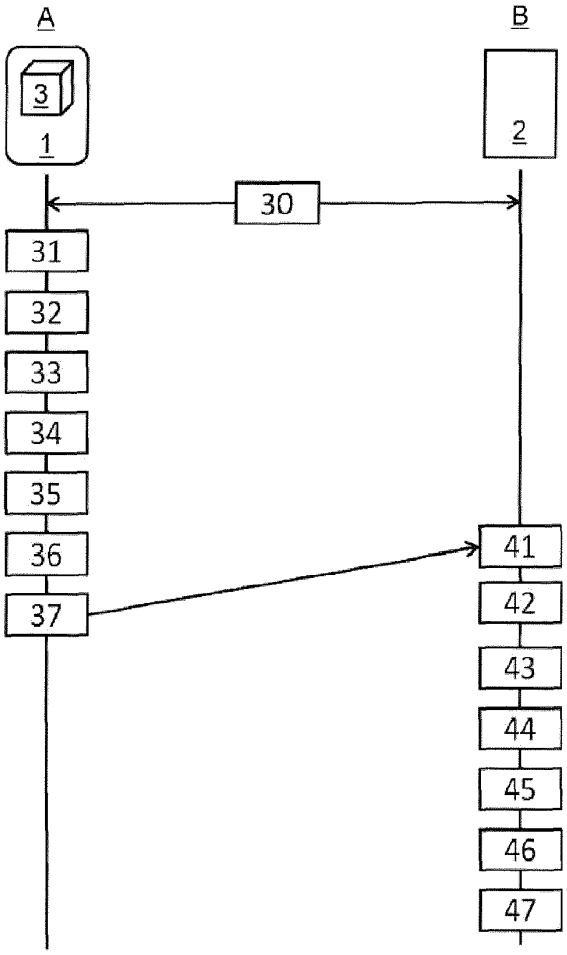


FIG.3

Petitioner Samsung Ex-1004, 0427

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 12 30 5497

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2009/140986 A1 (KARKKAINEN LEO MIKKO JOHANNES [FI] ET AL) 4 June 2009 (2009-06-04) * paragraph [0020] * * paragraph [0025]; figure 1 * * paragraph [0036] - paragraph [0049]; figures 3-5 *	1-15	INV. G06F3/01 G06F3/048 G06F1/16 H04W4/20
X	US 2011/316790 A1 (OLLILA ELINA [FI] ET AL) 29 December 2011 (2011-12-29) * paragraph [0020] - paragraph [0066]; figures 1-7 *	1-15	
X	US 2012/077436 A1 (KONDED VIKAS SHANKAR [IN] ET AL) 29 March 2012 (2012-03-29) * paragraph [0040]; figure 7 * * paragraph [0017] - paragraph [0035]; figures 1-6 *	1-15	
A	US 2010/257251 A1 (MOORING DAVID J [US] ET AL) 7 October 2010 (2010-10-07) * paragraph [0054] * * paragraph [0058] - paragraph [0062]; figure 4 *	1-15	TECHNICAL FIELDS SEARCHED (IPC) G06F H04W

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	17 August 2012	Ballerstein, Jens

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

1 EPO FORM 1503 03.82 (P04C01)

Petitioner Samsung Ex-1004, 0428

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 30 5497

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-08-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009140986 A1	04-06-2009	NONE	
US 2011316790 A1	29-12-2011	TW 201220175 A	16-05-2012
		US 2011316790 A1	29-12-2011
		WO 2011161312 A1	29-12-2011
US 2012077436 A1	29-03-2012	US 2012077436 A1	29-03-2012
		WO 2012038815 A1	29-03-2012
US 2010257251 A1	07-10-2010	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

Petitioner Samsung Ex-1004, 0429

Espacenet

Bibliographic data: CN204732935 (U) — 2015-10-28

Miniature charger

Inventor(s): SHI XIONG ± (SHI XIONG)

Applicant(s): SHI XIONG ± (SHI XIONG)

Classification: **- international:** ***H02J7/00***
- cooperative:

Application number: CN20152504255U 20150713

Priority number(s): CN20152504255U 20150713

Abstract of CN204732935 (U)

The utility model discloses a miniature charger, including base and top cap, wherein base and top cap are hollow structure, and base and top cap are inside all to be equipped with magnet piece and air gap pd, has all inlayed the electrode slice on base and the top cap, still is equipped with circuit board and power plug in the base, and the base outside still is equipped with smart machine charging plug and USB interface, and electrode slice, power plug, smart machine charging plug and USB interface on the base all link to each other with the circuit board, still are equipped with the key -ring on the top cap. The utility model discloses when not using, the adsorption of base and top cap accessible magnet piece and closing to a whole when needs use dry battery or rechargeable battery, separates base and top cap, adsorbs the battery live, fixes between base and top cap through the magnet piece, and the through the electrode piece forms the route makes battery and circuit board continuous, can charge for battery or other equipment through power plug, perhaps charge for other equipment through the battery, therefore convenient to use not only, easily carry in addition.

Petitioner Samsung Ex-1004, 0430

(19)中华人民共和国国家知识产权局

(12)实用新型专利

(10)授权公告号 CN 204732935 U
(45)授权公告日 2015.10.28

(21)申请号 201520504255.1

(22)申请日 2015.07.13

(73)专利权人 石雄
地址 400000 重庆市沙坪坝区柏杨村67号202-2

(72)发明人 石雄

(74)专利代理机构 重庆中之信知识产权代理事务所(普通合伙) 50213
代理人 张景根

(51)Int.Cl.
H02J 7/00(2006.01)

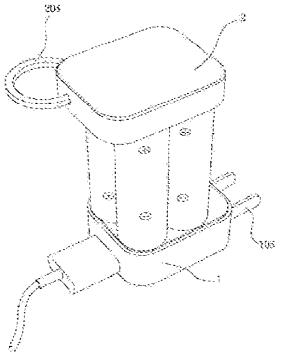
权利要求书1页 说明书3页 附图7页

(54)实用新型名称

一种微型充电器

(57)摘要

本实用新型公开了一种微型充电器，包括基座和顶盖，其中基座和顶盖均为中空结构，基座和顶盖内部均设有磁铁片和隔磁片，基座和顶盖上均嵌有电极片，基座内还设有电路板和电源插头，基座外部还设有智能设备充电插头和USB接口，基座上的电极片、电源插头、智能设备充电插头和USB接口均与电路板相连，顶盖上还设有钥匙环。本实用新型不使用时，基座和顶盖可通过磁铁片的吸附作用而合为一个整体，当需要使用干电池或充电电池时，将基座和顶盖分开，通过磁铁片将电池吸附住、固定在基座和顶盖之间，通过电极片形成通路使得电池和电路板相连，即可通过电源插头为电池或其他设备充电，或者通过电池为其他设备充电，因而不仅使用方便，而且易于携带。



CN 204732935 U

Petitioner Samsung Ex-1004, 0431

1. 一种微型充电器，其特征在于，包括基座 (1) 和顶盖 (2)，其中：所述基座 (1) 包括第一外壳 (101) 和第一内壳 (102)，所述第一外壳 (101) 和第一内壳 (102) 构成中空结构，所述基座 (1) 内设有电路板 (103)、磁铁片 (3)，所述第一内壳 (102) 上镶嵌有与电路板 (103) 相连的电极片 (4)，所述磁铁片 (3) 位于电极片 (4) 与电路板 (103) 之间，所述第一内壳 (102) 上设有与电路板 (103) 相连的智能设备充电插头 (104)；

所述基座 (1) 内设有插头滑槽 (105)，所述插头滑槽 (105) 内设有与电路板 (103) 相连的电源插头 (106)；

所述顶盖 (2) 包括第二外壳 (201) 和第二内壳 (202)，所述第二外壳 (201) 和第二内壳 (202) 构成中空结构，所述顶盖 (2) 内也设有磁铁片 (3)，所述第二外壳 (201) 上也镶嵌有电极片 (4)，所述第二内壳 (202) 上设有与智能设备充电插头 (104) 相匹配的插孔 (203)。

2. 如权利要求 1 所述的一种微型充电器，其特征在于：所述基座 (1) 和顶盖 (2) 内还均设有隔磁片 (5)，所述隔磁片 (5) 设于磁铁片 (3) 远离电极片 (4) 的一侧。

3. 如权利要求 1 所述的一种微型充电器，其特征在于：所述基座 (1) 上还设有与电路板 (103) 相连的 USB 插口 (107)。

4. 如权利要求 1 所述的一种微型充电器，其特征在于：所述电极片 (3) 为弹性接触片，所述第一内壳 (102) 和第二内壳 (202) 上设有用于放置电池正极的凹槽 (6)。

5. 如权利要求 1 所述的一种微型充电器，其特征在于：所述顶盖 (2) 上还设有钥匙环 (204)。

Petitioner Samsung Ex-1004, 0432

一种微型充电器

技术领域

[0001] 本实用新型涉及一种电子设备充电装置，尤其是一种微型充电器。

背景技术

[0002] 随着科技的发展，手机、平板电脑已成为人们生活、工作中通讯、获取信息的必备工具，其功能越来越强大，人们对其性能要求也越来越高，如电池容量和续航能力，但由于锂离子电池技术一直停滞不前，相对手机性能的几何级数增长，手机电池的续航能力却愈发捉襟见肘，人们只能简单地增加电池容量来提升手机续航能力，或者依靠额外的移动电源来应对手机长时间无法充电的状况，而当人们长时间处于野外或遇到停电等突发状况时，移动电源也将失去作用，此时人们就需要一种应急充电设备，可以将其他电源转化为手机供电电源。为此人们开发出了一些利用干电池为手机进行应急充电的装置，如申请号为CN201320139060.2的申请文件公开了一种可利用干电池充电的手机壳，其具有专门用于放置干电池的电池仓，因此具有体积较大的缺点，不利于随身携带。

实用新型内容

[0003] 针对现有技术中的上述问题，本实用新型提出了一种微型充电器。

[0004] 本实用新型的技术方案为：一种微型充电器，包括基座和顶盖，其中所述基座包括第一外壳和第一内壳，所述第一外壳和第一内壳构成中空结构，所述基座内设有电路板、磁铁片，所述第一内壳上镶嵌有与电路板相连的电极片，所述磁铁片位于电极片与电路板之间，所述第一内壳上设有与电路板相连的智能设备充电插头；

[0005] 所述基座内设有插头滑槽，所述插头滑槽内设有与电路板相连的电源插头；

[0006] 所述顶盖包括第二外壳和第二内壳，所述第二外壳和第二内壳构成中空结构，所述顶盖内也设有磁铁片，所述第二外壳上也镶嵌有电极片，所述第二内壳上设有与智能设备充电插头相匹配的插孔。

[0007] 进一步地，所述基座和顶盖内还均设有隔磁片，所述隔磁片设于磁铁片远离电极片的一侧。

[0008] 进一步地，所述基座上还设有与电路板相连的USB插口。

[0009] 进一步地，所述电极片为弹性接触片，所述第一内壳和第二内壳上设有用于放置电池正极的凹槽。

[0010] 进一步地，所述顶盖上还设有钥匙环。

[0011] 本实用新型通过设于基座和顶盖内的磁铁片可将干电池或充电电池吸附在底座和顶盖之间，并通过电极片连成通路并与电路板相连，从而可用于通过智能设备充电插头或者USB接口为其他设备充电；同时可利用电源插头连接外接电源，外接电源电压经过电路板转化后即可为充电电池充电，或者通过智能设备充电插头或USB接口为其他设备充电。

[0012] 与现有技术相比，本实用新型的有益效果是：

Petitioner Samsung Ex-1004, 0433

[0013] ①本实用新型通过在基座和顶盖内部均设置磁铁片，在不使用时，基座和顶盖可通过磁铁片的吸附作用而合为一个整体，此时基座上的智能设备充电插头可插入顶盖的插孔内，有效保护智能设备充电插头；当需要使用干电池或充电电池时，将基座和顶盖分开，通过磁铁片和电极片可将电池吸附住并固定在基座和顶盖之间，无需设置额外的导线，也无需配置放置电池的电池仓，使得本实用新型体积十分小巧、易于携带；

[0014] ②本实用新型集成了可收放的电源插头，因而可通过外接电源为设备或电池充电，功能更加全面；

[0015] ③本实用新型通过在顶盖上设置钥匙环，可用于悬挂在钥匙扣上或手提包上，便于随身携带；

[0016] ④本实用新型通过在磁铁片一侧设置隔磁片，以隔绝磁铁片对电路板或其他设备的影响，因此避免了磁铁片影响外部电子设备而导致的安全问题；

[0017] ⑤本实用新型采用弹性接触片作为连接电池的电极片，当电池长度尺寸不一时也可保证接触良好，使其正常工作，保证了产品的性能；同时通过设置凹槽使得电池固定得更加牢固。

附图说明

[0018] 图 1 为本实用新型的主视图。

[0019] 图 2 为本实用新型的立体视图。

[0020] 图 3 为本实用新型的又一立体视图。

[0021] 图 4 为本实用新型所述基座的立体视图。

[0022] 图 5 为本实用新型所述顶盖的立体视图。

[0023] 图 6 为本实用新型的内部结构示意图。

[0024] 图 7 为本实用新型的应用参考图。

[0025] 图中：1- 基座，101- 第一外壳，102- 第一内壳，103- 电路板，104- 智能设备充电插头，105- 插头滑槽，106- 电源插头，107-USB 插口，2- 顶盖，201- 第二外壳，202- 第二内壳，203- 插孔，204- 钥匙环，3- 磁铁片，4- 电极片，5- 隔磁片，6- 凹槽。

具体实施方式

[0026] 下面结合附图及实施例对本实用新型中的技术方案进一步说明。

[0027] 如图 1 ～图 7 所示，本实用新型包括基座 1 和顶盖 2，其中：所述基座 1 包括第一外壳 101 和第一内壳 102，所述第一外壳 101 和第一内壳 102 构成中空结构，所述基座 1 内设有电路板 103、磁铁片 3，所述第一内壳 101 上镶嵌有与电路板 103 相连的电极片 4，所述磁铁片 3 位于电极片 4 与电路板 103 之间，所述第一内壳 101 上设有与电路板 103 相连的智能设备充电插头 104，所述基座 1 内设有插头滑槽 105，所述插头滑槽 105 内设有与电路板 103 相连的电源插头 106；所述基座 1 上还设有与电路板 103 相连的 USB 插口 107；

[0028] 如图 5、图 6 所示，所述顶盖 2 包括第二外壳 201 和第二内壳 202，所述第二外壳 201 和第二内壳 202 构成中空结构，所述顶盖 2 内也设有磁铁片 3，所述第二外壳 201 上也镶嵌有电极片 4，所述第二内壳 202 上设有与智能设备充电插头 104 相匹配的插孔 203，所述顶盖上设有钥匙环 204；

Petitioner Samsung Ex-1004, 0434

[0029] 所述基座 1 和顶盖 2 内还均设有隔磁片 5，所述隔磁片 5 设于磁铁片 3 远离电极片 4 的一侧；所述电极片 4 为弹性接触片，所述第一内壳 102 和第二内壳 202 上设有用于放置电池正极的凹槽 6。

[0030] 以上所述仅为本实用新型的较佳实施例而已，并不用以限制本实用新型，凡在本实用新型的精神和原则之内，所作的任何修改、等同替换、改进等，均应包含在本实用新型的保护范围之内。

