

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.; AND
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner

v.
OURARING, INC.,
Patent Owner

Case No. PGR2024-00038
U.S. Patent No. 11,874,701

**PETITION FOR POST-GRANT REVIEW
OF U.S. PATENT NO. 11,874,701**

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Ex-1006	U.S. Patent No. 8,954,135 to Yuen (“Yuen”)
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Ex-1008	Certified Translation of DE 102013012339.9 to Schröder
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Ex-1011	U.S. Provisional Patent App. No. 61/768,279 to Mestas
Ex-1012	INTENTIONALLY LEFT BLANK
Ex-1013	U.S. Patent Publication No. 20120218184 to Wissmar (“Wissmar”)
Ex-1014	U.S. Patent Publication No. 2010/0219989 to Asami (“Asami”)
Ex-1015	U.S. Patent Publication No. 2011/0080339 to Sun (“Sun”)
Ex-1016	U.S. Patent No. 9,218,058 to Bress (“Bress”)
Ex-1017	U.S. Patent No. 8,031,172 to Kruse (“Kruse”)
Ex-1018	INTENTIONALLY LEFT BLANK

¹ Four-digit pin citations that begin with 0 are to the page stamps added by Samsung in the bottom right corner of the exhibits. All other pin citations are to original page, column, paragraph, and/or line numbers.

Ex-1019	INTENTIONALLY LEFT BLANK
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Ex-1021	INTENTIONALLY LEFT BLANK
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Ex-1024	U.S. Patent No. 4,830,014 to Goodman (“Goodman”)
Ex-1025	U.S. Patent No. 6,745,061 to Hicks (“Hicks”)
Ex-1026	U.S. Patent No. 7,190,986 to Hannula (“Hannula”)
Ex-1027	Volker Konig et al., <i>Reflectance Pulse Oximetry – Principles and Obstetric Application in the Zurich System</i> , 14 Journal of Clinical Monitoring (Aug. 1998) (“Konig”)
Ex-1028	U.S. Patent No. 6,608,562 to Kimura (“Kimura”)
Ex-1029	Kevin K. Tremper et al., <i>Pulse Oximetry</i> , 70 Journal of American Society of Anesthesiologists, Inc. (Jan. 1989) (“Tremper”)
Ex-1030	Y. Mendelson et al., <i>A Wearable Reflectance Pulse Oximeter for Remote Physiological Monitoring</i> , Proceedings of 28 th IEEE EMBS Annual International Conference (Aug. 30-Sept. 3, 2006) (“Mendelson 2006”)
Ex-1031	Sokwoo Rhee et al., <i>Artifact-Resistant, Power-Efficient Design of Finger-Ring Plethysmographic Sensors Part I: Design and Analysis</i> , IEEE (2000) (“Rhee 2000 Part I”)
Ex-1032	Sokwoo Rhee et al., <i>Artifact-Resistant, Power-Efficient Design of Finger-Ring Plethysmographic Sensors Part II: Prototyping and Benchmarking</i> , IEEE Proceedings of 22 nd Annual EMBS Int’l Conference (July 23-28, 2000) (“Rhee 2000 Part II”)
Ex-1033	Sokwoo Rhee et al., <i>Artifact-Resistant Power-Efficient Design of Finger-Ring Plethysmographic Sensors</i> , 48 IEEE Transactions of Biomedical Engineering (July 2001) (“Rhee 2001”)
Ex-1034	U.S. Patent No. 6,699,199 to Asada (“Asada ’199”)

Ex-1035	Sokwoo Rhee, <i>Design and Analysis of Artifact-Resistive Finger Photoplethysmographic Sensors for Vital Sign Monitoring</i> , MIT (June 2000) (“Rhee Thesis 2000”)
Ex-1036	C.T. Olofson et al., <i>Machining of Titanium Alloys</i> (1965) (“Olofson”)
Ex-1037	H. Harry Asada et al., <i>Mobile Monitoring with Wearable Photoplethysmographic Biosensors</i> , IEEE Engineering in Medicine & Biology Magazine 28 (May-June 2003) (“Asada 2003”)
Ex-1038	Denisse Castaneda et al., <i>A review on wearable photoplethysmography sensors and their potential future applications in health care</i> , Int J Biosens Bioelectron (2018)
Ex-1039	U.S. Patent No. 7,468,036 to Rulkov et al. (“Rulkov”)
Ex-1040	U.S. Patent Publication No. 2006/0211924 to Dalke et al. (“Dalke”)
Ex-1041	<i>Guidelines To Enhancing The Heart-Rate Monitoring Performance Of Biosensing Wearables</i> (2014)
Ex-1042	U.S. Patent No. 4,880,304 to Jaeb et al. (“Jaeb”)
Ex-1043	Tom Lister et al., <i>Optical Properties of human skin</i> , Journal of Biomedical Optics (2012)
Ex-1044	John G. Webster, <i>Design of Pulse Oximeters</i> , CRC Press (1997)
Ex-1045	U.S. Patent Publication No. 20130211291 to Tran (“Tran”)
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Ex-1047	WO 2011/132009 to Nyiradi (“Nyiradi”)
Ex-1048	U.S. Patent Application Publication No. 2014/0361945 to Misra et al. (“Misra”)
Ex-1049	U.S. Patent Application Publication No. 2014/0361934 to Ely et al. (“Ely”)
Ex-1050	European Patent No. 2281205 (Chen)
Ex-1051	Lawrence K. Au et al., <i>Episodic Sampling: Towards Energy-Efficient Patient Monitoring with Wearable Sensors</i> , Annual International Conference of the IEEE Engineering in Medicine and Biology Society

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Ex-1052	Anastasios Petropoulos et al., <i>Flexible PCB-MEMS flow sensor</i> , Procedia Engineering 47 236-239 (2012) (“Petropoulos”)
Ex-1053	Tianjia Sun et al., <i>Wireless Power Transfer for Medical Microsystems</i> , Springer (2013) (“Sun-Wireless”)
Ex-1054	U.S. Patent Pub. No. 2014/0187160 to Prencipe (“Prencipe”)
Ex-1055	H. Ardebili and Michael G. Pecht, <i>Encapsulation Technologies for Electronic Applications</i> , William Andrew (2009) (“Ardebili”)
Ex-1056	Ciprian Ciofu et al., Injection and Micro Injection of Polymeric Plastics Materials: A Review, Int’l J. Modern Mfg. Techs. 49 (2013)
Ex-1057	Richard J. Ross, LCP Injection Molded Packages—Keys to JEDEC 1 Performance, IEEE, 2004 Electronic Components and Technology Conference 1807 (2004)
Ex-1058	Tadamoto Sakai, Encapsulation Process for Electronic Devices Using Injection Molding Method, 12 Advances in Polymer Technology 61 (1993)
Ex-1059	N.J. Teh et al., Embedding of Electronics within Thermoplastic Polymers using Injection Moulding Technique, IEEE, 2000 Int’l Electronics Manufacturing Technology Symposium 10 (2000)
Ex-1060	U.S. Patent No. 6,201,698 to Hunter (“Hunter”)
Ex-1061	U.S. Patent No. 4,012,629 to Simms (“Simms”)
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Ex-1064	INTENTIONALLY LEFT BLANK
Ex-1065	INTENTIONALLY LEFT BLANK
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Ex-1067	Chao Chen and Carlos Pomalaza-Raez, Monitoring Human Movements at Home Using Wearable Wireless Sensors, Proceedings

	of ISMICT (2009) (“Chen 2”)
Ex-1068	Christoph Amma et al., Airwriting Recognition Using Wearable Motion Sensors, Proceedings of Augmented Human Conference, Megève, France (2010) (“Amma”)
Ex-1069	Yinghui Zhou et al., Analysis and Selection of Features for Gesture Recognition Based on a Micro Wearable Device, Int. J. Adv. Computer Sci. & Appls., Vol. 3 No. 1, 1-7 (2012) (“Zhou”)
Ex-1070	Taiwoo Park et al., E-Gesture: A Collaborative Architecture for Energy-efficient Gesture Recognition with Hand-worn Sensor and Mobile Devices, SenSys ’11, Seattle, WA (2011) (“Park”)
Ex-1071	Jun Rekimoto, GestureWrist and GesturePad: Unobtrusive Wearable Interaction Devices, Proc. 5th Int. Symposium on Wearable Computers (2001) (“Rekimoto”)
Ex-1072	H. Ying et al., Automatic Step Detection in the Accelerometer Signal, 4th Int. Workshop on Wearable and Implantable body Sensor Networks, Springer (2007) (“Ying”)
Ex-1073	Chun Zhu and Weihua Sheng, Wearable Sensor-Based Hand Gesture and Daily Activity Recognition for Robot-Assisted Living, IEEE Trans. Systems, Man, and Cybernetics, 41(3) (2011) (“Zhu”)
Ex-1074	Jiayang Liu et al., uWave: Accelerometer-based Personalized Gesture Recognition and Its Applications, Pervasive and Mobile Computing 5(6), 657-75 (2009) (“Liu”)
Ex-1075	Thomas Schlömer et al., Gesture Recognition With a Wii Controller, Proc. 2d Int. Conf. Tangible & Embedded interaction, Bonn, Germany (2008) (“Schlömer”)
Ex-1076	Kevin P. Murphy, Machine Learning: A Probabilistic Perspective, The MIT Press, Cambridge, Massachusetts (2012) (“Murphy”)
Ex-1077	Paulo Trigueiros et al., A Comparison of Machine Learning Algorithms Applied to Hand Gesture Recognition, 7th Iberian Conf. Inf. Syst. & Techs. (2012) (“Trigueiros”)

I. INTRODUCTION

Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc. (collectively, “Petitioner”) request post-grant review (“PGR”) of Claims 1-7, 11, and 13-20 of U.S. Patent No. 11,874,701 (“the ’701 Patent”) (Ex-1001), currently assigned to Ouraring, Inc., (“PO”).

II. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

Real Parties-in-Interest: Petitioner identifies the following real parties-in-interest: Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.

Related Matters: PO has not asserted the ’701 Patent. For the Board’s convenience, Petitioner notes that Petitioner is challenging the following ten patents, all directed to wearable electronic devices—U.S. Patent Nos. 11,868,178, 11,868,179, 11,599,147, 9,582,034, 10,893,833, 10,139,859, 11,874,701, 11,874,702, 10,281,953, and 10,842,429. The ’833 Patent claims substantially the same subject matter as the ’147 Patent. The ’701 Patent is from the same family as the ’178, ’179, ’147, ’034, ’859, ’702, and ’953 Patents. The ’429 Patent is directed to software used to determining the readiness of a user of a wearable electronic device.

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III. FEE AUTHORIZATION

Pursuant to 37 C.F.R. §42.15(a) and §42.103(a), the PTO is authorized to charge any and all fees to Deposit Account No. LA500639.

IV. GROUNDS FOR STANDING

Petitioner certifies that the '701 Patent is available for review, and Petitioner is not barred or estopped from requesting review

V. PRECISE RELIEF REQUESTED

Petitioner requests cancellation of Claims 1-7, 11, and 13-20 of the '701 Patent under AIA 35 U.S.C. § 103 on the following grounds, supported by a declaration from Dr. Brian W. Anthony. Ex-1002 ¶¶1-34, 43-167; Ex-1003.

Ground	Summary
1	Claims 1-7, 11, 13-16, and 18-20 are obvious in view of US 2011/0080339 (“Sun,” Ex-1015).
2	Claims 4 and 17 are obvious over Sun in view of US 8,031,172 (“Kruse,” Ex-1017)
3	Claims 1, 6-7, and 13-20 are obvious in view of Kruse
4	Claims 2-5, and 11 are obvious over Kruse in view of Sun
5	Claim 6 is invalid under 35 U.S.C. § 112 as indefinite

VI. THE CHALLENGED PATENT

The ’701 Patent relates to a wearable smart ring. Ex-1001, Abstract. The ring includes an accelerometer, which “can measure gestures performed by a user while wearing the [ring].” *Id.*, 8:64-66. In this manner, the ring “can be used to perform one or more commands, or to instruct another device, such as a mobile device, to perform one or more commands.” *Id.*, 25:22-31.

As part of a “training mode,” the ring can be programmed to recognize new gestures performed by the user. *Id.*, 9:27-36. Then, through “a mobile application running on a mobile device of the user,” the ring can be configured “so that the recognized gestures can perform functions designated by the user, such as clicks, swipes, unlocks, or media player controls.” *Id.*, 9:36-40. In a navigation mode (Fig. 18A below), the ring receives heading information from a mobile device executing a map application, and “can give feedback to the user regarding the actual heading

measured by the onboard magnetometer and the heading set forth in the direction information.” *Id.*, 20:55-21:2.

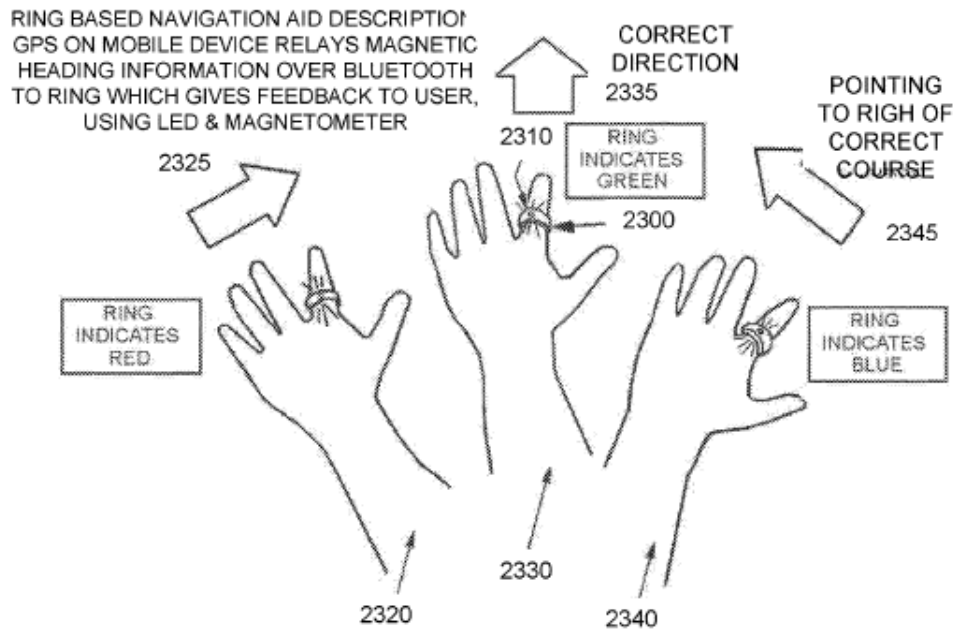


FIG. 18A

The challenged claims are directed to a “wearable electronic device” configured to identify gestures performed by the users, match the identified gestures to stored gesture patterns, and, based on the matching, “provide feedback to the user” or “transmit a signal” to control an external device. As discussed in further detail below, the challenged claims are obvious over prior art describing the same capabilities.

VII. PATENT PROSECUTION HISTORY

The '701 Patent was filed March 6, 2023, and claims priority through a series of continuation and divisional applications to Provisional App. No. 61/910,201 filed

November 29, 2013. Ex-1001, Cover. The as-filed application included a single claim, which was rejected on the basis of statutory double-patenting. Ex-1004, 0042-0047, 0861. The applicant amended by heavily revising that claim and adding new claims 2-20. *Id.*, 0030-0038. These claims were allowed without rejection. *Id.*, 0011-0017. The '701 Patent issued January 16, 2024. Ex-1001, Cover.

VIII. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art at the relevant time (“POSITA”) would have had at least a four-year degree in electrical engineering, mechanical engineering, biomedical engineering, optical engineering, or related field of study, or equivalent experience, and at least two years’ experience in academia or industry studying or developing physiological monitoring devices such as non-invasive biosensors. A person of ordinary skill in the art would have also been familiar with, for example, inertial sensor system design and signal processing. This description is approximate, and a higher level of education or skill might make up for less experience, and vice versa. Ex-1002 ¶¶30-31.

IX. PRIORITY DATE

For purposes of this proceeding only, Petitioner applies the earliest alleged priority date of the '701 Patent, November 29, 2013.² Accordingly, post-AIA 35 U.S.C. §102 applies.

X. CLAIM CONSTRUCTION

Petitioner interprets the claims according to *Phillips*. 37 C.F.R. §42.100(b). To resolve this Petition, Petitioner does not believe that any term requires express construction.³ CTPG, 44; Ex-1002 ¶¶168-169.

XI. BRIEF DESCRIPTION OF THE APPLIED PRIOR ART REFERENCES

A. Sun (Ex-1015)

Sun (U.S. Patent Publication No. 2011/0080339) was filed October 7, 2009, and published April 7, 2011. Sun qualifies as prior art under at least AIA 35 U.S.C. §102(a)(1) and §102(a)(2). Petitioner is unaware of any facts supporting an exception under §102(b). Ex-1002 ¶¶170-173.

² Petitioner respectfully reserves the right to challenge the priority date in other proceedings.

³ There is currently no pending district court litigation against Petitioner involving the '701 Patent. Petitioner respectfully reserves all rights to raise claim construction and other arguments in district court. Additionally, if an action is filed, Petitioner will request leave to submit the claim construction as soon as it becomes available. Moreover, should PO raise implied claim construction arguments in its Preliminary Response, Petitioner will respectfully seek a Preliminary Reply to respond. CTPG, 44-45 (permitting petitioner to respond to claim construction raised by patent owner).

Sun discloses a wrist/finger mouse that is configured to identify gestures performed by a user wearing the mouse, based on acceleration data obtained by a motion sensor within the mouse. Ex-1015, Abstract. The wrist/finger mouse includes a library mapping stored gestures to commands to be performed by an external computer. *Id.* ¶¶42, 44. In response to identifying a performed gesture and mapping it to a stored command, Sun’s wrist/finger mouse sends a command signal instructing the computer to perform the command. *Id.* ¶44.

B. Kruse (Ex-1017)

Kruse (U.S. Patent No. 8,031,172) was filed October 12, 2007, and issued October 4, 2011. Kruse qualifies as prior art under at least AIA 35 U.S.C. §102(a)(1) and §102(a)(2). Petitioner is unaware of any facts supporting an exception under §102(b). Ex-1002 ¶¶174-176.

Kruse discloses a wearable device (e.g., a wearable haptic ring) that is configured to identify gestures performed by a user wearing the device, based on movements of the device sensed by an accelerometer (Ex-1017, 3:34-39), by filtering out “any extraneous movements, which are considered as natural hand movements as oppose[d] to command movements” performed by the user to control an external device. Ex-1017, 8:1-4. The user’s filtered movements are mapped to input commands that are transmitted to external devices, such as a PC or PDA. Ex-1017, 8:6-11. Kruse’s wearable device is additionally configured to provide haptic

feedback to the user, in response to identifying an input command associated with the user's input gesture, to provide confirmation to the user of the selected input command. Ex-1017, 8:12-22.

XII. DETAILED EXPLANATION OF THE UNPATENTABILITY GROUNDS

A. Ground 1: Claims 1-7, 11, 13-16, and 18-20 Are Obvious Over Sun (Ex-1015)

1. Independent Claim 1

a. Element 1[pre]: A wearable electronic device, comprising:

Sun teaches⁴ the preamble of Claim 1, to the extent it is limiting. Ex-1002 ¶¶177-180. Sun's wrist/finger mouse 14, illustrated in annotated Figure 1, below,⁵ corresponds to a "wearable electronic device":

⁴ Petitioner uses the term "teaches" to include both express teachings and those fairly suggested to a person of ordinary skill in the art. *In re Baird*, 16 F.3d 380, 383 (Fed. Cir. 1994); *In re Keller*, 642 F.2d 413, 425 (CCPA, 1981) ("The test for obviousness is ... what the combined teachings of the references would have suggested to those of ordinary skill in the art." (citations omitted))

⁵ Throughout, emphasis and annotations are added unless otherwise specified.

