

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VALVE CORPORATION,
Petitioner,

v.

IMMERSION CORPORATION,
Patent Owner.

Case IPR2024-00478
Patent 9,430,042

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

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	BACKGROUND	6
	A. Summary of the '042 Patent.....	6
III.	ASSERTED ART.....	7
	A. Ichinose.....	7
	B. Levin.....	8
	C. Wang.....	12
	D. Rosenberg-I	13
	E. Rosenberg-II.....	15
	F. Goldenberg	17
IV.	NONE OF LEVIN, WANG, OR GOLDENBERG (KNOB PRIOR ART) ARE ANALOGOUS ART	18
	A. Legal Standard.....	18
	B. The '042 Patent and the Knob Prior Art do not share the same field of endeavor.....	19
	C. The Knob Prior Art lacks detent virtualization, and therefore is not reasonably pertinent to the problem or purpose of the '042 Patent	24
V.	CLAIM CONSTRUCTION.....	26
	A. Person of Ordinary Skill in the Art (POSA)	26
	B. “virtual detent”	27
	C. “detent profile”	28
	D. “input device configured to control a plurality of systems”	29
VI.	GROUND 1: THE ICHINOSE-LEVIN COMBINATION DOES NOT RENDER THE CHALLENGED CLAIMS OBVIOUS	38
	A. Levin is Not Analogous Art	39
	B. Neither Ichinose nor Levin Discloses Vibrotactile Feedback.....	39
	1. Neither Ichinose nor Levin alone or in combination discloses “a Virtual Detent”	39

2.	Neither Ichinose nor Levin Alone or in Combination Discloses “a detent profile comprising haptic data associated with a virtual detent”	43
3.	Neither Ichinose nor Levin Alone or in Combination Discloses “generating a vibrotactile signal ...”	44
C.	Petitioner Has Not Demonstrated a Motivation to Combine Ichinose and Levin with a Reasonable Expectation of Success	44
1.	Petitioner has failed to show that a POSA would be motivated to modify Ichinose with Levin.....	44
2.	Petitioner improperly applies hindsight bias in its proposed combination of Levin and Ichinose.....	46
3.	Petitioner fails to demonstrate a reasonable expectation of success	47
VII.	GROUND 2: THE WANG-ICHINOSE COMBINATION DOES NOT RENDER THE CHALLENGED CLAIMS OBVIOUS	48
A.	Wang is Not Analogous Art.....	49
B.	Neither Ichinose nor Wang Discloses Vibrotactile Feedback	49
1.	Neither Ichinose nor Wang alone or in combination discloses “a Virtual Detent”	49
2.	Neither Ichinose nor Wang alone or in combination discloses “a detent profile comprising haptic data associated with a virtual detent” and “generating a vibrotactile signal configured to cause an actuator to produce a . . . virtual detent”	50
C.	Petitioner Has Not Demonstrated a Motivation to Combine Wang and Ichinose	50
1.	A POSA would not be motivated to modify Wang with Ichinose and Petitioner has not demonstrated otherwise	50
2.	Petitioner fails to demonstrate a reasonable expectation of success	52

**VIII. GROUND 3: ROSENBERG DOES NOT ANTICIPATE THE
CHALLENGED CLAIMS.....52**

- A. Claim [1A] “receiving an input signal comprising information associated with a manipulation of an input device configured to control a plurality of systems, wherein the input device comprises a touch-pad;” 52
 - 1. Rosenberg does not disclose “an input device configured to control a plurality of systems” 52
- B. Claim [1B]: “receiving a detent profile associated with one of the systems, the detent profile comprising haptic data associated with a virtual detent” 58
 - 1. Rosenberg does not disclose “virtual detent” 58
 - 2. Rosenberg does not disclose a “detent profile” 59
 - 3. Rosenberg does not disclose “receiving a detent profile associated with one of the systems” 60

**IX. GROUND 4: THE ROSENBERG-GOLDENBERG
COMBINATION DOES NOT RENDER ANY OF THE
CHALLENGED CLAIMS OBVIOUS 63**

- A. Goldenberg is Not Analogous Art.....63
- B. Neither Rosenberg-I nor Goldenberg Alone or in Combination Discloses “manipulation of an input device configured to control a plurality of systems” 63
- C. Neither Rosenberg-I nor Goldenberg Alone or in Combination Discloses “a detent profile associated with one of the systems, the detent profile comprising haptic data associated with a virtual detent” 64
 - 1. The combination fails to teach “a virtual detent” 64
 - 2. The combination fails to teach “a detent profile associated with one of the systems” 64