Petitioner Samsung Ex-1004, 0435

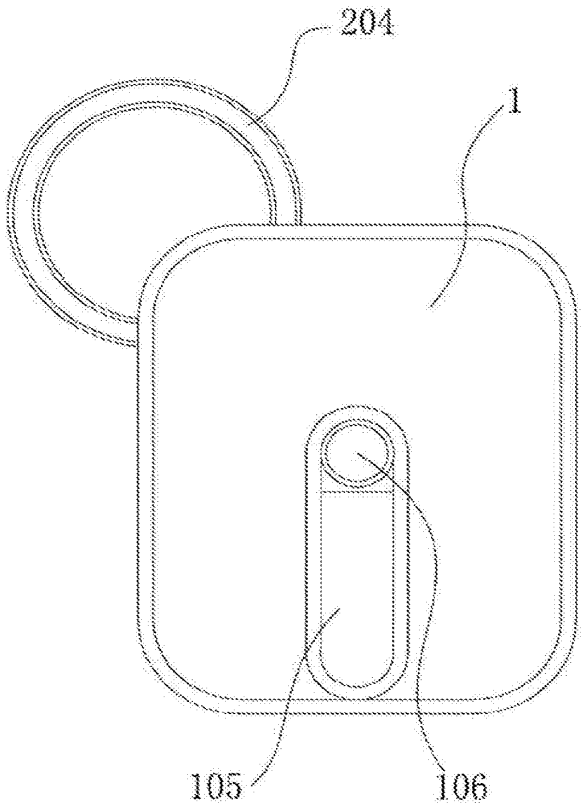


图 1

Petitioner Samsung Ex-1004, 0436

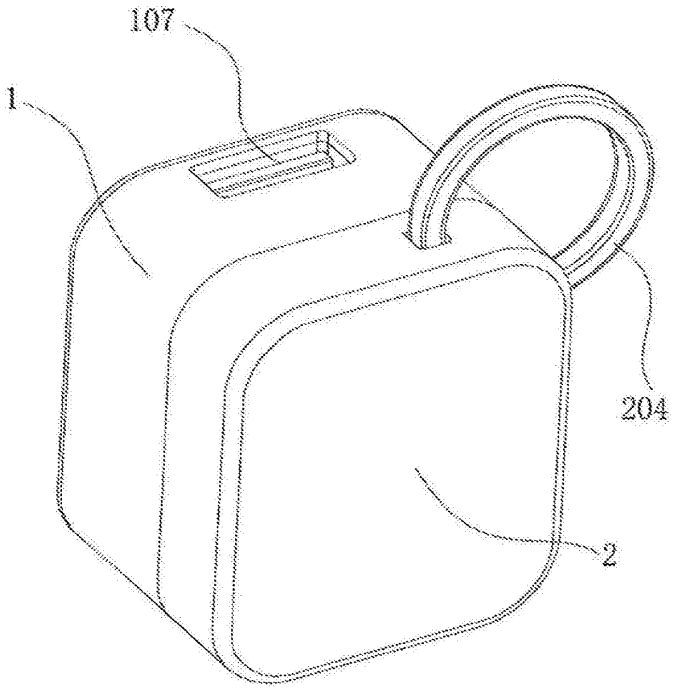


图 2

Petitioner Samsung Ex-1004, 0437

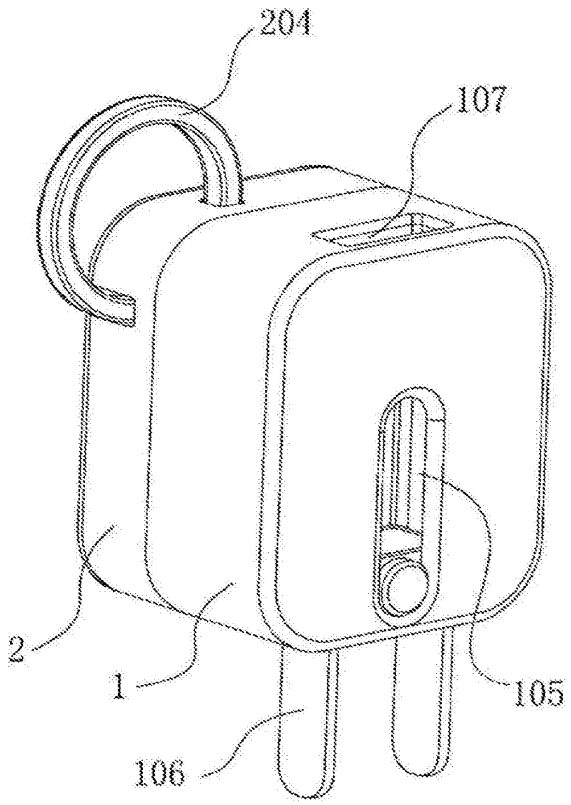


图 3

Petitioner Samsung Ex-1004, 0438

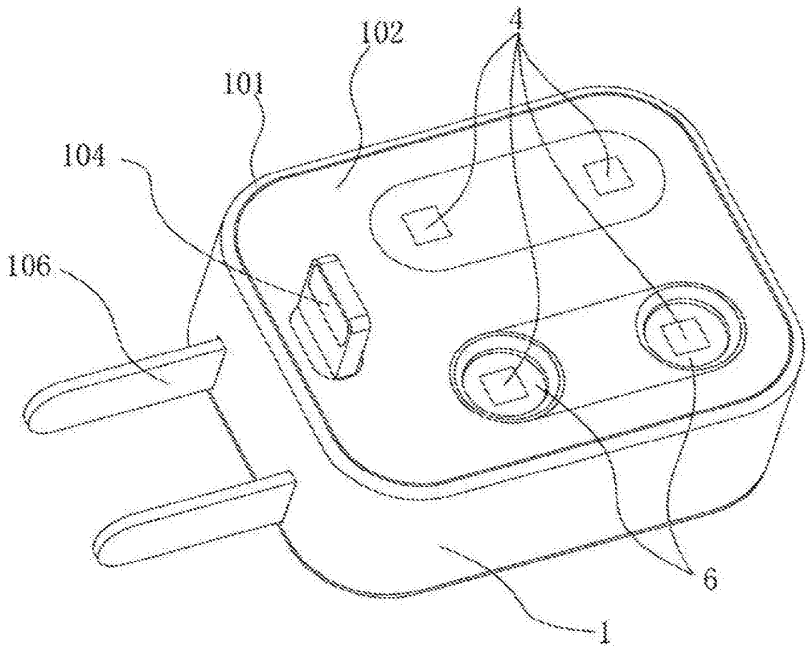


图 4

Petitioner Samsung Ex-1004, 0439

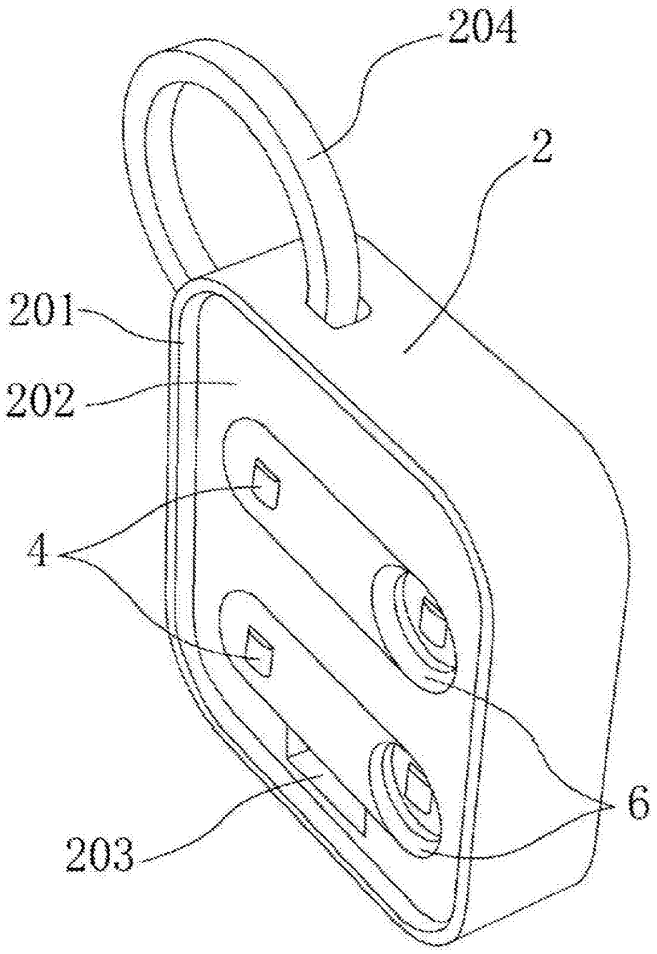


图 5

Petitioner Samsung Ex-1004, 0440

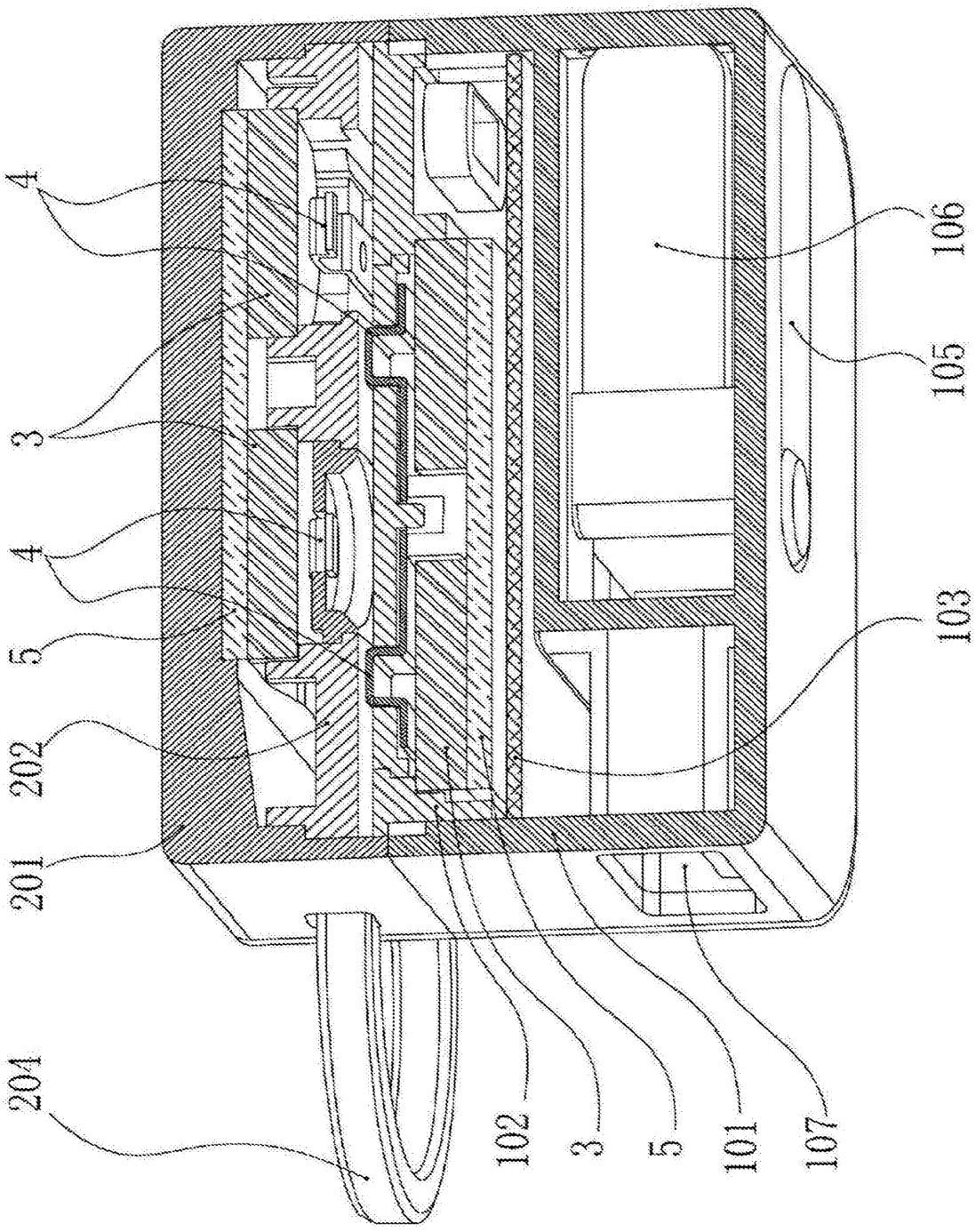


图 6

Petitioner Samsung Ex-1004, 0441

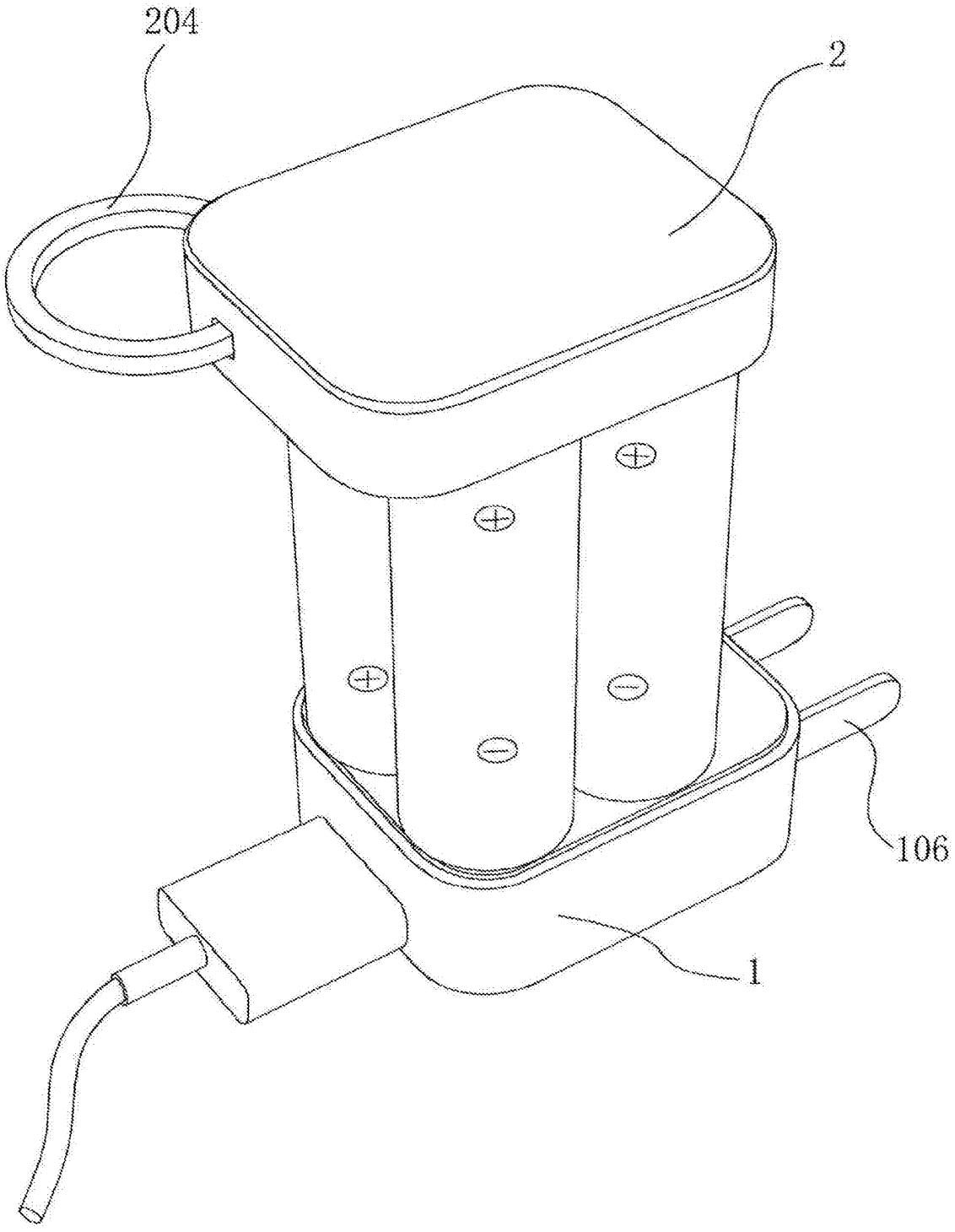


图 7

Petitioner Samsung Ex-1004, 0442

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 October 2009 (08.10.2009)

PCT

(10) International Publication Number
WO 2009/124076 A1

(51) **International Patent Classification**:
A61B 5/00 (2006.01)

(21) **International Application Number**:
PCT/US2009/039002

(22) **International Filing Date**:
31 March 2009 (31.03.2009)

(25) **Filing Language**: English

(26) **Publication Language**: English

(30) **Priority Data**:
61/072,600 31 March 2008 (31.03.2008) US

(71) **Applicant** *(for all designated States except US)*: **NELLCOR PURITAN BENNETT LLC** [US/US]; 6135 Gunbarrel Avenue, Boulder, CO 80301 (US).

(72) **Inventors; and**
(75) **Inventors/Applicants** *(for US only)*: **PETERSEN, Ethan** [US/US]; 659 Aileen Street, Oakland, CA 94609 (US). **PEREZ, Mark** [US/US]; 4105 Windgate Drive, Denair, CA 95316 (US).

(74) **Agent**: **SCHAUMANN, David, H.**; Attn Ip Legal, 60 Middletown Avenue, North Haven, CT 06473 (US).

(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*

WO 2009/124076 A1

(54) **Title**: MEDICAL MONITORING PATCH DEVICE AND METHODS

(57) **Abstract**: Embodiments described herein may include systems and methods for monitoring physiological parameters of a patient. Specifically, embodiments disclose the use of a generally self-contained pulse oximeter that is small and lightweight, such that it may be comfortably affixed to a patient to provide physiological data pertaining to the patient. Embodiments also provide methods of using and manufacturing a pulse oximetry patch.

Petitioner Samsung Ex-1004, 0443

MEDICAL MONITORING PATCH DEVICE AND METHODS

BACKGROUND

[0001] The present disclosure relates generally to medical devices and, more particularly, to medical monitoring devices.