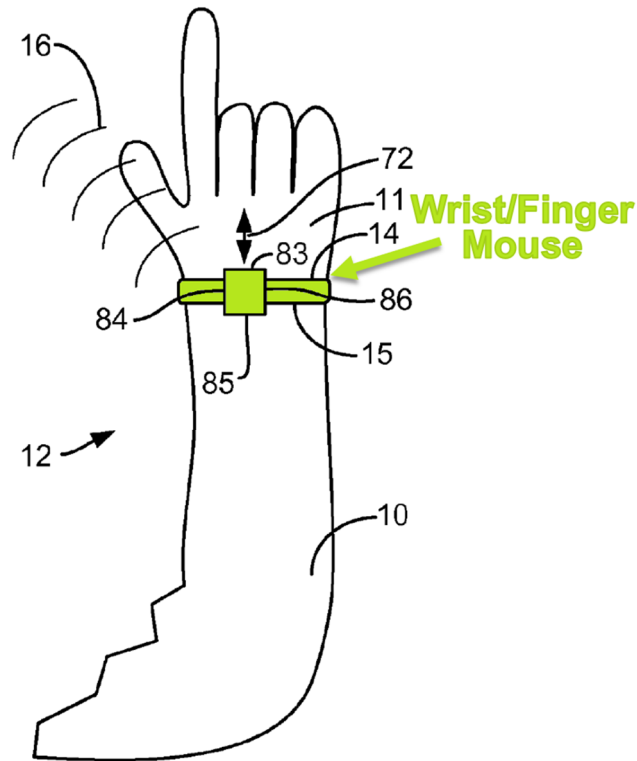


Fig. 1

Wrist/finger mouse 14 is wearable because it is “mountable to a user at the user’s hand or near the user’s wrist” (Ex-1015 ¶5) using wristband 22 (*id.* ¶17), as illustrated in annotated Figure 2, below.

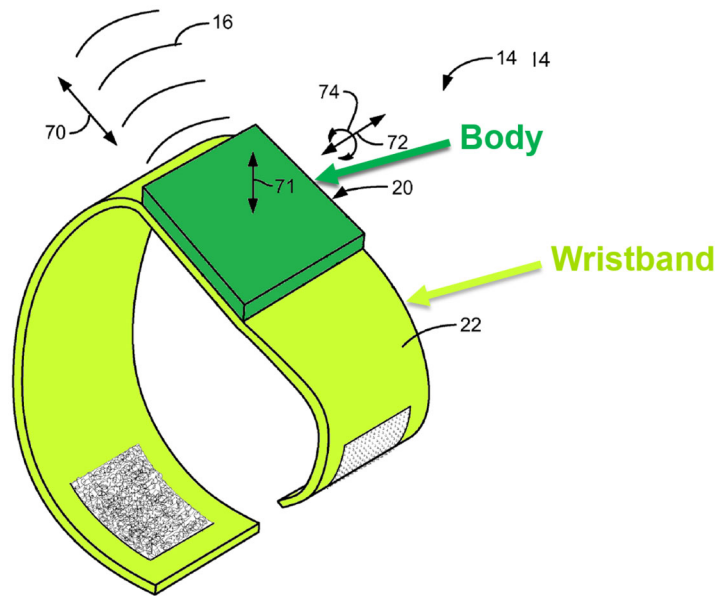


Fig. 2

Wrist/finger mouse 14 is an electronic device because body 20 includes “microelectromechanical systems (MEMS) sensors” and electronic “motion sensitive circuitry.” *Id.* ¶¶17-18; Ex-1002 ¶180.

b. Element 1[a]: a housing comprising an inner surface and an outer surface;

Sun teaches Element 1[a]. Ex-1002 ¶¶181-183.

Body 20 of wrist/finger mouse 14 (illustrated in modified Figure 2', below) corresponds to a housing, because “motion sensor 24 and motion sensitive circuitry 32 [are] *housed within* and carried by body 20.” Ex-1015 ¶17. Top 80 of body 20 is an outer surface, because, when worn by a user, it faces outward, away from the user’s body, and bottom 81 of body 20 is an inner surface, because it faces inward, towards the user’s body. This is consistent with the way the terms “inner”

and “outer” are used in the ’701 Patent. Ex-1001, 18:1-3 (“inner and outer walls 1612, 1614”), Fig. 14A (depicting inner wall 1612 and outer wall 1614); Ex-1002 ¶182.

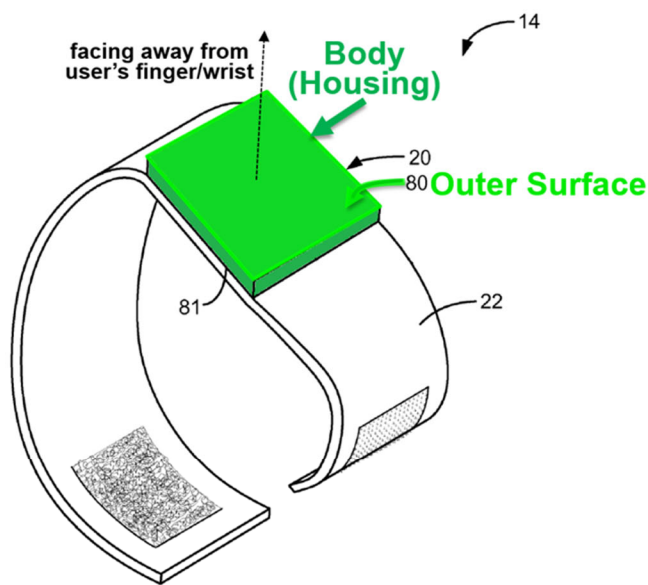


Fig. 2'

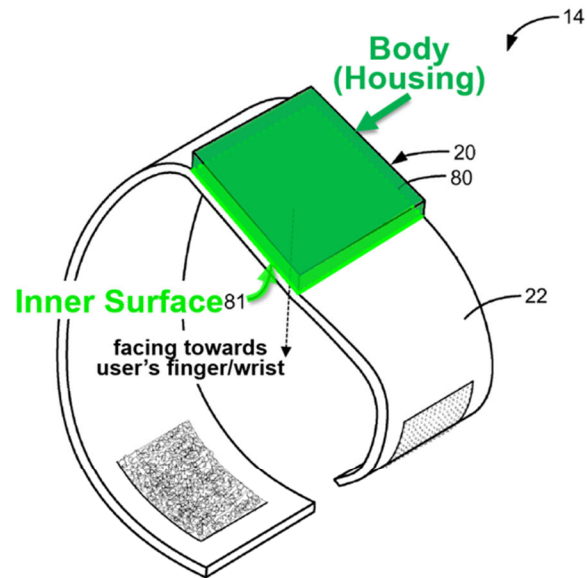
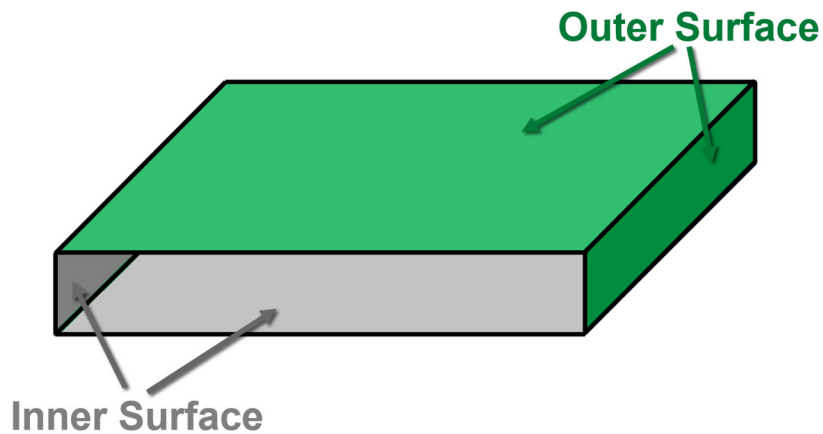


Fig. 2'

Alternatively, a POSITA also would have viewed the surfaces on the outside of body 20 as outer surfaces, and the surfaces inside body 20—and onto which internal components are “mounted” (Ex-1015 ¶43)—as inner surfaces, as illustrated in the cutaway diagram below. Ex-1002 ¶183.

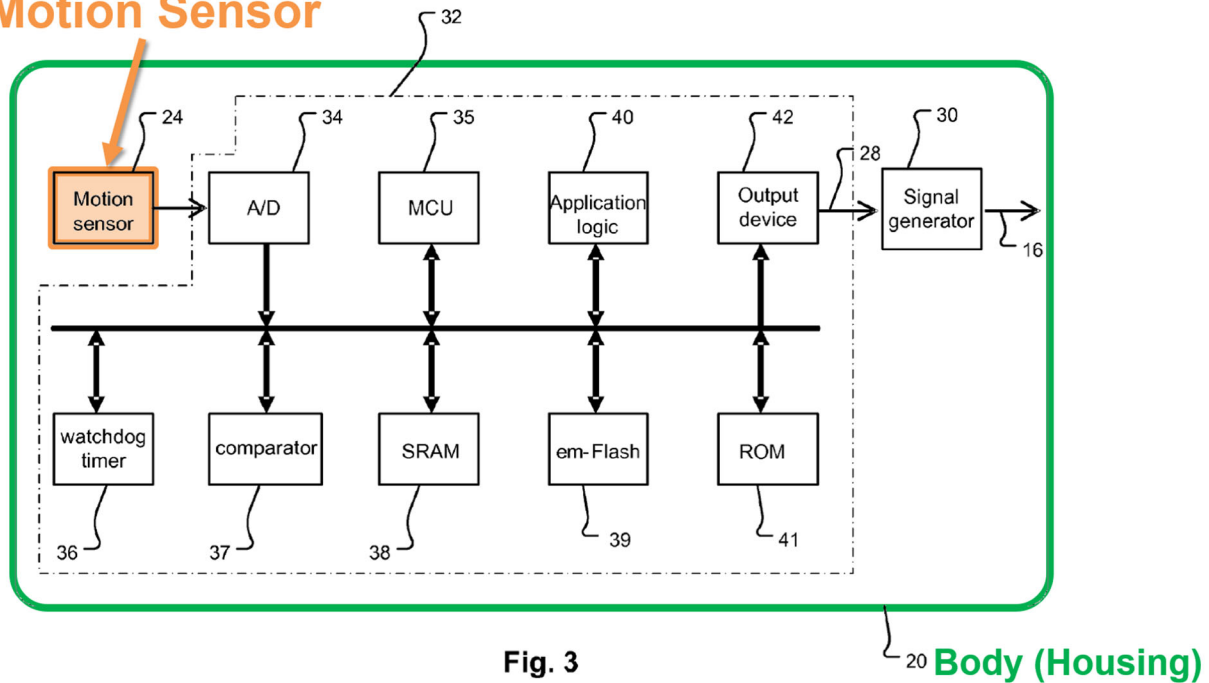


- c. **Element 1[b]: an electronic part disposed within the housing, the electronic part configured to acquire acceleration data from a user associated with the wearable electronic device; and**

Sun teaches Element 1[b]. Ex-1002 ¶¶184-188.

Sun's motion sensor 24, which is "housed within and carried by body 20" (Ex-1015 ¶17), as illustrated in annotated Figure 3, below, corresponds to an electronic part disposed within the housing. Ex-1002 ¶185.

Motion Sensor



Motion sensor 24 may include “microelectromechanical systems (MEMS) sensors” (Ex-1015 ¶18), packaged with “supporting circuitry such as an analog-to-digital converter, a signal processor and a communication port” (*id.* ¶24). Thus, motion sensor 24 is electronic. Ex-1002 ¶186.

Sun’s “gesture data” corresponds to the claimed “acceleration data.” Ex-1002 ¶187. As Sun explains, motion sensor 24 includes “accelerometers” (Ex-1015 ¶¶24-25) to acquire “gesture data” (*id.* ¶26) from a user wearing Sun’s wrist/finger mouse. These accelerometers are configured to sense movement (which may be numerically integrated, resulting in “displacement, velocity, and acceleration” components (Ex-1015 ¶21)) occurring when a user wearing wrist/finger mouse 14 performs a given “gesture” (e.g., “tapping the chosen hand of the user on a surface” (Ex-1015 ¶8)).

See also Ex-1015 ¶21. Sun’s “gesture data” is thus “acceleration data” because it is obtained using an accelerometer and includes data indicative of accelerations of the user’s hand, experienced by the wrist/finger mouse. Ex-1002 ¶188.

**d. Element 1[c]: one or more processors
communicatively coupled to the electronic part,
wherein the one or more processors are configured to:**

Sun teaches Element 1[c]. Ex-1002 ¶¶189-192.

Motion sensor 24 (“the electronic part”) is communicatively coupled to “motion sensitive circuitry 32,” because it provides the sensed “gesture data” (claimed “acceleration data”) to circuitry 32, as illustrated in annotated Figure 3, below. Ex-1015 ¶26; Ex-1002 ¶190.

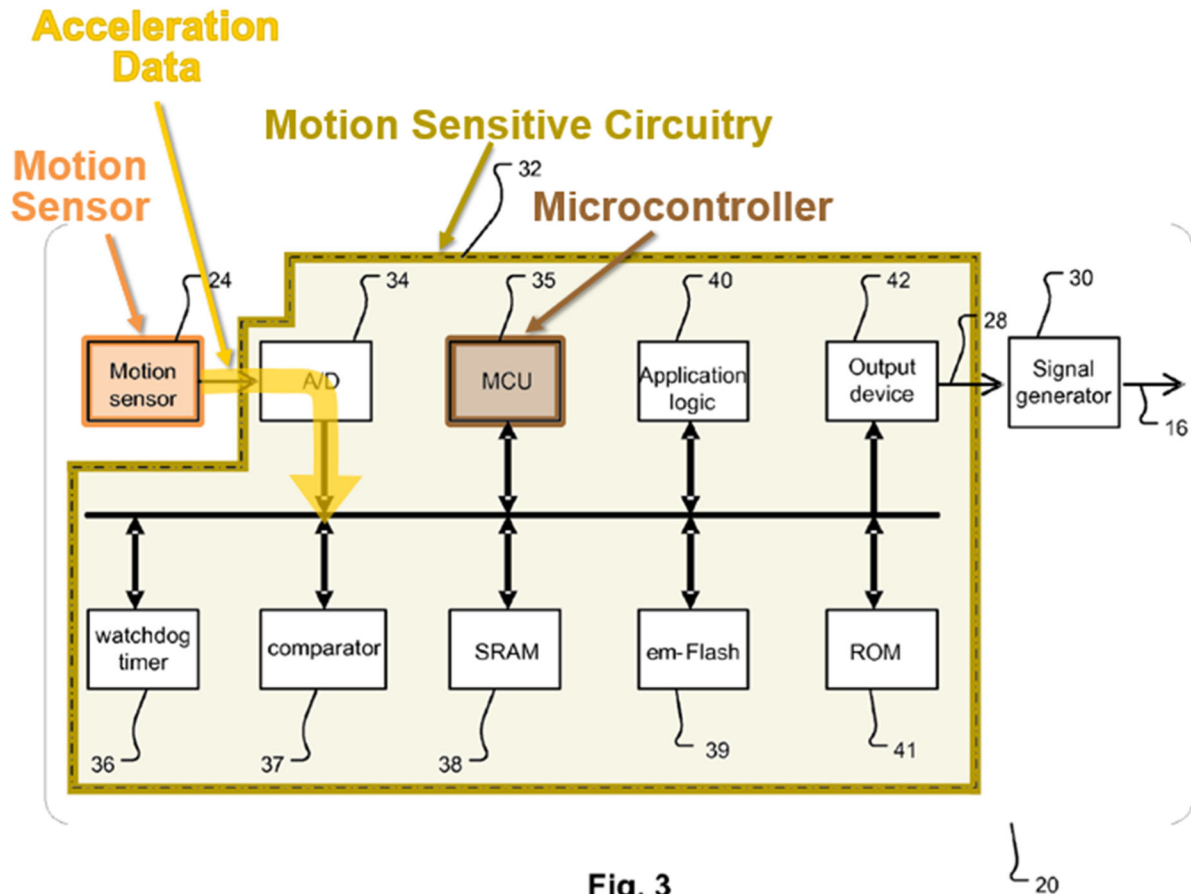


Fig. 3

Motion sensitive circuitry 32 includes “one or more processors,” as claimed, in the form of Sun’s MCU 35. Ex-1002 ¶191. As Sun explains, circuitry 32 includes “data processing resources” (Ex-1015 ¶26), such as “microcontroller unit MCU 35,” for “executing system firmware and coordinating processing with application logic” (Ex-1015 ¶43). A POSITA would have recognized that an MCU includes one or more processors. Ex-1002 ¶191.

Sun explains that MCU 35 (the claimed “one or more processors”) “coordinates activity among a number of units, executing system firmware and

coordinating processing with application logic for the gesture navigation.” Ex-1015 ¶43. Thus, a POSITA would have understood that the functions described as being performed by Sun’s motion sensitive circuitry 32 (including the functions described as performed by the components included therein) are performed by MCU 35 “executing system firmware and coordinating processing with application logic” (Ex-1015 ¶43). Ex-1002 ¶192. Accordingly, as explained in further detail below, a POSITA would have understood that the functions recited in Elements 1[c][i] through 1[c][iv] are performed by MCU 35 (the claimed “one or more processors”). Ex-1002 ¶192.

e. Element 1[c][i]: receive the acceleration data from the electronic part;

Sun teaches Element 1[c][i]. Ex-1002 ¶¶193-195.

Sun’s motion sensitive circuitry 32, as controlled by MCU 35 (“one or more processors”), receives acceleration data from motion sensor 24 (“the electronic part”). *See, e.g.*, Ex-1015 ¶26 (“Motion sensitive circuitry 32 comprises data processing resources which provide for interpretation of the gesture data received from motion sensor 24.”), ¶36 (“gesture data” provides “acceleration”). As illustrated in annotated Figure 3, below, motion sensor 24 is coupled to “analog-to-digital conversion circuit 34,” which is connected “to a bus on which []

microcontroller unit MCU 35 coordinates activity” among the various units within circuitry 32. Ex-1015 ¶43.

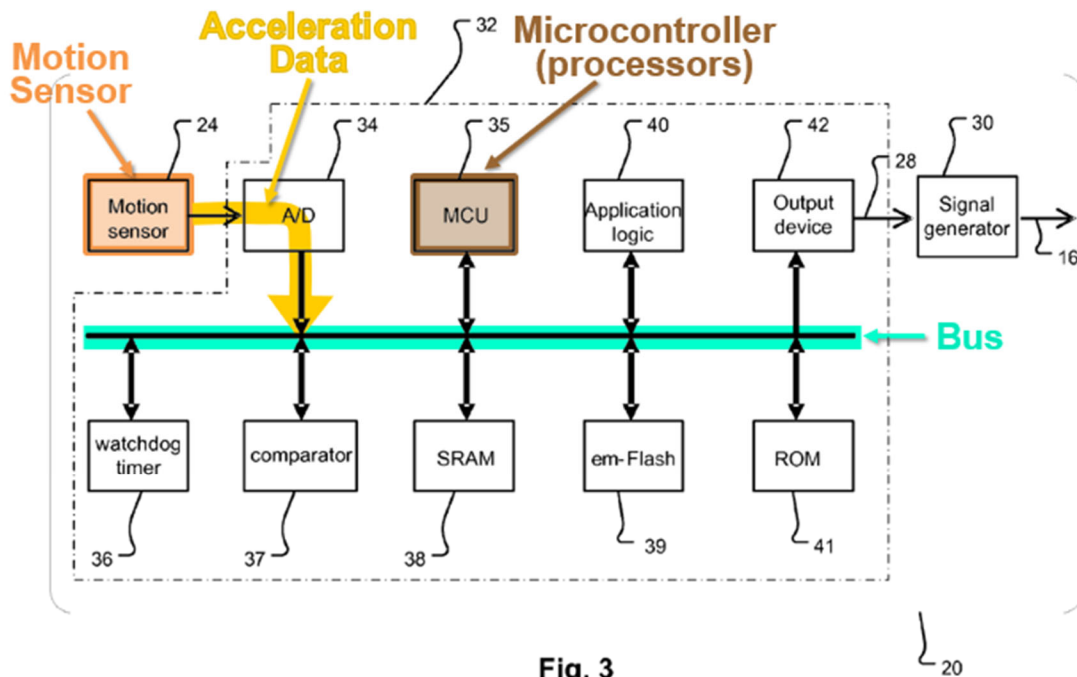


Fig. 3

Thus, Sun teaches that the “one or more processors” of MCU 35 receive the acceleration data sensed by motion sensor 24, through analog-to-digital circuit 34 and the bus of circuitry 32. Ex-1002 ¶195.

f. Element 1[c][ii]: identify a gesture performed by the user based at least in part on the acceleration data;

Sun teaches Element 1[c][ii]. Ex-1002 ¶¶196-205.

