

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VALVE CORPORATION,
Petitioner,

v.

IMMERSION CORPORATION,
Patent Owner.

Case IPR2024-00477
Patent 7,336,260

**PATENT OWNER'S RESPONSE
TO PETITION FOR INTER PARTES REVIEW**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	THE CHALLENGED PATENT—U.S. PATENT NO. 7,336,260	5
A.	Overview	5
B.	Claims of the '260 Patent	11
C.	Prosecution History of the '260 Patent	12
D.	Prior IPRs	15
III.	PERSON OF ORDINARY SKILL IN THE ART.....	17
IV.	CLAIM CONSTRUCTION.....	18
A.	Each Claimed Step Must Occur in Order.....	20
1.	Logic requires that each pressure must be detected before its corresponding tactile sensation is provided.	21
2.	As a matter of grammar, each pressure must be detected before their corresponding tactile sensation is provided.	22
3.	Grammar and logic also require limitations [1a]-[1f] to be performed in order.....	25
4.	The embodiments cited by the Board do not embody claim 1	28
B.	“Tactile Sensation” Should Be Construed as “Vibrotactile Sensation”	31
V.	THE ASSERTED REFERENCES.....	34
A.	Overview of Komata	34
B.	Overview of Tsuji.....	38
C.	Overview of Rosenberg.....	46
VI.	GROUND 1: CLAIMS 1-7 ARE PATENTABLE OVER KOMATA.....	50
VII.	GROUND 2: CLAIMS 1-7 ARE PATENTABLE OVER TSUJI.....	54
VIII.	GROUND 3: CLAIMS 1-7 ARE PATENTABLE OVER ROSENBERG	58

A. Rosenberg Does Not Disclose an Apparatus that Detects Three
Different Pressures and Provides a Tactile Sensation for Each
Pressure.....58

B. Rosenberg Does Not Disclose the “Tactile Sensation” Required
by the Claims.....63

IX. CONCLUSION 66

TABLE OF AUTHORITIES

CASES

<i>Abiomed, Inc. v. Maquet Cardiovascular, LLC</i> , IPR2017-01204, Paper 8 (PTAB Oct. 23, 2017)	65
<i>Altiris, Inc. v. Symantec Corp.</i> , 318 F.3d 1363 (Fed. Cir. 2003)	20
<i>Apple Inc. v. Immersion Corp.</i> , IPR2016-01884, Paper 2 (July 6, 2016)	15, 16
<i>Apple Inc. v. Immersion Corp.</i> , IPR2017-01369, Paper 1 (May 4, 2017)	16
<i>Baldwin Graphic Sys., Inc. v. Siebert, Inc.</i> , 512 F.3d 1338 (Fed. Cir. 2008)	22
<i>Cadence Pharms. Inc. v. Exela PharmSci Inc.</i> , 780 F.3d 1364 (Fed. Cir. 2015)	30
<i>Cont'l Can Co. USA, Inc. v. Monsanto Co.</i> , 948 F.2d 1264 (Fed. Cir. 1991)	53, 57
<i>Energizer Holdings, Inc. v. ITC</i> , 435 F.3d 1366 (Fed. Cir. 2006)	22
<i>Haemonetics Corp. v. Baxter Healthcare Corp.</i> , 607 F.3d 776 (Fed. Cir. 2010)	27
<i>Hytera Communs. Co. v. Motorola Sols., Inc.</i> , 841 Fed. Appx. 210 (Fed. Cir. 2021)	23, 26
<i>In re Oelrich</i> , 666 F.2d 578 (CCPA 1981)	53
<i>In re Robertson</i> , 169 F.3d 743 (Fed. Cir. 1999)	53
<i>Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.</i> , 381 F.3d 1111 (Fed. Cir. 2004)	16
<i>Intamin, Ltd. v. Magnetar Techs., Corp.</i> , 483 F.3d 1328 (Fed. Cir. 2007)	28
<i>Mastermine Software, Inc. v. Microsoft Corp.</i> , 874 F.3d 1307 (Fed. Cir. 2017)	24

<i>Medtronic, Inc. v. Teleflex Life Scis. Ltd.</i> , 2024 U.S. App. LEXIS 6703 (Fed. Cir. Mar. 21, 2024)	23
<i>Microprocessor Enhancement Corp. v. Tex. Instruments Inc.</i> , 520 F.3d 1367 (Fed. Cir. 2008)	23
<i>Phonometrics, Inc. v. N. Telecom Inc.</i> , 133 F.3d 1459 (Fed. Cir. 1998).....	25
<i>PPC Broadband, Inc. v. Corning Optical Communs. RF, LLC</i> , 815 F.3d 747 (Fed. Cir. 2016).....	29
<i>Process Control Corp. v. HydReclaim Corp.</i> , 190 F.3d 1350 (Fed. Cir. 1999).....	22
<i>Rambus Inc. v. Rea</i> , 527 F.App'x 902 (Fed. Cir. 2013).....	20
<i>Rexnord Corp. v. Laitram Corp.</i> , 274 F.3d 1336 (Fed. Cir. 2001).....	21
<i>Ruckus Wireless, Inc. v. Innovative Wireless Solutions, LLC</i> , 824 F.3d 999 (Fed. Cir. 2016).....	34
<i>SuperGuide Corp. v. DirecTV Enters., Inc.</i> , 358 F.3d 870 (Fed. Cir. 2004).....	30
<i>Therasense, Inc. v. Becton, Dickinson & Co.</i> , 593 F.3d 1325 (Fed. Cir. 2010).....	53
<i>Transclean Corp. v. Bridgewood Servs., Inc.</i> , 290 F.3d 1364 (Fed. Cir. 2002).....	53
<i>Trintec Indus., Inc. v. Top-U.S.A. Corp.</i> , 295 F.3d 1292 (Fed. Cir. 2002).....	53
<i>Tuna Processors, Inc. v. Haw. Int'l Seafood, Inc.</i> , 327 Fed. Appx. 204 (Fed. Cir. 2009).....	23
<i>Wi-LAN, Inc. v. Apple Inc.</i> , 811 F.3d 415 (Fed. Cir. 2016).....	22

STATUTES

35 U.S.C. § 102 13

35 U.S.C. § 103 13

35 U.S.C. § 112(d) 12, 54, 57

EXHIBIT LIST

Exhibit No.	Exhibit Description
2001	Declaration of Cliff Win, Jr. in Support of Motion for Admission <i>Pro Hac Vice</i>
2002	Declaration of Craig Rosenberg, Ph.D. in Support of Immersion Corporation's Patent Owner Preliminary Response, dated April 26, 2024
2003	<i>Curriculum Vitae</i> of Craig Rosenberg, Ph.D.
2004	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-000712-TL, Joint Claim Construction Statement (Exhibit A), D.I. # 68-1
2005	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-000712-TL, Order on Motion to Stay Pending <i>Inter Partes</i> Review, D.I. # 69
2006	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-000712-TL, Case Scheduling Order, D.I. # 46
2007	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-000712-TL, Valve Corp.'s Invalidity Contentions
2008	Declaration of Robert Akl, Ph.D. in Support of Immersion Corporation's Patent Owner Response, dated October 15, 2024
2009	<i>Curriculum Vitae</i> of Robert Akl, Ph.D.
2010	Transcript of September 24, 2024, Deposition of Jean Renard Ward in IPR2024-00477

I. INTRODUCTION

Patent Owner Immersion Corporation (“Immersion”) respectfully requests that the Board affirm the challenged claims 1-7 of Immersion’s U.S. Patent No. 7,336,260 (EX1001 or the “’260 Patent”) as Valve Corporation (“Petitioner”) has failed to carry its burden to show that those claims are unpatentable.

The Petition asserts three Unpatentability Grounds. Ground 1 alleges that Claims 1-7 of the ’260 Patent are anticipated by and/or obvious over U.S. Patent Application Pub. No. 2001/0008849 A1 (“Komata”). Ground 2 alleges that Claims 1-7 of the ’260 Patent are anticipated by and/or obvious over Japanese Patent Application Pub. No. 11-212725 (“Tsuji”). Ground 3 alleges that Claims 1-7 of the ’260 Patent are anticipated by and/or obvious over PCT Pub. No. WO 99/66997 (“Rosenberg”). The Rosenberg reference is a patent application by inventor Louis Rosenberg who is the founder of Immersion.

As detailed in this Patent Owner’s Response, the Petition suffers from multiple critical deficiencies, namely (1) Komata and Tsuji do not disclose the ordered steps of detecting a first, second, and third pressure applied to an input device in progressively increasing sequence as recited in Claim 1; (2) Rosenberg does not disclose an apparatus that detects three different pressures and provides a tactile sensation for each pressure; and (3) Rosenberg does not disclose providing

the tactile sensations required by the claims. The Petition alleges that these particular limitations are disclosed in the asserted prior art.

The inventors of the '260 Patent recognized that in prior art electronic devices, confirmation of user input was limited to visual or audible confirmation, which is not practical for users in a distracting environment, such as while they are driving. EX1001 at 1:19-30. Although certain simple mechanical feedback such as switch closure feedback existed in prior art devices, the physical feedback was identical for different buttons or keys. *Id.* at 1:30-49. Moreover, for buttons in which a single button serves multiple functions, the mechanical feedback remained the same regardless of the different functionality or button-press pressure applied. *Id.* Such rudimentary feedback was not suitable for multi-function softkeys such as those graphically generated on touchpads. For example, the alphanumeric softkey for the number "9" can be pressed with progressively increasing pressure to activate a different input in a sequence of letters, from W, X, Y, to Z (each letter associated with a different pressure level in increasing order). A user, however, may not be able to consistently and reliably apply pressure at some specific level on the softkey to achieve a particular input letter, where distinct levels of pressure applied can yield distinct results. *Id.* at 1:60-2:12. In this case, it was very difficult to navigate multi-function softkeys without visual confirmation.

The '260 Patent sought to overcome these challenges by providing distinct tactile sensations as confirmatory feedback for each disparate input functionality that was activated via varying levels of button presses that were detected in a progressive order. EX1001 at 1:19-2:5, 2:16-37, 8:62-9:11, 9:19-10:25. More specifically, the patent employs a method of detecting successive pressure levels that are applied in increasing sequence to a soft key that supports multiple input functions, and with each pressure level detection, providing a corresponding distinct tactile sensation to signify a distinct input function that is activated. *Id.* at 8:62-9:14.

In contrast, the asserted prior art references, Komata in Ground 1 and Tsuji in Ground 2, were not directed to input devices with multiple input functionality supported by a single button or softkey. Indeed, Komata and Tsuji do not disclose the detection of three progressively increasing pressure levels applied to the input button in the successive order that is recited in Claim 1 of the '260 Patent. As detailed further below, Komata and Tsuji merely disclose tables that lay out a correlation between the pressure level applied and the feedback provided for that particular pressure level.

Neither reference discloses detecting distinct pressure levels applied in progressively increasing sequence as a user presses on a multi-function button to move through different functions. The extent of Komata and Tsuji's disclosure is that *if* a certain pressure level is detected, *then* a certain feedback is provided. They

do not, however, disclose the ordered steps of: detecting a first applied pressure (and providing an associated tactile sensation), and then detecting a second applied pressure greater than the first pressure (and providing an associated tactile sensation), and then detecting a third applied pressure greater than the second pressure (and providing an associated tactile sensation), all three pressures of which were applied and detected in progressively increasing sequence.

The Rosenberg reference asserted in Ground 3 is directed to a mouse input device. While that reference discloses the ability to detect when the button is, for example, at a rest position, at a stop position, or at a threshold position to register a click, it does not disclose detecting a first, second, and third pressure and providing corresponding tactile sensations based, at least in part, on those pressures. As with a typical computer mouse, pressing a button on the mouse input device of Rosenberg causes the cursor to input a command, such as clicking an icon, but pressing the button at different pressures does not cause multiple interactions.

Furthermore, the Rosenberg reference does not disclose providing tactile sensations that correspond to the detection of a first, second, and third pressure applied to the mouse input device. Rosenberg only discloses a mouse button that mimics a spring-loaded button effect. Rosenberg provides a blunt push-back or resistive effect that a user feels when pressing down progressively harder on the mouse button. As explained in detail below, however, this type of force feedback,

i.e., contact force, is not a vibrotactile sensation, e.g., textures, jolts, etc., that is required by the claims of the '260 Patent and the only type of tactile sensation described by the '260 Patent as suitable. Accordingly, claims 1-7 of the '260 Patent are not invalid and should be affirmed.

II. THE CHALLENGED PATENT—U.S. PATENT NO. 7,336,260

A. Overview

The '260 Patent is directed to an apparatus that provides tactile sensations to an input device, such as a touchscreen, in response to detecting different successive levels of pressure a user applies to the input device. EX1001, Abstract; *id* at 5:39-58. Each of the successively increasing pressure levels may be associated with a distinct input signal. *Id.* at 6:10-11. Each of the distinct input signals may cause the generation of corresponding tactile sensations on the device. *Id.* at 8:1-23. The input signals can be generated as the user applies successively increasing amounts of pressure on the input device. The '260 Patent states in pertinent part that with each progressively increasing pressure level that is applied to the button and detected in such successive order in which pressure was applied, a corresponding control signal for tactile feedback is generated for each detected pressure level:

When the button 10i is in its first state, then the button 10i does not transmit an input signal. When pressure is applied to the button 10i by the user that exceeds the first magnitude, the button 10i transmits a first signal to the controller 9. When greater

pressure is applied to the button 10i that exceeds the second magnitude of pressure, the button 10i transmits a second signal to the controller. When still greater pressure is applied to the button 10i that exceeds a third magnitude of pressure, the button 10i transmits a third signal to the controller. When even greater pressure is applied to the button 10i that exceeds the fourth magnitude of pressure, the button transmits a fourth signal to the controller.