[0002] This section is intended to introduce the reader to various aspects of art that may be related to various aspects of the present disclosure, which are described and/or claimed below. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present disclosure. Accordingly, it should be understood that these statements are to be read in this light, and not as admissions of prior art.

[0003] In the field of medicine, doctors often desire to monitor certain physiological characteristics of their patients. Accordingly, a wide variety of devices have been developed for monitoring physiological characteristics. Such devices provide doctors and other healthcare personnel with the information they need to provide the best possible healthcare for their patients. As a result, such monitoring devices have become an indispensable part of modern medicine.

[0004] One technique for monitoring certain physiological characteristics of a patient is commonly referred to as pulse oximetry, and the devices built based upon pulse oximetry techniques are commonly referred to as pulse oximeters. Pulse oximetry

Petitioner Samsung Ex-1004, 0444

may be used to measure various blood flow characteristics, such as the blood-oxygen saturation of hemoglobin in arterial blood, the volume of individual blood pulsations supplying the tissue, and/or the rate of blood pulsations corresponding to each heartbeat of a patient.

[0005] Pulse oximeters typically utilize a non-invasive sensor that is placed on or against a patient's tissue that is well perfused with blood, such as a patient's finger, toe, forehead or earlobe. The pulse oximeter sensor emits light and photoelectrically senses the absorption and/or scattering of the light after passage through the perfused tissue. The data collected by the sensor may then be used to calculate one or more of the above physiological characteristics based upon the absorption or scattering of the light. More specifically, the emitted light is typically selected to be of one or more wavelengths that are absorbed or scattered in an amount related to the presence of oxygenated versus de-oxygenated hemoglobin in the blood. The amount of light absorbed and/or scattered may then be used to estimate the amount of the oxygen in the tissue using various algorithms.

[0006] Pulse oximeters and other medical devices are typically mounted on stands that are positioned around a patient's bed or around an operating room table. When a caregiver desires to command the medical device (e.g., program, configure, and so-forth), the caregiver may manipulate controls or push buttons on the monitoring device itself. The monitoring device typically provides results or responses to commands on a Liquid Crystal Display ("LCD") screen mounted in an externally visible position on the medical device. Patient data, alerts, and other information may be

Petitioner Samsung Ex-1004, 0445

displayed on the monitor directly, or may be transmitted to a central computer monitored by caregivers.

[0007] This conventional configuration, however, may have several disadvantages, particularly in emergency situations which may occur remotely from a hospital or medical environment. For example, conventional monitors are too heavy and bulky to be worn or constantly moved around to follow a patient. Additionally, in emergency situations, a convenient power supply may not be readily available, and the time required to set up the monitoring system may not be available considering other pressing emergency needs of the patient. The lack of time or a convenient power source may be particularly problematic in large scale emergencies wherein several patients require prompt medical treatment from limited medical personnel working with limited resources. Additionally, the bulk and expense of conventional monitors may make it logistically and economically unfeasible to have large numbers of such monitors on-hand and ready to be transported to emergency sites. It may be desirable, therefore, to have a pulse oximeter that is small, lightweight, inexpensive and battery operated, such that it can be worn by a patient and possibly disposed of after a single use.

SUMMARY

[0008] Certain aspects commensurate in scope with the original claims are set forth below. It should be understood that these aspects are presented merely to provide the reader with a brief summary of certain embodiments and that these aspects are not intended to limit the scope of the claims. Indeed, the claims and disclosure may encompass a variety of aspects that may not be set forth below.

Petitioner Samsung Ex-1004, 0446

[0009] Some embodiments described herein are directed to a wholly contained pulse oximetry system that may be worn by a patient. Certain embodiments may include an upper layer that includes a display, a bottom layer that includes one or more light emitters and one or more light detectors for acquiring physiological data from a patient and a middle layer between the upper layer and lower layer that holds the circuitry of the pulse oximetry system, including sensor circuitry, parameter processing circuitry, and display circuitry.

[0010] Other embodiments described herein are directed to methods of generating physiological data by a pulse oximetry system that is worn by a patient in the form of a patch for example. The pulse oximetry system may perform the acts of: driving LEDs to emit a light signal into a tissue to be tested; receiving a modified light signal after it has been transmitted through or reflected from the tissue to be tested; generating a physiological parameter based on the modified light signal; and generating a display output of the physiological parameter on an outer surface of the patch.

[0011] Other embodiments described herein are directed to methods of monitoring a patient by affixing a wholly contained pulse oximeter to the tissue of a patient and observing a physiological data display included on the pulse oximeter.

[0012] Still other embodiments described herein are directed to a method of manufacturing a pulse oximeter, such as by providing pulse oximeter circuitry configured to sense, process, and display physiological data of a patient, and enclosing

Petitioner Samsung Ex-1004, 0447

the pulse oximeter circuitry within an enclosure configured to be disposed adjacent to a tissue of the patient.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Advantages of the disclosure may become apparent upon reading the following detailed description and upon reference to the drawings in which:

[0014] Fig. 1A is a perspective view of a pulse oximetry patch in accordance with an embodiment in which the display includes a pair of light emitting diodes (LEDs);

[0015] Fig. 1B is a perspective view of a pulse oximetry patch in accordance with an embodiment in which the display includes a numerical display;

[0016] Fig. 2 is a perspective view of the back side of the pulse oximetry patch of Figs. 1A or 1B in accordance with an embodiment;

[0017] Fig. 3 is a depiction of a pulse oximetry patch of Figs. 1A or 1B disposed adjacent to the forehead of a patient in accordance with an embodiment;

[0018] Fig. 4 is a block diagram of a pulse oximeter of Figs. 1A or 1B in accordance with an embodiment;

[0019] Fig. 5 is a perspective exploded view of the pulse oximeter of Fig. 1A in accordance with an embodiment;

[0020] Fig. 6 is a perspective view of the back side of the pulse oximeter circuit board of Fig. 5 in accordance with an embodiment.

DETAILED DESCRIPTION

[0021] One or more embodiments will be described below. In an effort to provide a concise description of these embodiments, not all features of an actual

Petitioner Samsung Ex-1004, 0448

implementation are described in the specification. It should be appreciated that in the development of any such actual implementation, as in any engineering or design project, numerous implementation-specific decisions must be made to achieve the developers' specific goals, such as compliance with system-related and business-related constraints, which may vary from one implementation to another. Moreover, it should be appreciated that such a development effort might be complex and time consuming, but would nevertheless be a routine undertaking of design, fabrication, and manufacture for those of ordinary skill having the benefit of this disclosure.

[0022] Certain embodiments relate to a wholly contained pulse oximetry system that is small and lightweight such that it can be worn by a patient. Such a pulse oximetry system may be a small, battery operated, flexible patch that may be adhesively or otherwise affixed to a patient. Such a patch may be used once and thrown away. Therefore, such a pulse oximetry patch may be constructed inexpensively, having very simplified features and displays compared to a traditional pulse oximetry system.

[0023] Fig. 1A is a perspective view of a front side of pulse oximetry patch **10** in accordance with an embodiment. The front side of the pulse oximetry patch **10** is the side that would be visible to a caregiver after the pulse oximetry patch **10** is affixed to a patient. The pulse oximetry patch **10** may be small enough to be affixed to a patient and also holds circuitry utilized for sensing, processing and displaying physiological data of a patient. Because the pulse oximetry patch **10** is to be affixed to a patient, it will typically be small and lightweight. For example, it may have a surface area in the range of approximately three or four square inches, and a thickness

Petitioner Samsung Ex-1004, 0449

in the range of one-eighth of an inch. Additionally, to provide for a secure and comfortable fit, the patch **10** may be flexible. Furthermore, the patch **10** may also include various textual printing on the outer surface, such as, for example, labels, use instructions and model information. As will be explained in more detail below, the patch **10** may be made of any material known in the art such as, for example, polymeric materials.

[0024] The pulse oximetry patch **10** may also include a display, illustrated here as two displays **14** and **16**, which display certain physiological data of a patient. The displays **14** and **16** may display any data that is useful to a caregiver monitoring a patient. As example, the display **14** may include an LED that blinks correlatively with the heart beat of the patient. For another example, the display **16** may be activated or deactivated in response to the blood-oxygen saturation level of a patient. Specifically, in some embodiments the display **16** may light up when the patient's blood-oxygen level is above acceptable levels, informing the caregiver that the patient's blood-oxygen level is normal. In alternate embodiments, the display **16** may light up when the patient's blood-oxygen level is below acceptable levels, alerting the caregiver that the patient's blood-oxygen level is too low. Furthermore, the displays **14** and **16** may be color coded. For example, the display **16** may include an LED that emits green light when blood-oxygen levels are normal and emits red light when blood-oxygen levels are too low.

[0025] Referring to Fig. 1B, an embodiment that includes a numerical display **18** is shown. The numerical display **18** may be configured to display any useful numerical data corresponding to a physiological parameter of a patient, such as, for

Petitioner Samsung Ex-1004, 0450

example, a pulse rate and/or a blood-oxygen saturation level. Additionally, the numerical display **18** may be configured to display data corresponding to the pulse oximetry patch **10** itself, such as, for example, battery life and/or whether the patch **10** is transmitting a wireless signal. Furthermore, the display **18** may be configured to cycle through a set of numerical data, either on a timed basis or responsive to an input of the user.

[0026] Referring to Fig. 2, one example of the back side of the pulse oximetry patch **10** is shown. The back side **12** of the pulse oximetry patch **10** is the side that is affixed adjacent to the tissue of a patient. As will be explained further below, the pulse oximetry patch **10** detects physiological data of a patient through sensor circuitry that may include an emitter **19** and a detector **20**. The emitter **19** may include one or more LEDs, such as a red LED and an infra-red LED. The detector **20** may be, for example, any kind of photosensor known in the art, such as, for example a photodiode. When operable, both the emitter **19** and detector **20** are in contact with the skin or tissue of a patient.

[0027] To hold the pulse oximetry patch **10** against the patient, the back side **12** of the patch **10** may include an adhesive **22** that is configured to hold the pulse oximetry patch **10** against the skin of a patient. Additionally, to protect the adhesive **22** while the pulse oximetry patch **10** is not in use, a protective sheet **24** may be disposed over the adhesive **22**. The protective sheet **24** may be configured to be removed just prior to the pulse oximetry patch **10** being affixed to the skin of a patient.

Petitioner Samsung Ex-1004, 0451

[0028] The pulse oximetry patch **10** may be disposed adjacent to any part of a patient's body that is conducive to measuring physiological parameters and that can support the pulse oximetry patch **10**, such as for example, the forehead or the wrist. It should also be noted that the pulse oximetry patch **10** may be calibrated for use over a particular bodily area or tissue measurement site.

[0029] Referring to Fig. 3, an embodiment of a pulse oximetry patch **10** may be held by a headband **28** adjacent to the forehead of a patient **26** above the left eye, for example. A typical headband **28** may be affixed to the pulse oximetry patch **10** along the edges **29** of the pulse oximetry patch **10**. The headband **28** may be made of an elastic material configured to stretch to fit a wide range of head sizes. Additionally, the headband **28** may include a buckle **30** designed to adjust the fit of the headband **28**. In alternate embodiments, the pulse oximetry patch **10** may be held in place with an external adhesive bandage (not shown). In fact, many techniques will be recognized by one of ordinary skill in the art for holding the pulse oximetry patch **10** against the skin of a patient, and the examples recited above should not be considered an exhaustive list of possible embodiments.

[0030] Turning now to Fig. 4, a block diagram of a pulse oximetry patch **10** is illustrated in accordance with an embodiment. It will be understood that an actual implementation may include more or fewer components as needed for a specific application. In this embodiment, the pulse oximetry patch **10** may include a red emitter **19A** and an infra-red emitter **19B** that are configured to transmit electromagnetic radiation through the tissue of a patient **26**. In accordance with this embodiment, the emitters **19A** and **19B** may include an LED that emits

Petitioner Samsung Ex-1004, 0452

electromagnetic radiation in the respective region of the electromagnetic spectrum. The emitted radiation transmitted from the emitters **19A** and **19B** into a patient's tissue is detected by the detector **20** after the radiation has passed through or reflected from blood perfused tissue of a patient **26**. The detector **20** generates a photoelectrical signal correlative to the amount of radiation detected.

[0031] The signal generated by the detector **20** may then be amplified by an amplifier **34**, filtered by a filter **36**, and provided to one or more processor(s) **38**. The processor(s) **38** may include an analog-to-digital converter **52** that converts the analog signal provided by the detector **20** into a digital signal. The analog-to-digital converter **52** may provide the digital signal to the core **54** to be processed for computing physiological parameters related to the patient **26**. For example, the core **54** may compute a percent oxygen saturation of hemoglobin and/or a pulse rate, among other useful physiological parameters, as will be appreciated by one of ordinary skill in the art. By utilizing an analog-to-digital converter **52** within the processor(s) **38**, the size and cost of the patch may be reduced, compared to traditional pulse oximeters that use a separate analog-to-digital converter. In presently contemplated embodiments, the processor(s) **38** may include a Mixed-Signal Microcontroller such as model number C8051F353 available from Silicon Laboratories.

[0032] In addition to computing physiological parameters, the processor(s) **38** may control the timing and intensity of the emitted electromagnetic radiation of the emitters **19A** and **19B** via a light drive circuit **40**. In embodiments, the light drive circuit **40** may be driven by a digital-to-analog converter **48**, included in the

Petitioner Samsung Ex-1004, 0453

processor(s) **38**. By utilizing a digital to analog converter **48** within the microprocessor **38**, the size and cost of the patch may be reduced, compared to traditional pulse oximeters that use a separate digital-to-analog converter. In accordance with an embodiment, the light drive circuit **40** may have a low part count such as the light drive circuit discussed in detail in U.S. Provisional Patent Application No. 61/009,076, entitled "LED Drive Circuit and Method for Using Same." (TYHC:0008) which was filed December 26, 2007, and is incorporated herein by reference in its entirety for all purposes. The reduced part count of the drive circuit **40** may further reduce the size, complexity, and cost of the pulse oximetry patch **10**.

[0033] Furthermore, the processor(s) **38** may also include a RAM **56** and/or a flash memory **58** coupled to the core processor **54**. The RAM **56** may be used to store intermediate values that are generated in the process of calculating patient parameters. The flash memory **58** may store certain software routines used in the operation of the patch **10**, such as measurement algorithms, LED drive algorithms, and patient parameter calculation algorithms, for example. In certain embodiments, the patch **10** may include simplified pulse oximetry algorithms such that the computer code associated with those algorithms may be contained in the memory components of the processor(s) **38**.

[0034] In some embodiments, the pulse oximetry patch **10** may also include other memory components that are not included in the processor(s) **38**. For example, the patch **10** may include a read-only memory (ROM), which may be used to store such things as operating software for the patch **10** and algorithms for computing

Petitioner Samsung Ex-1004, 0454

physiological parameters. In other embodiments, however, all of the processing memory and measurement software is included in the processor(s) **38**.

[0035] Furthermore, in some embodiments, the patch **10** may also include a long-term memory device used for long-term storage of measured data, such as measured physiological data or calculated patient parameters. In other embodiments, however, the cost and/or part count of the pulse oximetry patch **10** may be further reduced by eliminating any long-term storage of measured data. By eliminating long-term storage of measured data, smaller, less expensive memory components may be utilized, or, alternatively, some memory components may be eliminated. This may reduce the part count and the size and complexity of the pulse oximetry patch **10**, compared to traditional pulse oximetry systems.

[0036] Also included in the pulse oximetry patch **10** is a display that may be coupled to the processor(s) **38** to allow for display of the computed physiological parameters. For example, the display may include an LED display **14**, **16** operably coupled to the processor(s) **38** and programmed to operate as described above in relation to Fig. 1. For another example, the display may include a numerical display **18**, such as a liquid crystal display, and drive circuitry configured to convert the processor **38** output into a format suitable for driving the numerical display **18**.

[0037] Embodiments may also include a wireless device **50** configured to transmit computed patient parameters such as, for example, pulse rate, blood-oxygen saturation, or the raw data. The wireless device **50** may include any wireless

Petitioner Samsung Ex-1004, 0455

technology known in the art. In an embodiment, the sensor **14** may transmit data via a wireless communication protocol such as WiFi, Bluetooth or ZigBee.

[0038] Turning now to Fig. 5, an exploded view of a pulse oximetry patch **10** is shown. In some embodiments, the pulse oximetry patch **10** may include three layers: a middle layer **60**, a top layer **62**, and a bottom layer **64**. The middle layer **60** may include all or substantially all of the circuitry of the pulse oximeter patch **10**. To operably couple the various circuitries, the middle layer **60** may include a circuit board **72**, which may be a flexible, or "flex," circuit board, and it may also be double sided. By making the circuit board **72** flexible, the pulse oximetry patch **10** can more easily conform to the contours of a patient while also preventing connection failures within the circuit board **72**.