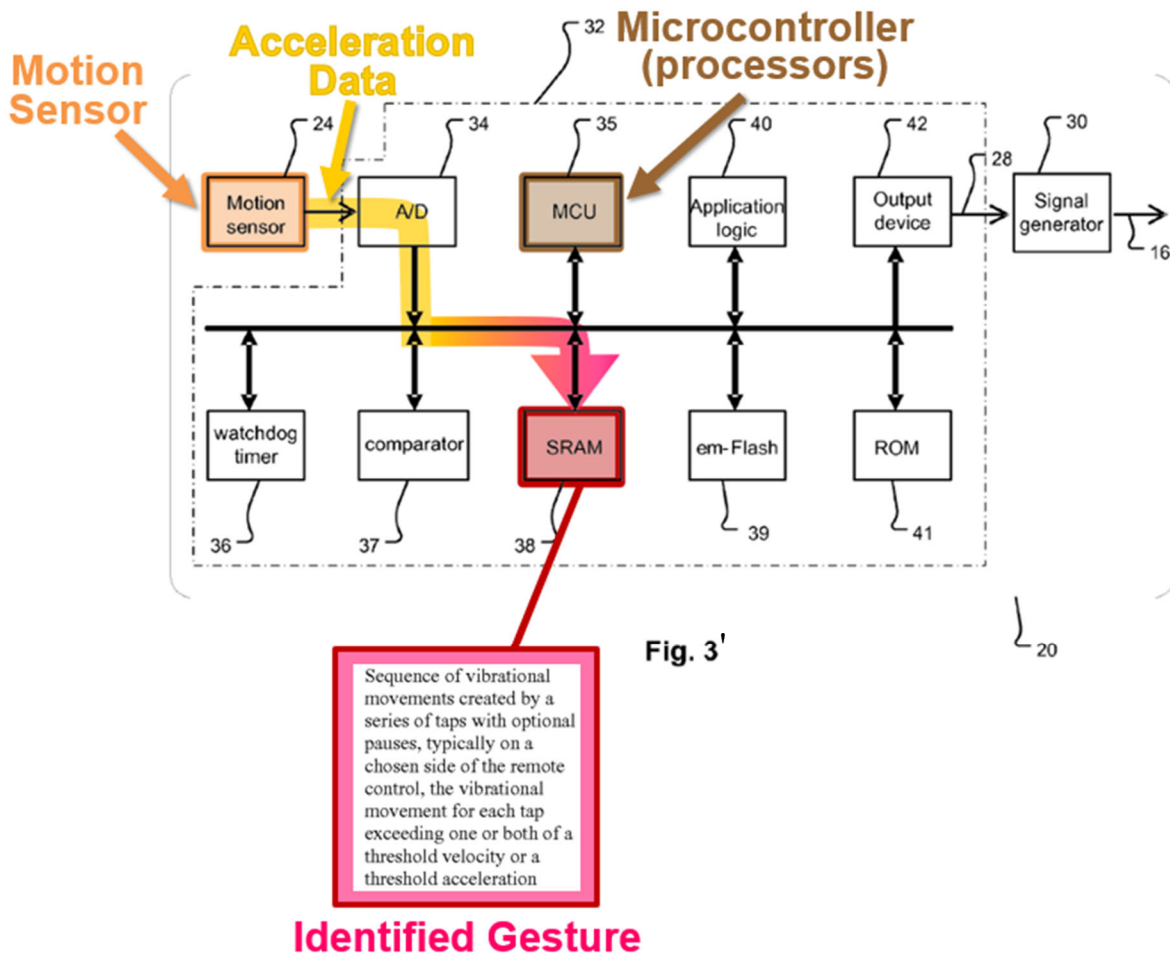
Sun explains that “[m]otion sensitive circuitry 32 comprises data processing resources which provide for interpretation of the gesture data received from motion sensor 24” (the claimed “acceleration data”). Ex-1015 ¶26. In particular, Sun

teaches that the gesture data can be analyzed by circuitry 32 to obtain “displacement, velocity and acceleration data for gestures as they are performed” (Ex-1015 ¶43; *see also id.* ¶36 (similar)). This displacement, velocity, and acceleration data is then stored in SRAM 38 (*id.*, ¶43), as “input sequences of data indicating gestures or component motions of gestures that include a sequence of component motions,” which can be compared “with stored sequences of data specifying the unique signatures for memorized gestures” (*id.*).

A POSITA would have understood that by generating displacement, velocity, and acceleration data from the gesture data received from sensor 24 (the claimed “acceleration data”) and then storing that data in SRAM 38, Sun’s motion sensitive circuitry (as controlled by MCU 35 (“one or more processors”)) “identif[ies] a gesture performed by the user based at least in part on the acceleration data.” In particular, this process identifies a gesture because it converts the gesture data received from sensor 24 into a form that the system can compare against pre-stored gesture signatures (and thereby recognize and interpret the specific gesture). Ex-1002 ¶198.

While a POSITA would have viewed Sun’s disclosure of MCU 35 generating displacement, velocity, and acceleration data from the gesture data received from sensor 24 (the claimed “acceleration data”) and then storing that data in SRAM 38 as sufficient to meet Element 1[c][ii], a POSITA would also have understood that

MCU 35 would perform additional processing on the generated displacement, velocity, and acceleration data. Ex-1002 ¶199. In particular, this data would be processed or filtered to remove movements that do not correspond to intentional input gestures performed by the user, prior to storing it in SRAM 38 and/or comparing it against the stored sequences of data that specify unique signatures for memorized gestures. *Id.* For instance, Sun describes an example in which circuitry 32, as controlled by MCU 35 (“one or more processors”) (Ex-1015 ¶43), identifies a tapping gesture (characterized by gesture data with “high-frequency oscillation or noise”) by distinguishing such high-frequency oscillation/noise from “lower frequency motions created when wrist mouse 14 is moved along straight and/or curved paths.” Ex-1015 ¶37. In this manner, a sequence of tapping gestures may be stored in SRAM 38 for comparison/matching to a memorized gesture, as illustrated below in modified Figure 3', without storing any extraneous movements of wrist/finger mouse 14 occurring while the user performs that sequence of taps. Ex-1002 ¶200. By separating the sequence of tapping gestures from non-gesture movements, Sun’s motion sensitive circuitry 32 “identif[ies] a gesture performed by the user based...on the acceleration data.” *Id.*



Similarly, a POSITA would have recognized that, when wrist/finger mouse 14 is attached to a user's finger/wrist, motion sensor 24 will sense a significant number of movements that do not correspond to any gestures performed by the user for the purpose of controlling external computer 18 (e.g., movement of the wrist/finger mouse while walking, shifting position, talking and gesticulating, etc.). Ex-1002 ¶201. A POSITA would have understood that attempting to match all such non-gesture movements to memorized gestures would waste significant processing resources and/or unnecessarily deplete the wrist/finger mouse's battery (or otherwise

waste power). *Id.* Thus, the POSITA would have been motivated to filter out these non-gesture movements prior to storing the detected movements in SRAM 38, in a similar manner to that described above, for distinguishing high-frequency oscillation/noise associated with tapping gestures from “lower frequency motions created when wrist mouse 14 is moved along straight and/or curved paths.” Ex-1015 ¶37; Ex-1002 ¶201. Such a POSITA would have understood that many such extraneous movements will be distinguishable from deliberate gesture movements based on the magnitude of the velocity/acceleration associated with the movement, with deliberate gestures characterized by fast movements and/or large accelerations. Ex-1002 ¶¶201-202. Indeed, Sun’s examples of memorized gestures that are stored by wrist/finger mouse 14 are all characterized by motions “exceeding one or both of a threshold velocity or a threshold acceleration,” as illustrated below, in an annotated excerpt of Sun’s Command Motion Library. Ex-1015 ¶42.

GESTURE NUMBER	COMMAND GESTURE NAME	MAPS TO PRESENTATION COMMAND	MOTION DETECTION PROCESS
1.	Left and back movement	Left click	Motion to the left and back exceeding one or both of a threshold velocity or a threshold acceleration
2.	Right and black movement	Right-click	Motion to the right and back exceeding one or both of a threshold velocity or a threshold acceleration
3.	Left and back movement, then right and forward movement, then left and back movement	Double click	Motion along each leg exceeding one or both of a first threshold velocity or a first threshold acceleration and below one or both of a second threshold velocity or a second threshold acceleration
4.	Back movement, then right and forward movement, then forward movement	Begin drawing with cursor	Motion along each leg exceeding one or both of a first threshold velocity or a first threshold acceleration and below one or both of a second threshold velocity or a second threshold acceleration

Memorized Gestures

Accordingly, a POSITA implementing Sun's wrist/finger mouse would have configured the device to filter out extraneous movements that do not correspond to gestures (i.e., because the associated velocity and/or acceleration falls below a set threshold), prior to storing "input sequences of data indicating gestures or component motions of gestures that include a sequence of component motions" (Ex-1015 ¶43) in SRAM 38. Ex-1002 ¶¶203-205. This filtering process would ensure that only relevant gesture data is stored and processed, optimizing the device's

performance and conserving its processing resources and battery life. *Id.* In this manner, Sun’s motion sensitive circuitry 32 “identif[ies] a gesture performed by the user based...on the acceleration data,” and stores the identified gesture in SRAM 38. *Id.*

g. Element 1[c][iii]: determine that the gesture matches a gesture pattern from a plurality of gesture patterns; and

Sun teaches Element 1[c][iii], through Sun’s disclosure of “a library of command []motions” (Ex-1015 ¶31) against which the user’s detected gesture is compared. Ex-1002 ¶¶206-209.

Sun’s library of command motions is “a map database including the specifications of gestures to be used with wrist mouse 14.” Ex-1015 ¶31. The library maps specific gestures (each “a gesture pattern from a plurality of gesture patterns”) to commands for controlling an external computer, as illustrated in the annotated excerpt, below. *Id.* ¶¶41-42.

GESTURE NUMBER	COMMAND GESTURE NAME	MAPS TO PRESENTATION COMMAND	MOTION DETECTION PROCESS
1.	Left and back movement	Left click	Motion to the left and back exceeding one or both of a threshold velocity or a threshold acceleration
2.	Right and black movement	Right-click	Motion to the right and back exceeding one or both of a threshold velocity or a threshold acceleration
3.	Left and back movement, then right and forward movement, then left and back movement	Double click	Motion along each leg exceeding one or both of a first threshold velocity or a first threshold acceleration and below one or both of a second threshold velocity or a second threshold acceleration
4.	Back movement, then right and forward movement, then forward movement	Begin drawing with cursor	Motion along each leg exceeding one or both of a first threshold velocity or a first threshold acceleration and below one or both of a second threshold velocity or a second threshold acceleration



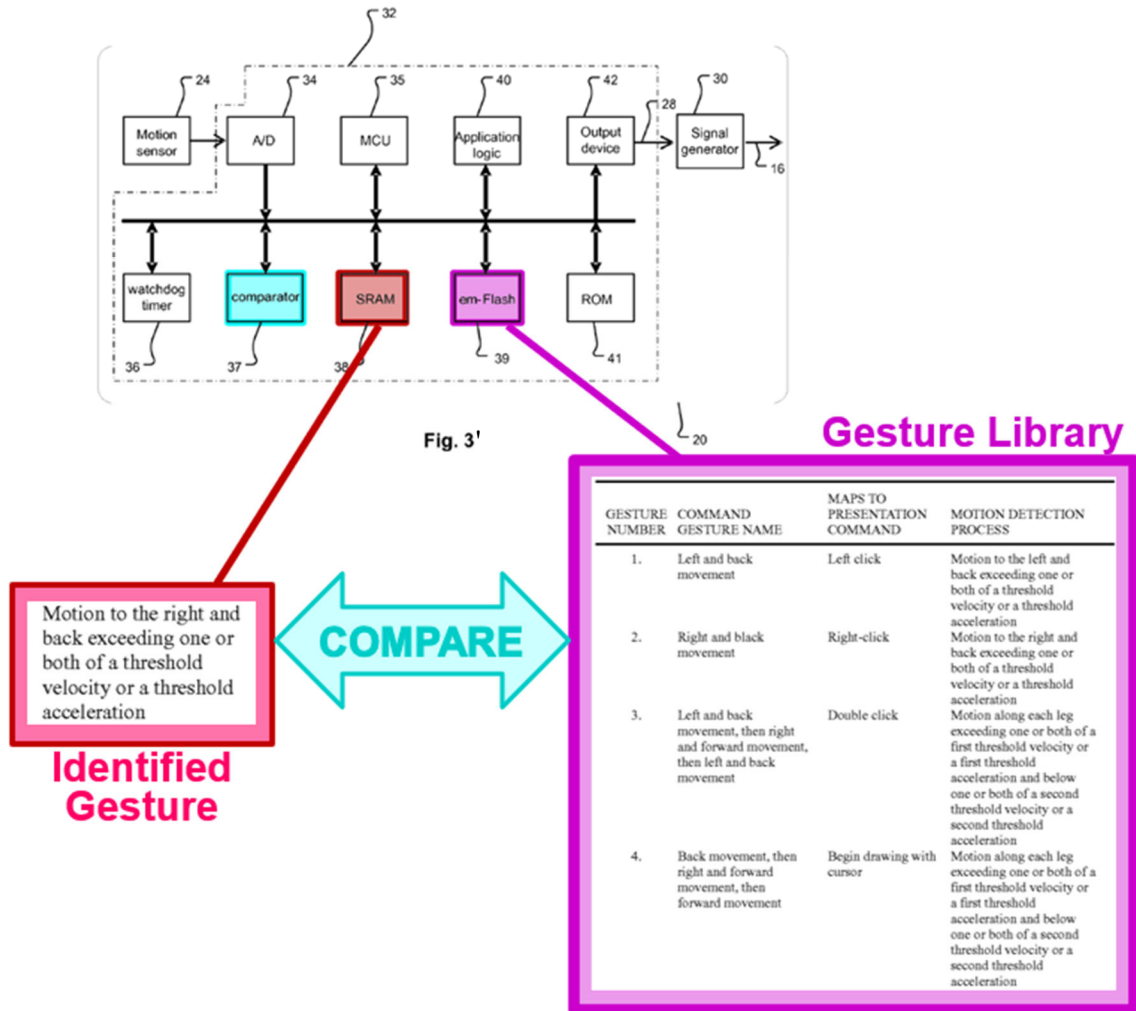
**Commands Mapped
to the Memorized
Gestures**



**Memorized Gestures
(Stored Gesture
Patterns)**

As explained for Element 1[c][ii], wrist/finger mouse 14 stores “input sequences of data indicating gestures or component motions of gestures that include a sequence of component motions” (each a “gesture”) in SRAM 38. Ex-1015 ¶43. Sun then uses “comparator logic 37” within motion sensitive circuitry 32, as controlled by MCU 35 (“one or more processors”) (Ex-1015 ¶43), to compare that input data stored in SRAM 38 (“gesture”) with “sequences of data specifying the unique signatures for memorized gestures for component motions” (“plurality of gesture

patterns”) that are stored as a database/library within embedded flash memory 39. Ex-1015 ¶43. In paragraph 42, Sun provides an example of this database/library, an excerpt of which is provided above. Ex-1015 ¶42. The set of 12 memorized gestures provided in this library correspond to the claimed “plurality of gesture patterns,” and each memorized gesture within the set of 12 memorized gestures corresponds to a claimed “gesture pattern.” Ex-1002 ¶209. By comparing the input data stored in SRAM 38 (“gesture”) to the set of memorized gestures stored within embedded flash memory 39 (“plurality of gesture patterns”), comparator logic 37 (as controlled by MCU 35 (“one or more processors”)) determines whether the detected gesture (claimed “gesture”) matches a memorized gesture (claimed “gesture pattern”), as illustrated in modified Figure 3', below. Ex-1015 ¶43; *see also id.* ¶44 (similar).

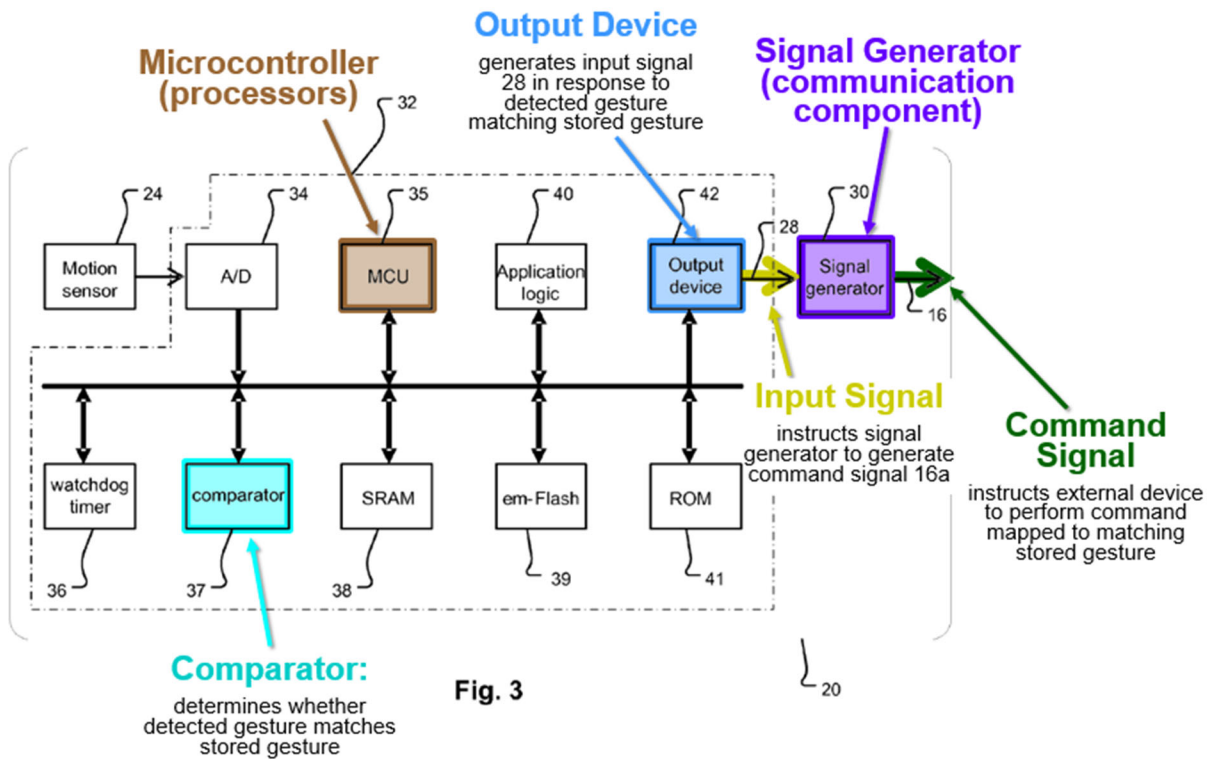


If a match is found, wrist/finger mouse 14 transmits a “command signal” to the external computer, instructing the computer to perform the command that is mapped to the matching memorized gesture, as explained for Element 1[c][iv], below.

- h. Element 1[c][iv]: 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.**

Sun teaches Element 1[c][iv]. Ex-1002 ¶¶210-214.

As explained for Element 1[c][iii], Sun's motion sensitive circuitry 32 (as controlled by MCU 35 (the claimed "one or more processors")) compares detected "input sequences of data indicating gestures or component motions of gestures" to memorized gestures that are stored in a library, where each stored gesture is mapped to a specific command for controlling an external computer. Ex-1015 ¶¶43-44. As illustrated in annotated Figure 3, below, in response to identifying a match, circuitry 32 (as controlled by MCU 35 (the claimed "one or more processors")) generates a message in the form of "input signal 28" (below, yellow). *Id.* Signal 28 causes signal generator 30 (below, purple) (i.e., "a communication component of the wearable electronic device") to "transmit[] a command signal 16 [(below, green)] to the signal receiver of computer 18" (i.e., "transmit a signal to an external device") (*id.*), where signal 16 (below, green) instructs computer 18 to perform the command mapped to the matching gesture stored in Sun's Command Motion Library (*id.* ¶¶19, 41-44).