D. Petitioner Has Not Demonstrated a Motivation to Combine 66

1. A POSA would not be motivated to modify Rosenberg
with Goldenberg and Petitioner has not demonstrated
otherwise 66

2. Petitioner fails to demonstrate a reasonable expectation
of success 68

X. CONCLUSION 68

TABLE OF AUTHORITIES

CASES

<i>10X Genomics, Inc. v. Bio-Rad Labs</i> , IPR2020-00086, Paper 8 (Apr. 27, 2020).....	32
<i>Airbus S.A.S., Firepass Corp.</i> , 941 F.3d 1374 (Fed. Cir. 2019).....	19
<i>Belden Inc. v. Berk-Tek LLC</i> , 805 F.3d 1064 (Fed. Cir. 2015)	70
<i>Grain Processing Corp. v. Am.-Maize Prods. Co.</i> , 840 F.2d 902 (Fed. Cir. 1988).....	48
<i>In re Bigio</i> , 381 F.3d 1320 (Fed. Cir. 2004)	18, 19, 21, 25
<i>In re Clay</i> , 966 F.2d 656 (Fed Cir. 1992)	20, 25, 27
<i>In re Klein</i> , 647 F.3d 1343 (Fed. Cir. 2011)	18
<i>In re Magnum Oil Tools Int'l, Ltd.</i> , 829 F.3d 1364 (Fed. Cir. 2016)	47
<i>In re Wood</i> , 599 F.2d 1032 (CCPA 1979)	19, 20
<i>Intel Corp. v. PACT XPP Schweiz AG</i> , IPR2020-00518, Paper 34 (Aug. 9, 2021)	54
<i>Johns Manville Corp. v. Knauf Insulation, Inc.</i> , IPR2018-00827, Paper 9 (Oct. 18, 2018)	47
<i>Neomagic Corp. v. Trident Microsystems</i> , 287 F.3d 1062 (Fed. Cir. 2002)	31, 57
<i>Net MoneyIN, Inc. v. VeriSign, Inc.</i> , 545 F.3d 1359 (Fed. Cir. 2008).....	63, 66
<i>Schott Gemtron Corp. v. SSW Holding Co.</i> , IPR2014-00367, Paper 62 (May 26, 2015).....	27
<i>Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.</i> , 2024 U.S. App. LEXIS 7185 (Fed. Cir. Mar. 27, 2024).....	71

Wang Laboratories, Inc. v. Toshiba Corp.,
993 F.2d 858 (Fed. Cir. 1993) 22, 24, 25

Wyers v. Master Lock Co., 616 F.3d 1231 (Fed. Cir. 2010)..... 19

Xerox Corp. v. 3Com Corp., 458 F.3d 1310 (Fed. Cir. 2006)..... 55, 56, 62, 65

EXHIBIT LIST

Exhibit No.	Exhibit Description
2001	Declaration of Craig Rosenberg Ph.D.
2002	CV of Craig Rosenberg Ph.D.
2003	Joint Claim Construction Statement
2004	Order on Motion to Stay Pending IPR
2005	Case Scheduling Order
2006	Valve Corp's Invalidity Contentions
2007	Declaration of Robert Akl, Ph.D.
2008	CV of Robert Akl, Ph.D.
2009	US 2006/0119573 ("Grant")
2010	US 2007/0222765 ("Nyssonen")

I. INTRODUCTION

Patent Owner Immersion Corporation (“Immersion”) respectfully requests that the Board affirm the challenged claims 1-19 of Immersion’s U.S. Patent No. 9,430,042 (EX1001 or the “’042 Patent”) as none of the asserted prior art alone or in combination discloses all limitations of the challenged claims.

The challenged ’042 Patent is directed to virtual controls that are implemented on touch-pads. Virtual controls are instantiated virtually rather than physically and therefore do not have physically manipulable appendages, i.e., a rotatable knob or slidable slider. As detailed in the Background section of the ’042 Patent, Immersion’s inventors recognized that with many mechanical functions being replaced by electronics, operation of controls has been made less intuitive. For example, without click-stops or “detents,” i.e., a sense of mechanical resistance, it may be difficult to achieve a similarly effective experience from an electronic substitute for a traditional mechanical control device. To mimic the experience of physically manipulatable appendages and corresponding detents (e.g., click-stops), the ’042 Patent introduced the concept of a virtual detent—which includes a simulation of a mechanical detent created through vibrotactile feedback to simulate a sense of mechanical resistance. The inventors also introduced the concept of detent profiles, which serve to define characteristics of the virtual detent depending on the system or application and corresponding detents being virtualized.