[0039] The circuit board **72** may include the microprocessor **38**, as well as other circuit components **76**, such as the circuit components discussed above with regard to Figs. 4 and 5. The circuit board **72** may also include one or more batteries **74**. The batteries **74** may be any small, lightweight battery such as a "coin cell" or "button cell." In some embodiments, the batteries **74** may be lithium ion batteries. In yet other embodiments, the batteries **74** may be nanowire batteries, i.e., high performance lithium ion batteries made from silicon nanowires. The batteries **74** serve to power the circuitry of the pulse oximetry patch **10** and are coupled to the circuitry through contacts **75**.

Petitioner Samsung Ex-1004, 0456

[0040] In an embodiment, an electrically insulative film (not shown) may optionally be inserted between the batteries **74** and the contacts **75** during manufacture to prevent the pulse oximetry patch **10** from becoming activated prior to its intended use. In some embodiments, the electrically insulative film may be an extension of the protective sheet **24**. For example, the protective sheet **24** may include an extension that is inserted during manufacture into the patch **10** through a small opening in the side of the patch **10**. This extension may be disposed between a battery and its corresponding electrical contact to block the flow of current from the battery. In this way, removal of the protective sheet **24** would simultaneously expose the adhesive **22** and turn on the patch **10**. In some embodiments, the removal of the electrically insulative film may be the only way of actuating the circuitry of the pulse oximetry patch **10**.

In alternate embodiments, other means of activating the pulse oximetry patch **10** may be included. For example, the pulse oximetry patch **10** may include a power button or switch, or, alternatively, the pulse oximetry patch **10** may include a pressure sensitive button that may be enclosed in the patch **10** and operable through compression of the patch **10**.

[0041] The circuit board **72** may also include the display LEDs **14** and **16**. As stated above, the display LEDs **14** and **16** provide the caregiver with the patient's physiological data. As such, the display LEDs **14** and **16** align with the display windows **66**, in the top layer **62**. As discussed in relation to Fig. 1B, the middle layer may also include a numerical display **18**, rather than a set of display LEDs.

Petitioner Samsung Ex-1004, 0457

[0042] In embodiments, the middle layer **60** may also include a wireless device **50** on the circuit board **72**. As discussed above, the wireless device **50** may allow the pulse oximetry patch **10** to transmit data wirelessly to a remote monitor. As such, the wireless device **50** may include a wireless transmitter circuitry and a radio frequency antenna, such as, for example a microstrip or patch antenna.

[0043] Additionally, although not depicted, embodiments may include one or more pushbuttons coupled to the circuit board **72** of the middle layer **60**. The pushbuttons may allow a user to turn the pulse oximetry patch **10** on or off or change a mode of the pulse oximetry patch **10**. For example, a pushbutton may allow a caregiver to cycle through various physiological data displayed on the numerical display **18**.

[0044] Furthermore, embodiments may also include an alarm and supporting circuitry. The alarm may be used as another way of communicating physiological data of a patient to a caregiver. For example, the alarm may be configured to emit a beeping sound corresponding with the heartbeat of a patient, or the alarm could be configured to sound when the patient's blood-oxygen saturation level falls below a certain acceptable level.

[0045] Turning briefly to Fig. 6, the back side of the circuit board **72** is shown. The back side of the circuit board **72** may include, at least, the emitter **19** and the detector **20**. In embodiments, the emitter **19** includes a red LED and an infra-red LED. The emitter **19** and detector **20** are placed to align with the sensor window **68** in

Petitioner Samsung Ex-1004, 0458

the bottom layer **64**. In some embodiments, the bottom side of the circuit board **72** may include additional circuit components.

[0046] Returning to Fig. 5, the pulse oximetry patch **10** may include a top layer **62** and bottom layer **64** that enclose the middle layer **60** to protect the circuitry inside, thus forming a shell around the circuitry and the circuit board **72**. The top layer **62** is the layer that is visible when disposed adjacent to the skin of a patient. As such, the top layer **62** may include display windows **66** that allow display components **14**, **16**, **18** to be seen through the top layer **62**. The display windows **66** may be constructed in any manner that allows visible light to pass through the top layer **62**. For example, the display windows **66** may include holes formed in the top layer **62**. Furthermore, the display windows may include a translucent material configured to prevent fluids from entering the pulse oximetry patch **10** through the display windows **66**. Alternatively, in some embodiments, the display windows **66** may include a reduced thickness of the top layer material, such that light may pass through the top layer **62** more easily at the display window **66**.

[0047] The top layer **62** or the bottom layer **64** may also include a battery "door" for allowing access to the batteries **74**. For example, part of the top layer **62** or the bottom layer **64** may swing or slide open to expose a battery compartment, allowing batteries to be changed. Alternatively, an embodiment may be configured such that the batteries are not accessible. As such, the pulse oximetry patch **10** would be intended to be thrown away after the batteries can no longer sufficiently charge the pulse oximetry device **10**, which may be suitable for a disposable, one-use patch.

Petitioner Samsung Ex-1004, 0459

[0048] The top layer **62** and bottom layer **64** may be formed using any suitable material. In an embodiment, the top layer **62** and the bottom layer **64** may include a metal such as aluminum. In another embodiment, the top layer **62** and bottom layer **64** may include one or more polymers, such as, for example, silicon polymers, polyvinylchloride and polyolefins such as polyethylene. The polymers may be elastomeric to provide for flexibility of the pulse oximetry patch **10** such that it may conform to the tissue of a patient. Additionally, any number of ways for coupling the top layer **62** and the bottom layer **64** may be employed. For example, the layers may be glued, melted or snapped together at the edges.

[0049] In various embodiments, the middle layer **60** may be encased in a unitary outer shell through the use of injection overmolding. As will be appreciated by one of ordinary skill in the art, a typical injection overmolding technique will include placing one or more fully assembled middle layers **60** into a die and injecting a molten thermoplastic into the die to surround the middle layer **60**. The mold may be constructed so that the display windows **66** and the sensor windows **68** are not obstructed. For example, the display LEDs **14** and **16**, the emitter **19** and the detector **20** may be situated at an outer edge of the mold volume such that the molten thermoplastic will not completely cover these components.

[0050] In yet other embodiments, a clamshell style container may be formed in a sheet thermoforming method that will be understood by one of ordinary skill in the art. The clamshell container may then be folded over the middle layer **60** and sealed within the clamshell such as by melting, snapping or gluing the edges together.

Petitioner Samsung Ex-1004, 0460

[0051] In certain embodiments, the patch **10** may be configured so that the middle layer **60** can be easily removed for later recycling or reuse. In this embodiment, the top layer **62** and bottom layer **64** may be pulled apart without causing damage to the middle layer **60**. The outer layers may then be discarded, while the middle layer **60** may be refitted with new batteries and repackaged with new top and bottom layers **62** and **64**. This may allow a program of recycling to be implemented, in which customers return used pulse oximetry patches to the manufacturer, rather than discarding them. In this way, a manufacturer of the disclosed embodiment may be better able to conform to electronic waste regulations, such as those called for in the Waste Electrical and Electronic Equipment Directive recently legislated by the European Union.

[0052] Some embodiments of a pulse oximetry patch **10** may also include a disabling mechanism that prevents unauthorized manipulation or reuse of the patch **10**. In this regard, the processor(s) **38** may be programmed to recognize whether the outer layers of the patch **10** have been separated. For example, a conductive contact may be included in the patch **10** that electrically couples an input/output (I/O) port of the processor(s) **38** to a zero-voltage reference. The I/O port may also be electrically coupled to a non-zero voltage through a high-resistance pull-up resistor. Furthermore, the conductive contact may be physically coupled to the top layer **62** and/or the bottom layer **64**, such that separation of the layers will cause the conductive contact to open electrically, allowing the I/O port to float to the higher voltage level through the pull-up resistor. The processor(s) **38** may be configured such that detection of a non-zero voltage at the I/O port at start-up or during operation disables the patch **10**.

Petitioner Samsung Ex-1004, 0461

[0053] Another example of a disabling mechanism may include an small integrated circuit (IC) chip such as an Erasable Programmable Read-Only Memory (EPROM) or a 1-Wire® chip available from Dallas Semiconductor Corp. The IC chip may be communicatively coupled to the processor(s) **38** and may hold information such as manufacturer information that may be read by the processor(s) **38**. The processor(s) **38** may be programmed to read and verify the IC information as part of a start-up routine, for example. Furthermore, a contact may be electrically coupled to the IC and physically coupled to the upper layer **62** and/or lower layer **64** such that separation of the layers will cause the information stored on the IC to be erased, thereby disabling the patch **10**. In this way, the information stored on the IC would have to be reprogrammed before the middle layer **60** could be reused.

Petitioner Samsung Ex-1004, 0462

CLAIMS

What is claimed is:

1. A pulse oximetry patch adapted for placement adjacent to tissue to be tested, comprising:

an upper layer comprising a display window;

a bottom layer comprising one or more light emitters and one or more light detectors, the emitters and detectors capable of acquiring physiological data from a patient; and

a middle layer disposed between the upper layer and the bottom layer comprising:

a drive engine configured to activate the one or more light emitters;

an oximetry engine configured to receive a signal corresponding to the physiological data acquired by the detectors and generate an output corresponding to the physiological data; and

a display adapted to receive the output corresponding to the physiological data.

2. The pulse oximetry patch of claim 1, wherein the bottom layer comprises a layer of adhesive for attaching the pulse oximetry patch to the patient.

3. The pulse oximetry patch of claim 1, further comprising a band adapted to hold the pulse oximetry patch against the patient.

Petitioner Samsung Ex-1004, 0463

4. The pulse oximetry patch of claim 1, wherein the display comprises a display configured to display a numerical value.

5. The pulse oximetry patch of claim 1, wherein the display comprises one or more light emitting diodes.

6 The pulse oximetry patch of claim 5, wherein one of the one or more light emitting diodes blinks correlatively with the heartbeat of the patient.

7. The pulse oximetry patch of claim 5, wherein one of the one or more light emitting diodes is activated or deactivated in response to a comparison of a measured blood-oxygen saturation value and a programmed blood-oxygen saturation value.

8. The pulse oximetry patch of claim 7, wherein the one or more light emitting diodes are color coded.

9. The pulse oximetry patch of claim 1, comprising a wireless transmitter configured to transmit patient parameters to an external monitor, display, and/or other device.

10. The pulse oximetry patch of claim 1, wherein the patch is approximately 3 inches by 1.5 inches.

11. A method of generating physiological data, comprising:

Petitioner Samsung Ex-1004, 0464

driving one or more light emitting diodes disposed in a generally self-contained patch to emit a light signal into a tissue to be tested;

receiving a modified light signal through a light detector disposed in the patch, the modified light signal corresponding to the light signal after it has been transmitted through or reflected from the tissue to be tested; and

generating within the patch a physiological parameter by processing the modified light signal;

generating a display output on an outer surface of the patch, the display output corresponding to the physiological parameter.

12. The method of claim 11, wherein driving the light emitting diodes comprises sequentially activating a red light emitting diode and an infrared light emitting diode.

13. The method of claim 11, wherein generating a display output comprises generating a numerical display corresponding to the physiological parameter.

14. The method of claim 11, wherein generating a display output comprises causing a light emitting diode to blink correlatively with the heartbeat of the patient.

15. The method of claim 11, wherein generating a display output comprises activating or deactivating a diode in response to a comparison of a measured blood-oxygen saturation value and a programmed blood-oxygen saturation value.

Petitioner Samsung Ex-1004, 0465

16. The method of claim 11, wherein the diode is color coded to indicate whether the measured blood-oxygen saturation value is higher or lower than the programmed blood-oxygen saturation value.

17. The method of claim 11, comprising generating a wireless transmission of the physiological data from the oximetry patch to an external display.

18. A method of monitoring a patient, comprising:

affixing a generally self-contained pulse oximeter to the tissue of a patient; and

activating the pulse oximeter causing the pulse oximeter to display physiological data.

19. The method of claim 18, comprising transmitting the physiological data to an external device wirelessly.

20. A method of manufacturing a pulse oximeter, comprising:

providing a pulse oximeter circuitry capable of sensing, processing, and displaying physiological data of a patient; and

enclosing the pulse oximeter circuitry within a generally self-contained enclosure capable of being disposed directly adjacent a tissue measurement site of the patient.

21. The method of claim 20, comprising disposing a layer of adhesive on one side of the enclosure.

Petitioner Samsung Ex-1004, 0466

22. The method of claim 20, comprising:

providing a first layer configured to be disposed on the tissue measurement site of the patient;

providing a second layer configured to allow observation of output data; and

enclosing the pulse oximeter circuitry between the first layer and the second layer.

23. The method of claim 20, comprising molding an enclosure around the pulse oximeter circuitry, the enclosure configured to be disposed adjacent to a tissue of the patient and allow observation of output data.

24. A pulse oximeter comprising:

a single processor chip comprising:

one or more first converters capable of activating one or more signal emitters for transmission of an emitted signal into tissue of a patient;

one or more second converters capable of receiving a signal generally correlative to the emitted signal from the tissue of the patient from one or more signal detectors;

a core processor configured to calculate physiological parameters of the patient from the signal from the one or more signal detectors; and

a program memory operatively coupled to the core processor and configured to store operating software of the pulse oximeter.

Petitioner Samsung Ex-1004, 0467

25. The pulse oximeter of claim 24, wherein the one or more first converters is configured to activate one or more display LEDs to indicate the physiological parameters of the patient.

26. The pulse oximeter of claim 24, wherein the single processor chip is configured to transmit output data corresponding with physiological parameters of the patient to a numerical display.