For example, Sun explains that “movement of wrist mouse 14 through a particular motion corresponding to a particular command, such as ‘left click,’ ...causes motion sensitive circuitry 32 to create a ‘left click’ input signal 28 to signal generator 30,” where “[r]eceipt of the ‘left click’ signal causes signal generator 30 [to] create a ‘left click’ command signal 16 for transmission to the signal receiver of computer 18.” *Id.* ¶19.

Thus, input signal 28 corresponds to the claimed “message,” which causes signal generator 30 (“a communication component”) to transmit command signal 16 (claimed “signal”) to computer 18 (“external device”).

2. Dependent Claims 2-7, 11, 13-16, and 18

- a. **Claim 2: 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.**

Sun teaches Element 2[a]. Ex-1002 ¶¶215-217.

As illustrated in the excerpted table, below, Sun’s Command Motion Library stores gestures (e.g., “Left and back movement”) associated with motion “exceeding...a threshold acceleration.” Ex-1015 ¶42; *see also id.*, Cls. 28-31 (same).

GESTURE NUMBER	COMMAND GESTURE NAME	MAPS TO PRESENTATION COMMAND	MOTION DETECTION PROCESS
1.	Left and back movement	Left click	Motion to the left and back exceeding one or both of a threshold velocity or a threshold acceleration
2.	Right and black movement	Right-click	Motion to the right and back exceeding one or both of a threshold velocity or a threshold acceleration
3.	Left and back movement, then right and forward movement, then left and back movement	Double click	Motion along each leg exceeding one or both of a first threshold velocity or a first threshold acceleration and below one or both of a second threshold velocity or a second threshold acceleration
4.	Back movement, then right and forward movement, then forward movement	Begin drawing with cursor	Motion along each leg exceeding one or both of a first threshold velocity or a first threshold acceleration and below one or both of a second threshold velocity or a second threshold acceleration

As explained for Element 1[c][ii], a POSITA would have understood that Sun's motion sensitive circuitry 32 (as controlled by MCU 35 (the claimed "one or more processors")) would identify "input sequences of data indicating gestures or component motions of gestures that include a sequence of component motions" (Ex-1015 ¶43) for storage in SRAM 38, based on a determination that the motion data exceeds a threshold acceleration and/or velocity. Ex-1002 ¶217.

b. Claim 3:

- 1. Element 3[a]: 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;**

Sun teaches Element 3[a]. Ex-1002 ¶¶218-221.

Sun describes a training mode that involves "training the wireless wrist mouse to recognize a command motion [(gesture)] associated with a command signal." Ex-1015, Cl. 25, ¶8 (similar). In training mode, "[t]he user enters a name for the new command into computer 18," and then performs "[a] new command gesture...so that wrist mouse 14 generates a new command signal 16." Ex-1015 ¶33. In this manner, the user may create a new entry in the Command Motion Library (by assigning a new gesture to a new command (*id.*)), or modify an existing entry of the Library (by replacing the existing gesture assigned to a command with a new gesture (*id.* ¶35)).

A POSITA would have understood that Sun's wrist/finger mouse (as controlled by MCU 35 (the claimed "one or more processors")) would receive an

indication of the training mode, prior to the user's performance of the new gesture. Ex-1002 ¶221. As Sun explains, during regular operation, if the wrist/finger mouse senses a gesture that does not match one stored in Sun's library, the gesture is ignored. Ex-1015 ¶44 ("If...there is no appropriate correlation between the sensed movement and the library of command motions stored within motion sensitive circuitry 32, control is returned to the input of sense movement 66."). Thus, in order to train Sun's wrist/finger mouse to recognize a new gesture, the mouse should receive an indication of the training mode, so that the mouse does not simply ignore the new gesture. Ex-1002 ¶221.

2. Element 3[b]: receiving additional acceleration data from the electronic part based at least in part on receiving the indication of the training mode; and

Sun teaches Element 3[b]. Ex-1002 ¶222. During Sun's training mode, "[a] new command gesture is performed by the user so that wrist mouse 14 generates a new command signal 16." Ex-1015 ¶33. Because motion sensor 24 uses accelerometers to sense the command gestures performed by the user (*id.* ¶36), the gesture data associated with the new gesture and provided by sensor 24 to circuitry 32 (*id.* ¶26) corresponds to "acceleration data." And, as explained for Element 3[b], circuitry 32 (as controlled by MCU 35 (the claimed "one or more processors"))

would receive this acceleration data after receiving an indication of the training mode. Ex-1002 ¶222.

3. Element 3[c]: generating the gesture pattern included within the plurality of gesture patterns based at least in part on the additional acceleration data.

Sun teaches Element 3[c]. Ex-1002 ¶223. As explained for Element 3[a], Sun's training mode may be used to create a new entry in Sun's library, by assigning a new gesture (corresponding to the claimed "gesture pattern") to a new command signal. Ex-1015 ¶33. Sun explains that the new gesture stored in the library is "a composite new command gesture" formed using gesture data (the claimed "additional acceleration data") received through the user's repeated performance of the gesture. *Id.*

c. Claim 4:

1. Element 4[a]: The wearable electronic device of claim 3, wherein the one or more processors are further configured to: receive a user input comprises 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,

Sun teaches Element 4[a]. Ex-1002 ¶¶224-226.

As explained for Element 3[a], during Sun's training mode, the user may use computer 18 to create a new entry to be stored in the Command Motion Library (by assigning a new memorized gesture ("gesture pattern") to a new command (Ex-1015

¶33)), or modify an existing entry of the Library (by replacing the existing memorized gesture assigned to a command with a new memorized gesture (*id.* ¶35)). This process involves the user entering, as input, an identification of the new or existing command to be assigned to the new memorized gesture (i.e., the command “to be performed...upon identifying the gesture that matches the gesture pattern”). Ex-1015 ¶33 (“The user enters a name for the new command into computer 18,” and then performs “[a] new command gesture”). Because Sun’s wrist/finger mouse stores the Command Motion Library into which the new memorized gesture-assigned command entry is stored, a POSITA would have understood that computer 18 would send the user input identifying the new/updated command to motion sensitive circuitry 32 (as controlled by MCU 35 (the claimed “one or more processors”)), as part of sending the new/updated Command Motion Library entry associated with the new/updated command to wrist/finger mouse 14. Ex-1002 ¶225. Accordingly, a POSITA would have understood that motion sensitive circuitry 32 (as controlled by MCU 35 (the claimed “one or more processors”)) receives the user input identifying the new/updated command. Ex-1002 ¶225.

Sun teaches that a variety of commands may be mapped to memorized gestures including commands to be performed entirely by wrist/finger mouse 14 (e.g., a command to “caus[e] wrist mouse 14 to go into a suspension mode” (Ex-1015 ¶37)), and commands to be executed on external computer 18 (e.g., *id.* ¶19).

A POSITA would have understood that, for the commands that are to be executed on external computer 18, each command is performed “at least in part by” wrist/finger mouse 14, because the mouse’s transmission of command signal 16 to computer 18—instructing computer 18 to execute the command—is required for the command to be executed by computer 18—i.e., without wrist/finger mouse 14’s transmission of command signal 16, the user’s input gesture does not result in computer 18 executing the associated command. Ex-1002 ¶225.

2. Element 4[b]: wherein generating the message is based at least in part on receiving the user input.

Sun teaches Element 4[b]. Ex-1002 ¶¶227-229.

As explained for Elements 3[a] and 4[a], during Sun’s training mode, a user may create a new entry in Sun’s Command Motion Library by assigning a new memorized gesture (“gesture pattern”) to a new command that is to be executed in response to wrist/finger mouse 14 identifying an input gesture matching that new memorized gesture. Ex-1015 ¶33. As explained for Element 4[a], wrist/finger mouse 14 (as controlled by MCU 35 (the claimed “one or more processors”)) “receiv[es] the user input” that identifies the new command as part of receiving the new Command Motion Library entry associated with the new command from computer 18.

In response to receiving the new Command Motion Library entry that maps the new memorized gesture to the new command, and subsequently identifying an input gesture that matches the new memorized gesture, wrist/finger mouse 14 is configured to generate the claimed “message” in the manner described for Element 1[c][iv]. Ex-1002 ¶229.

d. Claim 5:

- 1. Element 5[a]: 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,**

Sun teaches Element 5[a]. Ex-1002 ¶230. As explained for Element 3[c], Sun teaches generating a “composite new command gesture” (the claimed “gesture pattern”) based on gesture data (“the additional acceleration data”) obtained through the user’s repeated performance of the new gesture (“multiple instances of a training gesture performed by the user”). Ex-1015 ¶33.

2. **Element 5[b]: 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.**

Sun renders obvious Element 5[b]. Ex-1002 ¶¶231-236.

A POSITA would have understood that, for stored gesture patterns involving movement in a specific direction (*see, e.g.*, Ex-1015 ¶30 (“longitudinal movements parallel to or along x-axis”), matching a detected gesture to a stored gesture pattern would involve the use of error tolerances, to avoid frustrating the user by failing to recognize his/her intended gestures. For instance, as Samsung’s expert explains, for a gesture corresponding to a movement along a specific direction, without the use of error tolerances, a movement deviating by a fraction of a degree from the specified direction would not be found to match the stored gesture pattern. Ex-1002 ¶¶232-233. A POSITA also would have recognized that, the data obtained through a user’s repeated performance of a new gesture, and used to generate a “composite new command gesture” (Ex-1015 ¶¶33-34), could be used to generate error tolerances tailored to that specific user’s performance of the new gesture. Ex-1002 ¶¶234-236. And use of user-specific error tolerances would likely improve the user’s experience using the wrist/finger mouse, by characterizing that user’s performance of his/her

user-specific gestures (e.g., using large error tolerances when the user's performance of the gesture varies significantly from performance-to-performance, and small error tolerances when the user largely performs the gesture the same way over time) helping to ensure that the error tolerances are large enough to help ensure that the user's intended gestures are registered, but small enough to avoid false positives. Ex-1002 ¶236.

e. Claim 6:

- 1. Element 6[a]: The wearable electronic device of claim 1, wherein the plurality of gesture patterns correspond to a plurality of gesture commands,**

Sun teaches Element 6[a]. Ex-1002 ¶237. As explained for Elements 1[c][iii]-[iv], Sun's library stores mappings between a plurality of gesture patterns and associated commands for controlling an external computer. Ex-1015 ¶44.

- 2. Element 6[b][i]: 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 included within the plurality of gesture commands,**

Sun teaches Element 6[b][i]. Ex-1002 ¶¶238-240. Sun's motion sensitive circuitry 32 (as controlled by MCU 35 (the claimed "one or more processors")) is configured to identify a command that corresponds to the identified gesture

performed by the user, by determining that the user's gesture matches a memorized gesture pattern stored in Sun's library.

As Sun explains, circuitry 32 includes "comparator logic 37, for comparing input sequences of data indicating gestures or component motions of gestures that include a sequence of component motions, with stored sequences of data specifying the unique signatures for memorized gestures for component motions" (Ex-1015 ¶43), where those memorized gestures are stored in Sun's library and mapped to specific command signals 16 (Ex-1015 ¶44). As illustrated in the excerpted table below, each of the gestures stored in Sun's library maps to a command:

GESTURE NUMBER	COMMAND GESTURE NAME	MAPS TO PRESENTATION COMMAND	MOTION DETECTION PROCESS
1.	Left and back movement	Left click	Motion to the left and back exceeding one or both of a threshold velocity or a threshold acceleration
2.	Right and back movement	Right-click	Motion to the right and back exceeding one or both of a threshold velocity or a threshold acceleration
3.	Left and back movement, then right and forward movement, then left and back movement	Double click	Motion along each leg exceeding one or both of a first threshold velocity or a first threshold acceleration and below one or both of a second threshold velocity or a second threshold acceleration
4.	Back movement, then right and forward movement, then forward movement	Begin drawing with cursor	Motion along each leg exceeding one or both of a first threshold velocity or a first threshold acceleration and below one or both of a second threshold velocity or a second threshold acceleration

Commands Mapped to the Memorized Gestures

Memorized Gestures (Stored Gesture Patterns)

In response to determining that the user's gesture matches a memorized gesture pattern, circuitry 32 (as controlled by MCU 35 (the claimed "one or more processors")) generates a "command signal" corresponding to the command that is mapped to the memorized gesture in Sun's library. Ex-1015 ¶¶44, 19 ("movement of wrist mouse 14 through a particular motion corresponding to a particular command, such as 'left click,'...causes motion sensitive circuitry 32 to create a 'left click' input signal 28 to signal generator 30...[which] causes signal generator 30 [to] create a 'left click' command signal 16 for transmission to the signal receiver of computer 18").

3. Element 6[b][ii]: wherein the message generated by the one or more processors is configured to perform at least a portion of the gesture command.

As explained in Section XII.E, Claim 6 is indefinite because its recitation of a "message...configured to perform...the gesture command" is non-sensical. However, to the extent this phrase is understood to mean that the message *identifies* the gesture command, and/or transmission of the message *results in the performance of* the gesture command, Sun teaches Element 6[b][ii]. Ex-1002 ¶¶241-242.

As explained for Element 1[c][iv], input signal 28 corresponds to the claimed message. Signal 28 causes signal generator 30 to "transmit[] a command signal 16

to the signal receiver of computer 18” (Ex-1015 ¶44), where signal 16 instructs computer 18 to perform the command assigned to the gesture that was used to generate signal 16 (*id.* ¶¶19, 41-42). A POSITA would have understood that signal 28 thus identifies the command (otherwise the external computer would not know what command to perform in response to receiving signal 16), and results in computer 18’s performance of the command. Ex-1002 ¶242.

f. Claim 7:

- 1. Element 7[a]: The wearable electronic device of claim 1, wherein the message instructs the communication component to transmit the signal to the external device,**

Sun teaches Element 7[a]. Ex-1002 ¶243. As explained for Element 1[c][iv], input signal 28 corresponds to the claimed “message,” and command signal 16 corresponds to the claimed “signal.” In response to receiving signal 28, signal generator 30 (“the communication component”) “transmits [] command signal 16 to the signal receiver of computer 18.” Ex-1015 ¶44. Thus, input signal 28 instructs signal generator 30 to transmit signal 16 to the external computer. Ex-1002 ¶243.

- 2. Element 7[b]: wherein the signal instructs the external device to selectively modify one or more parameters of the external device.**

Sun teaches Element 7[b]. Ex-1002 ¶¶244-246.

Signal 16 is used to control external computer 18 (Ex-1015 ¶17), by instructing the computer to perform the command assigned to the gesture that was

used to generate signal 16 (*id.* ¶¶19, 41-42). Sun provides several examples in which the command associated with signal 16 is used to selectively modify one or more parameters of external computer 18. For example, signal 16 may be used to selectively modify one or more display parameters (the claimed “one or more parameters of the external device”), by causing an image on the display of the computer to zoom in or out. Ex-1015 ¶42. As another example, Sun’s wrist/finger mouse may be used for “temperature control for heating or cooling systems.” Ex-1015 ¶46. In such situations, signal 16 would instruct the heating/cooling system to selectively modify the temperature setting stored by the system (the claimed “one or more parameters of the external device”). Ex-1002 ¶246.

- g. Claim 11: The wearable electronic device of claim 1, wherein the one or more processor 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.**

Sun teaches Claim 11. Ex-1002 ¶¶247-248.

Sun’s wrist/finger mouse and external computer 18 may be configured such that a sequence of tap gestures “can be used to enter a password to, for example, allow access to computer 18.” Ex-1015 ¶38. Here, the wrist/finger mouse (as controlled by MCU 35 (the claimed “one or more processors”)) would generate input signal 28 (“the message”) and command signal 16 (instructing computer 18 to allow

access to the user), in response to determining that the sequence of tap gestures performed by the user matches a predefined sequence stored in the library (i.e., “authenticating the identity of the user” based on the gesture password entered by the user). Ex-1015 ¶44; Ex-1002 ¶248.

h. Claim 13:

- 1. Element 13[a]: The wearable electronic device of claim 1, wherein the external device comprises an access node,**

Sun teaches Element 13[a]. Ex-1002 ¶¶249-250.

Sun’s computer 18 is an access node, because it is configured to provide a user with access to the internet (Ex-1015 ¶22 (use of “e-mail”)). Ex-1002 ¶250.

- 2. Element 13[b]: 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.**

Sun teaches Element 13[b]. Ex-1002 ¶¶251-253.

As explained for Element 1[c][iv], command signal 16 (“the signal”) is generated in response to determining that the user’s gesture matches a stored gesture pattern. Signal 16 instructs computer 18 to perform the command assigned to the gesture that was used to generate signal 16 (*id.* ¶¶19, 41-42). Thus, signal 16 “comprises an indication of the gesture” through the stored correspondence between the gesture and the command (*id.* ¶44). Ex-1002 ¶252.

Sun also describes situations in which signal 16 identifies the gesture performed by the user. Ex-1002 ¶253. For instance, Sun explains that “[t]he tap function can [] be used to input a code, which had been programmed into computer 18, using a particular sequence of taps,” as well as “a password.” Ex-1015 ¶38. In such situations, a POSITA would have understood that signal 16 would identify the gesture-based code or password performed by the user, and corresponding to the code/password programming into the computer. Ex-1002 ¶253.

- i. **Claim 14: 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.**

Sun teaches Claim 14. Ex-1002 ¶254. Sun explains that the disclosed wrist/finger mouse may be used to control a variety of external devices, including “*digital home devices*,...[and] devices that operate light switches, *automatic door openers*, telephone answering machines, etc.” Ex-1015 ¶¶48, 46 (similar).

- j. **Claim 15: 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.**

Sun teaches Claim 15. Ex-1002 ¶255. Sun’s wrist/finger mouse is configured to detect a variety of gestures, including “tap” gestures. Ex-1015 ¶¶8 (“tapping...comprises tapping the chosen hand of the user on a surface [or]...tapping the body of the gesture device”), 42 (mapping “tap” gestures to commands).

- k. Claim 16: 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.**

Sun teaches Claim 16. Ex-1002 ¶256. As explained for Element 1[b], Sun’s motion sensor 24 corresponds to the claimed electronic part. Sun explains that this motion sensor may comprise “a MEMS sensor” (Ex-1015, Abstract), which may include “accelerometers” and “gyroscopes” (*id.* ¶24) including “capacitive or piezoelectric vibrating gyroscopes” (*id.* ¶25). *See also* Ex-1015, Cls. 3, 5-6 (MEMS accelerometer and gyroscope).

- l. Claim 18: The wearable electronic device of claim 1, wherein the wearable electronic device comprises a finger-worn wearable device.**

Sun teaches Claim 18. Ex-1002 ¶257. Sun explains that wrist/finger mouse 14 may be a finger-worn device: “Wrist/finger mouse 14 could also be configured for mounting to different parts of a user’s hand, typically a *finger*.” Ex-1015 ¶17.

3. Independent Claim 19

- a. Element 19[pre]: A system for performing gesture recognition, comprising:**

Sun teaches the preamble of Claim 19, to the extent it is limiting. Ex-1002 ¶¶258-260.