Id. at 6:11-25, 5:48-6:9; *see also id* at 4:58-62 (“[i]n addition to being in communication with the input device 2, ***the controller 9 is in communication with the actuator 6 to produce a tactile sensation in the actuator 6 corresponding to the input or input signal received by the controller 9*** from the input device 2) (emphasis added).

The '260 Patent addresses, among others, a problem with prior art devices in which users cannot always rely on visual feedback when using electronic devices (e.g., when they need to be watching the road while driving, in a distracting environment, or the user interface screen is not visible). The human hand cannot reliably or consistently sense the degree of pressure it is applying to an input device such as a touchpad or touchscreen or how the pressure is increasing or decreasing during an interaction. Thus, a user may not be able to consistently and reliably apply pressure at some specific level on the input device to achieve a particular result in

systems where distinct levels of pressure being applied yield distinct results. EX2008 (“Akl Decl.”) at ¶¶ 62-64; EX1001 at 1:60-2:12.

Accordingly, providing tactile feedback as the pressure applied by the user successively varies or increases offers an advantageous feature for communicating information between a pressure-sensitive electronic apparatus and the user to enhance efficiency and reduce user input errors. For example, the apparatus can also provide confirmation that the user has or has not pressed hard enough on a graphical object to trigger a desired event or has released pressure such that it is no longer active. *See, e.g., id.* at 9:11-18 (“a key 10i is movable from a first level (rest) 23 to a second level 25 upon the application of a sufficient amount of pressure to the input device”).

The '260 Patent provides an example of an input device such as a touchscreen with softkeys 36b-j, where a single key can provide multiple functions. In other words, each of these softkeys can represent multiple inputs as illustrated in Figure 5, which is reproduced below. *Id.* at 12:9-11.

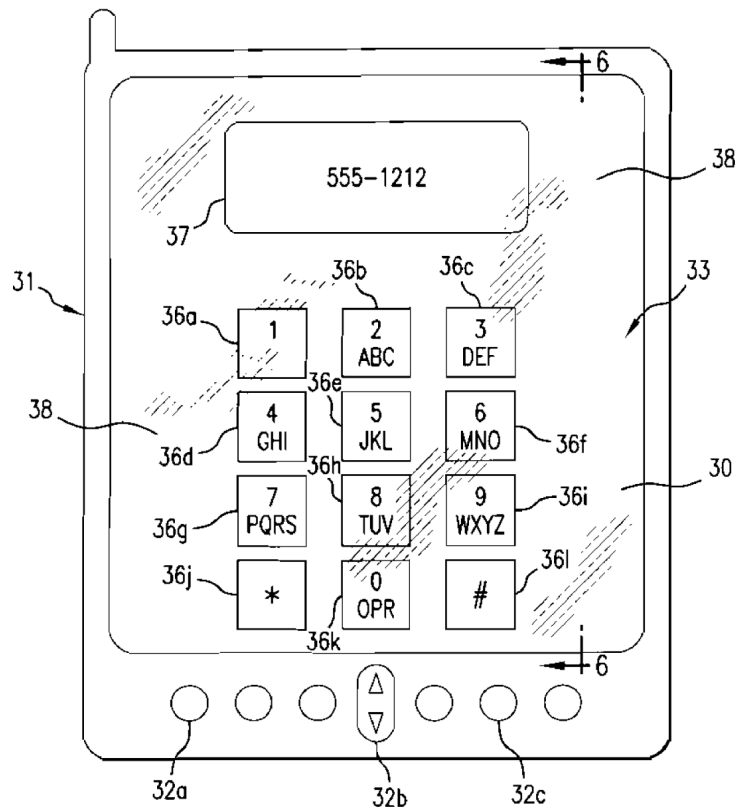
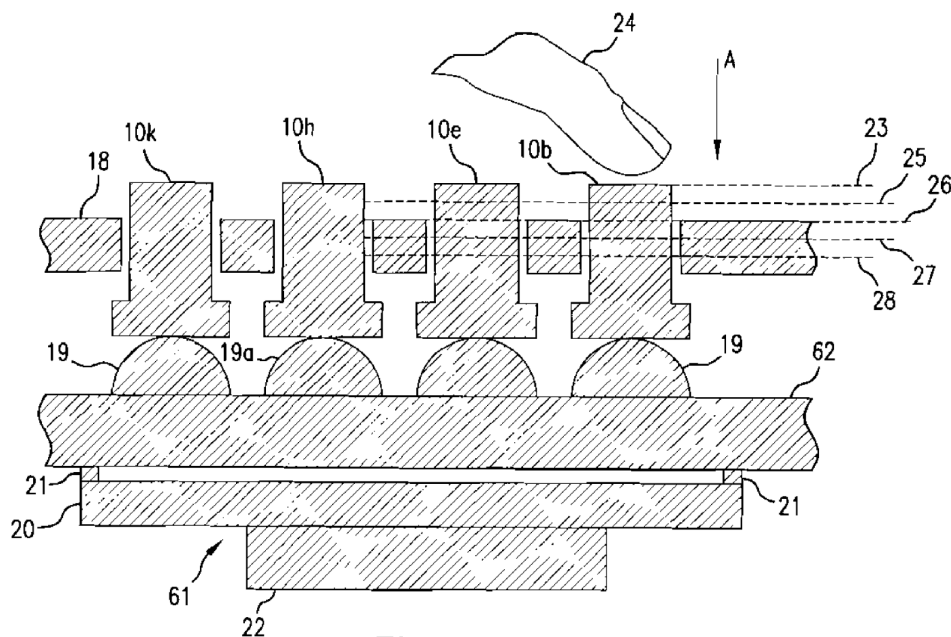


FIG. 5

The patent explains that a user can press on softkey 36i with increasing pressure to input the letters W, X, Y or Z. *Id.* at 12:50-53. A controller can detect a distinct amount of pressure applied by the user. *Id.* at 12:11-19. When a first level of pressure is applied to move a softkey from a first position (such as a rest position) to a second position, a first tactile sensation is produced. *Id.* at 12:33-45. Increasing the applied pressure to move the softkey to a third position will cause the generation of a second tactile sensation. *Id.* at 12:45-50. The softkey 36i has positions associated with four distinct applied pressures in increasing order that correspond to inputs for the letters W, X, Y or Z, respectively. *Id.* at 12:50-55. The user can continuously push on the

softkey to obtain the desired letter input. *Id.* Providing distinct tactile sensations for each of the letters as the user pushes through the different pressure levels allows the user to identify the selected input. *Id.* at 12:56-66. This is also illustrated in Figure 4 of the patent reproduced below in which increasing pressure levels are applied by a user's finger in the progressive sequence from level 23 through level 28:



The '260 Patent states in pertinent part that as the user presses on the button with increasing pressure, “the keys pass sequentially” through a second position 25, third position 26, fourth position 27, and fifth position 28, and which each pressure level is detected in that order:

As illustrated, the keys 10 are initially in a rest position 23. A biasing member arrangement (not shown) as is available and

understood in the art is used to hold the keys in the rest position 23. An object 24, for example the user's finger or a stylus, is used to select one or more of the keys 10 by applying pressure in the direction of arrow A. This pressure causes the selected key to progress through a plurality of positions. As illustrated, **after leaving the rest position 23, the keys pass sequentially through a second position 25, a third position, 26, a fourth position 27, and a fifth position, 28 as greater and greater pressure is applied to the button 10.**

Id. at 8:62-9:5 (emphasis added); *see also id* at 9:11-18 (“a key 10*i* is **moveable from a first level (rest) 23 to a second level 25 upon the application of a sufficient amount of pressure to the input device.**”) (emphasis added).

As shown below with independent Claim 1, the patented invention detects pressure levels and provides corresponding tactile sensations in a very specific order. The claim encompasses the detection of three applications of pressure to a touch surface of an input device that successively increase and provides vibrotactile sensations corresponding to each of the successive pressures applied and detected by the device. *Id.* at 9:11-18. The only type of tactile sensation described in detail and characterized as suitable by the '260 Patent are “vibrations, for example, jolts and textures, and a plurality of distinct tactile sensations can be created by varying the frequency, amplitude and waveform output by the actuator 6.” *Id.* at 3:48-51.

Also, as further discussed below, during the prosecution history of the '260 Patent, the Patent Examiner highlighted the novelty of the invention in which three pressures of progressively increasing levels are detected in sequence and providing tactile sensations corresponding to each pressure level in that progressive order. Thus, the Patent Examiner rejected prior art that merely disclosed providing two tactile sensations at different pressure levels. Thus, the intrinsic record confirms that the '260 Patent claims require at least a first, second, and third tactile sensation provided to the user as the user applies multiple different pressure levels in a progressive sequence as recited in independent Claim 1 and dependent Claim 2.

B. Claims of the '260 Patent

Petitioner challenges Claims 1-7 of the '260 Patent, including one independent claim which is recited below:

- 1[pre].** A computer-readable medium having instructions, the instructions including instructions that cause a processor to:
- [1a]** detect a first pressure on a first input device;
 - [1b]** provide a first tactile sensation to the first input device, the first tactile sensation based at least in part on the first pressure;
 - [1c]** detect a second pressure on the first input device, the second pressure greater than the first pressure; and
 - [1d]** provide a second tactile sensation to the first input device, the second tactile sensation based at least in part on the second pressure;

[1e] detect a third pressure on the first input device, the third pressure greater than the second pressure; and

[1f] provide a third tactile sensation to the first input device.

Claims 2-7 of the '260 Patent depend on claim 1 and, therefore, include all limitations of claim 1. 35 U.S.C. § 112(d) (“A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.”).

C. Prosecution History of the '260 Patent

The '260 Patent's application was filed on November 1, 2002. EX1012 at 1. The original claims recited, among other limitations, “detecting a first pressure on a first input device,” “providing a first tactile sensation to the first input device,” “detecting a second pressure on the first input device, the second pressure greater than the first pressure,” and “providing a second tactile sensation to the first input device.” *Id.* at 41.

On December 19, 2002, Patent Owner filed a preliminary amendment. *See, e.g., id.* at 92-94. For example, the preamble was amended from a “readable medium having instructions, the instructions including instructions that cause a processor to perform the steps of” to a “computer-readable medium having instructions, the instructions including instructions that cause a processor to.” *Id.* at 94.

On May 18, 2006, the Examiner issued a Non-Final Office Action that included a rejection of the claims under 35 U.S.C. § 102 as anticipated by the Yasutake reference (US 6,597,347) and under 35 U.S.C. § 103 as obvious over Yasutake. *Id.* at 186-189. The Examiner also rejected dependent claims covering how distinct pressures are calculated as obvious over Yasutake in view of the Rambaldi reference (US 6,292,173). *Id.* at 188-189. The Examiner, however, found that dependent Claim 2 covering the detection of a third successive pressure applied in sequence that was greater than the second pressure and providing a third tactile sensation would be allowable over the prior art if rewritten in independent form including all of the limitations of the base claim. *Id.* at 189.

On August 18, 2006, Applicant provided a response to the Office action including the following claim amendment shown here with underlining: “provide a first tactile sensation to the first input device, the first tactile sensation based at least in part on the first pressure” and “provide a second tactile sensation to the first input device, the second tactile sensation based at least in part on the second pressure.” *Id.* at 206. However, no agreement on the allowability was reached and the Examiner issued a Final Office Action on November 15, 2006. *Id.* at 221-228.

On February 12, 2007, Applicant provided a response to the Final Office Action with additional claim amendments rewriting dependent Claim 2 into independent form including the limitations of the base claim. *Id.* at 234-238.

AMENDMENTS TO THE CLAIMS

1. (Cancelled)
2. (Currently Amended) ~~The computer-readable medium of claim 1 further comprising stored instructions, the stored instructions including instructions which, when executed by a processor, cause the processor to~~ A computer-readable medium having instructions, the instructions including instructions that cause a processor to:
 - detect a first pressure on a first input device;
 - provide a first tactile sensation to the first input device, the first tactile sensation based at least in part on the first pressure;
 - detect a second pressure on the first input device, the second pressure greater than the first pressure; and
 - provide a second tactile sensation to the first input device, the second tactile sensation based at least in part on the second pressure;
 - detect a third pressure on the first input device, the third pressure greater than the second pressure; and
 - provide a third tactile sensation to the first input device.

Id. at 235.

On March 8, 2007, the Examiner issued a Notice of Allowance for all claims in the application. *Id.* at 254-258. In allowing the claims, the Examiner provided the following reasons for allowance:

Allowable Subject Matter

1. Claims 2, 3, 5-9, 14, and 15 are allowed.

The following is an examiner's statement of reasons for allowance: Claims 2, 3, 5-9, 14, and 15 are allowable since certain key features of the claimed invention are not taught or fairly suggested by the prior art. In claim 2, "detect a third pressure on the first input device, the third pressure greater than the second pressure". The closest prior art Yasutake (6,597,347) teaches of detecting first pressure and second pressure, and of providing first and second tactile sensations however singularly or in combination fails to anticipate or render the above underlined limitations obvious.

Id. at 258.