Petitioner Samsung Ex-1004, 0468

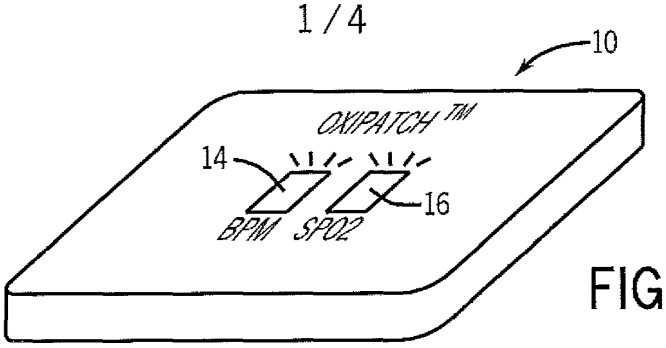


FIG. 1A

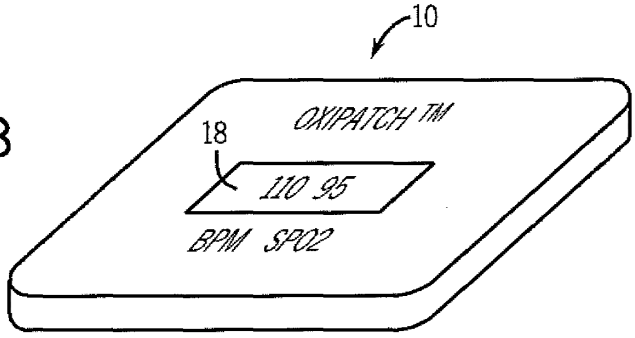


FIG. 1B

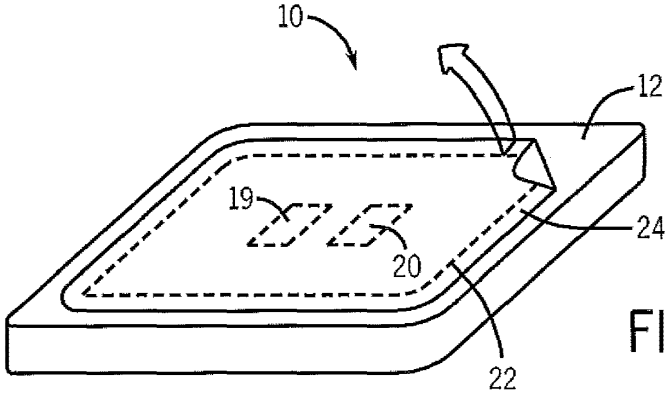


FIG. 2

Petitioner Samsung Ex-1004, 0469

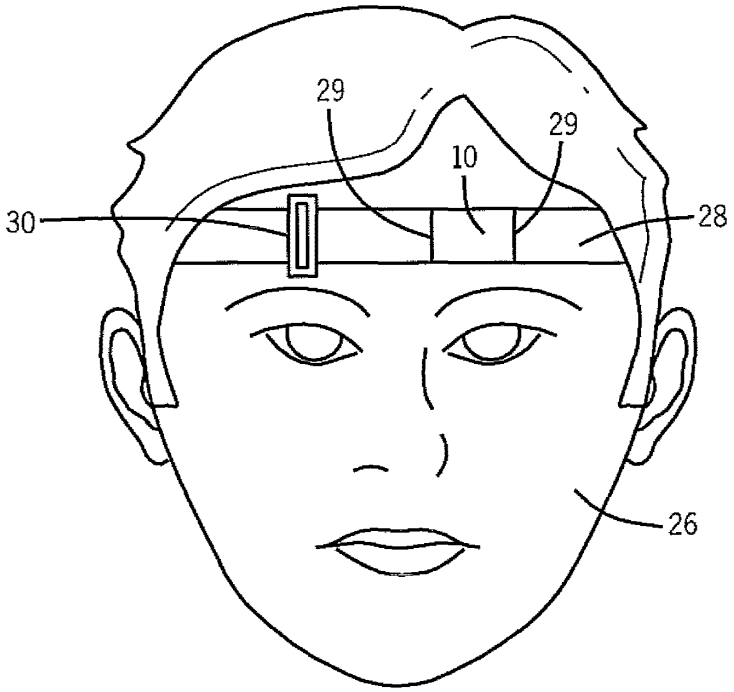


FIG. 3

Petitioner Samsung Ex-1004, 0470

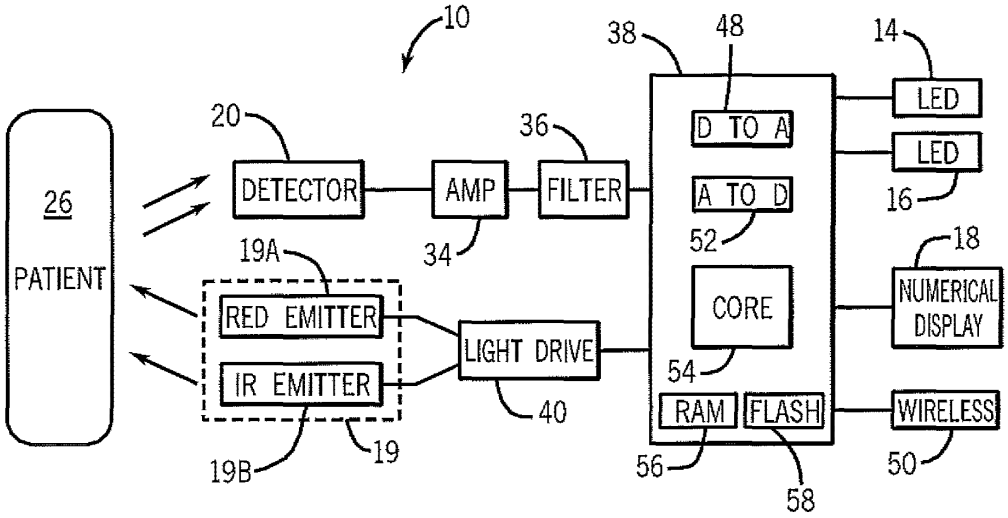


FIG. 4

Petitioner Samsung Ex-1004, 0471

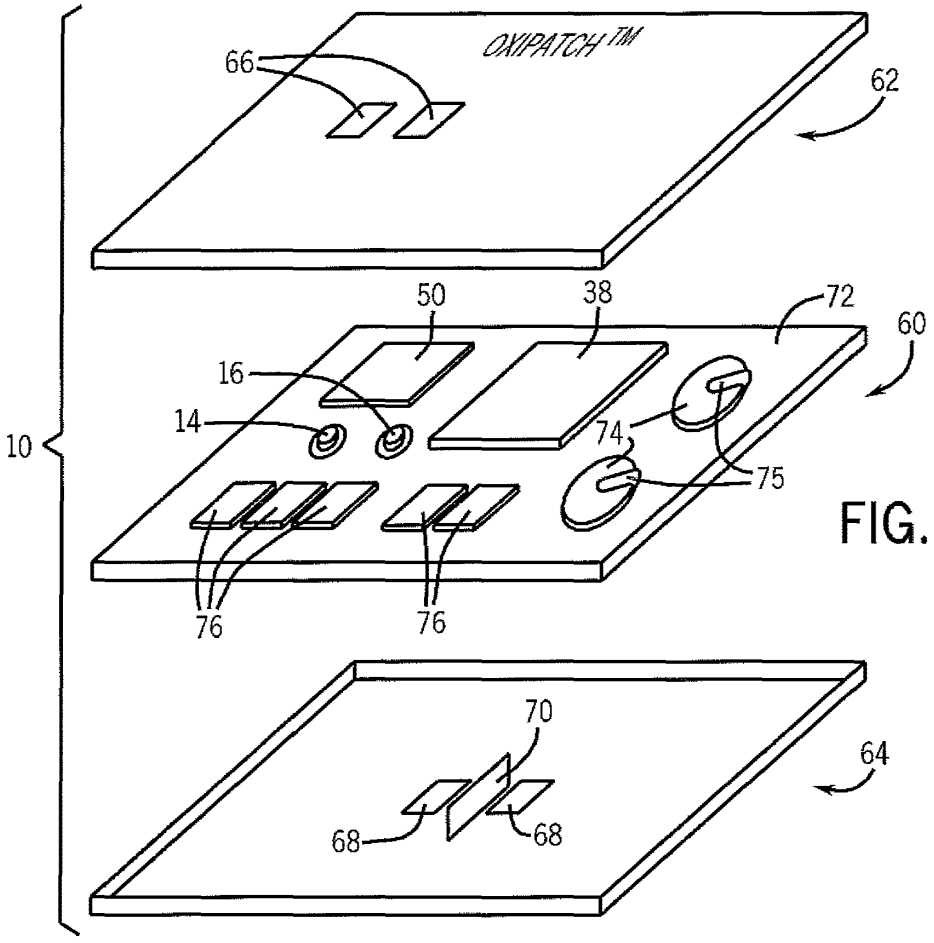


FIG. 5

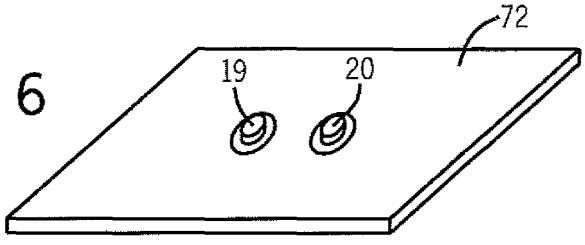


FIG. 6

Petitioner Samsung Ex-1004, 0472

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/039002

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B5/00

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)
A61B

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007/100219 A1 (SWEITZER ROBERT [US] ET AL) 3 May 2007 (2007-05-03) paragraphs [0012], [0014] paragraphs [0035] - [0039] paragraph [0044] paragraphs [0051] - [0056] figures	1-4, 9-11,13, 17-26
Y		5-8, 14-16
Y	WO 2004/078028 A (AVICOLA KEN [US]; MORTON RICHARD G [US]; ROSS JOHN R [US]) 16 September 2004 (2004-09-16) page 7, paragraph 2 - page 8, paragraph 2	5-8, 14-16

-/--

[X] Further documents are listed in the continuation of Box C.

[X] 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 document 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	Date of mailing of the international search report
19 June 2009	29/06/2009

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Bataille, Frédéric

Form PCT/ISA/210 (second sheet) (April 2005)

Petitioner Samsung Ex-1004, 0473

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/039002

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/228244 A1 (BANET MATTHEW J [US]) 13 October 2005 (2005-10-13) paragraph [0023] figures	11-13, 17-19
X	US 2005/070773 A1 (CHIN RODNEY [US] ET AL) 31 March 2005 (2005-03-31) paragraphs [0042], [0052], [0062] figure 13	11,13,18

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

Petitioner Samsung Ex-1004, 0474

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2009/039002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007100219 A1	03-05-2007	AU 2006306629 A1	03-05-2007
		CA 2626313 A1	03-05-2007
		CN 101330865 A	24-12-2008
		EP 1948009 A2	30-07-2008
		JP 2009513243 T	02-04-2009
		KR 20080065985 A	15-07-2008
		US 2009131774 A1	21-05-2009
		WO 2007050268 A2	03-05-2007
WO 2004078028 A	16-09-2004	NONE	
US 2005228244 A1	13-10-2005	US 2006009697 A1	12-01-2006
		US 2006009698 A1	12-01-2006
		US 2005228296 A1	13-10-2005
		US 2005228298 A1	13-10-2005
		US 2005228299 A1	13-10-2005
		US 2005228300 A1	13-10-2005
		US 2005228301 A1	13-10-2005
US 2005070773 A1	31-03-2005	US 2005070775 A1	31-03-2005

Petitioner Samsung Ex-1004, 0475

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date:
31 October 2013 (31.10.2013)

WIPO | PCT

(10) International Publication Number
WO 2013/163326 A1

(51) International Patent Classification:
H04L 29/08 (2006.01) *G06Q 30/00* (2012.01)
H04W 4/08 (2009.01)

(21) International Application Number:
PCT/US2013/038038

(22) International Filing Date:
24 April 2013 (24.04.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

61/637,834	24 April 2012 (24.04.2012)	US
61/670,226	11 July 2012 (11.07.2012)	US
61/693,169	24 August 2012 (24.08.2012)	US
61/701,457	14 September 2012 (14.09.2012)	US
61/713,239	12 October 2012 (12.10.2012)	US
61/716,373	19 October 2012 (19.10.2012)	US
61/717,864	24 October 2012 (24.10.2012)	US
61/728,677	20 November 2012 (20.11.2012)	US
61/745,395	21 December 2012 (21.12.2012)	US
61/745,308	21 December 2012 (21.12.2012)	US
13/773,336	21 February 2013 (21.02.2013)	US
13/773,379	21 February 2013 (21.02.2013)	US
13/833,227	15 March 2013 (15.03.2013)	US

(71) Applicant: **QUALCOMM INCORPORATED** [US/US]; Attn: International IP Administration, 5775 Morehouse Drive, San Diego, California 92121 (US).

(72) Inventors: **HUNTER, Kevin E.**; 5775 Morehouse Drive, San Diego, California 92121 (US). **SPRIGG, Stephen A.**; 5775 Morehouse Drive, San Diego, California 92121 (US). **MEIJERS, Neville J.**; 5775 Morehouse Drive, San Diego, California 92121 (US). **WURSTER, Charles S.**; 5775 Morehouse Drive, San Diego, California 92121 (US). **MENENDEZ, Jose R.**; 5775 Morehouse Drive, San Diego, California 92121 (US). **CANOY, Michael-David**; 5775 Morehouse Drive, San Diego, California 92121 (US).

(74) Agent: **JOYCE III, Gerald P.**; 5775 Morehouse Drive, San Diego, California 92121 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,

(Continued on next page)

(54) Title: SYSTEM FOR DELIVERING RELEVANT USER INFORMATION BASED ON PROXIMITY AND PRIVACY CONTROLS

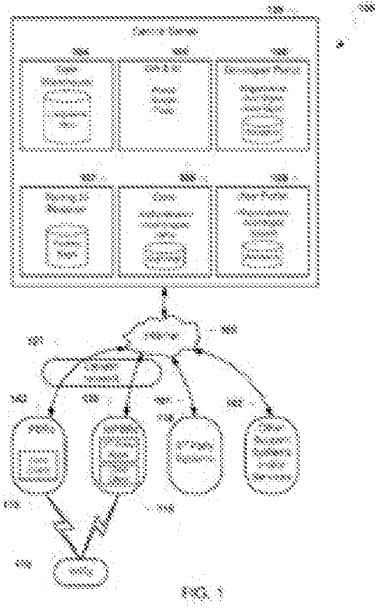


FIG. 1

(57) Abstract: Methods, systems and devices for providing relevant user information to devices within proximity of a user. A wireless identity transmitter associated with the user periodically broadcasts messages that include obscured identifiers. A proximate proximity broadcast receiver may receive and relay the broadcast messages to a central server which may process the included information. Based on categories related to the proximity broadcast receiver and the user, the central server may identify subsets of stored profile information about the user that are relevant to the proximity broadcast receiver. The central server may transmit relevant profile information to devices to assist in activities associated with the proximity broadcast receiver. In an embodiment, the central server may only transit relevant profile information that is authorized by the user via permissions associated with the profile. Further, the central server may transmit payment authentication profile information for use by point-of-sale devices within proximity of the user.

WO 2013/163326 A1

Petitioner Samsung Ex-1004, 0476

KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

Petitioner Samsung Ex-1004, 0477

SYSTEM FOR DELIVERING RELEVANT USER INFORMATION BASED ON PROXIMITY AND PRIVACY CONTROLS

RELATED APPLICATIONS

[0001] The present application is a continuation-in-part of and claims priority to U.S. Patent Application No. 13/773,379, titled "Platform for Wireless Identity Transmitter and System Using Short-Range Wireless Broadcasts," filed February 21, 2013 and U.S. Patent Application No. 13/773,336, titled "Preserving Security By Synchronizing a Nonce or Counter Between Systems," filed February 21, 2013, each of which claims the benefit of priority to U.S. Provisional Application No. 61/601,620 , filed February 22, 2012, U.S. Provisional Application No. 61/637,834, filed April 24, 2012, U.S. Provisional Application No. 61/693,169, filed August 24, 2012, U.S. Provisional Application No. 61/670,226, filed July 11, 2012, U.S. Provisional Application No. 61/701,457, filed September 14, 2012, U.S. Provisional Application No. 61/713,239, filed October 12, 2012, U.S. Provisional Application No. 61/716,373, filed October 19, 2012, U.S. Provisional Application No. 61/717,964, filed October 24, 2012, U.S. Provisional Application No. 61/728,677, filed November 20, 2012, and U.S. Provisional Application No. 61/745,395, filed December 21, 2012, U.S. Provisional Application No. 61/745,308, filed December 21, 2012, the entire contents of all of which are hereby incorporated by reference.

BACKGROUND

[0002] Efficient, directed customer service is often difficult for merchants, retailers, and other businesses to accomplish. For market or service models that utilize numerous locations and customer service representatives, merchants may not be able to immediately address and attend to customers with seamless, "high touch" service. In particular, counter staff, waiters, and attendants may have to conduct "cold start" interactions with customers to learn the customers' identities, preferences, and particular needs. For example, customer service personnel may

Petitioner Samsung Ex-1004, 0478

have to ask many questions of customers to discover preference information, such as favorite colors/styles of clothing, sizing information, shoe size, and other essential data related to the customers' experience. Merchants may benefit from an automated process that provides such customer information to expedite, customize, and improve dining, shopping, and other service experiences.

[0003] Further, when customers do provide essential customer information, merchants may access non-essential customer information that is unnecessary for serving the customer. For example, to meet with state alcohol licensing regulations, a bartender may request to see a customer's driver's license to confirm a legal drinking age and, as a result, may view the customer's address and other unrelated personal information. Customers may desire a more controlled manner of delivering personal information to services that protects privacy by only disclosing information authorized by the customers.

[0004] Additionally, retailers, merchants, and payment providers are trying to innovate around new payment technologies and processes utilizing mobile devices and enhanced foot traffic metrics. A key problem these providers are trying to solve involves hands-free payment via proximity. Currently providers are using global positioning systems (GPS) and near-field communication (NFC) to try to achieve a hands-free payment authentication system, but each technology has its own advantages and disadvantages. In particular, some providers may use geofencing GPS technology to establish a virtual fence, however GPS geofencing requires a much larger radius that what is necessarily ideal for a payment engagement. For example many providers may use a geofence radius of 300 feet which may place a customer into a point-of-sale system for payment engagement when he/she is not even located within the retail store. Additionally problematic, in an area with numerous closely positioned retailers (e.g., a mall), retailer geofences may overlap and cause a customer to be in proximity for payment engagement at many merchants' stores at the same time. Further, due to various interferences, GPS does not work well within buildings. NFC systems may provide more granular proximity detections useful

Petitioner Samsung Ex-1004, 0479

for hands-free payment engagements. However, NFC may utilize too small a proximity for hands-free payments (e.g., less than one foot radius), and NFC devices used in payment engagements may need to be pulled out and bumped or come very close to point-of-sale devices (e.g., cash registers, etc.).

SUMMARY

[0005] The various embodiments provide systems, devices, and methods for dynamically providing relevant user information to devices within proximity of a user, such as a customer within a retail store. In general, a compact wireless identity transmitter associated with a registered user (or customer) may be configured to broadcast messages that include a unique and secure identification code via a short-range wireless radio, such as a Bluetooth® Low Energy (LE) transceiver. The identification broadcast packets ("broadcast messages") may be received by physically proximate proximity broadcast receivers (PBR), which may be dedicated receivers, smartphones configured with a PBR application, tablet computers configured with a PBR application, and stationary receivers, to name just a few examples. The broadcast messages may be received by proximity broadcast receivers when the wireless identity transmitter is within reception range (e.g., within 0 to 25 feet). Proximity broadcast receivers may be mobile (e.g., smartphones configured with a PBR application) or stationary. Stationary proximity broadcast receivers may be positioned in strategic locations, such as in a movie theater, in or near stores within a shopping mall, at various locations within an amusement park, near doors of a house, and near particular product displays within a retail store. Because the wireless identity transmitter broadcasts short-range wireless signals, the proximity of the wireless identity transmitter to the areas may be recognized by reception of the signals by a proximity broadcast receiver located in the area. As the user travels through the place (e.g., a retail store), the proximity broadcast receivers may receive broadcast messages from user's wireless identity transmitter.