Sun discloses a system that includes wearable wrist/finger mouse 14 and external computer 18, as illustrated in annotated Figure 1, below:

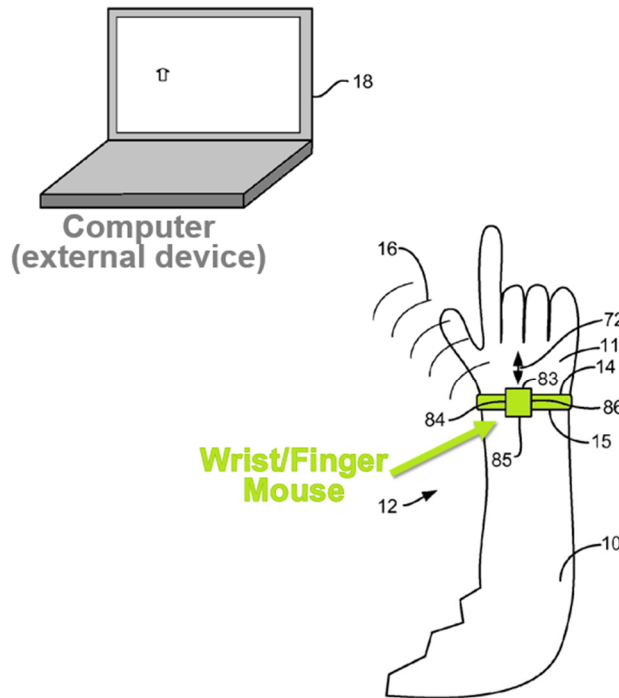


Fig. 1

As will be discussed for subsequent elements of Claim 19, Sun's wearable wrist/finger mouse is configured to identify gestures performed by a user wearing the device, map those identified gestures to commands, and transmit signals corresponding to those commands to control an external device. Ex-1002 ¶260. Sun's system is thus configured for performing gesture recognition. *Id.*

**b. Element 19[a]: a wearable electronic device
configured to measure acceleration data from a user;**

Sun teaches Element 19[a]. Ex-1002 ¶¶261-262. As explained for Element 1[pre], Sun's wrist/finger mouse 14 is "wearable" because it is "mountable to a user at the user's hand or near the user's wrist," (Ex-1015 ¶5), and it is an "electronic device" because it includes motion sensor 24—in the form of

“microelectromechanical systems (MEMS) sensors”—and electronic “motion sensitive circuitry” (*id.* ¶¶17-18). Ex-1002 ¶261.

As explained for Element 1[b], Sun’s motion sensor 24 includes “accelerometers” (Ex-1015 ¶¶24-25) for measuring “gesture data” (*id.* ¶26) from a user wearing the wrist/finger mouse, and the measured data provides acceleration (*see, e.g., id.* ¶42).

c. Element 19[b]: a user device communicatively coupled to the wearable electronic device; and

Sun teaches Element 19[b]. Ex-1002 ¶¶263-264.

Sun’s external computer 18 is a user device (i.e., it is operated by a user) communicatively coupled to the wearable electronic device. Ex-1002 ¶264. As illustrated in annotated Figure 4C, below, wrist/finger mouse 14 sends command signals 16 to computer 18, causing computer 18 to perform the associated command. Ex-1015 ¶44.

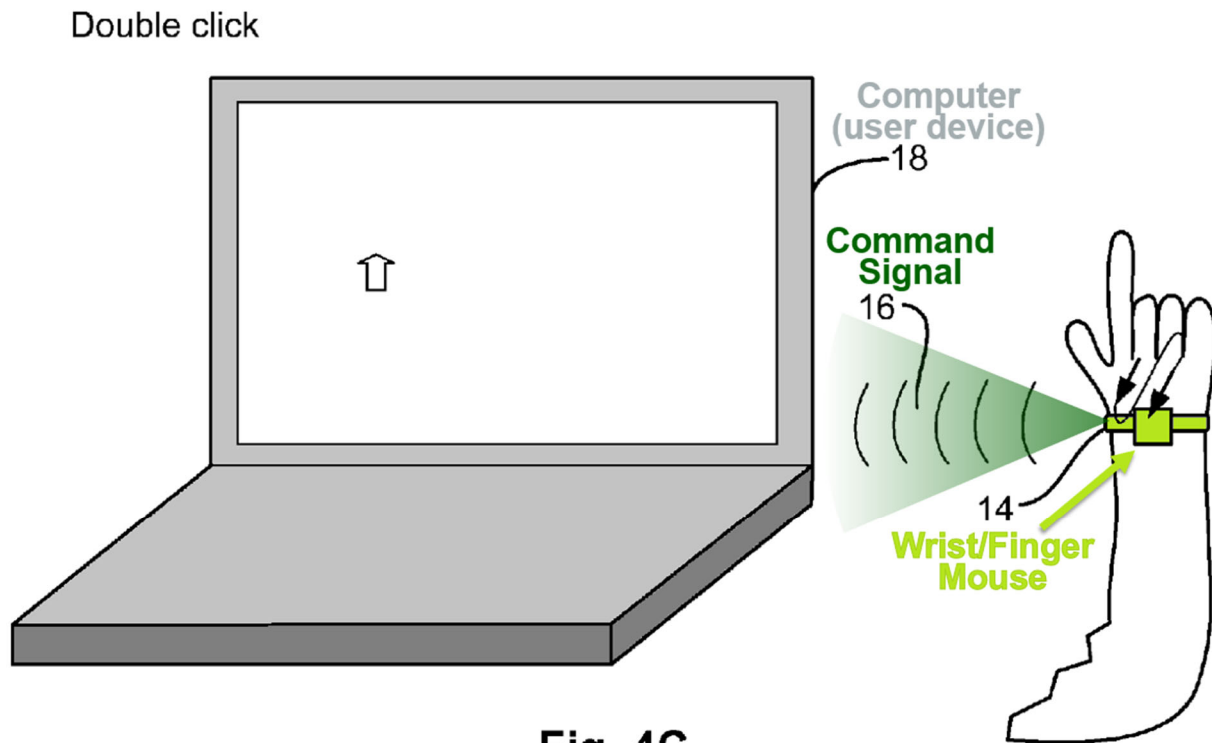
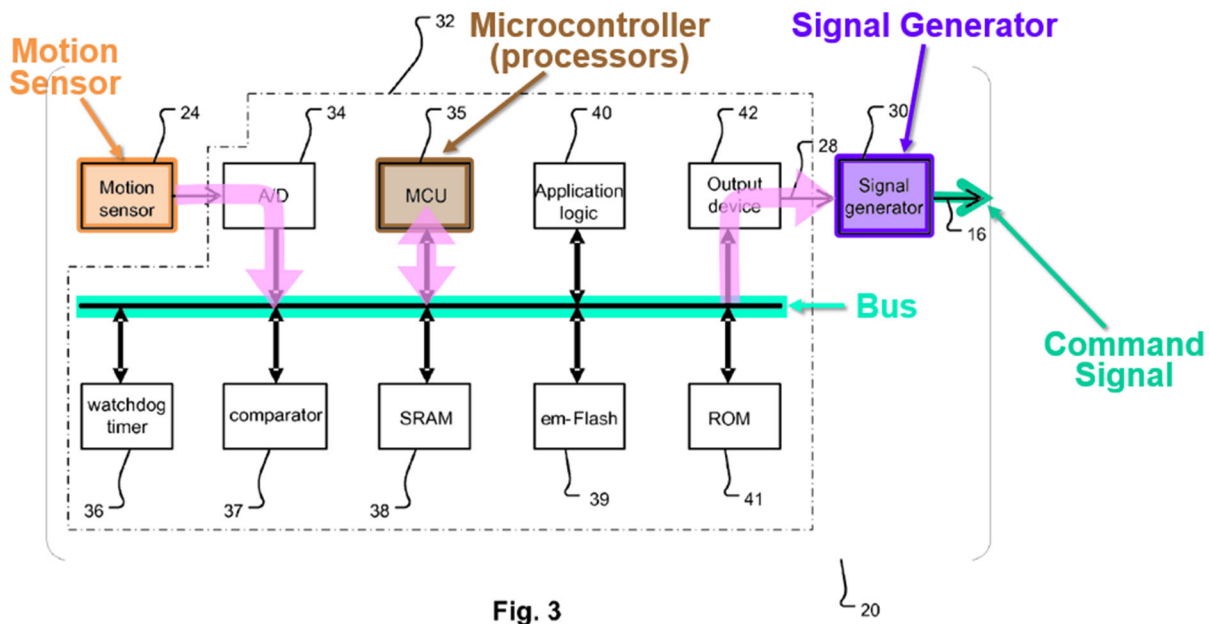


Fig. 4C

- d. **Element 19[c]: one or more processors communicatively coupled with the wearable electronic device and the user device, wherein the one or more processors are configured to:**

Sun teaches Element 19[c]. Ex-1002 ¶¶265-266. As explained for Element 1[c], MCU 35 (Ex-1015 ¶43) within motion sensitive circuitry 32 of Sun's wrist/finger mouse corresponds to "one or more processors." As illustrated in annotated Figure 2 below, MCU 35 is communicatively coupled to motion sensor 24 (through the communication bus of motion sensitive circuitry 32), and to computer 18 (through signal generator 30, which generates command signal 16 for computer 18):



- e. **Element 19[c][i]:** receive the acceleration data measured from the user via the wearable electronic device;

Sun teaches Element 19[c][i] for the reasons explained for Element 1[c][i].

Ex-1002 ¶267.

- f. **Element 19[c][ii]:** identify a gesture performed by the user based at least in part on the acceleration data;

Sun teaches Element 19[c][ii] for the reasons explained for Element 1[c][ii].

Ex-1002 ¶268.

- g. **Element 19[c][iii]:** determine that the gesture matches a gesture pattern from a plurality of gesture patterns; and

Sun teaches Element 19[c][iii] for the reasons explained for Element 1[c][iii].

Ex-1002 ¶269.

- h. Element 19[c][iv]: 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.**

Sun teaches Element 19[c][iv]. Ex-1002 ¶¶270-271.

As explained for Element 1[c][iv], Sun teaches that circuitry 32 (as controlled by MCU 35 (the claimed “one or more processors”)) generates a message in the form of “input signal 28” in response to identifying a match between a detected gesture and a memorized gesture stored in Sun’s library. Input signal 28 causes signal generator 30 to “transmit[] a command signal 16 to the signal receiver of computer 18” (“the user device”) (Ex-1015 ¶44), where signal 16 instructs computer 18 to perform the command mapped to the matching stored gesture (*id.* ¶¶19, 41-42). Sun explains that signal 16 may be used to instruct computer 18 to “open a new e-mail.” Ex-1015 ¶22. A POSITA would have understood that opening a new email would involve computer 18 (“user device”) communicating with the email server on which the new email is stored (“external device”). Ex-1002 ¶271. Thus, Sun teaches that signal 16 (the claimed “message”) is configured to cause a communication component of computer 18 (“user device”) to transmit a signal to the email server (“external device”). *Id.*

4. Dependent Claim 20:

- a. Claim 20: 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.**

Sun teaches Claim 20. Ex-1002 ¶272. As explained for Element 19[c], Sun discloses MCU 35 (“one or more processors”) positioned within wrist/finger mouse 14.

B. Ground 2: Claims 4 and 17 Are Obvious Over Sun In View Of Kruse

- 1. A POSITA would have been motivated to combine Sun and Kruse and would have had a reasonable expectation of success**

A POSITA would have been motivated to combine Sun’s and Kruse’s teachings and would have had a reasonable expectation of success because each relates to the same well-known technologies. Ex-1002 ¶273. Sun and Kruse are both directed to wearable devices for recognizing a user’s gestures and generating input commands for use in controlling external devices, based on the recognized gestures. Ex-1015 ¶44; Ex-1017, 7:63-8:11. Both devices may be worn on a user’s finger, and include similar components, such as motion sensors, transmitters, and processors. Ex-1015 ¶17 (“configured for mounting to...a finger”), ¶¶24-25 (motion sensor), ¶44 (“[s]ignal generator” for “transmit[ting] a command signal 16 to the signal receiver of computer 18”), ¶43 (“microcontroller unit MCU”); Ex-1017, 3:1

(“wearable haptic ring”), 3:34-36 (motion sensor), 2:63-64 (transmitter), 8:4-6 (processor).

Kruse teaches providing haptic feedback to a user, through the wearable ring, in order to confirm the user’s input gestures. Ex-1017, 4:14-18. In particular, Kruse’s haptic ring stores a library of “haptic effects,” where each input command that may be generated by the ring in response to detecting a user’s gesture is assigned “a unique confirmation haptic effect.” Ex-1017, 8:16-18. In response to identifying a user’s gesture and determining that it corresponds to a particular input command, haptic output device 328 within Kruse’s haptic ring “generates haptic feedback in accordance with the haptic data” assigned to the particular input command. Ex-1017, 8:20-22. Thus, Kruse’s haptic ring is able to inform the user that his/her gesture has been registered as corresponding to a specific input command, by providing the user with the haptic feedback effect that is mapped to that specific input command. Ex-1002 ¶274.

A POSITA would have been motivated to implement Kruse’s haptic feedback selector 324 and “haptic output device 328” (Ex-1017, 8:12-22) within Sun’s wrist/finger mouse, to improve the wrist/finger mouse by allowing it to provide haptic feedback to the user, thereby confirming to the user that his/her input gestures have been recognized as corresponding to specific commands. Ex-1002 ¶275. Such a POSITA would have recognized that providing such feedback information to the

user would improve the user's experience when using wrist/finger mouse 14. *Id.* For instance, in response to the user performing a gesture intended to control computer 18, if the computer does not respond, the user may be unable to determine whether he/she performed the gesture correctly or failed to perform the gesture correctly (such that a command signal was not sent to the computer), or he/she performed the correct gesture but some other issue arose (e.g., the command signal was sent to, but not received by the computer), potentially leading to user confusion and frustration. *Id.* By providing the user with haptic feedback in order to confirm to the user that he/she performed the gesture correctly, as taught by Kruse, the user's experience may thus be improved. *Id.*

As another example, Sun explains that wrist/finger mouse 14 may include "an on-off switch," which "helps to prevent unintended generation of command signal 16 by simply moving wrist mouse 14." Ex-1015 ¶20. A POSITA would have understood that, when actively engaged in using the mouse to control computer 18, repeatedly turning the mouse on/off to avoid sending unintended command signals to computer 18 is impractical, and would have searched for ways to mitigate the effects of transmitting unintended commands to the computer. Ex-1002 ¶276. A POSITA would have recognized that, by providing haptic feedback to the user to confirm the input commands generated by the user's gestures, Sun's wrist/finger mouse, as modified by Kruse, would immediately notify the user when a command

signal was unintentionally sent to computer 18, enabling the user to quickly remediate any potential issues associated with the computer's execution of the command. *Id.*

As a further example, Sun teaches that a user may use a sequence of gestures as a password to allow access to computer 18. Ex-1015 ¶38. By providing the user with unique haptic feedback for each distinct gesture performed by the user in the process of entering the password, Sun's wrist/finger mouse, as modified by Kruse, enables the user to confirm that he/she has correctly performed each gesture of the sequence. Ex-1002 ¶277. A POSITA would have understood that doing so would improve the user's experience, by enabling the user to abort entry of the password as soon as the user provided an incorrect gesture (as opposed to the user continuing to perform the remaining gestures of the (now) incorrect password), thereby saving the user time. *Id.*

A POSITA would have had a reasonable expectation of success in combining Sun and Kruse. Ex-1002 ¶278. A POSITA would have recognized that configuring Sun's wrist/finger mouse 14 to provide haptic feedback, as taught by Kruse, would correspond to a straightforward addition of Kruse's "haptic output device 328" and haptic feedback selector 324 (Ex-1017, 8:12-22) to Sun's wrist/finger mouse, as illustrated in the below modified Figure. 3'. Ex-1002 ¶278.

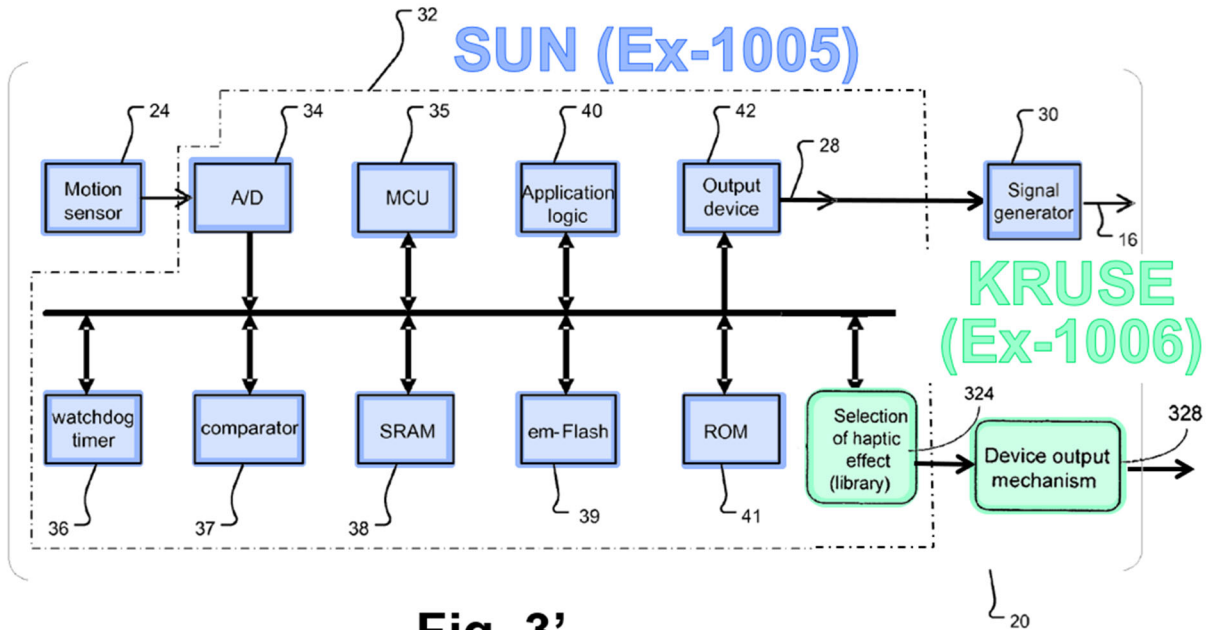


Fig. 3'

2. Dependent Claim 4:

- a. **Element 4[a]:** The wearable electronic device of claim 3, wherein the one or more processors are further configured to: receive a user input comprises 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,

Sun-Kruse teaches Element 4[a]. Ex-1002 ¶¶279-282.

As explained in Section XII.A.2.c.1 (Ground 1, Element 4[a]), Sun teaches wrist/finger mouse 14 (as controlled by MCU 35 (the claimed “one or more processors”)) “receiv[ing] a user input [that] compris[es] a gesture command that is to be performed...upon identifying the gesture that matches the gesture pattern,” where the gesture command corresponds to a command to be executed by computer 18. As explained in Section XII.B.1 (motivation to combine Sun-Kruse), a POSITA

would have been motivated to modify Sun's wrist/finger mouse to enable it to provide haptic feedback to the user, to confirm the input command to which the user's input gesture was mapped. As Kruse explains, Kruse's haptic ring stores a library of "haptic effects," where each input command that may be generated by the ring in response to detecting a user's gesture is assigned "a unique confirmation haptic effect." Ex-1017, 8:16-18. A POSITA would have understood that, when training the combined Sun-Kruse device to generate a new input command, in response to recognizing a new gesture performed by the user, in addition to receiving user input specifying the new input command to be assigned to the new gesture, the device would also receive user input specifying a haptic effect to be assigned to the new gesture, so that "a unique confirmation haptic effect" can be assigned (Ex-1017, 8:12-22). Ex-1002 ¶¶280-281.