D. Prior IPRs

Apple previously filed two IPRs challenging the '260 Patent. The first petition, IPR2016-01884, challenged Claims 1-2 by asserting the Komata and Tsuji references that are also asserted in this Petition. *Apple Inc. v. Immersion Corp.*, IPR2016-01884, Paper 2 (July 6, 2016). Patent Owner provided a preliminary response contending that the claimed steps of detecting the various pressure levels, required performance during a single touch "interaction"—without citing a specific basis in the claim terms for importing an "interaction" limitation. EX1011 at 10-14. Accordingly, Patent Owner argued that Komata and Tsuji did not disclose Claims 1-2 because those references did not teach providing different tactile sensations as a user applies varying pressure levels during the same touch "interaction," as opposed to different pressure levels applied in separate touch "interactions." *Id.*

In response, Apple highlighted that the word “interaction” did not appear in the claims. In its sur-reply, Patent Owner argued that Petitioner exalted form over substance. In its institution decision¹, the Board agreed with Apple that the claims did not expressly require the limitation, during a single touch “interaction.” EX1010 at 21-24. The Board further stated that “[c]oncentrating on the claim language is not a mere matter of form” and that “a claim construction analysis must begin and remain centered on the claim language itself.” *Id.* (citing *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)). Here, as explained below in Section IV.A, all that is required by the plain and ordinary reading of the claim is that the steps be performed in the order that they are recited as the claim language itself evinces a specific order.

The second petition brought by Apple, IPR2016-01884, challenged dependent Claims 3-9, and also relied on the same Komata reference for dependent Claim 6. *Apple Inc. v. Immersion Corp.*, IPR2017-01369, Paper 1 (May 4, 2017). The Board discretionarily denied institution based on *General Plastics* citing the fact that Apple did not adequately explain why it could not have addressed dependent claims 3-9 in the first petition. *Id.* at Paper 7 (Nov. 21, 2017).

¹ At the time, the Board applied the now-abrogated Broadest Reasonable Interpretation (“BRI”) standard.

Although the Board instituted IPR on one petition and discretionarily denied institution on the second, before the Board issued a Final Written Decision on the first petition, Apple opted to take a license to Immersion's patent portfolio.² Thus, the Board granted Apple's request for termination of the IPR. EX1017 at 2-3.

III. PERSON OF ORDINARY SKILL IN THE ART

Petitioner identifies a person of ordinary skill in the art ("POSA") as one who would have possessed a bachelor's degree in electrical engineering, computer science, or a related field, plus at least two years of industry or graduate level experience with software engineering, haptics programming, and/or human-computer interaction, including experience with user-interfaces and applications involving touchscreens, touchpads, and related technologies. Pet. at 7 (citing Ward, ¶¶38-44).

Immersion submits that a POSA at the time of the '260 Patent would have had a bachelor's degree in electrical engineering or computer science (or an equivalent degree), and two years of practical or industry experience in the field of human computer interaction (HCI), including implementation of computer-based systems and software for providing haptic feedback effects to a user. EX2008 at ¶ 27. Also,

²<https://www.businesswire.com/news/home/20180129005190/en/Immersion-Reaches-Global-Settlement-With-Apple> (last visited on Sep. 20, 2024).

a person could have qualified as a POSA with more formal education and less practical or industry experience, or vice versa. *Id.* In any event, the challenged claims of the '260 Patent are patentable under either Petitioner's or Immersion's definition of a POSA.

IV. CLAIM CONSTRUCTION

In the current parallel district court proceeding, Petitioner has proposed constructions for the following term, while Patent Owner maintains that this term should be afforded its plain and ordinary meaning as understood by a POSA.

Claim Term	Petitioner's Proposed Construction in District Court
"computer readable medium having instructions"	"a storage or transmission device that stores, transmits, or carries instructions"

See EX2004 (Joint Claim Construction Chart) at 4. In this proceeding, Petitioner believes no terms require construction. *See* Pet. at 8-9.

For the purposes of this Patent Owner's Response, Patent Owner proposes the following claim term constructions:

Claim Term	Patent Owner's Proposed Construction
“[1a] detect a first pressure on a first input device; [1b] provide a first tactile sensation to the first input device, the first tactile sensation based at least in part on the first pressure; [1c] detect a second pressure on the first input device, the second pressure greater than the first pressure; and [1d] provide a second tactile sensation to the first input device, the second tactile sensation based at least in part on the second pressure; [1e] detect a third pressure on the first input device, the third pressure greater than the second pressure; and [1f] provide a third tactile sensation to the first input device.” (Claim 1)	Steps [1a]-[1f] occur in the order recited in claim 1.
“tactile sensation” (Claims 1-7)	“vibrotactile sensation”

These proposed constructions are appropriate and supported by the '260 Patent, as explained below in Sections IV.A. and IV.B.

Aside from the claim terms listed in the table above, Patent Owner believes that all other terms may be given their ordinary and customary meaning, as understood by a POSA, in the context of the patent specification, and that no argument herein requires a special construction for any other term.

A. Each Claimed Step Must Occur in Order

A POSA would understand that claim 1 requires that the steps of detecting a *first* pressure, *second* pressure, and *third* pressure and providing a corresponding *first* tactile sensation, *second* tactile sensation, and *third* tactile sensation are performed in the order recited in the claim. EX2008 at ¶ 31. In view of the plain language of the claim, it would make no sense for these steps to be performed out of order. *See, e.g., Rambus Inc. v. Rea*, 527 F. App'x 902, 907 (Fed. Cir. 2013) (Finding the Board's interpretation for performance of claim steps out of order to be erroneous where "a plain reading of claim 1 evinces a specific order [...] It would make no sense for the second step to be performed first."). Determining whether steps of a claim must be performed in the order in which they are written requires looking first to the claim language to determine, if, as a matter of logic or grammar, they must be performed in the order written, and, if not, looking to rest of the specification to determine whether it directly or implicitly requires a particular order. *Altiris, Inc. v. Symantec Corp.*, 318 F.3d 1363, 1369-70 (Fed. Cir. 2003). As will be explained below, the logic and grammar of the claims, by themselves, establish that the recited

steps of claim 1 must occur in order, and the specification of the '260 Patent provides additional support for that construction.

1. Logic requires that each pressure must be detected before its corresponding tactile sensation is provided.

As the Board has noted in its Institution Decision, logic requires that the first step (limitation [1a]) of detecting a pressure and the second step of providing a first tactile sensation must be done in the order in which they are recited in claim 1:

We agree that as a matter of logic, the first step of detecting a first pressure must occur before the second step of providing a first tactile sensation based at least in part on the first pressure because the first tactile sensation could not be based on the first pressure if the first pressure has not been detected.

DI at 27. “[A] claim term should be construed consistently with its appearance in other places in the same claim or in other claims of the same patent.” *See Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342 (Fed. Cir. 2001); *see also* EX2008 at ¶¶ 31-33. Thus, by the Board’s logic, the same ordering should also apply to claim limitation [1c] (“detect a second pressure...”) because the second tactile sensation could not be based on the second pressure if the second pressure has not been detected. EX1001 at 20:39-43. Furthermore, this ordering should apply to limitation [1e] (“detect a third pressure”) as well since a third tactile sensation cannot be provided before a third pressure is detected. *Id.* at 20:44-46. Accordingly, as the

Board has already recognized with respect to limitation [1a], each “detect” step must precede its corresponding “tactile sensation” step as a matter of logic.

2. As a matter of grammar, each pressure must be detected before their corresponding tactile sensation is provided.

Grammar establishes that limitation [1a] (“detect a first pressure...”) must precede limitation [1b] (“provide a first tactile sensation...based at least in part on the first pressure”) because the term “a first pressure” of limitation [1a] provides antecedent basis for the term “the first pressure” of limitation [1b]. *Id.* at 20:35-38 (emphasis added); *see also Energizer Holdings, Inc. v. ITC*, 435 F.3d 1366, 1370 (Fed. Cir. 2006) (“The requirement of antecedent basis is a rule of patent drafting, administered during patent examination.”). As the Federal Circuit has repeatedly ruled, once a term is recited in a claim, “[s]ubsequent use of the definite articles ‘the’ or ‘said’ in a claim refers back to the same term recited earlier in the claim.” *Wi-LAN, Inc. v. Apple Inc.*, 811 F.3d 455, 462 (Fed. Cir. 2016), *citing Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008); *see also Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1356-57 (Fed. Cir. 1999) (“It is clear from the language of the claim itself that the term ‘a discharge rate’ in clause [b] is referring to the same rate as the term ‘the discharge rate’ in clause [d]...In addition, that conclusion avoids any lack of antecedent basis problem for the occurrence of “the discharge rate” in clause [d].”); *Microprocessor Enhancement*

Corp. v. Tex. Instruments Inc., 520 F.3d 1367, 1379 n. 8 (Fed. Cir. 2008) (“the term ‘the pipeline stage’ would properly take its antecedent basis from one of the previous uses of ‘pipeline stage’”). Thus, the term “a first pressure” in limitation [1a] and the term “the first pressure” in limitation [1b] should be read to refer to the same “first pressure.”

According to the Federal Circuit, “[a]lthough not an ironclad rule, when the current step of a method claim refers to a previous step using the definite article ‘the,’ the claim language indicates that the previous step occurs sequentially before the current step.” *Medtronic, Inc. v. Teleflex Life Scis. Ltd.*, 2024 U.S. App. LEXIS 6703 (Fed. Cir. Mar. 21, 2024), *citing Wi-LAN*, 811 F.3d at 462 (requiring steps performed by transmitter in apparatus claim to occur in order). The Court has routinely found that claim steps must be performed in sequence when a term in one step refers to the same term recited in a prior step. *See, e.g., Hytera Communs. Co. v. Motorola Sols., Inc.*, 841 Fed. Appx. 210, 218 (Fed. Cir. 2021) (holding that recited steps must be performed in order in which they are written where the use of “the” with a claim term referred to the same term recited earlier in the claim); *Tuna Processors, Inc. v. Haw. Int’l Seafood, Inc.*, 327 Fed. Appx. 204, 210 (Fed. Cir. 2009) (same). As is the case here with claim 1 of the ’260 patent, the Federal Circuit has also applied this rule to non-method claims that describe a device or instrumentality that performs certain steps, as well as method claims. *See, e.g., Wi-*

LAN, 811 F.3d at 462 (holding, in context of apparatus claim, that the claimed transceiver performs the recited steps in the order in which they are written where the use of “the modulated data symbols” in final limitation refers to “modulated data symbols” recited in an earlier limitation). The limitations of claim 1 are merely functional requirements of the invention and not an impermissible mixing of method steps into an apparatus claim. *See Mastermine Software, Inc. v. Microsoft Corp.*, 874 F.3d 1307, 1314-15 (Fed. Cir. 2017) (finding that claims were not invalid for indefiniteness despite use of functional language where they describe an apparatus with particular capabilities). Consistent with its prior finding that limitation [1a] must precede limitation [1b] as a matter of logic, the Board should find that limitations [1a] and [1b] must occur in that order based on grammar.

This same reasoning also requires limitations [1c] and [1d] to occur in order because they follow the same format and order as limitations [1a] and [1b], and they use similar terminology. Limitation [1c] recites “a second pressure...” EX1001 at 20:39-40 (emphasis added). Limitation [1d] recites “the second pressure.” *Id.* at 20:42-43 (emphasis added). If, as explained above, “the first pressure” finds antecedent basis in “a first pressure,” for the same reasons, “the second pressure” should find antecedent basis in “a second pressure.” The term “the second pressure” of limitation [1d] refers back to the term “a second pressure” of limitation [1c], which demonstrates that limitation [1c] must occur before limitation [1d] can occur.

Thus, grammar requires that limitations [1c] and [1d] be construed to occur in their written order to be consistent with limitations [1a] and [1b]. *See, e.g., Phonometrics, Inc. v. N. Telecom Inc.*, 133 F.3d 1459, 1465 (Fed. Cir. 1998) (“A word or phrase used consistently throughout a claim should be interpreted consistently.”).

3. Grammar and logic also require limitations [1a]-[1f] to be performed in order.

The term “the first pressure” is recited not just in limitation [1b], but it is also recited in limitation [1c]. EX1001 at 20:40. That term, as recited in limitation [1c], refers to the same “first pressure” previously recited as “a first pressure” in limitation [1a] and as “the first pressure” in limitation [1b]. Therefore, the term “the first pressure” recited in limitation [1c] finds antecedent basis in both limitations [1a] and [1b]. Just as antecedent basis indicates that limitation [1a] must be performed before limitation [1b], it also indicates that limitation [1c] must follow [1a] and [1b]. *See Medtronic*, 2024 U.S. App. LEXIS 6703, at *9 (concluding that claim steps 1.d, 1.e, and 1.f must occur in that order because “the substantially rigid portion” referenced in step 1.f was the same “substantially rigid portion” previously referenced in steps 1.d and 1.e). In other words, limitation [1c] should follow limitations [1a] and [1b] because [1c] references “the first pressure,” which is the same “first pressure” previously referenced in [1a] and [1b].

Such a construction is consistent with the Federal Circuit's analysis and claim construction in *Hytera Communs. Co. v. Motorola Sols., Inc.*, 841 Fed. Appx. 210 (Fed. Cir. 2021). In *Hytera*, the parties disputed whether the second step recited in claim 7 of the asserted patent—"preparing to transmit a particular payload type in a timeslot"—must be performed before the third recited step of "determining whether the timeslot is a current desired timeslot for the TDMA system," where the term "timeslot" was also recited in the preamble and first recited step. *Id.* at 213, 218 (emphasis added). The Court found that "each step of the method provides an antecedent basis for the steps that follow...includ[ing] 'a' timeslot in the 'preparing' step, which grammatically provides antecedent basis for 'the' timeslot in the 'determining' step." *Id.* According to the Court, "the fact that the 'determining' step says 'the' when it could have said 'a' reinforces our conclusion that it is meant to come after the 'preparing' step." *Id.* The Court rejected, "as a matter of logic," a construction requiring certain recited steps to be performed in their written order while disregarding the antecedent basis in the 'preparing' step and allowing that step to be performed out of order. *Id.*

Like the recited steps of claim 7 in *Hytera*, the limitations of claim 1 of the '260 Patent must follow a logical order because each limitation provides an antecedent basis for the steps that follow. As already discussed above, logic and grammar require limitation [1b] to follow [1a] and limitation [1d] to follow [1c].