Petitioner Samsung Ex-1004, 0480

[0006] Proximity broadcast receivers may relay received broadcast messages, along with other information (e.g., timestamp data, proximity information, etc.), to a central server in the form of sighting messages. Such a central server may use the information received in sighting messages to track the wireless identity transmitter, and thus a user associated with that device. The central server may maintain a database of relayed information that may represent both historical and actively updated information for the customer's wireless identity transmitter, such as proximities to proximity broadcast receivers and/or point-of-sale devices over a period. The central server may use the identification code within the relayed messages to identify the wireless identity transmitter, and thus the user of the device.

[0007] Once the user is identified as being within proximity of a proximity broadcast receiver, the central server may be configured to identify profile information associated with the user and relevant to the proximity broadcast receiver and/or a registered service deploying the proximity broadcast receiver. For example, the central server may identify information indicating the user's food preference as relevant to a restaurant deploying the proximity broadcast receiver. In various embodiments, the central server may compare information within profiles associated with both the user and the registered service related to the proximity broadcast receiver to identify relevant or matching profile information. The central server may transmit such relevant profile information to the proximity broadcast receiver or another device associated with the proximity broadcast receiver (e.g., another computing device within the same restaurant). In this way, the central server may not divulge the entirety or unnecessary information within the user's stored profile, and thus third-parties, such as stores and restaurants, may only gain access to information on a "need-to-know" basis. In various embodiments, the user may provide permissions (or permissions settings) that are stored and used by the central server to protect the privacy of the user. For example, the central server may only identify and transmit profile information that is authorized by the user for transmission to a particular store or

Petitioner Samsung Ex-1004, 0481

type of business. Thus, the user may provide his/her information only when a possible recipient may need the information and is authorized to receive it by the user.

[0008] In another embodiment, the central server may identify and transmit profile information that may be used to authenticate payments related to the user. The central server may determine when the user is within proximity of a point-of-sale device within a place, such as a cash register device within a retail store, and may transmit payment-related profile information to the point-of-sale device. For example, the central server may transmit a photograph or signature sample of the user to a device for verification by a cashier. Transmitting payment authentication information authorized by the user for delivery may promote proximity payment authentication services, such as identification confirmation, queuing for proximity payments, and expedited payment for goods while in line at a cash register

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The accompanying drawings, which are incorporated herein and constitute part of this specification, illustrate exemplary embodiments of the invention, and together with the general description given above and the detailed description given below, serve to explain the features of the invention.

[0010] FIG. 1 is a system diagram illustrating network components suitable for use in various embodiments.

[0011] FIG. 2 is a communication system diagram illustrating network components of embodiment architectures suitable for use in various embodiments.

[0012] FIG. 3 is a process flow diagram illustrating an embodiment method for broadcasting an identifier from a wireless identity transmitter.

Petitioner Samsung Ex-1004, 0482

[0013] FIG. 4 is a process flow diagram illustrating an embodiment method for a wireless identity transmitter receiving configuration settings after performing boot-up operations.

[0014] FIG. 5 is a process flow diagram of an embodiment method for a wireless identity transmitter performing two-way wireless communications with a proximity broadcast receiver.

[0015] FIG. 6 is a component diagram illustrating various modules within a mobile proximity broadcast receiver suitable for use in various embodiments.

[0016] FIG. 7 is a process flow diagram illustrating an embodiment method of a mobile proximity broadcast receiver relaying a wireless identity transmitter's identifier along with other data such as a time or location.

[0017] FIG. 8 is a call flow diagram for responding to a user request for a wireless identity transmitter's location in accordance with various embodiments.

[0018] FIG. 9 is a process flow diagram illustrating an embodiment method of performing code within a received broadcast message.

[0019] FIG. 10 is a process flow diagram illustrating an embodiment method of receiving an instruction from a central server in response to transmitting a sighting message based on proximity to a wireless identity transmitter.

[0020] FIG. 11 is a process flow diagram illustrating an embodiment method for a proximity broadcast receiver relaying a received broadcast message to and receiving a return message from a central server.

[0021] FIG. 12 is a component diagram illustrating various modules within a central server suitable for use in various embodiments.

[0022] FIG. 13 is a diagram illustrating a wireless identity transmitter registration process for use in various embodiments.

Petitioner Samsung Ex-1004, 0483

[0023] FIGS. 14A and 14B are process flow diagrams illustrating embodiment methods for a central server to process sighting messages received from proximity broadcast receivers.

[0024] FIGS. 15A-B are call flow diagrams illustrating communications between a wireless identity transmitter, a proximity broadcast receiver, and a central server in accordance with various embodiments.

[0025] FIG. 16 is a process flow diagram illustrating an embodiment method for a central server receiving sighting messages from a proximity broadcast receiver and transmitting return messages including various data.

[0026] FIG. 17 is a process flow diagram illustrating an embodiment method for a central server determining whether a proximity broadcast receiver has lost a wireless identity transmitter.

[0027] FIGS. 18A and 18C are communication system diagrams of mobile proximity broadcast receivers in communication with a wireless identity transmitter.

[0028] FIGS. 18B and 18D are process flow diagrams illustrating embodiment methods for determining the location of the wireless identity transmitter in the communication systems illustrated in FIGS. 18A and 18C, respectively.

[0029] FIG. 19 is a process flow diagram illustrating an embodiment method for a server handling a rolling identifier.

[0030] FIG. 20 is a process flow diagram illustrating embodiment operations by a wireless identity transmitter and a central server for transmitting and processing rolling identifiers encrypted with an encryption algorithm.

[0031] FIG. 21A is a process flow diagram illustrating an embodiment method for a wireless identity transmitter generating and broadcasting rolling identifier payloads using an encryption algorithm.

Petitioner Samsung Ex-1004, 0484

[0032] FIG. 21B a process flow diagram illustrating an embodiment method for a central server receiving and handling rolling identifier payloads using an encryption algorithm.

[0033] FIG. 22 is a process flow diagram illustrating embodiment operations by a wireless identity transmitter and a central server for transmitting and processing rolling identifiers using a pseudo-random function.

[0034] FIG. 23A is a process flow diagram illustrating an embodiment method for a wireless identity transmitter generating and broadcasting rolling identifier payloads using a pseudo-random function.

[0035] FIG. 23B a process flow diagram illustrating an embodiment method for a central server receiving and handling rolling identifier payloads using a pseudo-random function.

[0036] FIG. 24A is a process flow diagram illustrating an embodiment method for a wireless identity transmitter generating and broadcasting messages with rolling identifiers and encoded counters.

[0037] FIGS. 24B-24C are process flow diagrams illustrating embodiment methods for a central server receiving and handling messages including rolling identifiers and encoded counters.

[0038] FIG. 25 is a diagram illustrating an embodiment scenario including a wireless identity transmitter in communication with a proximity broadcast receiver, and a mobile device displaying information received from a central server.

[0039] FIGS. 26A-26B are process flow diagrams illustrating embodiment methods for a central server to transmit relevant profile information to a computing device.

Petitioner Samsung Ex-1004, 0485

[0040] FIGS. 27A-27B are diagrams illustrating embodiment data tables that include a user's profile information that may be stored by a central server and transmitted in response to receiving a sighting message.

[0041] FIGS. 28A-28B are diagrams illustrating various proximity broadcast receivers and a mobile device receiving different authorized information based on related profiles.

[0042] FIG. 28C is a process flow diagram of an embodiment method for a central server to identify authorized data to share based on two different profiles.

[0043] FIGS. 29A-29B are diagrams illustrating a first mobile device sharing authorized profile information in response to receiving short-range wireless signals from a second mobile device within proximity.

[0044] FIG. 29C is a process flow diagram of an embodiment method for a first mobile device to share authorized profile information in response to receiving short-range signals from a second mobile device within proximity.

[0045] FIG. 30 is an illustrative display of payment authentication information on a local computing device in accordance with an embodiment.

[0046] FIG. 31 is a process flow diagram of an embodiment method for a central server to transmit payment authentication information in response to receiving a sighting message from a proximity broadcast receiver within a retail store.

[0047] FIGS. 32A-32C are process flow diagrams of embodiment methods for a local computing device to utilize payment authentication information to conduct transactions within a retail store.

[0048] FIGS. 33A-33B are component block diagrams of wireless identity transmitters in accordance with various embodiments.

[0049] FIGS. 34A-34B are component block diagrams of proximity broadcast receivers in accordance with various embodiments.

Petitioner Samsung Ex-1004, 0486

[0050] FIG. 35 is a component block diagram of a mobile device suitable for use in various embodiments.

[0051] FIG. 36 is a component block diagram of a server device suitable for use in various embodiments.

DETAILED DESCRIPTION

[0052] The various embodiments will be described in detail with reference to the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts. References made to particular examples and implementations are for illustrative purposes, and are not intended to limit the scope of the invention or the claims.

[0053] The word "exemplary" is used herein to mean "serving as an example, instance, or illustration." Any implementation described herein as "exemplary" is not necessarily to be construed as preferred or advantageous over other implementations.

[0054] The term "mobile device" is used herein to refer to any one or all of cellular telephones, smart-phones (e.g., iPhone®), web-pads, tablet computers, Internet enabled cellular telephones, WiFi enabled electronic devices, personal data assistants (PDA's), laptop computers, personal computers, and similar electronic devices equipped with a short-range radio (e.g., a Bluetooth® radio, a Peanut® radio, a WiFi radio, etc.) and a wide area network connection (e.g., an LTE, 3G or 4G wireless wide area network transceiver or a wired connection to the Internet). Reference to a particular type of computing device as being a mobile device is not intended to limit the scope of the claims unless a particular type of mobile device is recited in the claims.

[0055] The term "broadcast message" is used herein to refer to short-range wireless broadcast signals broadcast by wireless identity transmitters (defined below) that may include identification information (i.e., identifiers) associated

Petitioner Samsung Ex-1004, 0487

with the wireless identity transmitters and/or their users. Such identifiers may be periodically changed and encrypted, encoded, or otherwise obscured (i.e., rolling identifiers). In various embodiments, broadcast messages may include other identifying information, such as Bluetooth® MAC addresses and counters, which may also be encrypted. Additionally, broadcast messages may include metadata and other data, such as characteristics of the transmitting wireless identity transmitter (e.g., device type), sensor data, and/or commands or other instructions. In various embodiments, broadcast messages may be transmitted via a wireless communication protocol, such as Bluetooth® Low Energy, WiFi, WiFi Direct, Zigbee®, Peanut®, and other RF protocol. In various embodiments, because of the high unreliability of certain short-range transmission channels, broadcast messages may be single packet transmissions limited to a certain size (e.g., 80 bits, 10 bytes, 20 bytes, etc.). For example, the payload of an embodiment broadcast message may be 80 total bits, including 4 bits that indicate battery status information and 76 bits that indicate a rolling identifier. As another example, an embodiment broadcast message may include 20 bits representing a counter and 60 bits representing a rolling identifier, such as generated with a pseudo-random function or encryption algorithm.

[0056] The term "wireless identity transmitter" is used herein to refer to a compact device configured to periodically transmit broadcast messages via short-range wireless transmitters. Wireless identity transmitters may be mobile, such as when carried or affixed to mobile persons or items, or alternatively may be stationary, such as when installed within buildings. Wireless identity transmitters may store and be associated with a unique device identifier (i.e., a "*deviceID*"), such as a factory ID. In an embodiment, the unique device identifier may be a code 56-bits in length. In various embodiments, for security purposes, this unique device identifier, along with other data (e.g., counter values), may be encoded, encrypted, or otherwise obfuscated when included within broadcast messages as a "rolling identifier." Wireless identity transmitters may be configured to maintain inaccurate time (e.g., UTC) information, such as by using

Petitioner Samsung Ex-1004, 0488

a 30 ppm 16 kHz crystal oscillator as a clock. In an embodiment, the wireless identity transmitter may be within or a mobile device, or alternatively, operations may be performed by a mobile device that are similar to the operations of the wireless identity transmitter. For example, a smartphone may execute software that configures that smartphone to utilize its Bluetooth® radio to transmit broadcast messages that include a secured, unique identifier. Wireless identity transmitters are described in more detail below with reference to FIGS. 33A-33B. In various figures and diagrams of this disclosure, wireless identity transmitters may be referred to as "WIT" or "WITs".

[0057] The term "proximity broadcast receiver" is used herein to refer to devices that are configured to receive broadcast messages, such as transmitted by wireless identity transmitters. In various embodiments, proximity broadcast receivers may be stationary devices (or "stationary proximity broadcast receivers") permanently positioned throughout places (e.g., buildings, retail stores, etc.) or alternatively may be mobile devices configured to operate as proximity broadcast receivers (or "mobile proximity broadcast receivers"). For example, a smartphone may be configured to receive broadcast messages and operate as a mobile proximity broadcast receiver. Reference to a particular type of computing device as being a proximity broadcast receiver is not intended to limit the scope of the claims unless a particular type of device is recited in the claims. Further, unless otherwise indicated, references to proximity broadcast receivers throughout this disclosure are not intended to limit any method or system to a particular type of proximity broadcast receiver device (e.g., wireless or stationary). Proximity broadcast receivers are described in more detail below with reference to FIGS. 34A-34B. In various figures and diagrams of this disclosure, proximity broadcast receivers may be referred to as "PBR" or "PBRs," and mobile proximity broadcast receivers are referred to in the figures as "MPBR" or "MPBRs."

[0058] The terms "identity transceiver" and "wireless identity transceiver" are used herein to refer to devices that are configured to receive and transmit

Petitioner Samsung Ex-1004, 0489

broadcast messages. In other words, an identity transceiver may function as both a proximity broadcast receiver and an identity transmitter. For example, a smartphone may be configured to broadcast short-range signals that include its unique identifier as well as receive broadcast messages from wireless identity transmitters within proximity. Throughout this disclosure, various operations may be described as being distinctly performed by either a wireless identity transmitter or a proximity broadcast receiver, however, those skilled in the art should appreciate that a device configured to operate as an identity transceiver may be configured to perform any or all of the same operations and thus may be interchangeable with references to either a wireless identity transmitter or a proximity broadcast receiver.

[0059] The term "sighting message" is used herein to refer to reports, signals, and/or messages sent by proximity broadcast receivers to a central server in response to receiving broadcast messages from wireless identity transmitters. Sighting messages may be transmissions that include part or all of the information encoded in received broadcast messages, including any obscured or encrypted information, such as identifiers of wireless identity transmitters. Additionally, sighting messages may include metadata and other information (or "associated data"), such as the sending proximity broadcast receivers' identification information (e.g., device ID, third-party affiliations, etc.), whether the proximity broadcast receiver paired with a wireless identity transmitter, transmissions context information (e.g., a code indicating the sighting message is related to an alert or a registered service), information regarding software or applications executing on proximity broadcast receivers (e.g., app IDs), location information, proximity information with respect to known areas within a place, and timestamp data. In an embodiment, sighting messages may also include authentication information (e.g., secret keys, passes, special codes, digital certificates, etc.) that may be used by a central server to confirm the identification (or identification information) of proximity broadcast receivers transmitting the sighting messages. For example, a sighting message may

Petitioner Samsung Ex-1004, 0490

include a code from a hash function that can be decoded by the central server to ensure the sending proximity broadcast receiver is associated with a particular registered service. In various embodiments, sighting messages may be sent immediately after receipt of broadcasts (e.g., when related to an alert), buffered, or scheduled along with other scheduled transmissions.

[0060] The various embodiments provide methods, devices, and systems for dynamically providing user profile information to computing devices within proximity of a wireless identity transmitter associated with a user in a trusted architecture. Using a proximity-based signaling system, the embodiments provide mechanisms for delivering user profile information as permitted by the user to the organization where the user is standing in a manner that can be trusted by both the user and the recipient, such as a merchant. For example, when a user approaches a proximity broadcast receiver, such as at a merchant check out counter, that proximity broadcast receiver receives signals broadcasted by the user's wireless identity transmitter. The proximity broadcast receiver relays identity information obtained from the received broadcast signal in a sighting message sent to a central server trusted that by both the user and the merchant. The central server uses the identity information received in the sighting message to access a data record that includes user profile information (e.g., photo, name, address, credit card numbers, etc.). The central server may send a portion of the user's profile information, selected based on user privacy settings and permissions, to a merchant computing device, such as a computing device near or coupled to the proximity broadcast receiver. Since the central server is trusted by the merchant and the user profile information is sent to the merchant only when the user is close to the proximity broadcast receiver, the merchant can rely on the profile information to complete a transaction with the user.