Thus, the combined Sun-Kruse device is configured to receive user input identifying both the new input command and the new haptic effect (collectively, "a gesture command"), where the new haptic effect is to be performed by the wearable device in response to determining that a user's gesture matches the new gesture ("gesture pattern") (Ex-1017, 8:12-22). Ex-1002 ¶282. Thus, the claimed "gesture command" (both the new input command and the new haptic effect) is to be performed at least in part by the wearable electronic device, because the wearable device performs the haptic feedback effect. *Id.*

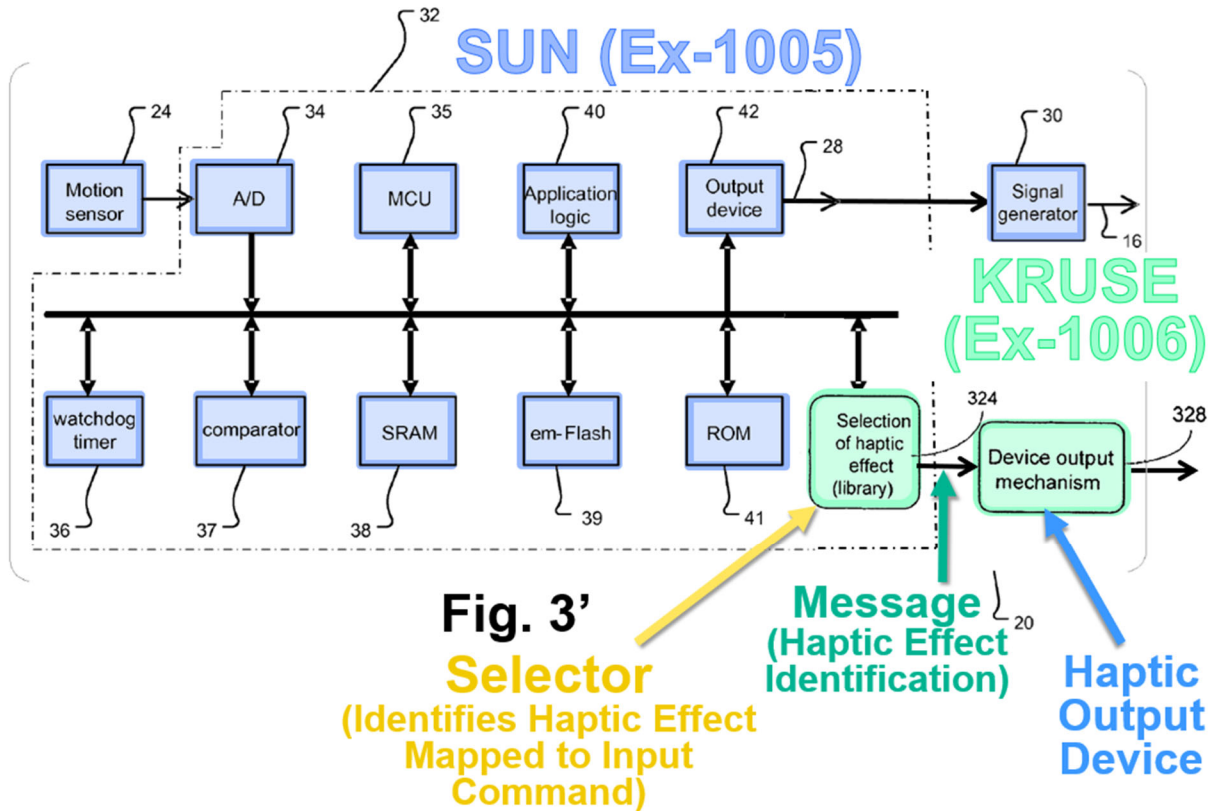
b. Element 4[b]: wherein generating the message is based at least in part on receiving the user input.

Sun-Kruse teaches Element 4[b], for the reasons explained in Section XII.A.2.c.2 (Ground 1, Element 4[b]). Ex-1002 ¶283.

3. Dependent Claim 17: The wearable electronic device of claim 1, wherein the feedback comprises visual feedback, audio feedback, haptic feedback, or any combination thereof.

Sun-Kruse teaches Claim 17. Ex-1002 ¶¶284-286. As explained in Section XII.B.1 (motivation to combine Sun and Kruse), Sun’s wrist/finger device, modified by Kruse, is configured to provide haptic feedback to the user.

As illustrated in the annotated Figure below, in response to the modified wrist/finger device identifying an input command assigned to the user’s input gesture, selector 324 sends a message to “[h]aptic output device 328” with “haptic data” corresponding to the assigned haptic effect. Ex-1017, 8:20-21. Haptic output device 328 then “generates haptic feedback in accordance with th[at] haptic data from selector 324.” *Id.* For example, haptic output device 328 may generate “a vibration effect” to confirm a mouse click command. Ex-1017, 8:21-22.



Thus the message sent from selector 324 to haptic output device 328 corresponds to “a message configured to cause a feedback component of the device to provide feedback to the user,” wherein the feedback is haptic feedback, because it causes haptic output device 328 (“a feedback component”) to generate haptic feedback that is provided to the user through wearable device 102/302. Ex-1002 ¶286.

C. Ground 3: Claims 1, 6-7, and 13-20 Are Obvious Over Kruse

1. Independent Claim 1

- a. Element 1[pre]: A wearable electronic device, comprising:**

Kruse teaches the preamble of Claim 1, to the extent it is limiting. Ex-1002 ¶¶287-289. Kruse's wearable remote input device 102—an embodiment of which is illustrated in annotated Figure 1A, below—corresponds to a “wearable electronic device”:

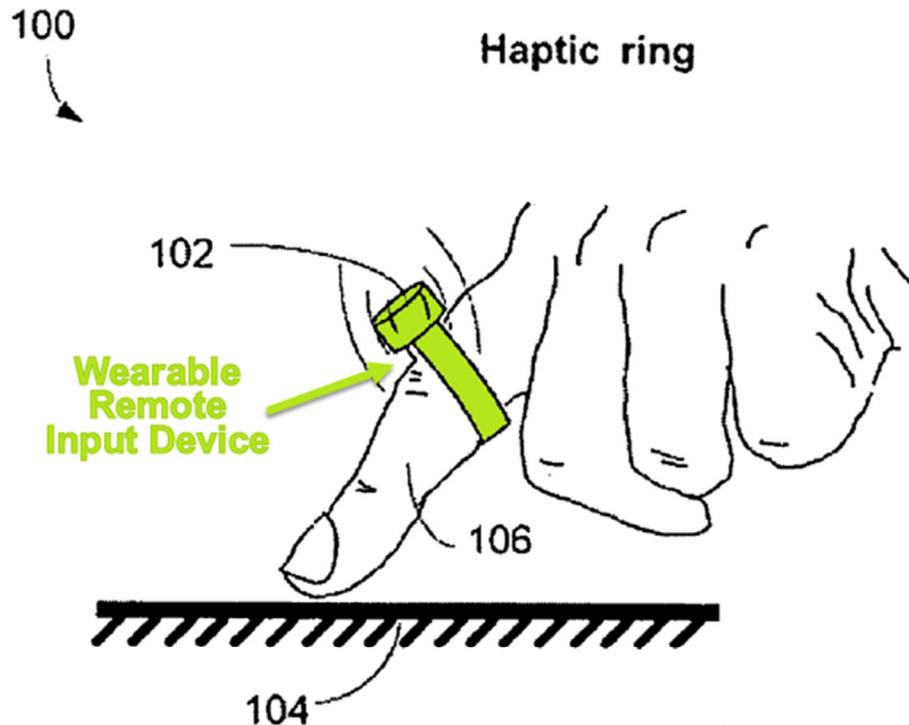


FIG 1A

Device 102 is wearable because it can “be attached to a finger or a hand or any parts of a body.” Ex-1017, Abstract. When in the form of “[w]earable haptic ring 102,” as illustrated above, it “is designed and structured in a ring shape that can be worn and/or fit on a finger.” Ex-1017, 3:8-11.

Device 102 is an “*electronic* interface device[.]” Ex-1017, 1:6-7. For instance, device 102 may include a piezoelectric sensor/actuator (Ex-1017, 3:48-4:2), a wireless transmitter (*id.*, Cl. 1), and internal processing components (*id.*, 9:27-34), all of which a POSITA would have understood to be electronic components. Ex-1002 ¶289.

b. Element 1[a]: a housing comprising an inner surface and an outer surface;

Kruse teaches Element 1[a]. Ex-1002 ¶¶290-293.

Device 102 includes various components, including “a sensor, a filter, an input identifier, and a transmitter.” Ex-1017, 2:52-55. A POSITA would have understood that such components would be housed within a housing of device 102. Ex-1002 ¶291. For instance, such a housing is annotated in Figure 1A, below, for the haptic ring embodiment of device 102:

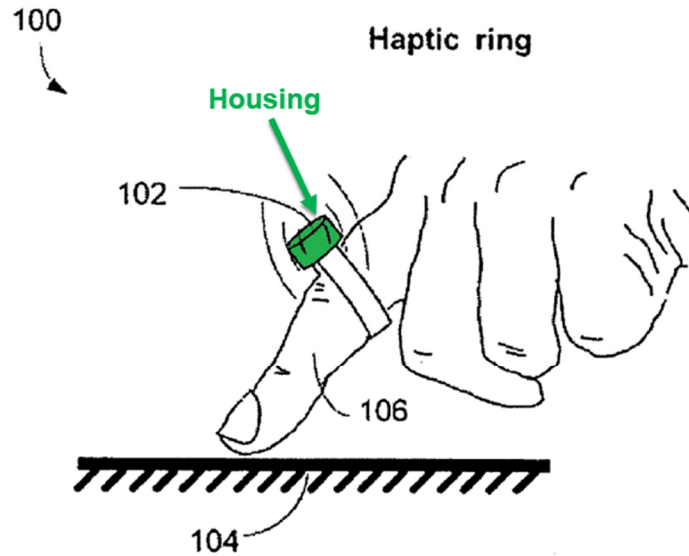
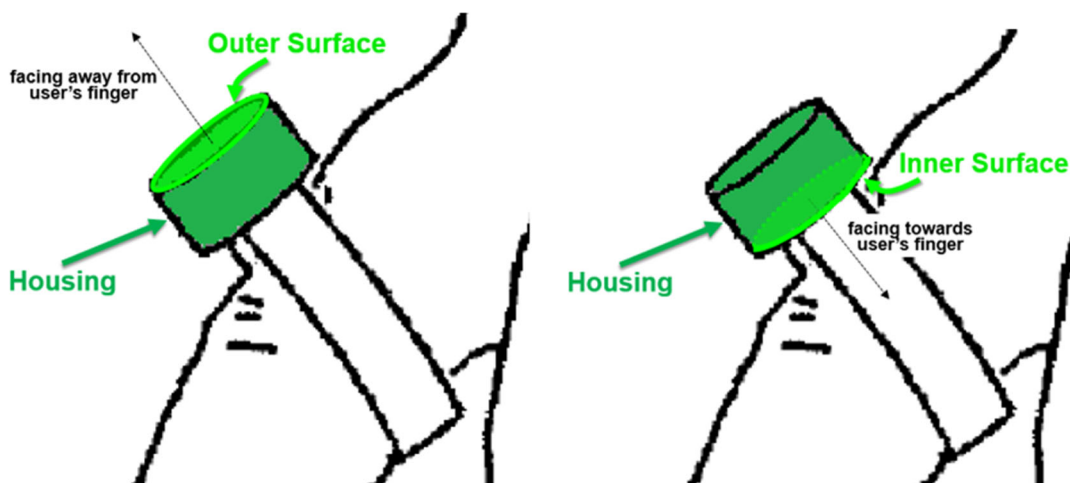


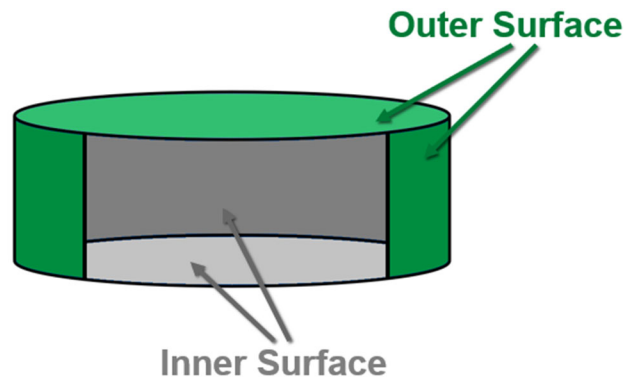
FIG 1A

As illustrated below, when worn on a finger, the housing of Kruse's haptic ring includes an outer surface (i.e., a surface that faces outward, away from the finger), and an inner surface (i.e., a surface that faces inward, towards the finger).



This is consistent with the way the terms “inner” and “outer” are used in the ’701 Patent. Ex-1001, 18:1-3 (“inner and outer walls 1612, 1614”), Fig. 14A (depicting inner wall 1612 and outer wall 1614); Ex-1002 ¶292.

Alternatively, a POSITA also would have viewed the surfaces on the outside of haptic ring 102’s housing as corresponding to outer surfaces, and the surfaces inside the housing as corresponding to inner surfaces, as illustrated in the cutaway diagram below. Ex-1002 ¶293. Such a POSITA would have understood that the internal components of the haptic ring would be mounted on the inner surface of the housing. *Id.*

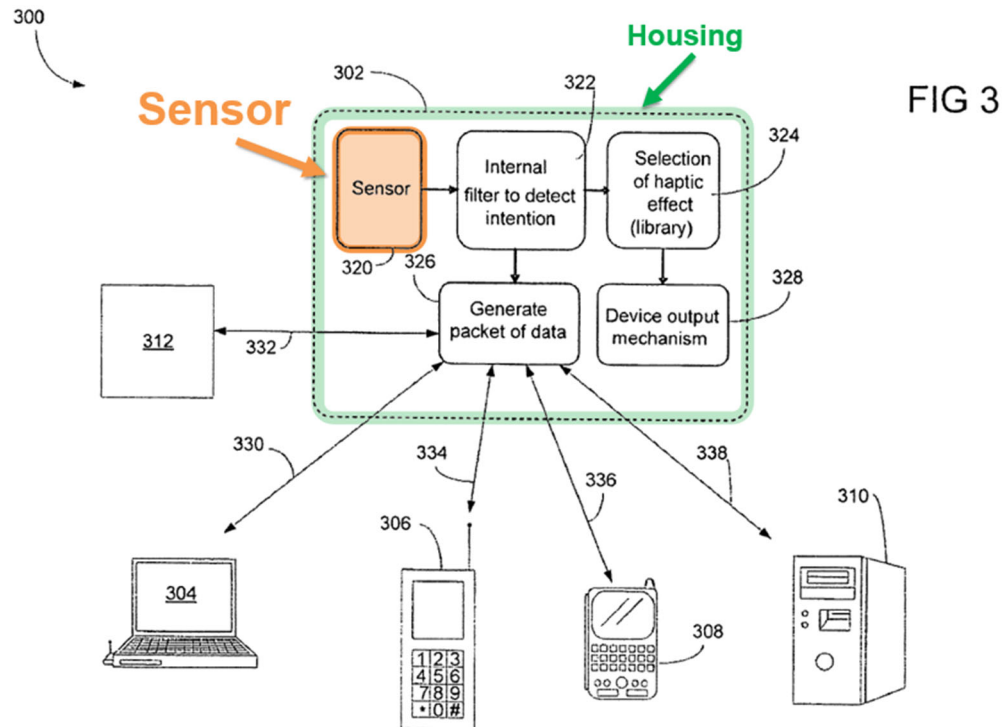


- c. **Element 1[b]: an electronic part disposed within the housing, the electronic part configured to acquire acceleration data from a user associated with the wearable electronic device; and**

Kruse teaches Element 1[b]. Ex-1002 ¶¶294-297.

Kruse’s sensor 320 corresponds to an electronic part disposed within the housing. Ex-1002 ¶295. As explained for Element 1[a], a POSITA would have

understood that the components of Kruse's device 102/302 would be housed within a housing, as illustrated in annotated Figure 3, below.



Sensor 320 may be a piezoelectric sensor (Ex-1017, 3:48-4:2), configured to generate electronic signals based on sensed parameters. Ex-1002 ¶296. Thus, sensor 320 is electronic. *Id.*

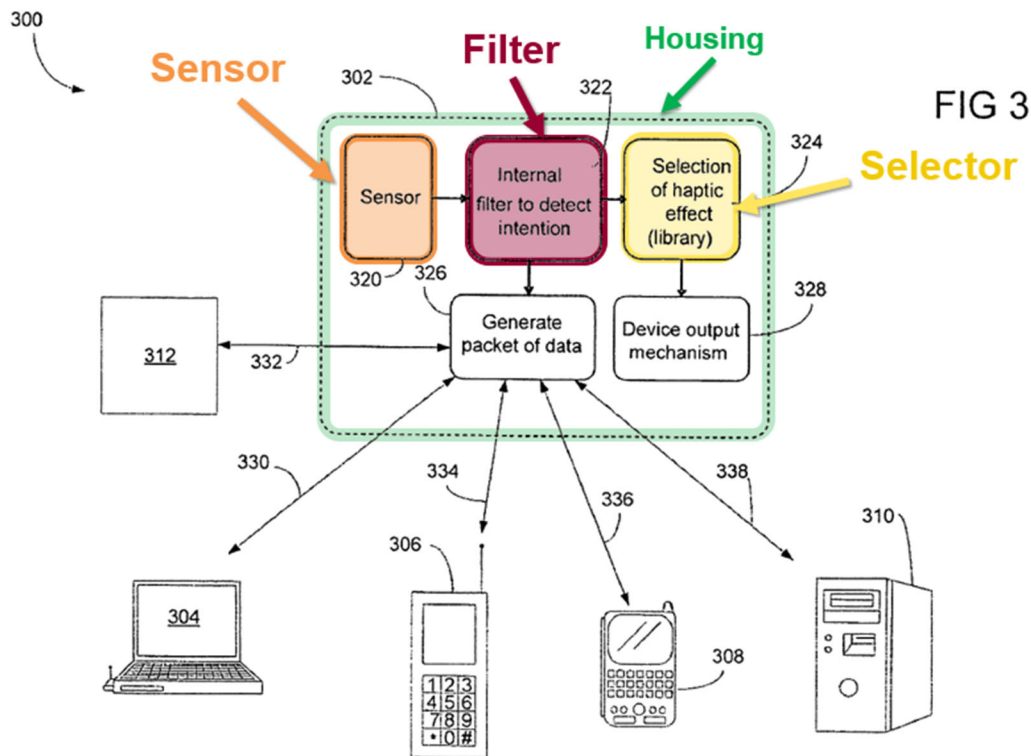
Sensor 320 corresponds to/includes an “acceleration” sensor (Ex-1017, 8:23-27), for “sensing the movement of the finger” to which device 102 is attached (Ex-1017, 1:37-40). *See also id.*, 3:34-36 (“When finger 106 touches or collides with surface 104, wearable haptic ring 102 senses the motion or movement using an *accelerometer* or similar sensor(s).”). A POSITA would have understood that data

associated with a user's finger movements and acquired by an accelerometer corresponds to "acceleration data from [the] user." Ex-1002 ¶297.

**d. Element 1[c]: one or more processors
communicatively coupled to the electronic part,
wherein the one or more processors are configured to:**

Kruse teaches Element 1[c]. Ex-1002 ¶¶298-300.

As illustrated in annotated Figure 3, below, in addition to sensor 320, wearable interface device 302 includes "an internal filter 322" and "a selector 324." Ex-1017, 7:63-65.



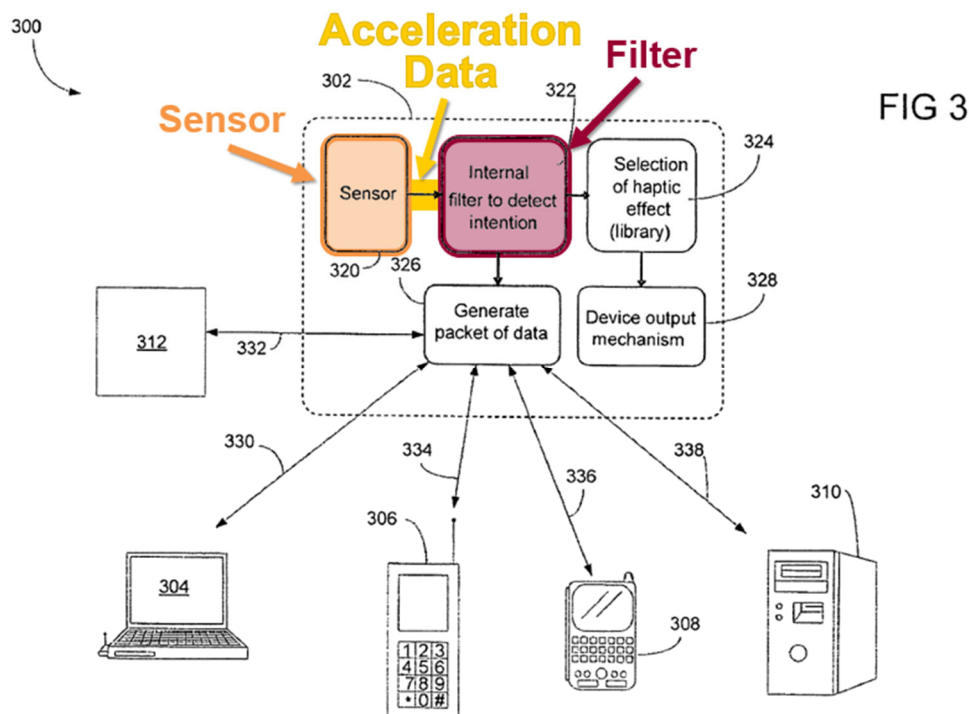
Kruse explains that these components may correspond to "computer executable instructions" (Ex-1017, 9:24-34) implemented by a processor (*id.*, 8:4-6). Thus, a POSITA would have understood that the functions performed by these components

are performed by “one or more processors,” as claimed. Ex-1002 ¶300. As illustrated above, filter 322—i.e., a processor executing instructions for performing the functions of filter 322—is communicatively coupled to sensor 320 (“the electronic part”). Ex-1002 ¶300.

e. Element 1[c][i]: receive the acceleration data from the electronic part;

Kruse teaches Element 1[c][i]. Ex-1002 ¶¶301-302.