However, logic and grammar also require limitation [1c] to follow limitations [1a] and [1b]. Limitation [1c] recites “detect a second pressure...greater than the first pressure” (EX1001 at 20:40), which depends on the “first pressure term” of limitations [1a] and [1b] for antecedent basis. The fact that limitation [1c] refers to “first pressure” using the definite article “the” shows that it refers to the same “first pressure” referenced in limitations [a] and [b], which shows that those steps must occur before limitation [1c] can occur. Ignoring the antecedent basis of limitation [1c]’s “the first pressure” term would fail to give effect to the full claim language. *Haemonetics Corp. v. Baxter Healthcare Corp.*, 607 F.3d 776, 781-82 (Fed. Cir. 2010) (“reading ‘the centrifugal unit’...as the district court did, ignores the antecedent basis for ‘the centrifugal unit’...and fails to give effect to the claim language “comprising a centrifugal component.”) (internal citation omitted).

Moreover, limitation [1c] requires “the second pressure” to be “greater than the first pressure.” As a matter of logic, the invention cannot “detect a second pressure...greater than the first pressure” unless “detect[ing] a first pressure” happens first; a “first pressure” must first exist before the invention can detect that the “second pressure” is greater.

Similarly, limitation [1e], “detect a third pressure...greater than the second pressure” (EX1001 at 20:44-45), refers to the same “second pressure” previously referenced in limitations [1c] and [1d], and, therefore, depends on those prior

limitations for antecedent basis. This antecedent basis necessarily requires limitation [1e] to follow limitations [1c] and [1d] since they all refer to the same “second pressure.” Moreover, the invention cannot detect that the “third pressure” is greater than the “second pressure” unless the “second pressure” is already detected. Finally, limitation [1f] must follow limitation [1e] because, just as the first and second tactile sensations follow detecting the first and second pressures, respectively, the third tactile sensation must logically follow detecting a third pressure. Construing the claim to require an order between only certain limitations (e.g., [1a] before [1b]) but *not* other limitations (e.g., [1a] and [1b] before [1c]) would improperly disregard the antecedent basis for, and logical sequence, of those limitations. *See Hytera*, 841 Fed. Appx. at 218.

4. The embodiments cited by the Board do not embody claim 1

The Board cites the embodiment described in the '260 Patent at 14:43-15:15 and Figure 9 as showing that the '260 Patent encompasses the possibility of detecting the different pressures independently of one another and without any order. DI at 29. The Federal Circuit has “acknowledge[d] that a claim need not cover all embodiments.” *Intamin, Ltd. v. Magnetar Techs., Corp.*, 483 F.3d 1328, 1336-37 (Fed. Cir. 2007) (affirming construction that might not cover a particular disclosed embodiment). Moreover, “[t]he fact that one construction may cover more

embodiments than another does not categorically render that construction reasonable.” *PPC Broadband, Inc. v. Corning Optical Communs. RF, LLC*, 815 F.3d 747, 754-55 (Fed. Cir. 2016) (finding that Board’s construction, which included all disclosed embodiments, was unreasonable). To the extent the embodiment described by the cited language and Figure 9 does not require the pressures to be detected in order, the assumption that this is a possible embodiment of claim 1 is incorrect.

The Board’s assumption ignores the pressure magnitude relationships corresponding to each detection as expressly recited in claim 1 (e.g., the second detected greater than the first detected, the third detected greater than the second detected, etc.). EX2008 at ¶¶ 31-33. Claim 1 describes a specific, progressive relationship in pressure intensity among the specific detected pressures. *Id.* As a result, claim 1 and its dependent claims are specific to embodiments where a user’s progressive pressing of, e.g., a button, is detected at discrete steps in the same corresponding progressive order. EX2008 at ¶ 37.

By contrast, the embodiment at 14:43-15:15 and Figure 9 of the patent has no such pressure relationships between each detected pressure. EX2008 at ¶ 38. For example, in one instance the embodiment detects “Pressure 1” (’260 Patent at 14:44-46) and in a next instance, it detects “pressure 3 on input device number 5.” *Id.* at 14:58-59. However, those pressures listed for input device 5 in Figure 9 are merely three pressures that happened to be named pressure 1, pressure 2, and pressure 3. *Id.*

The specification provides no explicit description in this embodiment of any specific “greater-than” relationships among these three pressures. *Id.* Rather, this embodiment describes a truth table where, if the processor detects pressure 1 on input device 5 during a monitoring pass, it outputs Sensation 13; if the processor detects pressure 3 on input device 5 during another monitoring pass, it outputs sensation 15; etc., but pressure 3 is not necessarily greater than pressures 1 or 2. *See* ’260 Patent at 14:47-50, 60-63; Figure 9. EX2008 at ¶ 39. Accordingly, this disclosure does not embody claim 1. *Id.*

In addition, the Board’s conclusion that “by disclosing detecting distinct Pressures 1 and 3 during different monitoring passes, the ’260 Patent encompasses the possibility of detecting Pressures 1 and 3 independently of one another and not in any particular order” (D.I. 29) improperly imports limitations from a particular embodiment into claim 1. As the Board stated in its Institution Decision, “[i]t is generally improper to read limitations from specific embodiments into the claims.” *Id.* at 28-29, citing *Cadence Pharms. Inc. v. Exela PharmSci Inc.*, 780 F.3d 1364, 1369 (Fed. Cir. 2015) and *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004). As detailed here, it is improper to import “during a monitoring pass” into claim 1. D.I. at 29. While claim 1 refers to detecting pressures, it does not reference monitoring passes explicitly or implicitly, and the specification does not state that monitoring passes are inherent or necessary to the invention. EX2008 at ¶

40. Petitioner's own expert admits that the challenged claims do not recite monitoring passes. EX2010 at 85:13-86:9. Moreover, while the specification discloses detecting pressure 1 during a monitoring pass and then detecting pressure 3 on a later monitoring pass (EX1001 at 14:44-46, 58-59) without mentioning pressure 2, there is no support for the assumption that the embodiment did not detect pressure 2. *See* EX2008 at ¶ 41. Petitioner's expert concedes that the '260 Patent does not disclose whether or not the embodiment detects pressure 2. EX2010 at 87:16-21.

For at least these reasons, the Board should construe claim 1 as requiring limitations [1a]-[1f] to be performed in their written order.

B. "Tactile Sensation" Should Be Construed as "Vibrotactile Sensation"

In the context of the '260 Patent, a POSA would understand that the claim term "tactile sensation" should be construed as "vibrotactile sensation." EX2008 at ¶ 44. The specification explains that a "suitable" tactile sensation is an effect with vibrations, and which can be created by varying the frequency, amplitude, and waveform output by the actuator:

The apparatus 1 shown in FIG. 1 also includes a vibrotactile actuator 6 in communication with the input device 2. Preferably, the actuator 6 is configured to output a plurality of distinct tactile feedback sensations to the input device 2. **Suitable tactile**

sensations include vibrations, for example, jolts and textures, and a plurality of distinct tactile sensations can be created by varying the frequency, amplitude and waveform output by the actuator 6. The actuator 6 is selected to deliver the desired tactile sensations to the input device 2[.]

EX1001 at 3:44-52; *see also id* at 3:56-60 (“the actuator [6] can include a flexure, for example an arrangement of flexible material, couple to the rotating shaft of a DC motor or step motor to transform the rotation of the motor shaft into vibrations or other haptic sensations”), 4:35-38 (“the actuator [6] is an existing eccentric mass motor as is used, for example, as a vibrating ringer in a pager or mobile telephone”), 4:39-42 (“[t]he vibrotactile actuator 6 can also be mounted to a portion of the case or housing of the electronic device in which the apparatus 1 is disposed, communicating the tactile sensations to the entire electronic device”).

Not only are vibrotactile sensations the only form of feedback described as “suitable” by the '260 Patent, but they are also the only type of tactile sensations attributed to the invention at all. Other possible types of tactile sensations are either not mentioned at all or, in the case of simple force feedback that applies a pressure or resistance, are mentioned only in the titles of the '260 Patent's cited prior art references (EX1001 at 3) and in vague references to the prior art in the BACKGROUND section. *See, id.* at 1:30-34 (“In some such devices, physical feedback is provided by conventional mechanical switches in the form of the

conventional mechanical feedback of switches, for example the switch closure force displacement profile”); 1:44-45 (“Such cues include raised bumps on the center key of a telephone keypad....”); EX2008 at ¶¶ 42-44.

The Board’s conclusion that the ordinary and customary meaning of “tactile sensation” is not limited to only vibratory tactile sensations (D.I. at 39) leads to an unreasonably broad interpretation. Construed broadly, “tactile” means “perceptible by touch.” *See* <https://www.merriam-webster.com/dictionary/tactile> (last visited Sep. 12, 2024). Under this interpretation, merely resting a finger on any button would provide a tactile sensation, as would the “switch closure force displacement profile” and “raised bumps” referenced in the Background. However, “tactile sensation” must be construed in the context of the ’260 Patent, which relates to providing tactile sensations in modern “input devices or electronic devices” (EX1001 at 2:16-18) and expressly refers only to “vibrations” as “[s]uitable tactile sensations.” *Id.* at 3:48.

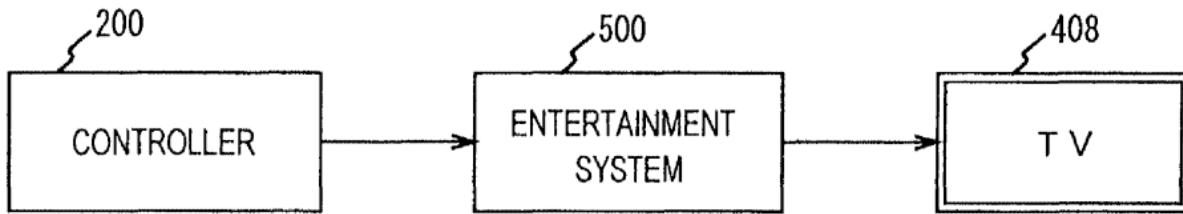
There are many kinds of possible tactile feedback, such as resistive force feedback, electrotactile feedback, ultrasonic feedback, and thermal feedback. However, the only kind of feedback that the ’260 Patent provides written description and enabling disclosure for is vibration feedback. *See, e.g., id.* at 3:44-52, 3:56-60, 4:35-42; EX2008 at ¶ 44. Except for a minor reference in the BACKGROUND to a switch closure force displacement profile (EX1001 at 1:33-34) and “passive touch

cues” such as “raised bumps” (*id.* at 1:43-45), the '260 Patent lacks disclosure sufficient to enable any other type of feedback. EX2008 at ¶ 44. The simple and obvious reason for this lack of enablement for other types of feedback is that the claims of the '260 Patent were never meant to cover more than vibrotactile sensations. Interpreting “tactile sensation” to include types of feedback that it was never meant to cover would improperly render the claims invalid for lack of enablement and written description. *See Ruckus Wireless, Inc. v. Innovative Wireless Solutions, LLC*, 824 F.3d 999, 1004 (Fed. Cir. 2016) (declining to construe claims to encompass certain subject matter since doing so “would likely render the claims invalid for lack of written description”); EX2008 at ¶ 44. The disclosure of the '260 Patent establishes that the claims must be limited to “vibrotactile sensations.”

V. THE ASSERTED REFERENCES

A. Overview of Komata

Komata discloses a method and computer to provide control of vibrations of a controller used in video game machines provided with the controller. EX1005 at Abstract. The system is shown in Figure 1, reproduced below, which includes an Entertainment System 500 connected to controller 200.



The internals of the system 500 are shown in Figure 5, and controller 200 is shown in Figure 6, both reproduced below.