A common theme across the Petition's obviousness grounds is the hindsight reconstruction of the '042 Patent by combining two types of prior art: (1) patents that disclose virtual controls on 2-dimensional touchpads and (2) patents that disclose detents with physical 3-dimensional controls (such as knobs and sliders) and mechanisms that provide continuous contact forces, i.e., force feedback, to mimic the feel of a traditional mechanical detent. Petitioner attempts to combine these two types of art to yield a simulated version of a mechanical detent, i.e., a "virtual detent," on a touchpad with vibrotactile feedback to simulate the feeling of the detents. But there is no sufficient rationale for why a POSA would combine touchpad patents with physical knob mechanical detent patent. A POSA would not implement such physical knobs and force feedback producing mechanisms in 2-dimensional touchpad screens, much less be able to fit such 3-dimensional apparatuses in the form factor of a touchpad. This is the epitome of hindsight reconstruction.

The Petition also ignores a key aspect of the '042 Patent—virtual controls and virtual detents—and cites art that focuses on physical input devices (e.g., 3-dimensional knobs and sliders) that provide **non-vibrational** force feedback (e.g., continual normal forces that do not include vibrotactile sensations). Force feedback is continuous force exerted against a user, e.g., when the user presses a brake pedal he feels a normal opposing force from the pedal. "Normal forces" are contact forces

a solid object exerts in a direction opposite to which a user pushes against the contact surface. These forces are not vibrational as they do not oscillate in direction or magnitude, in contrast to vibrotactile effects which do so.

Although prior art for 3-dimensional control appendages (such as a physical slider, switch, knob, etc.) output force feedback to mimic mechanical detent on such physical knobs and sliders, this type of detent prior art, is not applicable to the 2-dimensional touch-pad environment that provide on-screen virtual controls of the '042 Patent. As such, force feedback would also not be applicable to touchpads. Rather, vibrotactile feedback is more suited to touchpads. The force feedback prior art simply discloses the mechanical detent functions that Immersion's inventors sought to virtualize in the '042 Patent. By asserting art that only discloses the mechanical detent control appendages that the '042 Patent's virtual controls were intended to replace, the Petition merely identifies the problem the invention solved, rather than demonstrate that the prior art renders the challenged claims obvious.

Furthermore, the Petition suffers from several other fatal deficiencies. *First*, the Rosenberg reference in Grounds 3-4 does not disclose the claim element "receiving an input signal comprising information associated with a manipulation of an input device configured to control *a plurality of systems*." More specifically, Rosenberg does not disclose "a plurality of systems" under the term's plain and ordinary meaning since Rosenberg only discloses a single computer system. To

overcome this clear deficiency, however, Petitioner engages in an improper claim construction that is contrary to the fundamental canons of construction. Petitioner assigns a special construction to the term “plurality of systems” to categorically equate all software applications as the claimed “systems.” Petitioner does not base its construction on any intrinsic evidence whatsoever. Instead, it bases it solely on an improper and erroneous interpretation of Patent Owner's infringement contentions in the district court case. Petitioner's approach to claim construction is fundamentally improper. As a matter of well settled law, claims may not be construed by reference to the accused product.

Here, Petitioner has misunderstood Patent Owner's reading of the claim term in its infringement contentions to mean that all applications constitute the claimed “plurality of systems.” This is how improperly relying on infringement contentions to construe a claim leads to incorrect claim constructions, and why the standard for claim construction requires two separate steps of first construing the claims *without reference to the accused products*, and then applying the construction to the product or prior art—not the other way around, as Petitioner does. Therefore, even though Rosenberg fails to disclose the limitation under its plain and ordinary meaning, Patent Owner offers the correct construction that reflects how the term is understood in light of the intrinsic evidence in order to clarify the proper meaning of the claim term in contrast to Petitioner's erroneous construction. As detailed below,

Rosenberg does not disclose the claims of the '042 Patent under both (1) the plain and ordinary meaning and (2) the clarifying construction for the claim element “receiving an input signal comprising information associated with a manipulation of an input device configured to control a plurality of systems” which properly reflects the intrinsic evidence and is consistent with the proper reading of the infringement contentions.

Second, the knob prior art (Levin, Wang, and Goldenberg) are not analogous to the '042 Patent because they disclose physical input devices with force feedback, rather than vibrotactile feedback, which are not in the same field of endeavor as, nor reasonably pertinent to, the '042 Patent and the problem it solves. *Third*, because the knob art is not directed to vibrotactile feedback, the Grounds relying on that art do not disclose key claim elements such as “vibrotactile effect,” “virtual detent,” and “detent profile.” *Fourth*, as detailed herein, a POSA would not have been motivated to combine 3-dimensional physical knob input devices providing force feedback with touch-pads. Petitioner applies hindsight bias by using the '042 Patent as a guide to reconstruct the invention using the prior art. Also, a POSA would recognize that force feedback, for 3-dimensional appendages to exert such normal forces, cannot be applied to a touch-pad with a 2-dimensional input surface. “Normal forces” are contact forces that a solid object exerts against a surface on which a user pushes against—i.e., they are continual and non-vibrational. Thus, a POSA would also not

have had a reasonable expectation of success in making this combination. For these reasons detailed below, the challenged claims should be upheld.