[0061] In various embodiments, the wireless identity transmitter may be a compact device configured to transmit a packet with an identification code in a format that can be received by any proximity broadcast receiver within range of the short-range wireless broadcast. Since the wireless identity transmitter relies

Petitioner Samsung Ex-1004, 0491

on relatively short-range wireless signaling (e.g., short-range radio signals, Peanut®, Zigbee®, RF, WiFi, Bluetooth® Low Energy signals, light signals, sound signals, etc.) to transmit broadcast messages that include its identifier, only proximity broadcast receivers within proximity of the transmitter may receive such broadcast messages. Thus, a proximity broadcast receiver's own location may provide an approximate location for the wireless identity transmitter at the time of receipt of a broadcast message. Wireless identity transmitters may be deployed by various parties registered with the central server, such as government agencies, merchants, retailers, and stores. In an embodiment, the broadcast range of wireless identity transmitters may be three or less to one hundred feet while within a retail store.

[0062] Proximity broadcast receivers, in particular mobile proximity broadcast receivers (e.g., smartphones, etc.), may be configured with processor-executable instructions, such as an application that users may download or that may be incorporated in the device by the manufacturer. By configuring many mobile devices with such an application, a wide spread network of proximity broadcast receivers may be deployed for little or no cost, taking advantage of the popularity of smartphones. Stationary proximity broadcast receivers may be deployed in strategic places, such as throughout retail stores, to supplement the network of smartphones. Proximity broadcast receivers may be located coincident to, within, or otherwise within proximity of certain areas within a place, such as merchandise displays in a move theater, point-of-sale devices, or an entrance to a retail store. For example, a proximity broadcast receiver may be on top of, next to, or within a product display arranged within a product aisle. Point-of-sale devices may coincide with either stationary proximity broadcast receivers or wireless identity transmitters deployed within an area (e.g., a retail store) to detect nearby customers. For example, a cash register device may coincide with a wireless identity transmitter that broadcasts messages related to a merchant.

[0063] Each proximity broadcast receiver receiving a broadcast message from the wireless identity transmitter may pass information to a central server for

Petitioner Samsung Ex-1004, 0492

processing, such as by transmitting sighting messages including the rolling identifier of the wireless identity transmitter. Sighting messages transmitted by proximity broadcast receivers to the central server may include part or all of the information encoded in received broadcast messages from proximate wireless identity transmitters, including any rolling, obscured, or encrypted information related to the wireless identity transmitters. In various embodiments, sighting messages may be sent immediately after receipt of broadcast message (e.g., when related to an alert), buffered, scheduled along with other scheduled transmissions, or otherwise based on characteristics of broadcast message. Sighting messages may include metadata, header information, or other encodings to indicate various reported data. For example, a sighting message may contain metadata that includes a code for a particular merchant, and may therefore indicate that the sighting message was transmitted by a proximity broadcast receiver within the merchant's store. As another example, a sighting message may contain metadata that includes a code indicating a user's smartphone and therefore the proximity broadcast receiver may be a mobile proximity broadcast receiver belonging to the user. In an alternative embodiment, a local computing device, such as a retail store server or router, may receive sighting messages from proximity broadcast receivers and may in turn pass each sighting message to the central server.

[0064] Upon receipt of sighting messages, the central server may decode, decrypt, or otherwise access obscured information (e.g., rolling identifiers) within the sighting messages. For example, the central server may decode a broadcast message within a sighting message and determine the customer associated with the broadcast message using data stored within a registration database. Based on the location of a proximity broadcast receiver that transmitted a sighting message, the central server may determine the proximity of the related broadcast message, or the approximate proximity. For example, since a stationary proximity broadcast receiver that transmits a sighting message is within proximity of a customer's wireless identity transmitter at the time of receiving a broadcast message, the central server may determine the customer's

Petitioner Samsung Ex-1004, 0493

wireless identity transmitter is within several feet of the GPS coordinates indicated in the proximity broadcast receiver's sighting message or known to the central server in the case of fixed proximity broadcast receivers. Further, the central server may be configured to transmit messages in response to receiving and processing sighting messages. For example, the central server may transmit return messages to devices associated with a merchant/retailer/store, such as a store server, a point-of-sale device (e.g., a cash register device), a mobile device or other computing device used by an employee of the merchant (e.g., a tablet device used by a waiter/hostess/customer service rep, etc.), and/or a proximity broadcast receiver associated with the merchant (e.g., a stationary proximity broadcast receiver that relayed the broadcast signal from the customer's wireless identity transmitter).

[0065] In various embodiments, the central server may serve as a trusted "middle-man" that delivers certain profile information to devices associated with registered services (e.g., retailers, merchants, marketing services), and only when the user's wireless identity transmitter is in proximity with a proximity broadcast receiver of the registered service. In other words, the central server may act as an indirection mechanism that transmits subsets of a user's profile when the user is within proximity of a registered service's devices. The central server may store profiles (or profile information) of users received during registration procedures. For example, a user may be required to submit personal information to the central server when activating a wireless identity transmitter and/or a mobile proximity broadcast receiver. During such a registration, users may indicate various profile information describe the users' interests, personal demographics or personal information (e.g., race, gender, age, etc.), characteristics, issues, needs, wants, and preferences regarding various topics. For example, profile information may include a user's birth date, residence, medical information, health conditions (e.g., food allergies), age, customer preferences, and clothing size information (e.g., shirts, pants, shoes, etc.). As another example, profile information may indicate preferences for certain products, colors, styles, brands, sellers, stores,

Petitioner Samsung Ex-1004, 0494

communities, websites, shopping experiences (e.g., how to be approached by salespersons), foods, beverages, and automobiles.

[0066] The central server may categorize or otherwise label all profile information associated within user profiles. For example, individual pieces of data provided by a customer may be labeled as relating to "Food," "Clothes," "Entertainment," "Personal," "Health," "Politics," etc. The types of categories may be simple, discrete headings (e.g., "Shopping") and/or may include detailed sub-categories/groups (e.g., Shopping->Shoes->Sandals). In an embodiment, the central server may obtain (or "scrape") profile information from other databases or online services users may be affiliated with or use to store personal information. For example, the central server may perform operations to receive preference information, shopping history, personal data, and other historical information about the user from shopping accounts or websites, such as an Amazon shopping profile/account, or social networking accounts, such as a Facebook, LinkedIn, MySpace, or FourSquare account.

[0067] In an embodiment, the profile information may be continually updated based on scheduled operations by the central server (e.g., the central server may query an Amazon account daily to detect shopping patterns or preferences) and/or from received sighting messages associated with the user. For example, the central server may determine the user was last in a certain restaurant based on broadcast signals being received by stationary proximity broadcast receivers within that restaurant. Additionally, the central server may determine profile information based on the user's behavior over time. For example, the central server may store indicators that the user prefers a certain sporting team based on recorded attendance at a sporting event.

[0068] In various embodiments, the central server may determine categories describing profile information based on predefined relationships. For example, a certain profile creation question presented to the user during registration may be related to a "Job" category. Users may also manually modify and/or set

Petitioner Samsung Ex-1004, 0495

categories for profile information stored within the central server. Further, the central server may process stored profile information using natural language processing to determine the nature or topic of particular data within a profile. Alternatively, the central server may simply prompt parties registering with the central server, such as individual users or registered services (e.g., merchants, retailers, etc.), to provide categories that describe their primary demographics (e.g., "Shoe store," "customer," etc).

[0069] The central server may also store permissions corresponding to user profiles that may indicate how the central server is authorized to share profile information with third-parties, such as merchants, government entities, and/or other users (i.e., registered services). The terms "permissions" or "permissions settings" are used herein to refer to settings, tags, flags, or other information that indicates whether a user authorizes to have various information stored within a profile provided to third-parties, merchants, retailers, and other registered services. Permissions may be set, provided, or otherwise indicated during procedures initiated and/or participated in by users, such as during registration as a user with the central server or during configuration of a wireless identity transmitter. For example, a user may update his/her permission settings to indicate a certain store may subsequently receive messages including the user's preference of cola drink. Permissions may indicate authorizations for individual recipients (e.g., no information sharing with Restaurant B), general types of recipients (e.g., information sharing is authorized for all hospitals), individual pieces of profile information (e.g., birth date is private), or sections of profiles (e.g., any data related to shopping habits is public), and any combination of similar authorizations (e.g., birth date is authorized for any recipient EXCEPT Restaurant B). Alternatively, permissions may include global settings for all profile information (i.e., an entire profile is private/public).

[0070] During and after registration, users may set profile permissions that may indicate subsets (e.g., "windows") of the stored profile information that may be provided to particular registered services or in particular circumstances. For

Petitioner Samsung Ex-1004, 0496

example, a user may indicate that all personal information stored within his/her profile, such as birth date, address, and health information, may be private and thus may not be disclosed to any merchant. As another example, the user may indicate that his/her shopping preferences may be shared with merchants who offer particular products or services. When permissions are stored, the central server may only transmit profile information that is authorized, regardless of its relevant to a registered service. With permissions, the central server may provide profile information that assists third-parties in providing improved services to users while maintaining relative anonymity of the users.

[0071] In another embodiment, permissions may indicate a hierarchy of profile information that may be shared with third-parties. Such a hierarchy may indicate various conditions or categories must be present for certain profile information to be authorized for transmission to a registered service. For example, a user may indicate permissions settings that enable the central server to share basic information with a restaurant hostess (e.g., share the user's first name), more specific information with the restaurant's bartender (e.g., the user's is above the legal drinking age), and more information with the restaurant's waiter (e.g., a signature or photo for payment authentication).

[0072] In response to receiving a sighting message corresponding to broadcast messages from a user's wireless identity transmitter, the central server may identify profile information within the user's profile that is relevant to a registered service related to a received sighting message. Relevant profile information may be determined by matching categories related to the user and the registered service. Registered services may be associated with various categories that describe at least one of the services offered, the products offered, the type of business, demographics, interests, and/or target audience of the registered service. For example, a shoe seller that is registered with the central server may be associated with the categories of "Shoes," "Stores," and "Shopping," and thus the central server may identify profile information within the user's profile that relate to the categories of "Shoes," "Clothing," and/or "Shopping," such as prior

Petitioner Samsung Ex-1004, 0497

sneaker purchases or preferences in sneaker brands or shoe design. In an embodiment, the central server may find matches of categories related to information stored in two different profiles corresponding to the sighting message. For example, the central server may compare a first profile of the registered service (or another user) and a second profile of the user to find any similar or matching categories to determine relevant profile information of the user.

[0073] When there is relevant profile information that is authorized for sharing based on permissions, the central server may transmit a return message including the relevant profile information. For example, the central server may transmit a message to a computer within a retail store that instructs customer service representatives in the retail store to approach the user by name and show him/her shoes that are in his/her size. As another example, a waiter receiving food/beverage preferences profile information on a tablet device may offer a preferred drink or food selection, or alternatively avoid offering food with nuts when the profile information indicates a customer has a nut allergy.

[0074] In an embodiment, profile information may be shared between mobile devices without transmitting messages to the central server. For example, in response to receiving a short-range wireless signal from a first device within proximity that shares data from a first user's profile information, a second mobile device may respond with a transmission that includes certain profile information of a second user. In another embodiment, the central server may transmit payment authentication information to a point-of-sale device (e.g., a cash register computing device) when a user is determined to be within proximity. The term "payment authentication information" is used herein to refer to information stored within a user's profile that may be utilized by third-parties to confirm the user's identity and otherwise facilitate a transaction. For example, payment authentication information may include address information, email addresses, photographs, audio samples of a user's voice, and signature samples that may be used to verify the identity of the user carrying a wireless identity transmitter

Petitioner Samsung Ex-1004, 0498

within a retail store. Additionally, payment authentication information may include financial information, such as a user's credit card information (e.g., number, expiration date, etc.) or information about a preferred banking account. Store agents (e.g., customer service representatives, managers, cashiers, salesmen, etc.) may use payment authentication information to approach users waiting in line to efficiently conduct transactions and provide "high-touch" service.

[0075] To transmit payment authentication information, the central server may compare the location of a proximity broadcast receiver that transmitted a received sighting message to known locations of point-of-sale device within a place, such as a retail store. For example, the central server may compare the location of the proximity broadcast receiver indicated within the sighting message to the locations of all cash register point-of-sale devices within the retail store. When the proximity broadcast receiver is within a certain proximity threshold of a point-of-sale device, the wireless identity transmitter related to the sighting message may be assumed to be near a payment area (e.g., waiting at a check-out counter, in line at a cash register, etc.), and so the central server may transmit payment authentication information to the retail store. For example, the central server may send a photo of the user to a cash register near the user to assist store employees operating the cash register. Payment authentication information may only be relevant when users are in a location that is likely to include payment transactions, such as in a cash register line. Thus, the central server may use a rather small proximity threshold to ensure data is not sent to point-of-sale devices when users are merely walking or alternatively when users are not in a payment area. In an embodiment, the proximity threshold may be three feet or less to twenty-five feet or more.

[0076] In various embodiments, proximity information of wireless identity transmitters may be estimated by proximity broadcast receivers and/or a server (e.g., a local computing device, a central server, etc.). Based on signal strength of received broadcast messages or concurrent sighting messages from more than

Petitioner Samsung Ex-1004, 0499

one proximity broadcast receiver, a server may determine the proximity broadcast receiver closest to the wireless identity transmitter. In other words, a central server may determine the proximity broadcast receiver among a plurality of proximity broadcast receivers that is closest to a wireless identity transmitter. When the proximity broadcast receivers are placed in strategic places, such as on a cash register or embedded within aisles of a retail store, determining the proximity broadcast receiver that is closest to a transmitter possessed by a user may enable a server to determine the area or point-of-sale device the user intends to address (e.g., a particular check-out line).

[0077] In various embodiments, the operations to determine whether a wireless identity transmitter is within proximity of a point-of-sale device may be performed by a central server as described above, a local computing device, such as a retail store server, and/or proximity broadcast receivers. For example, a local computing device within the retail store may compare the location of a proximity broadcast receiver receiving a broadcast message to the locations of all cash register computing devices within the retail store to detect whether a wireless identity transmitter is within a proximity threshold.

[0078] In another embodiment, data within received sighting messages may be useful in generating statistical information and customer trending data (i.e., foot traffic information). For example, even when broadcast messages are received outside of the proximity threshold for a particular area within the retail store (e.g., the wireless identity transmitter is twenty-five to one hundred feet from a product aisle or point-of-sale device), data within the sighting message may be stored by the central server. The central server may store data from sighting messages in relation to users and collect valuable information about the users' habits while within places. Such data may include unique visitor counts, aggregated dwell time, specific customer dwell time, purchase conversions, passing-by data, and data useful in developing loyalty programs. Over time, the central server may receive and store proximity information of a particular customer's wireless identity transmitter to various areas within a place, and may

Petitioner Samsung Ex-1004, 0500

determine paths the customer repeatedly made throughout the place. For example, the data may describe the customer as walking from the entry of a retail store to a particular department numerous times over a period of time. As another example, the data from sighting messages may show that the user went to a check-out area after visiting a particular department, indicating a completed transaction. The various statistical information and trending data may be used by merchants, retailers, and other registered services to create profit equations and understand customer behaviors.

[0079] In various embodiments, a place, such as a retail store, building, or location associated with a registered service, may utilize stationary proximity broadcast receivers to receive and relay broadcast messages from customers' wireless identity transmitters. Alternatively, the place may deploy stationary wireless identity transmitters and customers' mobile proximity broadcast receivers may receive and relay broadcast messages. In further embodiments, the place may employ both proximity broadcast receivers and wireless identity transmitters to receive, relay, and process data from both users carrying wireless identity transmitters and/or mobile proximity broadcast receivers. Regardless of the source of broadcast messages, the central server (or a local computing device) may determine approximate proximities between a proximity broadcast receiver and a wireless identity transmitter based on received sighting messages.

[0080] Additionally, based on identification of the proximity broadcast receiver and the wireless identity transmitter related to a received sighting message, the central server may be configured to determine which device is related to a registered service (e.g., a retail store) and which is related to a user (e.g., a customer). The term "registered service" may be used herein to refer to a party or service that is registered, authenticated, valid, or otherwise known to a central server and that may be related with sighting messages. Registered services may include merchants, retailers, services, stores (e.g., big-box retailers, local coffee shops, etc.), and various other third-parties that are registered with the central server. Registered services may also include known routines, actions, or services

Petitioner Samsung Ex-1004, 0501

managed by the central server, such as particular searches or active alerts, or alternatively applications that may be executing on a mobile device (e.g., a third-party app). In an embodiment, registered services may further include any third-parties that have registered as developers with the central server. For example, a registered service may correspond to a merchant that has registered proximity broadcast receivers with the central server. In an embodiment, registered users (e.g., customers) employing mobile proximity broadcast receivers that transmit sighting messages in response to receiving broadcast messages from others' wireless identity transmitters (e.g., a merchant's stationary identity transmitter positioned within a retail store) may also be considered registered services by the central server.