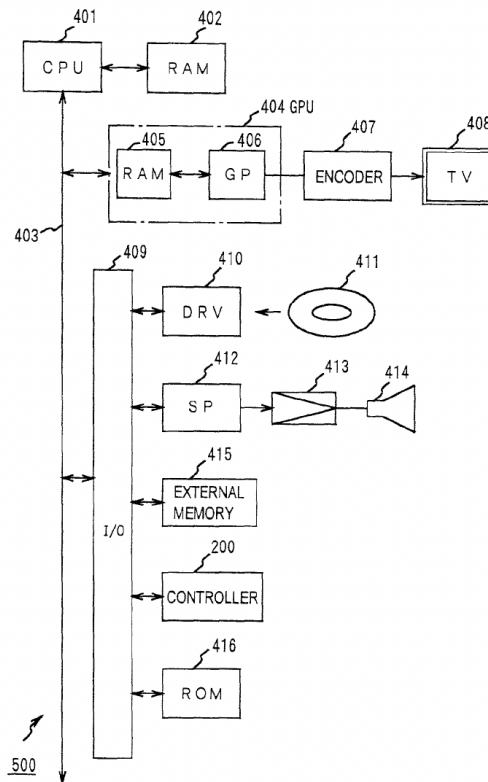
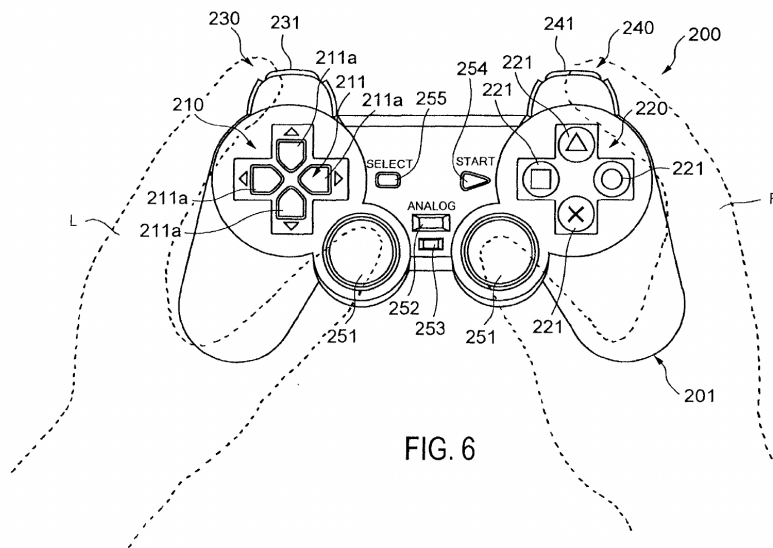


FIG. 5



Komata's system includes two of these controllers each having a pressure-sensitive unit and a vibration unit connected to a video game system to allow the two players to play a game against each other. The system 500 reads a pressure-sense value from a switch in one controller and provides a corresponding drive signal for driving the motor in the other controller. *Id.* at ¶¶ [0007], [0032].

Komata discloses “a head-to-head timing” game between two players who are holding controllers connected to an entertainment system 500 (Figure 1). *Id.* at ¶ [0034]. In the game, a first player pushes a pressure sensitive switch on her controller to generate a vibration in a second player's controller, and the second player reacts and pushes a switch on his controller. EX1005 at ¶¶ [0034]-[0035]; Abstract (“Based on the output value from the pressure-sensitive unit of one of the controllers, vibration is caused in the vibration unit of the other controller, and, based on the output value from the pressure-sensitive unit of the other controller, vibration is

caused in the vibration unit of the first one of the controllers.”). The system awards points to the reacting player based on the speed of the response time—a faster response time receives more points. *Id.* at ¶ [0035], [0048].

Figure 2 of Komata shown below is a table that maps the pressure-sense value detected in a controller to the drive signal for applying in the other controller. *Id.* at ¶ [0036].

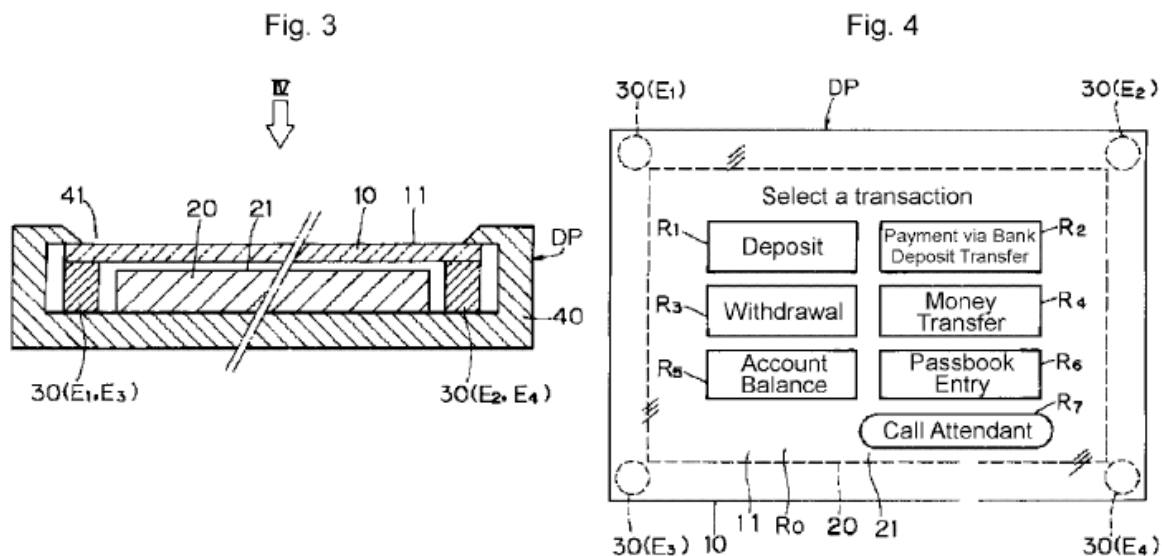
PRESSURE-SENSE VALUE	DRIVE SIGNAL
0	0
1	P 1
⋮	⋮
2 5 5	P 2 5 5

The system 500 receives a pressure-sense value from detecting a button pressed on the first player's controller and provides a drive-signal, derived from the mapping table in Figure 2, to the second player's controller to cause it to vibrate. *Id.* at ¶¶ [0034]-[0036]. Komata mentions in passing that vibration may be provided in both controllers. *Id.* at ¶¶ [0034]-[0035]. However, in the context of Komata's game,

vibration is provided only to the other player's controller, as shown in Steps S4 or S6. *Id.* at Figure 3.

B. Overview of Tsuji

Tsuji discloses two hardware configurations for an information display device with a touchscreen such as an automatic teller machine (ATM). In the first configuration, display unit DP is illustrated in Figures 3 and 4 reproduced below and includes a transparent operation panel 10 positioned over a liquid crystal display panel 20. EX1007 at ¶¶ [0045]-[0046]. As shown in Figure 4, Regions R1 through R7 are selectable by the user, for example to initiate a function such as deposit or withdrawal. *Id.* at ¶ [0047].



Tsuji discloses using piezoelectric elements E1-E4 positioned on the corners of the display, which are used both to detect which of the operation areas were

pressed by a user and the force of the operation press, and also used to vibrate the operation panel 10. *Id.* at ¶¶ [0046], [0048].

In the second configuration, the operation panel 10 of display operation unit DP is replaced by a touch panel 10T, as shown in Figure 15 reproduced below. The hardware control circuit of the Figure 15 embodiment is illustrated in Figure 16. *See id* at ¶ [0133]-[0144]; Figures 15-16.

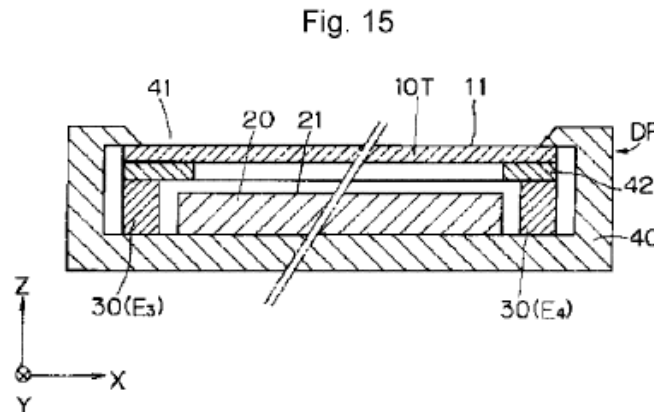


Figure 7 reproduced below discloses a hardware control circuit CT that is used with the first ATM embodiment. Figure 8, also reproduced below, discloses the internal configuration of the Operation Unit 51 in Figure 7.

Fig. 7

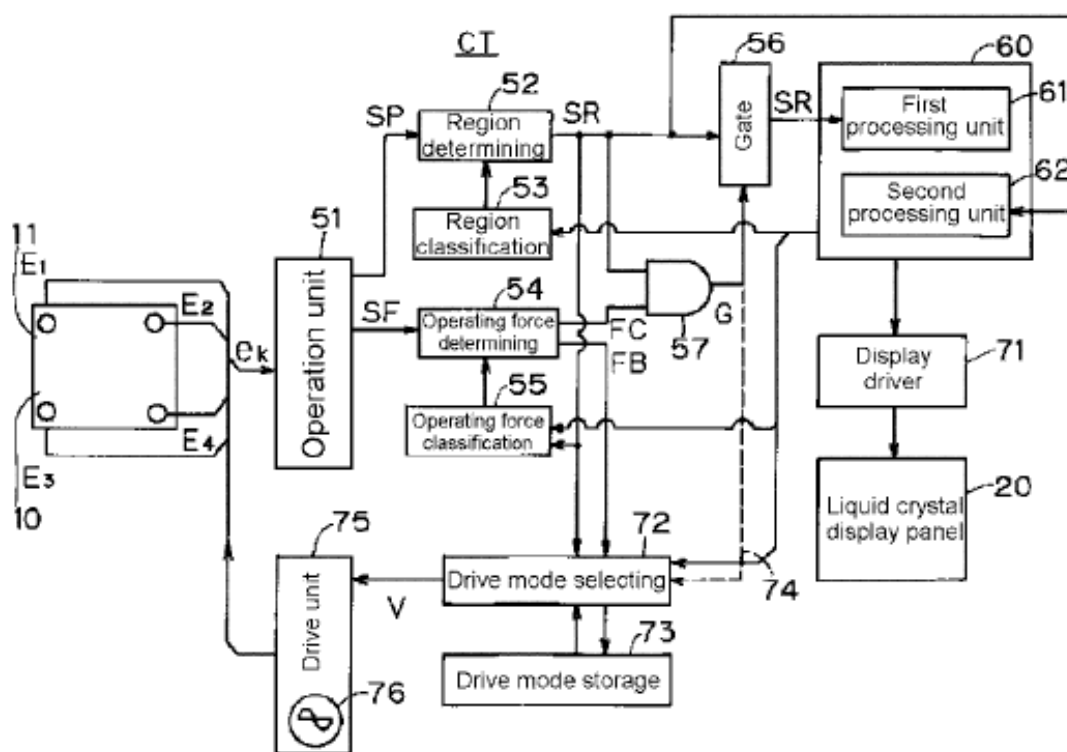
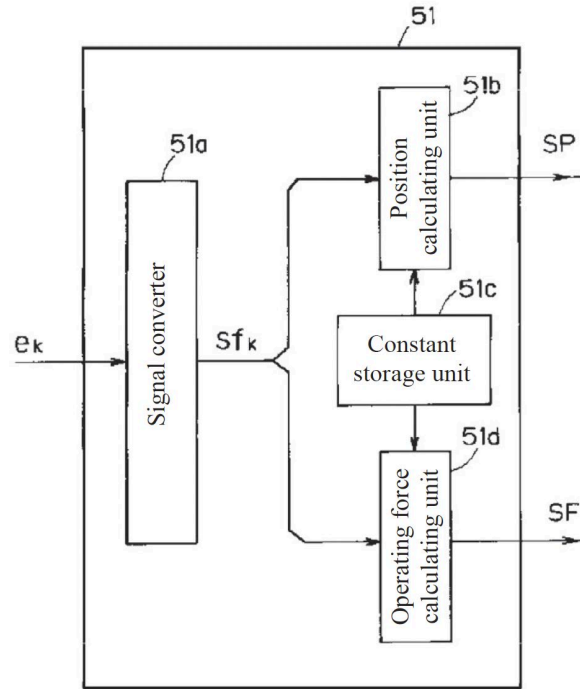


Fig. 8

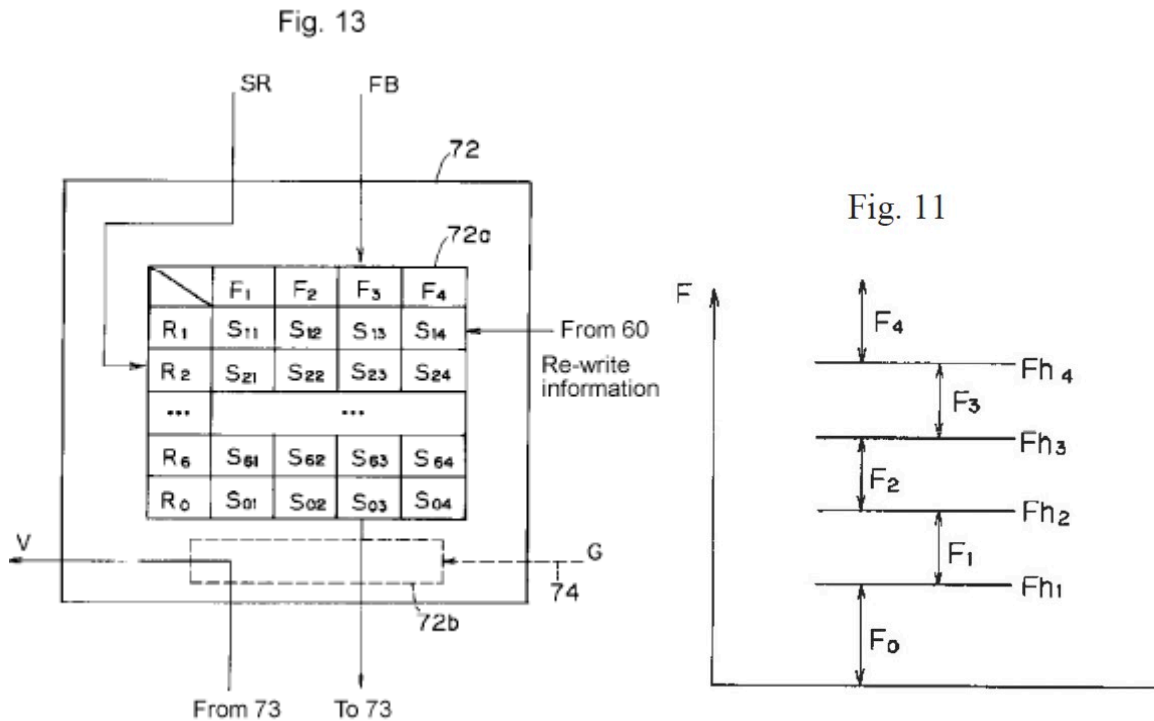


Position calculating unit 51b in Figure 8 determines the operation position through a series of calculations performed by unit 51b and outputs operation position signal SP, which is provided to region determining unit 52. *Id.* at ¶¶ [0084], [0087]. Region determining unit 52 in Figure 7 determines whether a user contacted any of the operation regions R1 through R7 or non-operation region R0, and outputs region determining signal SR to indicate the contacted region. *Id.* at ¶¶ [0088]-[0091]; EX2008 at ¶ 86. In the second embodiment of control circuit unit CT, operating position specification unit 51T outputs operation position signal SP, and the rest of control circuit unit CT operates as it does in the first embodiment. EX1007 at ¶¶ [0139]-[0140].