II. BACKGROUND

A. Summary of the '042 Patent

The '042 Patent describes techniques for simulating the experience of physical input devices such as knobs, sliders, and levers on input devices such as touchpads. EX1001, 2:59-63. Physical input devices typically have mechanical detents such as click-stops that gave users feedback on the extent of their manipulation. *Id.*, 1:22-29. The inventors of the '042 Patent recognized that modern electronic input devices were less intuitive to use because they did not have “click-stops or ‘detents,’ or otherwise a sense of mechanical resistance” which made it “difficult [for users] to obtain a similar experience from an electronic substitute for a traditional mechanical control device” *Id.*, 1:33-37.

To solve this problem, the '042 Patent introduced the concept of the virtual detent. *Id.*, 1:15-17. A virtual detent uses vibrotactile feedback to mimic a mechanical detent. *Id.* Understanding that detents come in a variety of forms corresponding to different input devices (e.g., different systems), the inventors also introduced the concept of the “detent profile,” which defines “which of a plurality of simulated mechanical detents to generate.” *Id.*, 55-56. The '042 Patent discloses

example detent profiles that define rotary detents (*id.*, 13:47-53), hard stop detents (*id.*, 13:54-62), damper detent profiles (*id.*, 14:27-34), among others.

III. ASSERTED ART

A. Ichinose

Ichinose (U.S. 6,819,990) describes a touch-pad for vehicle applications. EX1015, Abstract. Ichinose's touch-pad is disclosed to be a 2-dimensional surface mounted to a steering wheel:

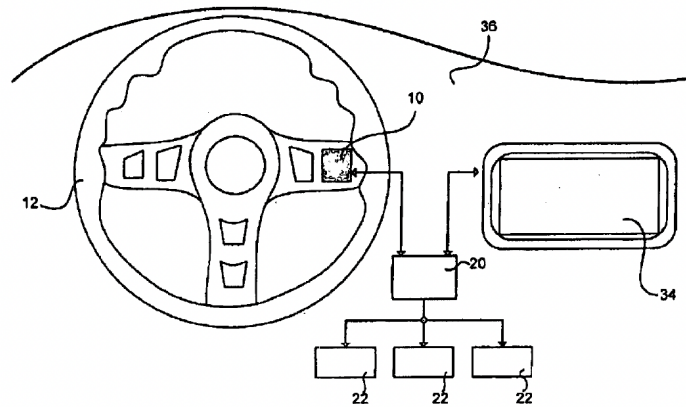


FIG. 1A

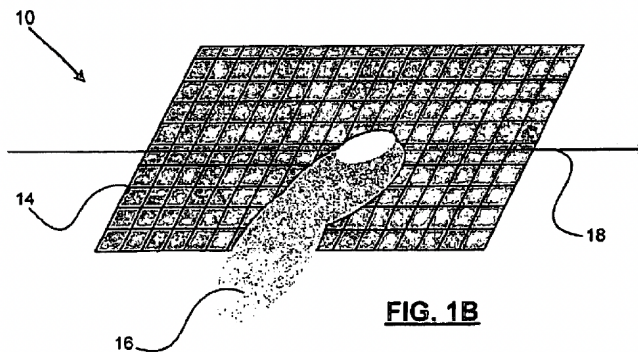


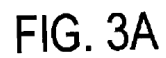
FIG. 1B

Id., FIGS. 1A-B.

Ichinose describes that a user may control a cursor of a display interface. *Id.* Ichinose's system is taught to output a feedback signal when the user "traverses a boundary of the display region on the display." *Id.* As described, Ichinose system includes a software module that generates a feedback signal, which the feedback device outputs as a feedback signal. *Id.*, 1:45-51.