[0081] For illustration purposes, a mobile proximity broadcast receiver (e.g., a smartphone configured to operate as a proximity broadcast receiver) carried by the user waiting in the check-out line may receive a broadcast message from a wireless identity transmitter positioned on top of the cash register point-of-sale device within the retail store and may transmit a sighting message to the central server. Upon receive of the sighting message, the central server may determine that the wireless identity transmitter belongs to the retail store based on the profile that corresponds to a rolling identifier and that the mobile proximity broadcast receiver is associated with a customer profile based on an identifier of the proximity broadcast receiver included within metadata in the sighting message. From this information, the central server may securely transmit payment authentication information to a cash register point-of-sale device within proximity of the customer's proximity broadcast receiver.

[0082] In various embodiments, a wireless identity transmitter may be configured to periodically generate new identification data (referred to as a rolling identifier) that may be decoded by a central server to reveal the unique device identifier and other identifying information of the wireless identity transmitter. For example, a wireless identity transmitter may be configured to periodically broadcast a Bluetooth® packet including an encoded version of the

Petitioner Samsung Ex-1004, 0502

wireless identity transmitter's device identifier (i.e., *deviceID*). Such encryption of identifiers indicated in broadcast messages may be required to enable the central server to reliably identify the wireless identity transmitter that sent the broadcast message while forcing a third-party (e.g., passive attacker) to determine the origin of the broadcast message by guessing. For example, if the identifier was static, the third party could sniff the identifier, such as by impersonating a proximity broadcast receiver, and then use the identifier to track the wireless identity transmitter. Rolling identifiers may make such an attack impossible if the third party lacks the means of generating the encrypted identifiers.

[0083] In various embodiments, a single packet broadcast message may not support a payload that can fit cipher text of a conventional asymmetric key encryption, making standard private/public key pair encryption impossible. Additionally, communications between wireless identity transmitters and various devices, such as direct transmissions to proximity broadcast receivers or indirect messages to a central server, may be one-way and not utilize any back channels. Therefore, in various embodiments, the central server may process encrypted message payloads by pre-provisioning a shared secret key unique to each wireless identity transmitter. Such secret keys may be associated with each wireless identity transmitter's unique device identifier at the central server and may be used to decode data (e.g., identifiers) encoded by the each wireless identity transmitter. Performing an embodiment method, a wireless identity transmitter may use a streaming-like encryption algorithm (e.g., AES-CTR) to encrypt its device identifier, shared secret key, and a counter, broadcasting a payload that includes the encrypted data with and the counter in the clear. Performing another embodiment method, a wireless identity transmitter may use a pseudo-random function to encrypt the device identifier, shared secret key, and a counter, broadcasting a payload that includes the encrypted data without the counter in the clear. Performing another embodiment method, a wireless identity transmitter may use a combination of a streaming-like and pseudo-random

Petitioner Samsung Ex-1004, 0503

function encryptions to generate a payload to broadcast. In an embodiment, the wireless identity transmitter and the central server may each have a cryptographically secure pseudo-random number generator or algorithm that is used to generate identifiers on a common time scale so that any given moment, the central server can calculate the identifier being transmitted by a particular wireless identity transmitter.

[0084] In various embodiments, the wireless identity transmitter may maintain a counter (or clock data) that periodically increments to represent the passage of time and that may be used in various encryption methods. When the wireless identity transmitter is powered on (or the battery is replaced), the counter may be set to a known initial value, such as 0. As the wireless identity transmitter functions, the counter may increment periodically (e.g., increment by one every several minutes/hour). If the wireless identity transmitter encounters inconsistent power (e.g., the battery is taken out or replaced), the counter may reset. Using such a counter, a wireless identity transmitter may be configured to periodically broadcast messages with encrypted payloads that include changing and encrypted device identification. In an embodiment, an encrypted payload may contain a concatenation of the device's unique identifier (i.e., the *deviceID*) and a current counter value for that wireless identity transmitter. In an embodiment, the wireless identity transmitter may encrypt the concatenated data using a secret key. Payloads may be broadcast at varying frequencies.

[0085] In an embodiment, the central server may be configured to identify wireless identity transmitters by matching received encrypted payloads with pre-generated payloads (or model payloads) corresponding to registered wireless identity transmitters. Based on information obtained during registration operations between the central server and wireless identity transmitters, the central server may store unique information about each wireless identity transmitter. For example, the central server may know the secret key, device identifier (or *deviceID*), and initial counter value of a wireless identity transmitter based on registration communications. Using such stored information, the

Petitioner Samsung Ex-1004, 0504

central server may generate a series of model payloads the wireless identity transmitter is expected (or likely) to broadcast within a time period, such as a 24-hour period. If the central server receives a payload that matches any of these model payloads, the central server may determine the identity of the originating wireless identity transmitter as well as a loosely-accurate counter value within the wireless identity transmitter. Model payloads may be generated based off of a current, synched counter for each registered wireless identity transmitter (i.e., current model payloads). In an embodiment, the central server may also adjust for wireless identity transmitter clock skew by keeping a window of model payloads. For example, the central server may generate payloads using counter values representing times before and after an expected counter. The central server may also determine the period of the wireless identity transmitter clock by monitoring the change in the received payloads over time. In an embodiment, the central server may track changes of the reported counter values of a wireless identity transmitter and may report how inaccurate a device clock is for a particular period of time.

[0086] Model payloads may also be generated based off of initial counter values reported by each registered wireless identity transmitter during registration operations (i.e., initial model payloads). When a wireless identity transmitter is powered off and on again (e.g., rest, battery replaced, etc.), the wireless identity transmitter may reset to the original or initial counter value. If an encrypted payload received at the central server does not match any current model payload, the central server may compare the received encrypted payload to stored initial model payloads. When the central server finds an initial model payload matches the received encrypted payload (e.g., the wireless identity transmitter was reset), the central server may update a database to indicate the corresponding wireless identity transmitter's counter was reset, thus re-synchronizing with the reset wireless identity transmitter's clock.

[0087] In a situation in which a wireless identity transmitter pauses for a period but does not reset its counter used for generating encrypted payloads, payloads

Petitioner Samsung Ex-1004, 0505

subsequently generated by the wireless identity transmitter may not match expected payloads stored in the central server (e.g., current model payloads and initial model payloads). Accordingly, the central server may determine that a pause occurred when model payloads and/or counter values do not match a received encrypted payload. The central server may identify the wireless identity transmitter by performing a brute-force search of all known and/or registered wireless identity transmitters represented in a database and decode the received encrypted payload based on recorded secret keys and device identifications. In an embodiment, the brute-force search may include only wireless identity transmitters that have not broadcast payloads recently received by the central server.

[0088] Additional precautions may be important to protect against security breaches, such as hacker attacks against databases associated with a central server, as well as to provide registered users (e.g., merchants, parents, children, etc.) peace of mind and confidence their privacy may be fully protected. Such privacy safeguards may be provided to parties registered with embodiment systems by storing identifying information (e.g., names, addresses, financial information, medical information, etc.) separately from other information related to tracking devices and/or proximity information of users. In particular, to avoid unintended leaking of personal information of registered merchants, customers, children, or individuals, embodiment systems may utilize "double-blind" architectures. For example, such a double-blind architecture may use a first unit (e.g., a server, database, or other computing hub) that stores and has access to information related to the proximity information or other location-based data of registered users' devices (e.g., wireless identity transmitters, proximity broadcast receivers, identity transceivers, mobile devices, etc.). In other words, the first unit may access information associated with sighting messages that indicate approximate locations/proximities of various users' devices. However, the first unit may not store uniquely identifying personal information, such as user names, addresses, and/or social security numbers. Instead, a second unit may store the

Petitioner Samsung Ex-1004, 0506

identifying personal information without being configured to access any location/proximity information as used by the first unit. The first and second units may use anonymous identifiers that connect data stored within the two units without indicating the protected information stored in either unit. In an embodiment, the first and second units may be maintained by separate entities (e.g., service providers), and further, at least one of such entities may be trusted by registered users who provide identifying information.

[0089] The various embodiments may leverage a large infrastructure of mobile devices already in place. Many modern mobile devices, such as smartphones, are already equipped with multiple radios, including short-range radios such as Bluetooth® radios, and therefore may be configured to perform as mobile proximity broadcast receivers and receive identification codes from a proximate wireless identity transmitter. For example, a customer carrying a smartphone configured to operate as a mobile proximity broadcast receiver (or mobile identity transceiver) may receive broadcast messages from wireless identity transmitters within a retail store. Mobile devices are also often equipped with a clock that may provide a current time and a GPS receiver that may provide a current location whenever a wireless identity transmitter identifier is received. The mobile devices may communicate these identification codes, times, and locations via sighting messages to central servers through longer range network connections, such as a cellular radio connection. Thus, many of the large number of mobile devices already in use or soon to be in use may be incorporated as mobile proximity broadcast receivers to extend the reach of various embodiment systems.

[0090] By relying on the long range radios and other services of proximity broadcast receivers to report the location and time of received broadcast message (or "sightings") to a central server, wireless identity transmitters can be relatively small, inexpensive, and simple devices, including little more than a short-range radio, such as a Bluetooth® LE transceiver, and a battery. In various embodiments, wireless identity transmitters may also include additional short-

Petitioner Samsung Ex-1004, 0507

range radios, such as Peanut® radios. In various embodiments, the wireless identity transmitters may not include a user interface, multiple radios, global positioning system (GPS) receiver, or other features common on mobile devices. Embodiment wireless identity transmitters may also consume very little power allowing them to be deployed without needing to be frequently recharged or replaced. These characteristics make them ideal for a wide variety of uses and implementation in a variety of physical configurations. For example, wireless identity transmitters may be easily hidden or incorporated into many different personal objects, such as buttons, watches, shoes, briefcases, backpacks, ID badges, clothing, product packaging, etc.

[0091] In further embodiments, wireless identity transmitters and proximity broadcast receivers may be configured to exchange transmissions using various wireless technologies, such as LTE-D, peer-to-peer LTE-D, WiFi, and WiFi Direct. In an embodiment, wireless identity transmitters may be configured to broadcast messages via a WiFi radio such that proximity broadcast receivers with WiFi transceivers may receive the broadcast messages. In such embodiments, wireless identity transmitters may utilize WiFi transmissions to broadcast identification information similar to WiFi access point broadcasts advertisements. For example, a wireless identity transmitter including a WiFi radio may be configured to transmit broadcast messages via WiFi transmissions with low power so that the reception range is limited, thereby providing a short-range radio signal with a range similar to that of Bluetooth® LE transmissions. In utilizing various wireless broadcast technologies and communication protocols with wireless identity transmitters, proximity broadcast receivers with limited capabilities may still be capable of receiving and processing broadcast messages from wireless identity transmitters. For example, a smartphone configured to operate as a mobile proximity broadcast receiver and including a WiFi transceiver but not a Bluetooth® LE radio may receive and process broadcast messages from a wireless identity transmitter configured to broadcast short-range signals with a WiFi radio. In an embodiment, wireless identity transmitters may

Petitioner Samsung Ex-1004, 0508

broadcast over multiple radios, such as a Bluetooth® LE transceiver and a low-power WiFi transceiver, in order to enable more models of proximity broadcast receivers (e.g., more types of smartphones) to receive and relay sightings.

[0092] Wireless identity transmitters and proximity broadcast receivers are described throughout this disclosure as exchanging short-range wireless signals that include short-range RF signals, such as Bluetooth®, Bluetooth® Low Energy, Peanut, Zigbee, etc. However, such short-range wireless signals are not limited to short-range RF signals, and wireless identity transmitters may broadcast messages using other forms of wireless signaling, such as infrared light, visible light, vibration, heat, inaudible sound, and audible sound, as well as combinations of radio frequency (RF) signals and non-RF signals. For example, wireless identity transmitters may emit heat signals, such as infrared light, using infrared light-emitting diodes or other components capable of emitting infrared radiation. Additionally, wireless identity transmitters may emit vibration signals using vibration motors and other mechanical components capable of generating controlled vibrations. Wireless identity transmitters may also emit light signals from a number of common emitters, such as light emitting diodes, incandescent lights and projectors. Light signals may be received by light sensors (e.g., cameras) on proximity broadcast receivers, and may include visuals, such as lights, colors, and imagery (e.g., photos, projections, videos, symbols, etc.). Wireless identity transmitters may also or alternatively emit audible or inaudible (i.e., infrasonic or ultrasonic) sound signals from a speaker (e.g., a piezoelectric speaker). Sound signals may be received by a microphone of the proximity broadcast receivers, and may include a variety of sounds, such as beeps, voices, noise, clicks, ultrasounds, tones, and musical notes.

[0093] Wireless identity transmitters may be configured to broadcast the various short-range wireless signals in particular sequences, patterns, manners, durations, or manifestations such that proximity broadcast receivers may convert the signals into data in a manner similar to how RF signals (e.g., Bluetooth® LE signals) are interpreted in embodiments described herein. For example, a

Petitioner Samsung Ex-1004, 0509

wireless identity transmitter may broadcast particular sequences of modulating visible or sound signals, such as strings of differing musical notes, changing images, or flashing lights that a proximity broadcast receiver may receive and convert into data that includes an identity of the wireless identity transmitter. In an embodiment, proximity broadcast receivers may convert such wireless signals into data (and vice versa) based on matching sequences of signals with patterns within predefined protocols. As an illustrative example, a wireless identity transmitter affixed to the outside of a child's clothing may periodically emit a sequence of flashes using an embedded light source (e.g., an LED bulb) that may be received, converted to data, and relayed by a proximity broadcast receiver to a central server for determining identification information related to the child. As another example, a wireless identity transmitter within a business establishment may be mounted on the ceiling and may periodically emit a sequence of flashes using an embedded light source that may be received, converted to data, and relayed by a proximity broadcast receiver to a central server to obtain coupons, announcements or customer-incentives tied to the customer being on the premises.

[0094] The various embodiments are described within this disclosure as including communication systems for providing intermediary communications between wireless identity transmitters, proximity broadcast receivers (e.g., mobile proximity broadcast receivers and stationary proximity broadcast receivers) and a central server that utilize short-range messaging (such as with Bluetooth® LE signaling) that enables proximity detection based simply on signal reception. However, the various embodiments are not limited to the described communication systems and methods, and other communication systems, protocols, devices, methods and messaging protocols may be used to convey information to a central server to enable identifying when customers are within proximity of predefined areas to enable the central server to distribute relevant information without disclosing unauthorized information of customers. For example, transceivers in a retail store may be configured to monitor for WiFi,

Petitioner Samsung Ex-1004, 0510

Zigbee®, Bluetooth®, Peanut®, and/or other radio frequency signaling from customers' mobile devices or wireless broadcasting devices within proximity, and relay proximity information to a central server that delivers coupons to customers. Further, embodiments may not require determining exact locations for wireless identity transmitters and/or proximity broadcast receivers but instead may determine approximate and/or relative locations of devices between each other. Accordingly, references to determining location and/or distance throughout the disclosure may be for the purpose of determining proximity between signaling devices.

[0095] FIG. 1 illustrates an exemplary system 100 that may be used in various embodiments. In general, a central server 120 may be configured to receive, store, and otherwise process data corresponding to wireless identity transmitters 110. The central server 120 may be configured to exchange communications with various devices via the Internet 103, such as proximity broadcast receivers 142, mobile proximity broadcast receivers 138, third-party systems 101, and other support systems and/or services 102. The wireless identity transmitters 110 may broadcast messages that may be received by nearby proximity broadcast receivers 142 and/or the mobile proximity broadcast receivers 138 via short-range wireless signals. The proximity broadcast receivers 142, 138 may utilize long-range communications to relay received broadcast messages as sighting messages to the central server 120 via the Internet 103. For example, the proximity broadcast receivers 142 and mobile proximity broadcast receivers may utilize a cellular network 121 to transmit sighting messages to the central server 120. The third-party systems 101 may include merchant servers, retail store computing devices, computing devices associated with emergency services. The other support systems and/or services 102 may include computing devices associated with various technologies, such as computing devices utilized by users to provide registration information, systems that deliver user-relevant content (e.g., Qualcomm Gimbal™), and services that provide location-specific information (e.g., Qualcomm IZat™).

Petitioner Samsung Ex-1004, 0511