The operating force calculating unit 51b in Figure 8 calculates the force applied to the operating surface and outputs an operating force signal SF. *Id.* at ¶¶ [0085]-[0086]. In Figure 7, operating force signal SF is “is applied to an operating force determining unit 54.” *Id.* at ¶ [0092]. The operating force determining unit 54 in Figure 7 includes hardware circuitry shown in Figure 12 that determines whether the force falls within one of the thresholds F1 to F4, and outputs two signals FC (operation enabling signal) and a force determining signal FB. *Id.* at ¶¶ [0095]-[0102]; *see also id* at Figures 7, 11, 12.

If a user contacts the operating surface at a pressure below Fh1 (such as during a tracing operation), the operating enabling signal FC is at a non-active level. If FC is not enabled, the AND gate 57 inhibits any vibration as shown in Figure 7. *Id.* at ¶¶ [0104]-[0105]; EX2008 at ¶ 88. The operation of the operating force calculating unit 51b in Figure 8 is similar in the embodiment of Figure 16. EX1007 at ¶ [0143]. Tsuji discloses activating a selection only when both the region determining signal SR indicates the touch is within a valid region (e.g., R1) and the location is pressed with a predetermined threshold force. Tsuji does not disclose multi-function input buttons. For example, region R3 or the withdrawal button only supports a single function, i.e., to initiate a withdrawal. In other words, Tsuji does not disclose activating different input selections or functions by applying different pressure levels to single region or button.

The region determination signal SR and force determining signal FB are both inputs into a drive mode selection unit 72 in Figure 13, reproduced below. The drive mode selection unit 72 selects a single drive mode (e.g., S23) based on the signals SR and FB, and will cause a single operating surface to vibrate. *Id.* at ¶ [0108].

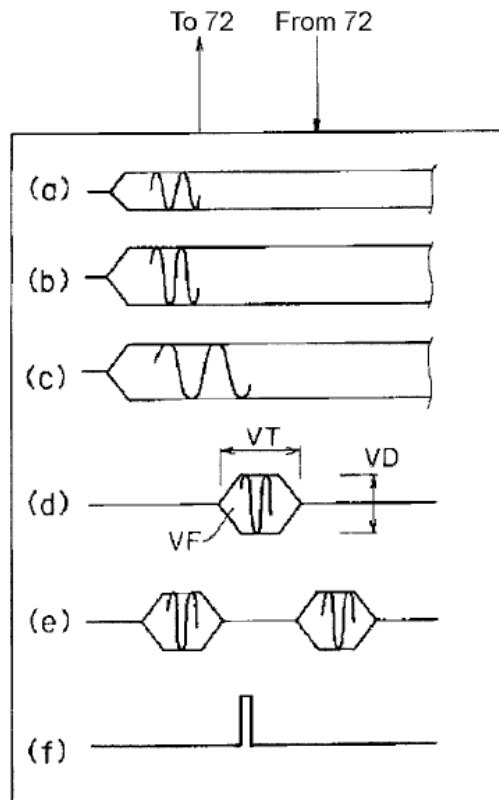


As shown in Figure 11 above, force classifications F1, F2, F3, and F4 signify certain levels of applied force within force threshold levels Fh1 through Fh4, respectively. Thus, referring to the truth table of Figure 13 above, if a force level of F1 is applied to region R1, for example, then code S11 will be selected to specify a certain vibration mode. If a greater force level F3 is applied to region R1, then code S13 will be selected to specify a stronger vibration mode than that of code S11, for example. *Id.* at ¶ [0111]. Tsuji, however, does not disclose applying force levels F1

through F3 in progressive sequence. EX2008 at ¶ 91. Rather, Tsuji merely discloses a truth table in which if a user applies a certain force level to a certain region, then a certain vibration mode is selected, and if a user applies another force to the region, then a different vibration mode is selected. *Id.*

Tsuji also discloses different drive modes (as illustrated in Figure 14 reproduced below) which are stored in the drive mode storage unit. *Id.* at ¶¶ [0110]-[0111]. Figures 14(a) – (b) are continuous drive modes having small and large amplitudes, respectively. Figure 14(c) is a continuous drive mode having a different frequency from drives modes 14(a) and 14(b). If the vibration selected is one of modes 14(a) – 14(c), the vibration continues until the operation is larger than the minimum threshold F1. When a user weakens the force applied to the display panel or removes his finger, the vibration stops. *Id.* at ¶ [0126]. Figures 14(d) –(e) show drive modes where the user instead simply received a single or double vibration. Figure 14(f) shows a drive mode that provides a one-shot pulse. *Id.* at ¶ [0110].

Fig. 14



Tsuji discloses a further embodiment implemented as a game device 200, shown in Figures 17-19. *Id.* at ¶¶ [0145]-[0152]. In this embodiment, “operating regions R1 through R4 displayed by the liquid crystal display panel are visible through the operating surface 11 in FIG 17.” *Id.* at ¶ [0146]. Tsuji states that when a user presses on one of the operating regions R1 to R4 with pressure larger than a predetermined threshold, the operating surface is vibrated. *Id.* (“When the position of this pressing operation is sensed, if the pressing force thereof is larger than a predetermined threshold, the operation input is accepted, a displayed object 210 (FIG. 18) on a screen changes, and the operating surface 11 is vibrated or slightly

displaced based on a predetermined mode.”). Tsuji does not disclose the detection of multiple pressure levels applied to operating regions R1 to R4 in Figures 17-18. EX2008 at ¶ 93.

C. Overview of Rosenberg

The Rosenberg reference is a 1999 patent application by inventor Louis Rosenberg, who is the founder of Patent Owner Immersion. Rosenberg discloses a low-cost force feedback interface device designed to enhance user interactions in environments displayed by a computer such as in video games or virtual reality environments. EX1008 at Abstract. The force feedback device is manipulatable by the user in its planar workspace and includes a sensor to detect movement of the device in the workspace. The sensor can also detect button presses on the device. *Id.* The device also includes an actuator to generate output force in a direction that is perpendicular to the plane of the device's movement in the workspace. *Id.* The force feedback interface device and its interaction with the user are illustrated in Figure 1, reproduced below.

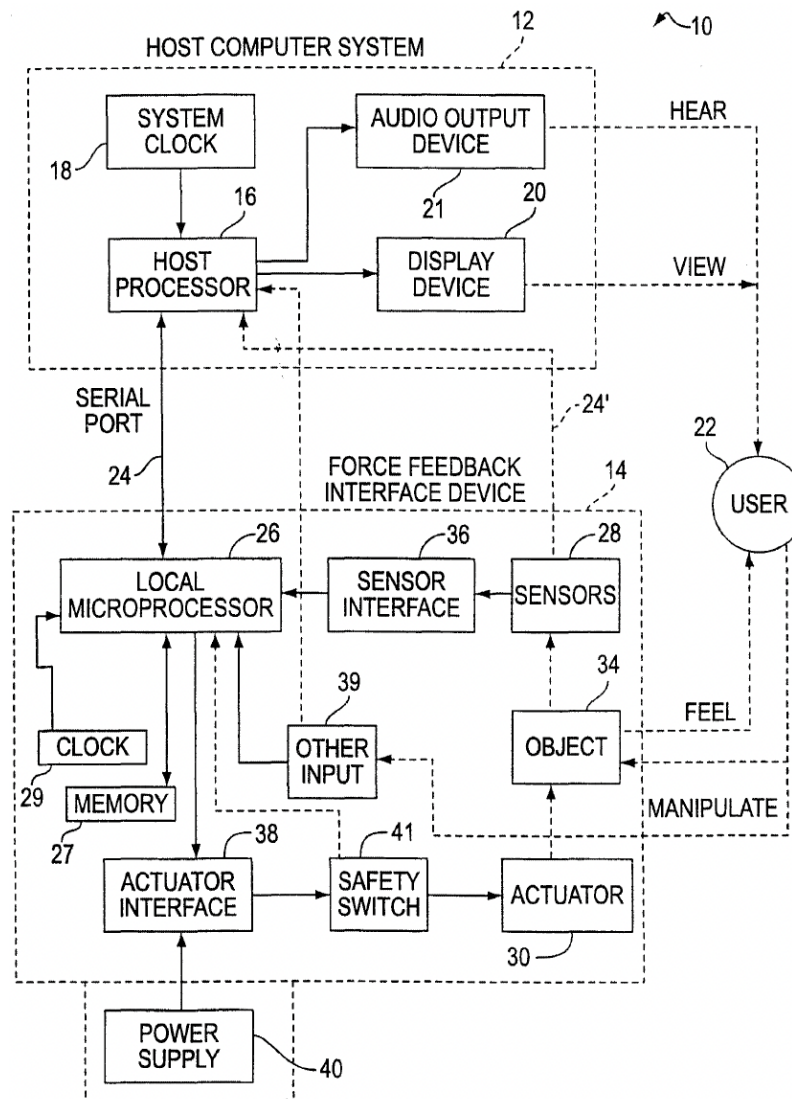
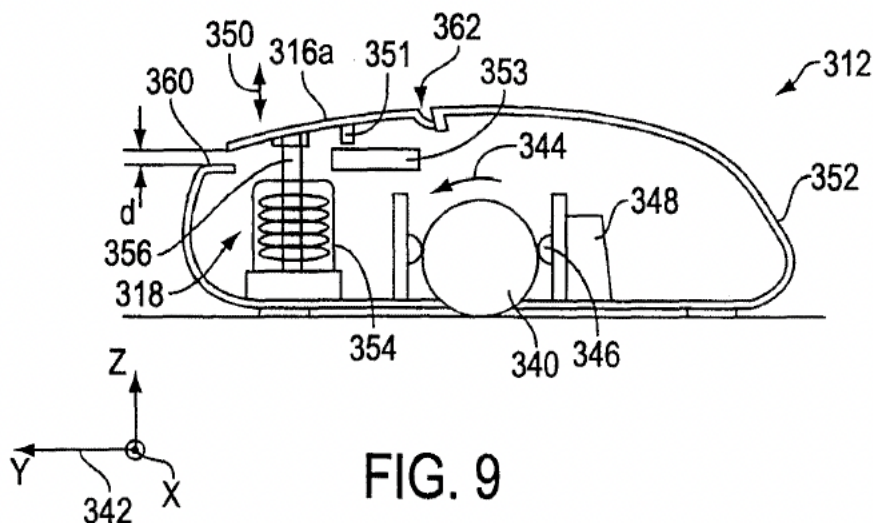


FIG. 1

In one embodiment disclosed in Rosenberg, the force feedback interface device is a conventional computer mouse movable in a planar workspace. *Id.* at 23:15-24:3. The mouse includes a sensor to detect button presses and the precise position of the button in its range of motion when it is pressed. *Id.* at 23:15-24:3, 25:33-26:4, 28:20-25. The sensor can alternatively be a force sensing switch to detect the amount of force applied to the button as it is being pressed to determine

the position of the button within its degree of freedom. *Id.* at 28:20-25. Based on the determined position of the button, a force feedback output is provided to the user. *Id.* at 25:33-26:4. This force feedback sensation is a spring force provided by actuator 318 as shown in Figure 9, reproduced below. *Id.* at 30:29-34. Rosenberg states that the magnitude of this force feedback is dependent on the distance of the button from the origin of the spring shown in the illustration. *Id.* In other words, as illustrated in Figure 9 below, the feedback mechanism of the button is simply like a traditional loaded spring where the further a user pushes down on the spring, the greater the resistance. *Id.* But there is no activation of different input functions as the user pushes down harder in this way. EX2008 at ¶ 108. In any event, as explained in greater detail below in Section VIII.B, a POSA would not consider this type of blunt or resistive feedback force to be a tactile sensation. *Id.*



In another embodiment disclosed in Rosenberg, the force feedback mouse is designed to provide sensations that make user interaction with graphical objects more compelling and intuitive. *Id.* at 29:14-21. This embodiment is illustrated in Figure 12, reproduced below, which is a diagram of display screen 326 of host computer 314 showing a graphical user interface for use with the mouse. *Id.* In Figure 12, a cursor 446 is controlled by the mouse to select and manipulate the graphical objects on the screen. *Id.* The position of the cursor corresponds to a position of the mouse on its planar workspace. *Id.*