B. Levin

Levin (U.S. 6,686,911) describes a "control knob on a device that allows a user to control functions of the device." EX1016, Abstract. The control knob is described to be "rotatable in a rotary degree of freedom and moveable in at least one transverse direction approximately perpendicular to the axis." This is also illustrated below:



As shown, the knob 18 is a physical knob—not a virtual one—that the user physically moves in the transverse directions 28 (*id.*, 13:5-17). FIG. 3B further illustrates that knob 18 has a cylindrical shape with grooved surfaces for the user to manipulate in 3-dimensions:

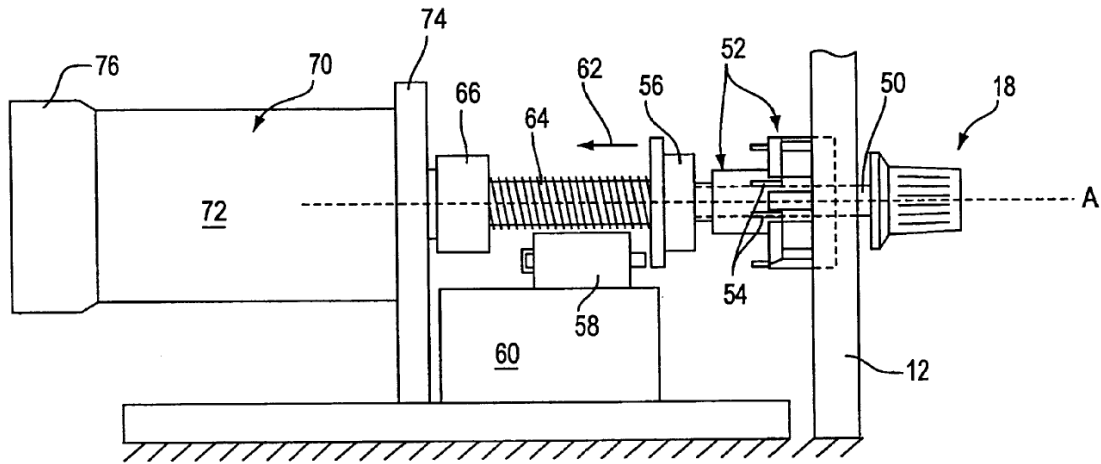


FIG. 3B

Id., FIG. 3B. According to Levin, detent forces are provided to the control knob. EX1016, 3:9-12. This force feedback is taught to be in the rotary degree of freedom for knobs (*id.*, 5:48-50) and in the linear degree of freedom for sliders (*id.*, 7:10-11).

Levin does not employ vibration forces exerted through the physical knob for the purpose of mechanical detents. The only vibration Levin discloses is for using vibration forces that “correlate with the magnitude” of, for example, fan rotation speed in a specific use case for fan adjustment controls. EX1016, 8:11-26. This is not used for the underlying detent effects. Instead, this helps a user to adjust a rotating knob to control the fan speed in a car’s climate system along with detents. *Id.* In this case, force feedback is provided to the user to provide mechanical detents, and then another layer of vibrational feedback (indicating fan speed) is superimposed with the force feedback detents. *Id.* A faster vibration is provided for

higher fan speed such that a user can feel both the force feedback detents as well as the vibrations signifying the fan speed. In this way, the user can better select fan speed based on tactile feel as the detent indicates each discrete fan setting and the vibration provides a sense of the increasing fan speed. *Id.*

Levin teaches the augmentation of additional forces such as vibrations and jolts to force feedback detents but does not teach that these vibrations and jolts simulate the force feedback detent itself. The vibration indicates a fan speed level, but the force feedback simulates the detent. *Id.* The same is true of jolts, which is similarly not disclosed to be a detent itself. *Id.*, 11:59-67.

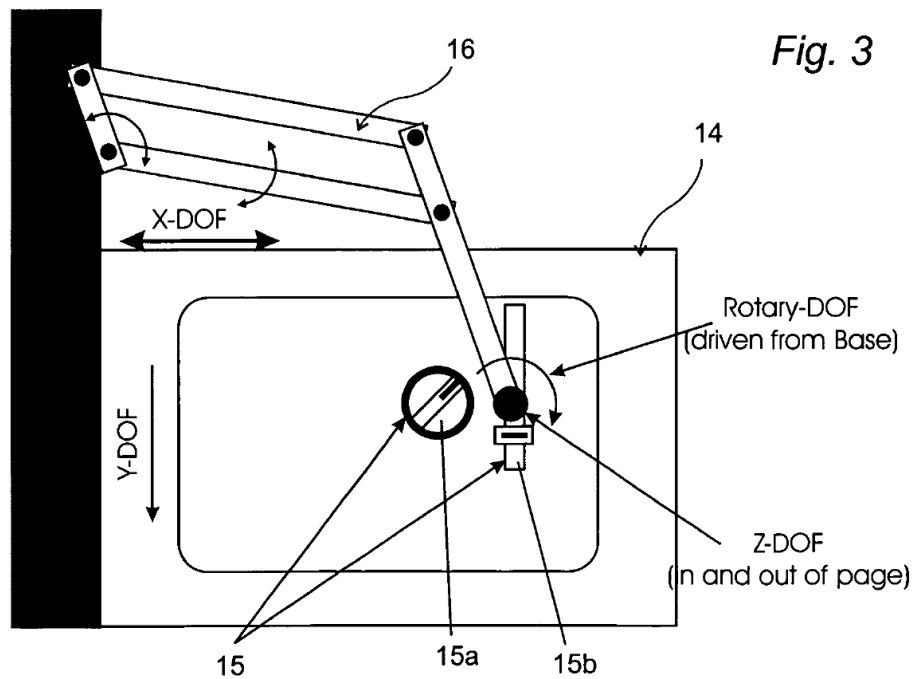
Levin teaches combining jolts with an underlying force feedback detent. *Id.*, 11:37-53; 11:62-65; 12:12-18. For example, in the context of a rotary knob or a slider, the underlying force feedback detents are output at particular rotational or linear positions of the knob or slider to inform the user how much the knob has rotated. *Id.* To enhance the feedback or make the detent's position more noticeable, Levin teaches that a jolt or bump force can be added on top of the underlying force feedback. *Id.* At 7:63-67, 10:11-32, 11:62-65. This combination of force feedback and jolts can make selection easier for the user by providing more pronounced physical feedback when the knob reaches a detent position. *Id.* Consequently, Levin's vibrations and jolts are not taught to simulate the force feedback detents itself, but rather augment the force feedback.