As explained for Element 1[b], sensor 320 (“the electronic part”) acquires movement data (“acceleration data”) associated with the movements of a user finger wearing device 102/302. As illustrated in annotated Figure 3, below, filter 322 receives this movement data from sensor 320. *See also* Ex-1017, 8:1-4 (filter 322 is configured for subsequent processing of the movement data acquired by sensor 320).



f. Element 1[c][ii]: identify a gesture performed by the user based at least in part on the acceleration data;

Kruse teaches Element 1[c][ii]. Ex-1002 ¶¶303-304.

Filter 322 is configured to identify a gesture performed by the user based on the movement data (“acceleration data”) received from sensor 320. Specifically, “[f]ilter 322 is used to filter any extraneous movements, which are considered as natural hand movements as oppose[d] to command input movements,” from the data acquired by sensor 320, leaving the command input movements. Ex-1017, 8:1-4. These input movements correspond to “input gestures, such as point/drag and button click.” Ex-1017, 4:38-40; *see also id.*, 7:41-46 (“wearable haptic ring(s)...identify [] gestures”). Thus, filter 322 is configured to identify gestures performed by the user. Ex-1002 ¶304.

g. Element 1[c][iii]: determine that the gesture matches a gesture pattern from a plurality of gesture patterns; and

Kruse teaches Element 1[c][iii]. Ex-1002 ¶¶305-309.

Kruse’s “input identifier,” which is implemented as part of filter 322 (Ex-1017, 2:61-63), is configured to determine that the filtered movement data (“gesture”) matches a gesture pattern from a plurality of gesture patterns. Ex-1002 ¶307.

As Kruse explains, the input identifier of filter 322 uses “the filtered movements” (Ex-1017, 2:61-63) “to identify input commands such as mouse button

clicks, key strokes, and other selections” (*id.*, 4:14-16). This is done “in accordance with the calibration of [the] wearable remote interface device.” Ex-1017, 10:2-7. A POSITA would have understood that calibrating Kruse’s wearable device “to multiple virtual input devices such as a virtual keyboard and a virtual mouse” (Ex-1017, 10:5-7) would involve generating mappings between input movements that may be detected by the device (e.g., a finger tap) and associated input commands (e.g., a mouse click command). *See* Ex-1017, 8:30-32 (“A user worn wearable haptic ring 102, for example, calibrates and emulates a mouse button click by [the user] tapping his or her finger on a surface 104.”); Ex-1002 ¶308. Then, during normal use, in response to identifying an input movement (“gesture”), the input identifier of filter 322 would determine whether such input movement matches any known movement (“gesture pattern”) of all of the known movements that had been mapped to input commands through the initial calibration process (“a plurality of gesture patterns”). Ex-1002, ¶309.

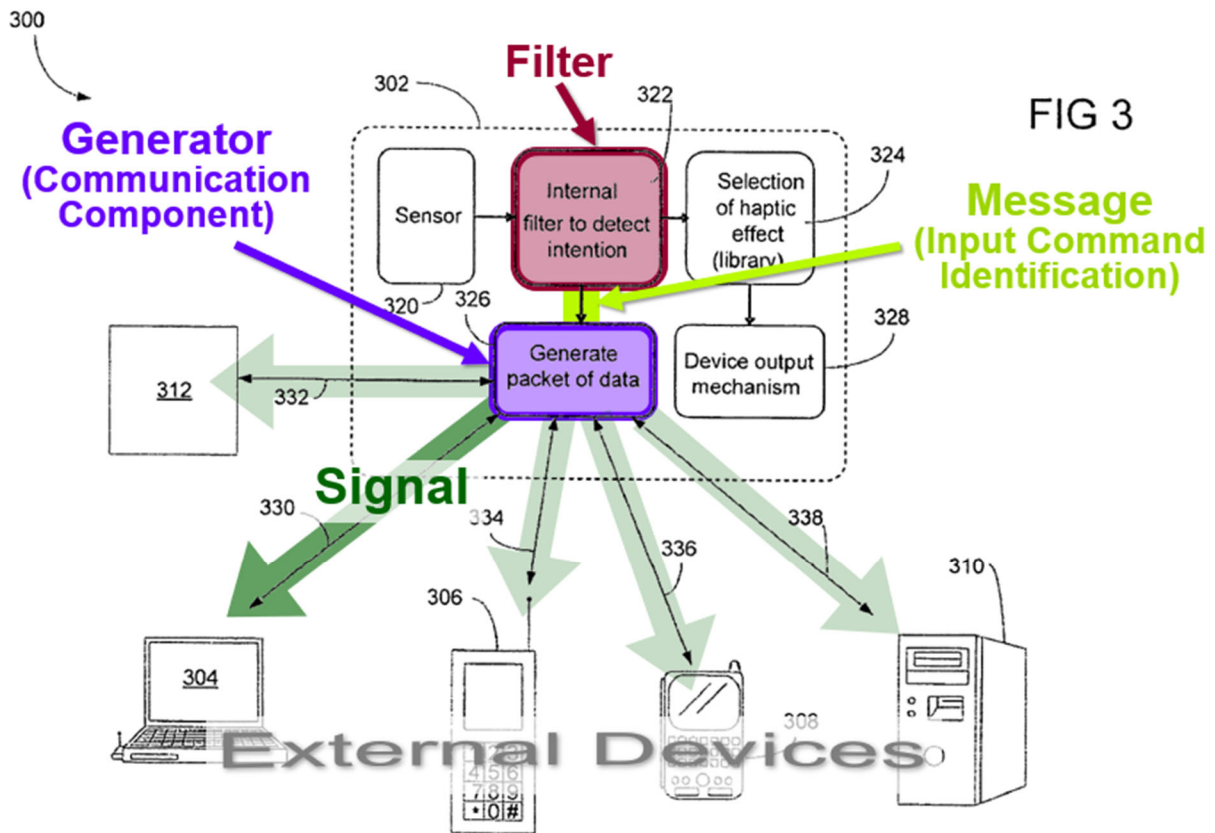
- h. Element 1[c][iv]: generate a message based at least in part on the gesture matching the gesture pattern, wherein the message is configured to cause a feedback component of the wearable electronic device to provide feedback to the user, cause a communication component of the wearable electronic device to transmit a signal to an external device, or both.**

Kruse teaches Element 1[c][iv]. Ex-1002 ¶¶310-317.

As explained for Element 1[c][iii], filter 322 matches a user's input movement ("gesture") to a known movement ("gesture pattern"), which had been mapped to a particular input command during Kruse's calibration process. Based on that mapping, filter 322 is then able to identify that the particular input command mapped to the user's input movement corresponds to the user's intended input command. Ex-1002 ¶311. In response to identifying that mapped input command, Kruse teaches that wearable device 102/302 is configured both to (1) generate a message configured to cause a feedback component of the device to provide feedback to the user, and (2) generate a message configured to cause a communication component of the device to transmit a signal to an external device, as explained below.

1. Transmit a Signal to an External Device

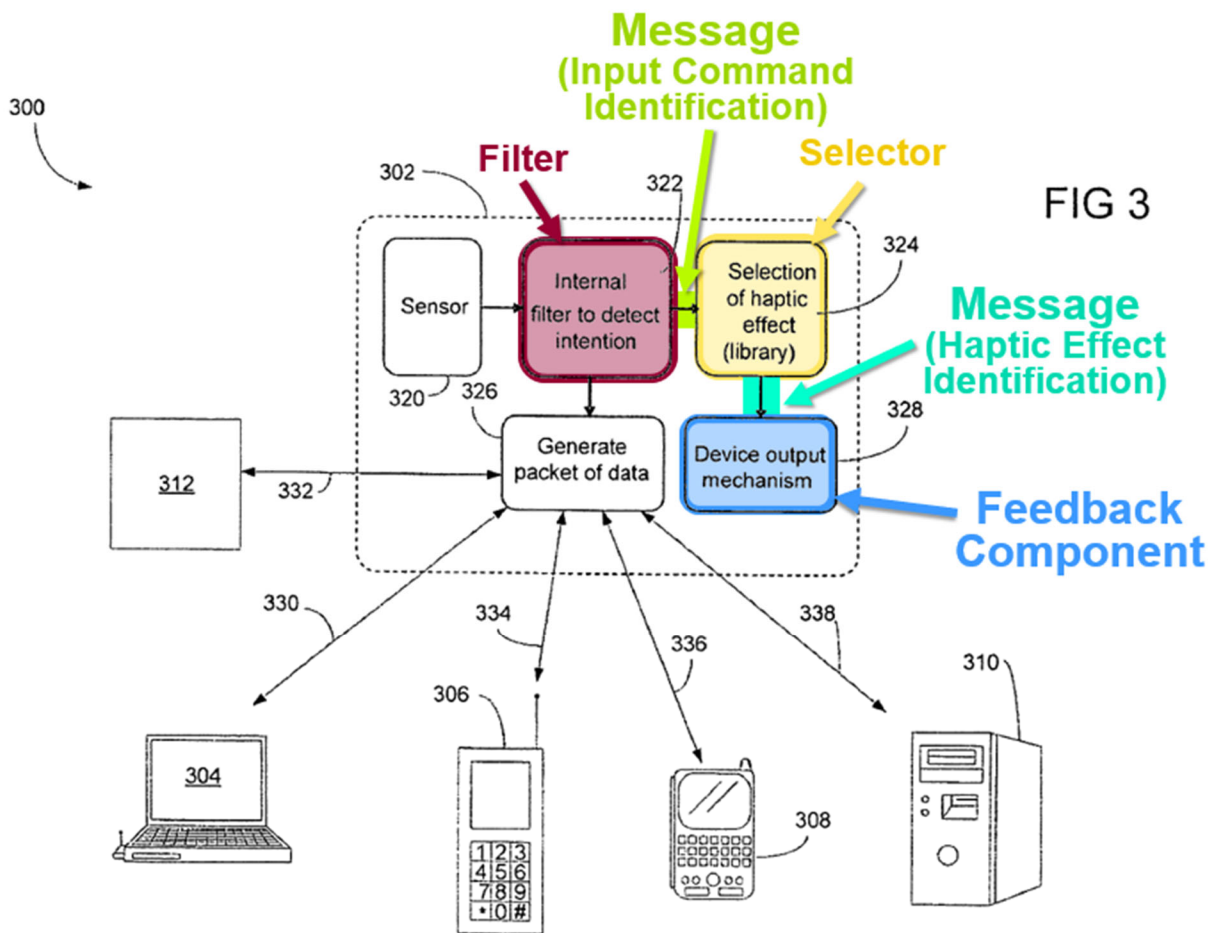
As illustrated in annotated Figure 3, below, in response to identifying the specific input command corresponding to the user's movement of wearable device 102/302, filter 322 is configured to generate and send a message to generator 326, identifying that input command. Ex-1002 ¶312.



In response to receiving the message from filter 322 identifying the input command, generator 326 generates a signal corresponding to that input command, and transmits that input command signal to an external device (e.g., 304) (Ex-1017, 8:6-10) via “a wireless communications network” (e.g., along communication channel 330) (*id.*, 2:63-64). Generator 326 is thus a “communication component” of Kruse’s wearable device, and the message sent from filter 322 to generator 300 corresponds to “a message configured to cause a communication component of the device to transmit a signal to an external device.” Ex-1002 ¶313.

2. Provide Feedback to the User

As illustrated in annotated Figure 3, below, in response to identifying the specific input command corresponding to the user's movement of wearable device 102/302, filter 322 is also configured to send a message to selector 324, identifying that input command. Ex-1002 ¶314.



“Selector 324 includes one or more libraries...containing a list of haptic effects.” Ex-1017, 8:12-13. This list of haptic effects “is used to provide a haptic feedback to a user,” to confirm the user's intended input command. Ex-1017, 8:14-

15. In particular, each input command “may have a unique confirmation haptic effect,” such that, when activated, not only does it indicate to the user that Kruse’s device registered user movement corresponding to an input command, but it also provides the user with an indication of the specific input command that the device identified. Ex-1017, 8:16-18.

In response to receiving the message from filter 322, identifying the input command, selector 324 uses its library to identify the haptic effect assigned to the identified input command. *Id.*; *see also id.*, 4:16-18 (similar). As illustrated in annotated Figure 3, above, in response to identifying the assigned haptic effect, selector 324 sends a message to “[h]aptic output device 328” (“a feedback component”) with “haptic data” corresponding to the assigned haptic effect. Ex-1017, 8:20-21. Haptic output device 328 then “generates haptic feedback in accordance with th[at] haptic data from selector 324.” *Id.* For example, haptic output device 328 may generate “a vibration effect” to confirm a mouse click command. Ex-1017, 8:21-22.

Thus the message sent from selector 324 to haptic output device 328 corresponds to “a message configured to cause a feedback component of the device to provide feedback to the user” because it causes haptic output device 328 (“a feedback component”) to generate feedback that is provided to the user through wearable device 102/302. Ex-1002 ¶317. The message sent from filter 322 to

selector 324 also corresponds to the claimed message, because it indirectly causes haptic output device 328 to generate the feedback for the user, by causing selector 324 to send the message to haptic output device 328. Ex-1002 ¶317.

2. Dependent Claims 6-7, and 13-18

a. Claim 6:

- 1. Element 6[a]: The wearable electronic device of claim 1, wherein the plurality of gesture patterns correspond to a plurality of gesture commands,**

Kruse teaches Element 6[a]. Ex-1002 ¶¶318-319. As explained for Elements 1[c][iii]-1[c][iv], filter 322 of Kruse’s wearable device is configured to match filtered movements to known movements of a set of known movements (“a plurality of gesture patterns”) established during the initial calibration process, where each of the known movements is mapped to an input command of a set of input commands (“a plurality of gesture commands”).

- 2. Element 6[b][i]: 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 included within the plurality of gesture commands,**

Kruse teaches Element 6[b][i]. Ex-1002 ¶¶320-321. As explained for Element 1[c][iii], filter 322 of Kruse’s wearable device is configured to match a filtered input movement (“gesture”) to a known movement (“gesture pattern”) that

had been mapped to a specific input command of a set of possible input commands (“the gesture command included within the plurality of gesture commands”) during the calibration process. As explained for Element 1[c][iv], based on this matching, filter 322 is able to identify the particular input command that corresponds to the user’s filtered input movement (“identify a gesture command that corresponds to the identified gesture”).

3. Element 6[b][ii]: wherein the message generated by the one or more processors is configured to perform at least a portion of the gesture command.

As explained in Section XII.E, Claim 6 is indefinite because its recitation of a “message...configured to perform...the gesture command” is non-sensical. However, to the extent this phrase is understood to mean that the message *identifies* the gesture command, and/or transmission of the message *results in the performance of* the gesture command, Kruse teaches Element 6[b][ii]. Ex-1002 ¶¶322-323.

As explained for Element 1[c][iv], the message sent from filter 322 to generator 300 corresponds to the claimed “message.” This message includes an identification of the input command (“gesture command”) identified as corresponding to the user’s input movement. *See* Element 1[c][iv]. In response to receiving this message, generator 326 transmits an input command signal to an

external device (Ex-1017, 8:6-10), where the input command is used to control the external device (*id.*, 4:14-25).

b. Claim 7:

- 1. Element 7[a]: The wearable electronic device of claim 1, wherein the message instructs the communication component to transmit the signal to the external device,**

Kruse teaches Element 7[a]. Ex-1002 ¶¶324-325. As explained for Element 1[c][iv], the message identifying an input command and sent from filter 322 to generator 326 corresponds to the claimed “message,” and the input command signal generated by generator 326 corresponds to the claimed “signal.” In response to receiving the message, generator 326 transmits the input command signal “to one or more processing devices such as PC 304 or PDA 308” (“external devices”). Ex-1017, 8:6-11. Thus, the message instructs generator 326 to transmit the input command signal to the external devices. Ex-1002 ¶325.

- 2. Element 7[b]: wherein the signal instructs the external device to selectively modify one or more parameters of the external device.**

Kruse teaches Element 7[b]. Ex-1002 ¶¶326-327. The input command signal transmitted by generator 326 is used to control the external device. Ex-1017, 7:46-47, 4:18-25 (“wearable haptic ring 102...provides a remote input/output (‘I/O’) device to interact with any computers and/or smart objects” and “can be used in place of a computer mouse, a remote control, a keyboard, a phone pad, a touch pad,

a touch screen, a touch-screen table computer, etc.”). As Kruse explains, “[w]earable haptic ring 102 is applicable to...an interaction in an automobile, an interaction with any appliance, etc.” Ex-1017, 4:49-51. A POSITA would have recognized that there are a finite number of interactions that a user can have with an appliance. Ex-1002 ¶327. For instance, for an oven, the user can turn on the oven, set the temperature, set a timer, set a cooking mode, turn on/off an internal light, etc. *Id.* Such a POSITA would have understood that such interactions involve selectively modifying one or more parameters of the oven (e.g., a temperature parameter, a mode parameter, etc.). *Id.*

c. Claim 13:

1. Element 13[a]: The wearable electronic device of claim 1, wherein the external device comprises an access node,

Kruse teaches Element 13[a]. Ex-1002 ¶¶328-329.

Kruse’s wearable device may be used to control external devices such as a server and/or PC (Ex-1017, 7:46-47), and/or a generic processing device (Ex-1017, Figure 3 (processing device 312)). These external devices correspond to access nodes because they are configured to provide a user with access to a communication network. Ex-1017, 9:20-23 (external computer “may include a modem or a wireless network interface device...that facilitate[s] communication between computer 200 and the network”); Ex-1002 ¶329.

2. **Element 13[b]: 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.**

Kruse teaches Element 13[b]. Ex-1002 ¶¶330-332.

As explained for Element 1[c][iv], generator 326 transmits an input command signal to control an external device, in response to filter 322 determining that the user's input movement ("gesture") matches a known movement ("gesture pattern") that was mapped to the input command during the calibration process. Thus, the input command signal transmitted by generator 326 "comprises an indication of the gesture" through the stored mapping between the known movement and the input command. Ex-1002 ¶331.

Kruse also describes situations in which the input command signal transmitted by generator 326 identifies the gesture performed by the user. Ex-1002 ¶332. Kruse explains that the "specific command gestures" performed by the user "may...mimic natural motions as pointing, dragging, and button clicking" (Ex-1017, 7:41-43), and may be used to control "a touch pad, a touch screen, a touch-screen table computer, etc." (*id.*, 4:22-25). A POSITA would have understood that, when Kruse's wearable device is used as a remote input device for an external touch screen, the specific command gestures performed by the user would mimic the gestures that the user

would otherwise perform directly on the touch screen to control it (but would be performed on some surface other than the touch screen). Ex-1002 ¶332. Accordingly, the input command signals transmitted by Kruse's device to the touch screen would include indications of those command gestures, and would be configured to control the touch screen as if those command gestures had been performed directly on it. *Id.*

- d. Claim 14: 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.**

Kruse teaches Claim 14. Ex-1002 ¶333. Kruse's wearable device may be used to control an external device in the form of a smart phone (Ex-1017, 4:26-31), an appliance (*id.*, 4:49-51), and/or a door (*id.*, 5:30-47).

- e. Claim 15: 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.**

Kruse teaches Claim 15. Ex-1002 ¶334. Kruse explains that the gestures performed by the user while wearing the wearable device “may...mimic natural motions as pointing, dragging, and button clicking.” Ex-1017, 7:41-43; *see also id.*, 4:38-41 (similar).