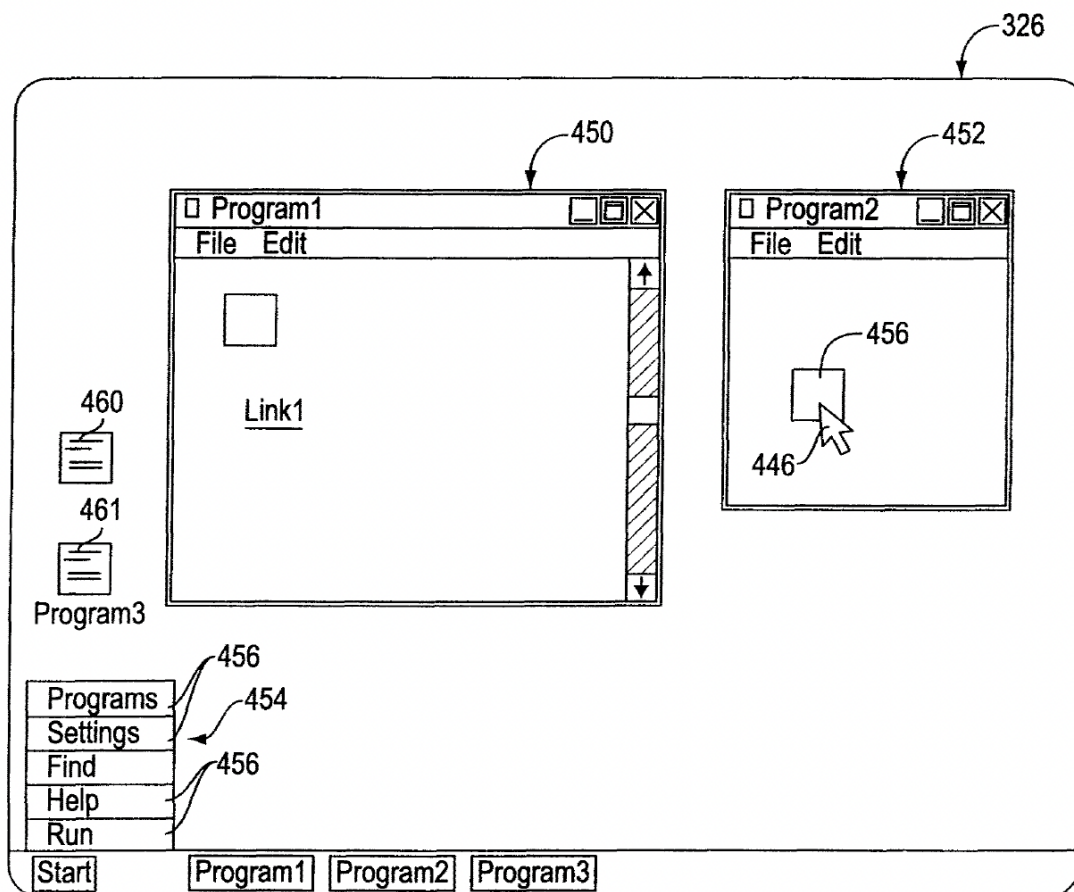


FIG. 12

In this embodiment, tactile feedback such as vibration sensations and textured sensations are output using actuator 318 in the mouse based on the user-controlled cursor's movements in the displayed graphical environment and the cursor's interactions with the graphical objects. *Id.* at 29:20-30:6. For example, sensations described as textured bumps are output depending on whether cursor has moved over the location of a bump in a graphical object. *Id.* In other words, when the sensed position of the mouse moves over a designated texture area, the sensation is output by the actuator. *Id.* Thus, in this embodiment of Rosenberg, tactile sensations are provided based on the spatial location of the movable mouse in its planar workspace, and not based on any pressure applied to the mouse button.

VI. GROUND 1: CLAIMS 1-7 ARE PATENTABLE OVER KOMATA

Under the appropriate construction discussed above in Section IV.A., Komata does not anticipate and/or render obvious claims 1-7 of the '260 Patent because Komata does not disclose the ordered steps of detecting a first, second, and third pressure applied in progressively increasing sequence required by independent claim 1 and dependent claims 2-7.

Komata does not disclose the detection of a *first* pressure, *second* pressure, and *third* pressure and the provision of their corresponding tactile sensations in the ordered sequence recited in claim 1. Petitioner contends that Komata discloses the sensing of pressure when the button on the video game controller is pressed. Pet. at

19-20. To show that Komata discloses detecting a pressure level applied to the game controller button, Petitioner cites to Komata's statement that "analog output from the pressure-sensitive devices is converted by an A/D converter to digital values in the range of 0-255." *Id.* at 20 (citing EX1005 at ¶ [0032]; Figure 2, reproduced below). In this way, Petitioner contends that, for example, "Pressure-Sense Value 1" is detected.

PRESSURE-SENSE VALUE	DRIVE SIGNAL
0	0
1	P 1
⋮	⋮
2 5 5	P 2 5 5

To show that Komata discloses also detecting the next successive levels of increasing pressure applied by the user, Petitioner merely states that "[u]sing that same process [as for detecting Pressure-Sense Value 1], the CPU can also detect digital Pressure-Sense Value 10," for example, when the user has pushed the button in a manner that would generate "Pressure-Sense Value 10." Pet. at 24-25. Komata, however, does not disclose detecting three progressively increasing pressure levels that were applied to the game controller button in the successive order recited in

claim 1 of the '260 Patent. In fact, Petitioner's expert admits that nothing in Figure 2 discloses detecting pressures in order: "...Figure 2 illustrates sensing 256 different pressure levels and generated 256 corresponding drive signals, and I see nothing in the figure right now that would – goes in order." EX2010 at 23:7-16. Petitioner's expert further notes that the pressure values are also not necessarily listed in the table in order. EX2010 at 26:20-27:6 ("...I do not see the table necessarily places an order on that values [sic]. The table just says that there are pressure values."). Komata only discloses the table shown above that provides a correlation of pressure-sense values to drive signals in the range of 0 to 255. Komata is devoid of any disclosure for a user applying progressively increasing pressure levels in sequence to begin with. Komata also lacks any disclosure for detecting pressure levels in the sequence they were applied to provide corresponding tactile sensations. EX2008 at ¶¶ 80-81; EX2010 at 34:19-35:1.

Petitioner attempts to gloss over this deficiency by arbitrarily hypothesizing that in one instance a button press could result in the detection of Pressure-Sense Value 1, and in another instance, a button press could result in the detection of Pressure-Sense Value 10. Pet. at 24-25. However, a POSA would understand that the mere disclosure of the table in Figure 2 does not teach the ordered steps of detecting progressively increasing pressure levels—the claimed feature that is

uniquely tailored to the problem that the '260 Patent faced in the prior art. EX2008 at ¶¶ 80-81.

Further, Petitioner has not shown that Komata performs the claimed steps in order either expressly or inherently. “For a claim to be anticipated, each claim element must be disclosed, either expressly or inherently, in a single prior art reference, and the claimed arrangement or combination of those elements must also be disclosed, either expressly or inherently, in that same prior art reference.” *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332-1333 (Fed. Cir. 2010). “[A]nticipation by inherent disclosure is appropriate only when the reference discloses prior art that must *necessarily* include the unstated limitation [...]” *Transclean Corp. v. Bridgewood Servs., Inc.*, 290 F.3d 1364, 1373 (Fed. Cir. 2002). “Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.” *Cont'l Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1269 (Fed. Cir. 1991) (quoting *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981)); *see also Trintec Indus., Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 1295 (Fed. Cir. 2002) (“Inherent anticipation requires that the missing descriptive material is ‘necessarily present,’ not merely probably or possibly present, in the prior art.” (quoting *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999))). Here, Petitioner’s mapping to Komata is nothing more than conjecture that pressure *could be* applied

and detected in the progressively increasing order that is recited in claim 1 of the '260 Patent.

Accordingly, Komata does not disclose the ordered steps of detecting a first, second, and third pressure applied in progressively increasing sequence as claimed, and thus, Komata does not anticipate and/or render obvious independent claim 1. Since claims 2-7 of the '260 Patent ultimately depend on claim 1, they include all limitations of claim 1. 35 U.S.C. § 112(d). Therefore, for the same reasons articulated above with respect to claim 1, Komata does not anticipate and/or render obvious claims 2-7 of the '260 Patent.

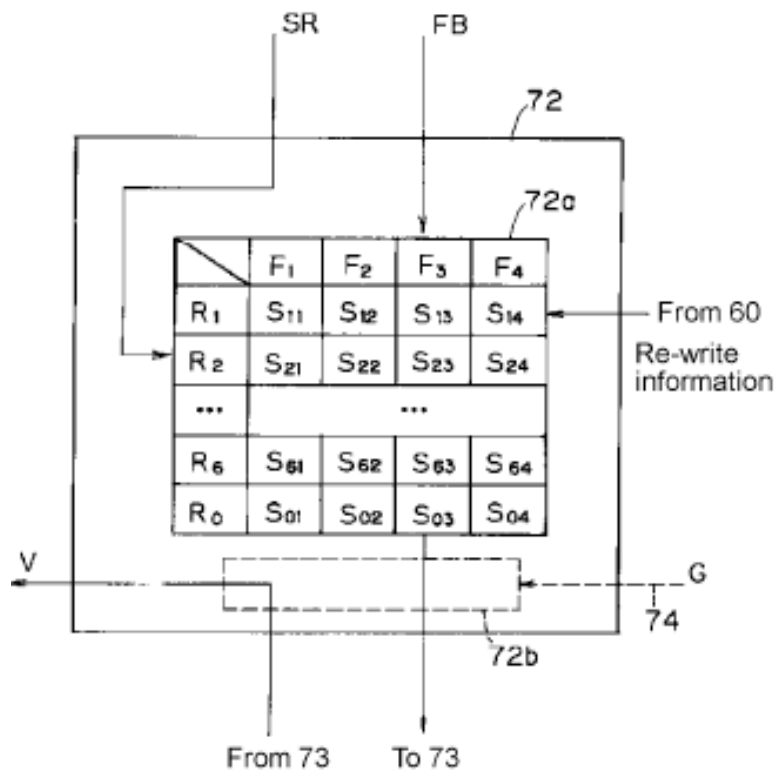
VII. GROUND 2: CLAIMS 1-7 ARE PATENTABLE OVER TSUJI

Under the appropriate construction discussed above in Section IV.A., Tsuji does not anticipate and/or render obvious claims 1-7 of the '260 Patent because Tsuji does not disclose the ordered steps of detecting a first, second, and third pressure applied in progressively increasing sequence required by independent claim 1 and dependent claims 2-7.

Tsuji does not disclose the detection of a *first* pressure, *second* pressure, and *third* pressure and the provision of their corresponding tactile sensations in the ordered sequence recited in Claim 1. Petitioner contends that Tsuji discloses detecting a pressure level when a user presses on the operating regions displayed on the electronic device such as an ATM screen or video game device. Pet. at 42-43.

Petitioner states that “voltages from piezoelectric elements E1-E4 within device 100 are used to detect pressure that is applied to the display, e.g., when a finger presses an operating region.” *Id* (citing EX1007 at ¶¶ [0018], [0051], [0081]-[0085]). Accordingly, Petitioner contends that, for example, a pressure within the F1 classification is detected. Pet. at 43.

Fig. 13



To show that Tsuji allegedly discloses also detecting the next successive levels of increasing pressure, Petitioner relies on the mere fact that Tsuji has five force classifications F0 to F4, which correspond to the detected levels of force applied to an operating region on the touchscreen. Pet. at 46. In the truth table shown

above, a certain feedback signal, e.g., S11, is output if a certain level of force, e.g., F1, is applied on a certain region, e.g., R1. *Id.* Thus, Petitioner conjectures that in one instance a force level of F1 is detected as applied on a region, and then in another instance, a force level of F2, which is greater than F1, is detected as applied on the same region. *Id.*

Tsuji, however, does not disclose detecting three progressively increasing pressure levels that were applied to the touchscreen in the successive order recited in Claim 1 of the '260 Patent. Tsuji only discloses the table shown above that provides a correlation of detected force classifications (F1-F4) to drive mode signals, e.g., S11, S12, etc. As Petitioner's expert concedes, Tsuji does not disclose that the forces must be detected in any order. EX2010 at 40:2-7 ("Q...The disclosure of Tsuji, in general, doesn't require that the forces must be detected in any particular order, does it?...THE WITNESS: I don't see that right now, no, sir."). Nowhere in Tsuji is there any disclosure of a user applying progressively increasing pressure levels and detecting pressure levels in the sequence they were applied to provide corresponding tactile sensations. EX2008 at ¶ 100.

Petitioner makes much of the statement in Tsuji that says, "a stronger vibration is to be applied as the operating force F gets larger." Pet. at 46 (citing EX1007 at ¶ [0111]). This, however, is simply describing the nature of the truth table of Figure 13, reproduced above, which clearly shows that for higher force

classifications, a stronger drive signal is generated. In other words, this statement explains the logic of Tsuji's system in accordance with the truth table—that is, *if* a certain force is applied, then a certain drive signal is generated, and *if* a stronger force is applied, then a stronger drive signal is generated. A POSA would understand that neither Figure 13 nor this statement in Tsuji discloses the ordered steps of detecting progressively increasing pressure levels—the claimed feature that is uniquely directed to the problem in the prior art that the '260 Patent solves. EX2008 at ¶¶ 101-102. Further, similar to the discussion above in Section VI above for Komata, Petitioner's mapping to Tsuji here is nothing more than conjecture that pressure is applied and detected in the progressively increasing order that is recited in Claim 1. Thus, Petitioner has not shown that Tsuji performs the claimed steps in the order written either expressly or inherently. *Cont'l Can Co. USA, Inc.*, 948 F.2d at 1269 (“Inherency [...] may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.”).