C. Wang

Wang (WO 02/102616) describes a “haptic reconfigurable dashboard system for controlling and monitoring various subsystems and hardware in a vehicle.” EX1022, 1:3-5. Wang discloses replacing “conventional physical knobs, levers and controls [] with virtual knobs, levers, control and haptic technology.” *Id.*, 2:5-7. Wang’s “virtual knobs” are implemented using **a physical control appendage (haptic device 16) overlaid¹** on a “picture of dial (a virtual control device) on the virtual device panel.” *Id.*, 6:15-18. The haptic device 16 is a 3-dimensional object, which “feels solid” and is physically rotatable. *Id.*, 6:18-20.

The haptic device 16 is taught to have a rotary, X, Y, and Z degrees of freedom. *Id.*, FIG. 3. This is shown below:

¹ All emphasis is added unless otherwise noted.

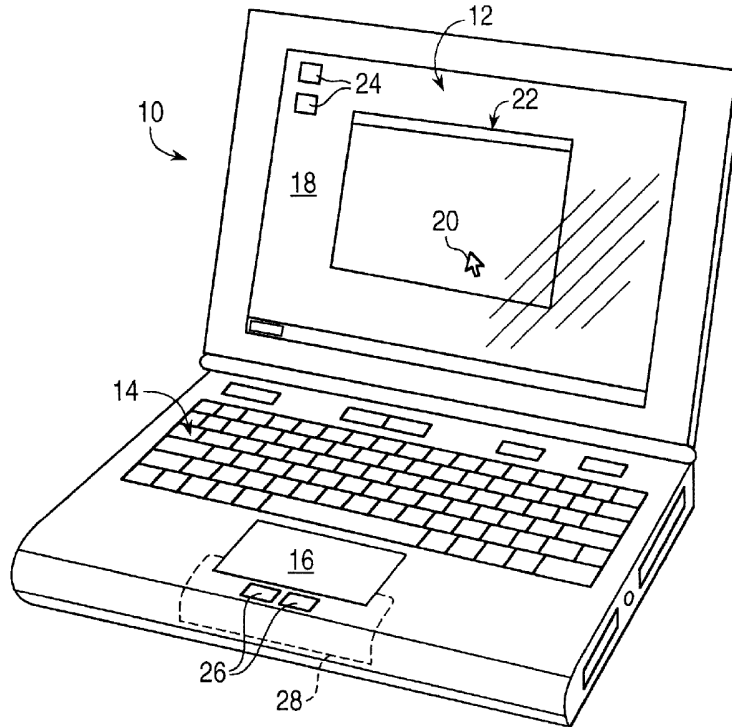


Id.

In Wang, the control knob is provided with “a haptic feedback mechanism for providing a force effect to the haptic device when it manipulates the virtual control device or indicator.” *Id.*, 2:15-17.