- f. Claim 16: 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.**

Kruse teaches Claim 16. Ex-1002 ¶335. As explained for Element 1[b], Kruse's sensor 320 corresponds to the claimed "electronic part." Sensor 320 corresponds to/includes an "accelerometer." Ex-1017, 3:34-36; *see also id.*, 8:23-27 (similar).

- g. Claim 17: The wearable electronic device of claim 1, wherein the feedback comprises visual feedback, audio feedback, haptic feedback, or any combination thereof.**

Kruse teaches Claim 17. Ex-1002 ¶336. As explained for Element 1[c][iv], the feedback provided to the user is haptic feedback, generated by "[h]aptic output device 328." Ex-1017, 8:20-22.

- h. Claim 18: The wearable electronic device of claim 1, wherein the wearable electronic device comprises a finger-worn wearable device.**

Kruse teaches Claim 18. Ex-1002 ¶337. Kruse's wearable remote interface device can "be attached to a finger." Ex-1017, 1:34-35. For instance, Kruse discloses embodiments of the device in the form of a haptic ring (Ex-1017, Fig. 1A), a haptic finger cap (*id.*, Fig. 1B), and a haptic fingernail interface device (*id.*, Fig. 1C).

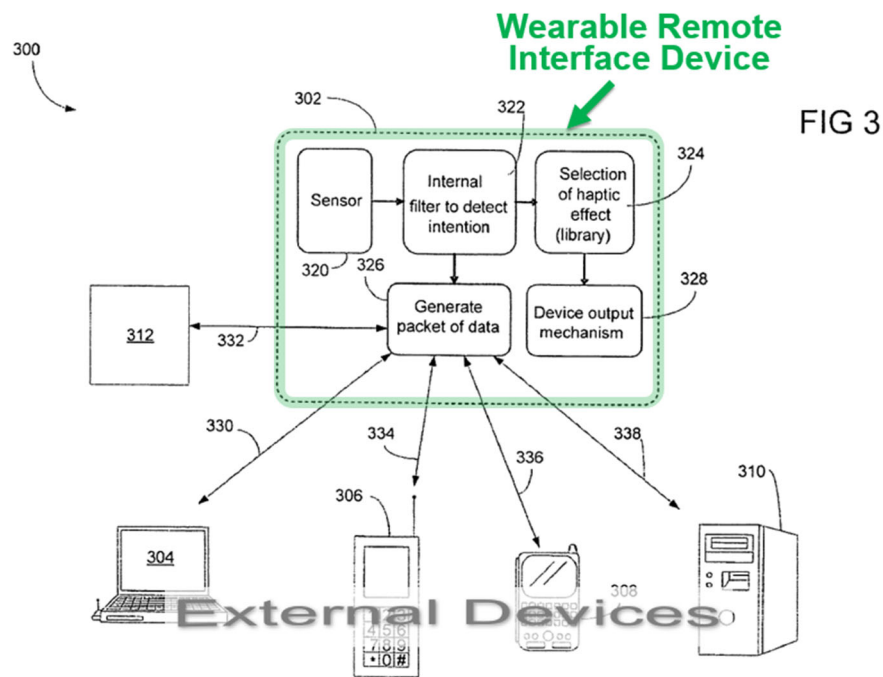
3. Independent Claim 19:

a. Element 19[pre]: A system for performing gesture recognition, comprising:

Kruse teaches the preamble of Claim 19, to the extent it is limiting. Ex-1002

¶¶338-340.

Kruse discloses a system including “a wearable remote interface device” 302 and external devices 304-312, as illustrated in annotated Figure 3, below:



As will be discussed for subsequent elements of Claim 19, Kruse’s wearable remote interface device is configured to identify input gestures performed by a user wearing the device, identify commands assigned to those input gestures, and transmit signals to corresponding those commands to control the external devices.

Ex-1002 ¶340. Kruse’s system is thus configured for performing gesture recognition. *Id.*

b. Element 19[a]: a wearable electronic device configured to measure acceleration data from a user;

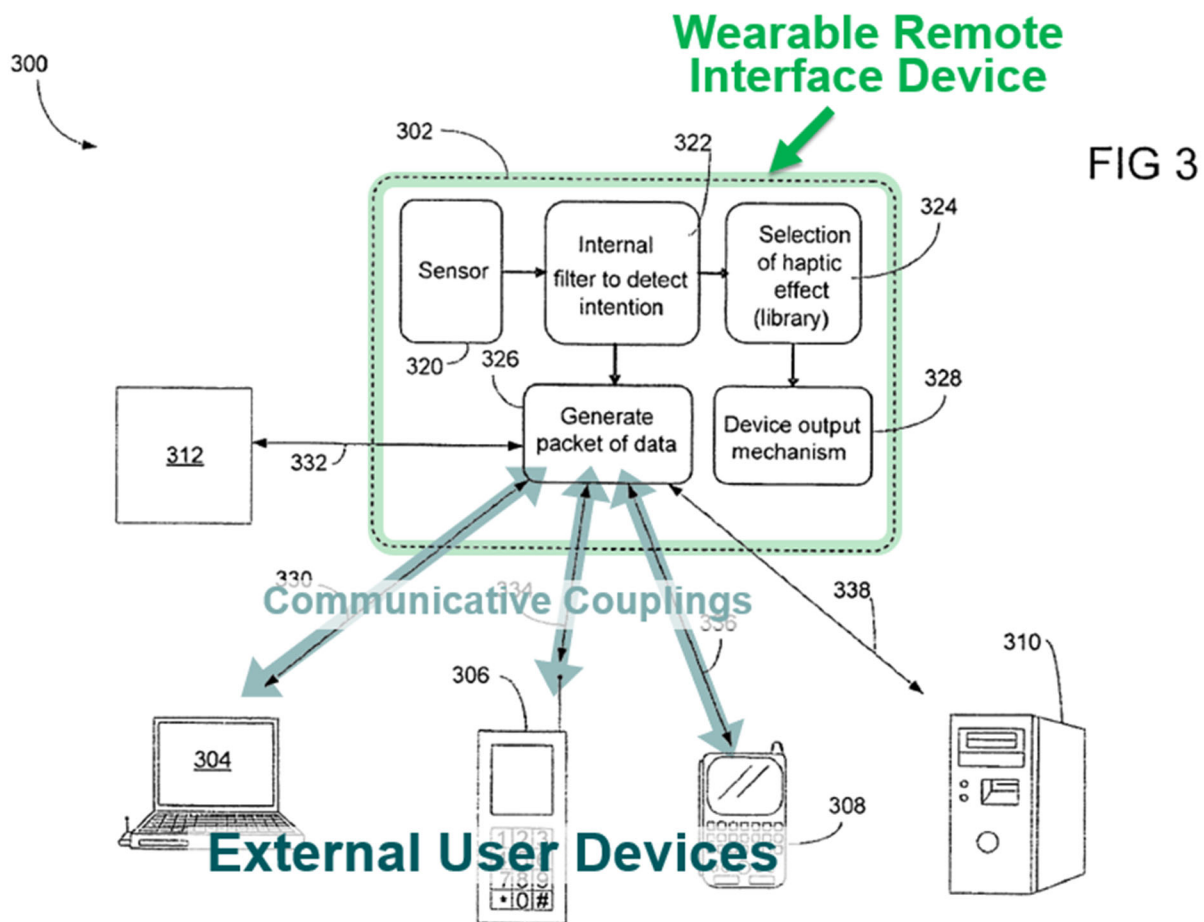
Kruse teaches Element 19[a]. Ex-1002 ¶¶341-343. As explained for Element 1[pre], Kruse’s wearable device 102 is “wearable” because it can “be attached to a finger or a hand or any parts of a body” (Ex-1017, Abstract; *id.*, 3:8-11 (“[w]earable haptic ring” that “can be worn and/or fit on a finger”)), and it is an “electronic device” because it includes a piezoelectric sensor/actuator (*id.*, 3:48-4:2), a wireless transmitter (*id.*, Cl. 1), and internal processing components (*id.*, 9:27-34), all of which a POSITA would have understood to be electronic components. Ex-1002 ¶342; *see also* Ex-1017, 1:6-7 (device 102 is an “***electronic*** interface device[]”).

As explained for Element 1[b], device 102 includes an “accelerometer” to sense the motion of a user’s finger on which the device is worn. Ex-1017, 3:34-36. A POSITA would have understood that data associated with a user’s finger movements and acquired by an accelerometer corresponds to “acceleration data from [the] user.” Ex-1002 ¶343.

c. Element 19[b]: a user device communicatively coupled to the wearable electronic device, and

Kruse teaches Element 19[b]. Ex-1002 ¶¶344-346.

Kruse discloses user devices in the form of personal computer 304, cellular phone 306, and PDA 308. Ex-1017, 7:55-57. As illustrated in annotated Figure 3, below, wearable device 302 sends input commands to these external user devices “via various communication channels 332-338, which may be wired or wireless communications.” Ex-1017, 8:6-11.



Thus, wearable device 302 is communicatively coupled to these user devices. Ex-1002 ¶346.

d. Element 19[c]: one or more processors communicatively coupled with the wearable electronic device and the user device, wherein the one or more processors are configured to:

Kruse teaches Element 19[c]. Ex-1002 ¶¶347-348. As explained for Element 1[c], Kruse's wearable device includes a processor (Ex-1017, 8:4-6) for executing "computer executable instructions" corresponding to functional components of the device (*id.*, 9:24-34). When executing the instructions corresponding to filter 322, this processor is communicatively coupled to sensor 320 of device 302, as explained for Element 1[c]. As explained for Element 19[b], wearable device 302 is communicatively coupled to external user devices. Thus, the processor of the wearable device is communicatively coupled to those user devices. Ex-1002 ¶348.

- e. **Element 19[c][i]: receive the acceleration data measured from the user via the wearable electronic device;**

Kruse teaches Element 19[c][i] for the reasons explained for Element 1[c][i].

Ex-1002 ¶349.

- f. **Element 19[c][ii]: identify a gesture performed by the user based at least in part on the acceleration data;**

Kruse teaches Element 19[c][ii] for the reasons explained for Element 1[c][ii].

Ex-1002 ¶350.

- g. **Element 19[c][iii]: determine that the gesture matches a gesture pattern from a plurality of gesture patterns; and**

Kruse teaches Element 19[c][iii] for the reasons explained for Element 1[c][iii]. Ex-1002 ¶351.

- h. **Element 19[c][iv]: 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.**

Kruse teaches Element 19[c][iv]. Ex-1002 ¶¶352-353. Kruse teaches that the processor of wearable device 102/302 is configured to “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,” for the reasons explained for Element 1[c][iv].

4. Dependent Claim 20:

- a. Claim 20: 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.**

Kruse teaches Claim 20. Ex-1002 ¶354. As explained for Element 19[c], Kruse teaches a processor within wearable device 102.

D. Ground 4: Claims 2-5, and 13 Are Obvious Over Kruse In View Of Sun

- 1. A POSITA would have been motivated to combine Sun and Kruse and would have had a reasonable expectation of success**

A POSITA would have been motivated to combine Sun and Kruse and would have had a reasonable expectation of success, for the reasons explained in Section XII.B.1, and the additional reasons below. Ex-1002 ¶¶355-360.

Kruse’s haptic device includes filter 322 to “filter extraneous gestures or motions” from a sensed input motion, where “the extraneous gesture or extraneous motion is related to the nature of a hand movement.” Ex-1017, 9:60-66. A POSITA seeking to implement Kruse’s haptic device would have been motivated to search for additional references providing implementation details that may be used for

filtering out extraneous motion that does not correspond to gesture commands. *Id.* Sun is one such reference. Ex-1002 ¶356.

Sun teaches that gestures may be distinguished from extraneous motion, through the use of velocity and/or acceleration thresholds. Ex-1015 ¶42. In particular, Sun discloses that detected movements may correspond to gestures when the movements “exceed[] one or both of a threshold velocity or a threshold acceleration.” *Id.* A POSITA seeking to implement Kruse’s filter 322 to remove extraneous motions from actual gestures, would have been motivated to use Sun’s velocity/acceleration thresholds to do so, as they correspond to easy-to-implement rules for performing such filtering. Ex-1002 ¶357.

As another motivation to combine Kruse and Sun, Kruse explains that an initial “calibration” process is used to configure Kruse’s haptic ring to identify the “input commands” assigned to filtered movements sensed by the ring. Ex-1017, 10:1-7. A POSITA seeking to implement Kruse’s haptic ring would have been motivated to search for additional references providing implementation details that may be used for calibrating the ring to identify user movements as corresponding to particular input commands. Ex-1002 ¶358.

Sun teaches a training mode that may be used to enable Sun’s wrist/finger mouse to identify new command gestures that are assigned by the user to new commands for controlling external computer 18. Ex-1015 ¶33. In Sun’s training

mode, the user uses computer 18 to specify a new input command, to which a new gesture should be mapped. *Id.* The user then performs the new gesture multiple times, resulting in the generation of “a composite new command gesture,” which is “added to the library of command gestures” stored on wrist/finger mouse 14. *Id.*

A POSITA would have understood that Sun’s training mode could be used to implement Kruse’s calibration process, through which Kruse’s haptic ring is calibrated to identify user movements corresponding to specific input commands, and would have been motivated to turn to Sun for implementation details. Ex-1002 ¶360. Such a POSITA would have had a reasonable expectation of success in using Sun’s training mode to calibrate Kruse’s haptic ring. Ex-1002 ¶360. As explained in Section XII.B.1, a POSITA would have understood that filter 322 of Kruse’s haptic ring would store mappings between input movements that may be detected by the device (e.g., a finger tap) and associated input commands (e.g., a mouse click command). *See* Ex-1017, 8:30-32; Ex-1002 ¶360. Thus, implementing Sun’s training mode in Kruse’s system would involve generating new entries in the mappings stored in Kruse’s device, in the same manner as Sun teaches for generating new entries in Sun’s Command Motion Library. Ex-1002 ¶360.

2. Claim 2:

- a. Element 2[a]: 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,**

Kruse-Sun teaches Element 2[a]. Ex-1002 ¶¶361-362. As explained in Section XII.D.1, a POSITA would have been motivated to implement Sun's acceleration threshold within Kruse's filter 322, to remove "extraneous gestures or motions from the input motion" sensed by sensor 320, leaving input motion that satisfies the acceleration threshold. Ex-1017, 9:60-66; Ex-1002 ¶362.

- b. Element 2[b]: 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.**

Kruse-Sun teaches Element 2[b]. Ex-1002 ¶¶363-364. As explained in Section XII.C.1.f (Ground 3, Element 1[c][ii]), filter 322 is configured to identify gestures performed by the user, by filtering "extraneous gesture or extraneous motion" from input motion sensed by sensor 320. As explained above, in the combined Kruse-Sun system, filter 322 performs such filtering by removing motion for which the acceleration does not satisfy Sun's acceleration threshold. Ex-1002 ¶364.

3. Claim 3:

- a. Element 3[a]: 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;**

Kruse-Sun teaches Element 3[a]. Ex-1002 ¶¶365-366.

As explained in Section XII.D.1 (motivation to combine Kruse and Sun), a POSITA would have been motivated to implement Sun's training mode for the purpose of calibrating Kruse's haptic ring. Sun teaches receiving an indication of a training mode, for the reasons explained in Section XII.A.2.b.1 (Ground 1, Element 3[a]).

- b. Element 3[b]: receiving additional acceleration data from the electronic part based at least in part on receiving the indication of the training mode; and**

Sun-Kruse teaches Element 3[b], for the reasons explained in Section XII.A.2.b.2 (Ground 1, Element 3[b]). Ex-1002 ¶367.

- c. Element 3[c]: generating the gesture pattern included within the plurality of gesture patterns based at least in part on the additional acceleration data.**

Sun-Kruse teaches Element 3[c], for the reasons explained in Section XII.A.2.b.3 (Ground 1, Element 3[c]). Ex-1002 ¶368.

4. Claim 4:

- a. Element 4[a]: 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,**

Sun-Kruse teaches Element 4[a], for the reasons explained in Section XII.A.2.c.1 (Ground 2, Element 4[a]). Ex-1002 ¶369.

- b. Element 4[b]: wherein generating the message is based at least in part on receiving the user input.**

Sun-Kruse teaches Element 4[b], for the reasons explained in Section XII.A.2.c.2 (Ground 2, Element 4[b]). Ex-1002 ¶370.

5. Claim 5:

- a. Element 5[a]: 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:**

Sun-Kruse teaches Element 5[a], for the reasons explained in Section XII.A.2.d.1 (Ground 1, Element 5[a]). Ex-1002 ¶371.

- b. Element 5[b]: 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.**

Sun-Kruse teaches Element 5[b], for the reasons explained in Section XII.A.2.d.2 (Ground 1, Element 5[b]). Ex-1002 ¶372.

- 6. Claim 11: 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.**

Kruse-Sun teaches Claim 11. Ex-1002 ¶¶373-375.

As explained in Section XII.A.2.g (Ground 1, Element 11[a]), Sun teaches configuring Sun's wrist/finger mouse and external computer 18 such that a sequence of tap gestures "can be used to enter a password to, for example, allow access to computer 18." Ex-1015 ¶38. Here, the wrist/finger mouse would generate input signal 28 ("the message") and command signal 16 (instructing computer 18 to allow access to the user), in response to determining that the sequence of tap gestures performed by the user matches a predefined sequence stored in the library (i.e., "authenticating the identity of the user" based on the gesture password entered by the user). Ex-1015 ¶44; Ex-1002 ¶374.

Kruse similarly teaches that the wearable device may be used for authentication purposes. Specifically, Kruse teaches that the wearable device may be used to enter “a secret code for authentication,” by using haptic feedback from the device to locate a virtual keyboard, and then entering the secret code using the virtual keyboard. Ex-1017, 5:30-47. Based on this disclosure, a POSITA seeking to implement Kruse’s wearable device would have been motivated to search for additional ways in which Kruse’s wearable device could be used for user-authentication purposes, such as that taught by Sun. Ex-1002 ¶375. Such a POSITA would have recognized that Sun’s authentication method could be implemented to improve Kruse’s authentication process, by removing the need for the user to search a door the user seeks to unlock to locate a virtual keypad. *Id.* Instead, the user could simply perform a sequence of gestures corresponding to a passcode stored by both the wearable device and the electronics controlling the door, and wirelessly transmit the passcode to the door to open it, following local authentication of the passcode by the wearable device. Ex-1002 ¶375. This method not only simplifies the authentication process, but it also enhances security—by reducing the chances of unauthorized access through physical tampering or observation—and offers greater flexibility and convenience for users, by allowing for authentication in various scenarios where locating a virtual keyboard might be impractical or time consuming. *Id.*

E. Ground 5: Claim 6 Is Invalid Under 35 U.S.C. §112 As Indefinite

Element 6[b][ii] recites “wherein the message generated by the one or more processors is configured to perform at least a portion of the gesture command.” Claim 6 is indefinite because it is unclear how a “message” itself (as opposed to, e.g., a processor executing instructions contained within a message) can *perform* a command. Ex-1002 ¶¶376-380. Because this element is “nonsensical and require[s] an impossibility,” it renders the claim indefinite. *Synchronoss Techs., Inc. v. Dropbox, Inc.*, 987 F.3d 1358, 1366–67 (Fed. Cir. 2021).

XIII. THE BOARD SHOULD NOT USE ITS DISCRETION TO DENY INSTITUTION UNDER *FINTIV*.

The Board should decline to exercise its discretion to deny institution under 35 U.S.C. § 314(a) because there is no pending district court litigation against Petitioner involving the '701 Patent.

XIV. CONCLUSION

The unpatentability grounds presented above are reasonably likely to prevail, post-grant review should be instituted, and Claims 1-7, 11, and 13-20 should be cancelled as unpatentable over the prior art.

Respectfully Submitted,

/s/ William M. Fink

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner certifies that this petition includes 14,844 words, as measured by Microsoft Word, exclusive of the table of contents, mandatory notices under § 42.8, certificates of service, word count, and exhibits.

CERTIFICATE OF SERVICE (37 C.F.R. §42.6(e)(1))

The undersigned hereby certifies that the above document was served on June 28, 2024, by filing this document through the Patent Trial and Appeal Board P-TACTS System, as well as delivering a copy via express mail upon the following attorneys of record for the Patent Owner:

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