Accordingly, Tsuji does not disclose the ordered steps of detecting a first, second, and third pressure applied in progressively increasing sequence as claimed, and thus, Tsuji does not anticipate and/or render obvious independent claim 1. Since claims 2-7 of the '260 Patent ultimately depend on claim 1, they include all limitations of claim 1. 35 U.S.C. § 112(d). Therefore, for the same reasons

articulated above with respect to claim 1, Tsuji does not anticipate and/or render obvious claims 2-7 of the '260 Patent.

VIII. GROUND 3: CLAIMS 1-7 ARE PATENTABLE OVER ROSENBERG

A. Rosenberg Does Not Disclose an Apparatus that Detects Three Different Pressures and Provides a Tactile Sensation for Each Pressure

Petitioner argues that Rosenberg's mouse embodiment, as shown in Figures 8 and 9 below, anticipates or renders obvious the challenged claims, but it is fundamentally different from the invention claimed in the '260 Patent and, therefore, does not and cannot disclose the elements of claim 1 or its dependent claims.

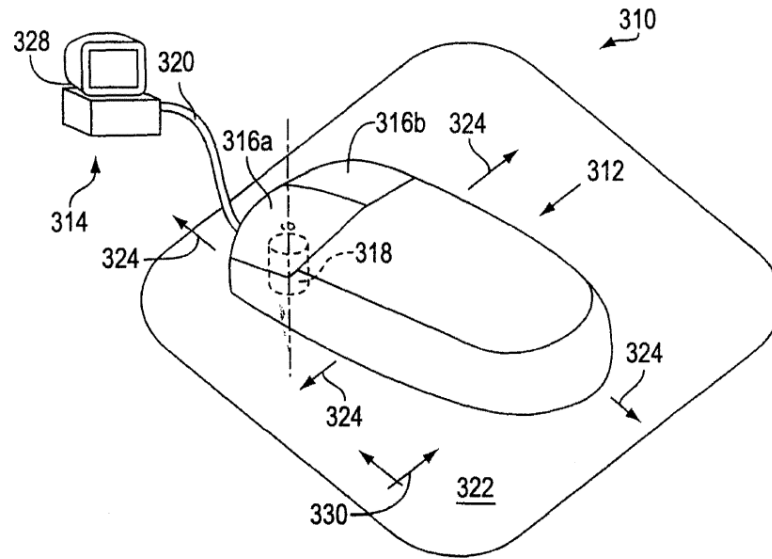


FIG. 8

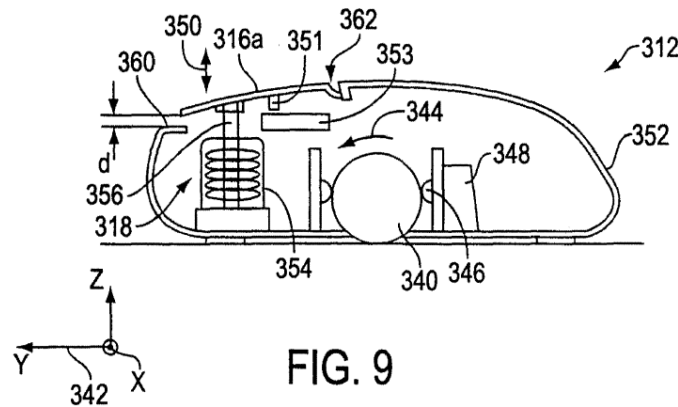


FIG. 9

As Petitioner's expert admits, Rosenberg discloses "a mouse that would have been conventional at the time of this – this reference [Rosenberg]," which is the approximately the period of 1998 to 1999. EX2010 at 43:21-44:9. A POSA would understand that the mouse shown has buttons 316a and 316b which operate over a short range of travel in a single degree of freedom to input a single command signal

(i.e., a mouse click) when pressed. EX2008 at ¶ 105. As Rosenberg's specification explains, this embodiment functions like an ordinary computer mouse:

Buttons 316a and/or 316 b are selected by the user as a "command gesture" when the user wishes to input a command signal to the host computer 314. The user pushes the button 316a down (in the degree of freedom of the button approximately along axis z) toward the actuator 318 to provide a command to the computer.

EX1008 at 25:23-26. According to Rosenberg, the mouse button's range of motion can be further limited in a variety of ways. For example, the button can be pressed downward from a rest position until it reaches a stop, which may be part of or coupled to the housing of the mouse, preventing further movement. *Id.* at 25:17-20. The button can also have a stop that limits its travel to a desired distance from the housing, which might be different from the rest position. *Id.* at 25:20-21, 26:32-33. As described above in Section V.C, the mouse may also output a force that moves the mouse button either up or down, using, for example, a hinge, spring, or repulsive magnet pair. *Id.* at 26:14-24. Thus, Rosenberg discloses several positions of the button such as a point of rest or at defined stops.

A POSA would understand that in this embodiment of Rosenberg, there is only one click that registers and one corresponding feedback sensation associated with that click because that is how conventional mice work, both at the time of the

invention and even today. EX2008 at ¶ 105; *see also* EX2010 at 43:21-44:9 (Petitioner's expert describing Rosenberg's mouse as conventional). Moreover, a POSA would understand the short range of a mouse button is too narrow for a user to conveniently, efficiently, and reliably register multiple-stage clicks, each with an associated tactile sensation. EX2008 at ¶ 105. Rather, as Rosenberg explains, the switch determines "a simple on or off state of the button." *Id.* at 25:32; EX2008 at ¶ 105.

Petitioner, on the other hand, argues that:

by using a "continuous-range sensor," like a force-sensing switch (Ward, ¶327), "***each position*** of the button can be sensed as a different analog value and used as an analog value or a digital value in processing the button position. This allows ***the host computer 314 (or local microprocessor)*** to determine the position of the button and to control a force output based on that position." 25:33-26:4.

Pet. at 61. But this does not mean that the mouse provides different tactile sensations at different button positions, rather it is meant to convey that a force output is provided at the ON position. Even for this purported "continuous-range sensor," Rosenberg does not disclose multiple-stage clicks with multiple tactile sensations corresponding to the different stage clicks. *Id.* at 25:33-26:4. The "continuous-range" of Rosenberg's button is meant to provide flexibility on where to define the

threshold line for the ON or OFF state—i.e., where the mouse click happens and dead zones before or after the click happens. EX2008 at ¶ 106. There is no disclosure of multiple pressures, with one greater than another, or different tactile sensations provided for each pressure. In the context of a mouse button, there is simply no room or need for multiple stages of pressures and associated effects, i.e., tactile sensations. *Id.*

Petitioner points to claims 35 and 36 of Rosenberg as disclosing detecting a range of at least three positions of the button and that output force is dependent, at least in part of the position of the button, but all they describe is a button with, e.g., a rest position, a stop position, and a predetermined threshold position at which the mouse outputs a force. EX2008 at ¶ 107; *see also* EX1008 at 26:14-36 (Rosenberg's explanation of a rest position and stop position). In other words, Rosenberg's mouse has only one "ON" position that registers a single click with a single corresponding feedback. Claims 35 and 36 are separate claims, they do not depend on each other, and there is no indication in Rosenberg that they describe the same embodiment or can be combined. Both claims ultimately depend on claim 30, which states that when the "button is pressed by said user to a predetermined position, a command signal is sent to said host computer." EX1008 at 38:5-6. This indicates that there is a single predetermined position that registers a click to send a single command signal, consistent with Rosenberg's previously described mouse button embodiment that

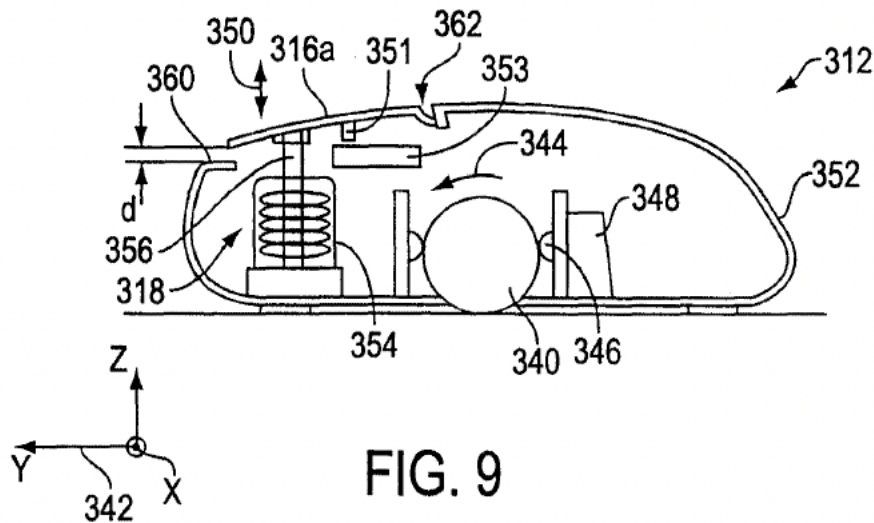
registers an on or off state as mouse buttons typically do. *Id.* at 25:31-32; EX2008 ¶ 107. Neither of claims 35 or 36, individually or in combination, disclose three pressures, each greater than the last, and corresponding tactile sensations provided upon detecting each pressure. *Id.* at ¶¶ 107-108.

B. Rosenberg Does Not Disclose the “Tactile Sensation” Required by the Claims

Rosenberg does not disclose providing tactile sensations that correspond to the detection of a first, second, and third pressure applied to the input device, i.e., the mouse in Rosenberg. Instead, what Petitioner points to as a tactile sensation in Rosenberg is the blunt push-back or resistive effect that the user experiences when pushing down on the mouse button. As explained in Section IV.B. above, this force feedback effect does not meet the claimed tactile sensation limitation in the '260 Patent.

Petitioner maps Claim 1 of the '260 Patent to an embodiment disclosed in Rosenberg that mimics the spring effect when a mouse button is pressed as shown in Rosenberg's Figure 9. For example, Petitioner contends that “the ‘force’ applied to button 316 ‘detects’ the ‘*pressure*’ applied to the button.” *See* Pet. at 61. Petitioner then contends that the claimed limitation for providing a corresponding tactile sensation is met because Rosenberg allegedly teaches “a force sensation that mimics a mechanical spring so ‘[t]he magnitude of this force sensation is dependent on the

distance of the button from the origin of the spring” as illustrated below. Pet. at 62; *see also id.* (“the magnitude of the force sensation that the actuator provides on button 316a increases as the pressure applied by the user increases to push the button further down”).



A POSA would understand that this type of rudimentary, blunt force feedback effect provided to mimic a mechanical spring as shown above for the Figure 9 embodiment is not a tactile sensation required by the '260 Patent. EX2008 at ¶¶ 108, 111-116.

Petitioner and its expert also contend that the actuator of the mouse of the Figure 9 embodiment produces “vibration” sensations. Pet. at 62 (citing EX1008 at 3:14-15, 17:17-18:5 (discussing vibration sensations) and EX1003 at ¶¶ 328-329). However, Petitioner cannot conflate the sensations produced by the actuator in the separate spatial movement-based embodiment of Figure 12 with the sensations

produced by the actuator in the button press embodiment of Figure 9. EX2008 at ¶ 110. The vibration sensations that Petitioner and its expert refer to are produced based on the location of the mouse in the planar workspace; not based on the position of the mouse button that is pressed in simulating a mechanical spring. *See, e.g.*, EX1008 at 30:1-4 (“This type of [textured or vibration] force is ***spatially-dependent***, i.e., a force is output depending on the sensed position of the mouse as it moves over a designated textured area”) (emphasis added); EX2008 at ¶ 110.

While Rosenberg's spatial movement-based embodiment of Figure 12 (as discussed above in Section V.C) provides vibrotactile sensations such as “textured bumps,” it provides those sensations based on the spatial position of the mouse (i.e., the position of the user-controlled cursor on the graphical display), not based on detecting pressure applied to the mouse button as required by the '260 Patent. *See* § V.C, *supra* (citing EX1008 at 29:14-30:6); EX2008 at ¶ 110. Petitioner cannot point to this second embodiment for its vibrotactile sensations in combination with the previously discussed button press embodiment of Figure 9 since there is no showing that the features of the two embodiments in Rosenberg can be interchanged or combined. *See, e.g., Abiomed, Inc. v. Maquet Cardiovascular, LLC*, IPR2017-01204, Paper 8 at 11, (PTAB Oct. 23, 2017) (denying institution of IPR because petitioner failed to show that the features of disparate embodiments in the prior art reference were interchangeable or combinable). Accordingly, Rosenberg does not

anticipate and/or render obvious independent Claim 1 or its challenged dependent claims 2-7 because Rosenberg does not disclose providing tactile sensations based on detecting pressure applied to the input device as required by the claims of the '260 Patent.

IX. CONCLUSION

Petitioner has not met its burden to show that claims 1-7 of the '260 Patent are unpatentable, and, therefore, the challenged claims should be affirmed.

Respectfully Submitted,

Dated: October 15, 2024

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(Case No. IPR2024-00477)

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CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the word count for all portions of the foregoing Patent Owner's Response totals 12,676 words per Microsoft Word, which complies with the requirement of 14,000 words allowed under 37 C.F.R. § 42.24(d).

Respectfully submitted,

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CERTIFICATE OF SERVICE

As authorized by Patent Owner's Mandatory Notice, I hereby certify that on October 15, 2024, a copy of this document has been served in its entirety by electronic mail on Petitioner's lead and backup counsel.

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