D. Rosenberg-I

Rosenberg-I (U.S. 6,429,846) describes “a haptic feedback planar touch control used to provide input to a computer.” EX1009, Abstract. The planar touch control is described to control a “cursor in a displayed graphical environment.” *Id.* This is shown below:

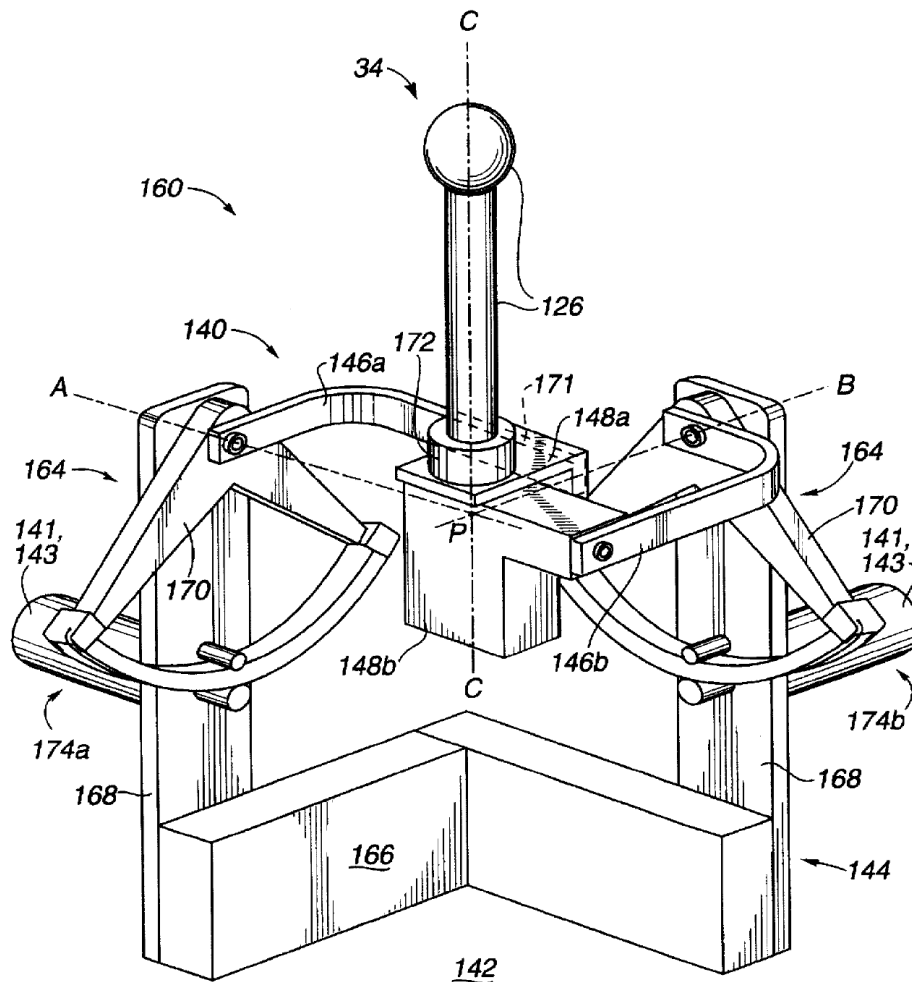


Id., FIG. 1.

Rosenberg-I describes that an “actuator is coupled to the touch input device and outputs a force on the touch input device to provide a haptic sensation to the user contacting the touch surface.” *Id.*, 2:14-19. The haptic feedback is described to “assist and inform the user of interactions and events within a graphical user interface.” *Id.*, 2:56-58. According to Rosenberg-I, the haptic sensations are associated with user interaction with interface elements: “haptic sensation, such as a pulse, vibration, or spatial texture, are preferably output in accordance with a interaction of a controlled cursor with a graphical object in the graphical environment.” *Id.*, 2:41-44.

E. Rosenberg-II

Rosenberg-II (U.S. 5,734,373) describes a physical, 3-dimensional control object such as a joystick for interfacing with a computer. EX1010, Abstract. Rosenberg-II's "host computer updates a host application process, such as a simulation or video game, in response to the input control signal [and a] microprocessor local to the interface apparatus and separate from the host computer receives the host command and provides a processor output control signal." *Id.*, 3:35-40. Rosenberg-II discloses that "[a]n actuator receives the processor output control signal and provides a force along a degree of freedom to a user-manipulated object, such as a joystick, in accordance with the processor output control signal." *Id.*, 40-44. An example joystick is shown below:

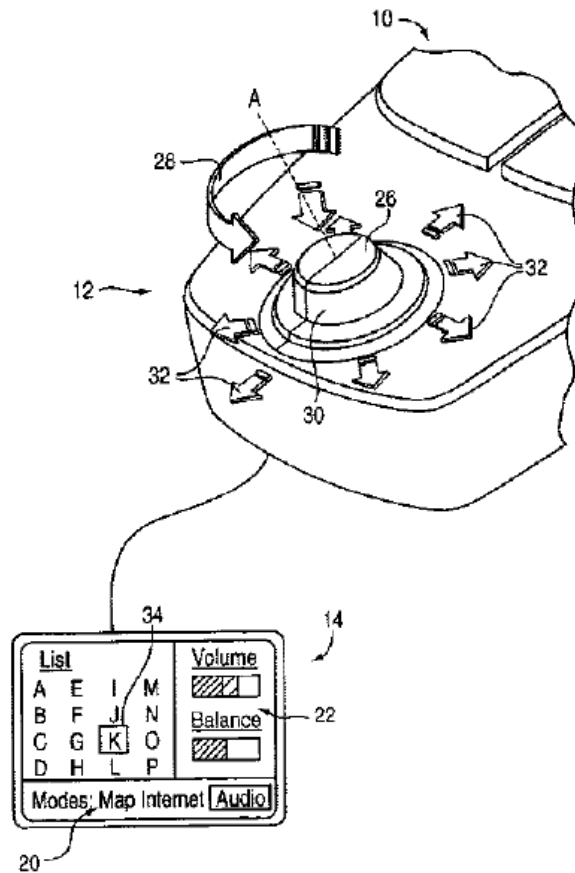


Id., FIG. 7.

As shown, Rosenberg-II's joystick comprises 3-dimensional surfaces for “providing a mechanical input and output” *Id.*, 26:62-63. According to Rosenberg-II, the force feedback is associated with events such as interactions with displayed objects: “Forces are preferably associated with the interactions of the cursor with displayed graphical objects.” *Id.*, 11:28-29.

F. Goldenberg

Goldenberg (U.S. 6,636,197) describes “haptic sensations for a haptic feedback device and especially for a rotational device such as a knob.” EX1007, Abstract. According to Goldenberg, the force effects can include “hill force effect and barrier force effect allow easier selection of menu items, menus, values, or other options by the user.” *Id.* The knob is disclosed to be a thumb-stick, as shown below:



Id., FIG. 1.

Goldenberg's knob is a physical, 3-dimensional object for physical manipulation rather than a virtual control. For example, Goldenberg states that "the user preferably grips or contacts the circumferential surface of the knob 26 and rotates it." *Id.*, 5:21-24.

In Goldenberg, force feedback is associated with events such as user interaction with menu items: "detent force can be output when the cursor moves from one menu item to a different menu item." *Id.*, 2:40-42.

IV. NONE OF LEVIN, WANG, OR GOLDENBERG (KNOB PRIOR ART) ARE ANALOGOUS ART

A. Legal Standard

Whether asserted prior art is analogous to the claimed invention is a threshold question. *See In re Klein*, 647 F.3d 1343, 1348 (Fed. Cir. 2011). The Federal Circuit applies a two-part test to determine whether art is analogous: (1) is it from the same field of endeavor, regardless of the problem addressed or, (2) if it is not within the field of the inventor's endeavor, whether it still is reasonably pertinent to the particular problem the inventor solved. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

Courts focus on the "Field of Invention" section to determine the field of endeavor. *Airbus S.A.S., Firepass Corp.*, 941 F.3d 1374, 1381, n. 8 (Fed. Cir. 2019) ("[T]he specification of each reference includes a 'Field of the Invention' section

that distinctly describes each applicable field of endeavor.”). Express definitions in the “Field of Invention” sections are often determinative. *See In re Wood*, 599 F.2d 1032, 1036 (CCPA 1979) (confining field of endeavor to scope explicitly specified in background of invention section); *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010) (finding reference concerning padlocks to be in same field of endeavor where “patent itself refers to ‘the prior art padlock’ in the background of the invention.”). The claims are also an important focus of the inquiry. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004) (The “appropriate field of endeavor [is determined] by reference to explanations of the invention’s subject matter in the patent application, including the embodiments, function, and structure of the **claimed invention**.”).

“A reference is reasonably pertinent if [...] it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.” *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992).

B. The '042 Patent and the Knob Prior Art do not share the same field of endeavor

The '042 Patent's “field of endeavor” is explicitly defined by the “Field of Invention”: “The present invention generally relates to *vibrotactile feedback*. More particularly, the present invention relates to methods and systems for providing *virtual detents through vibrotactile feedback*.” EX1001, 1:14-17. This express

definition is determinative. *See In re Wood*, 599 F.2d at 1036. The claimed subject matter, which likewise is directed to providing virtual detents through vibrotactile feedback, confirms this as shown in claim [1B] and [1C] :

receiving a detent profile associated with one of the systems, the
detent profile comprising haptic data associated with a
virtual detent; and

generating a ***vibrotactile signal*** configured to cause an actuator
to produce a ***vibrotactile effect*** to the input device, the
vibrotactile effect comprising the virtual detent.

EX1001, cl. 1; *In re Bigio*, 381 F.3d at 1325. The “Summary” of the ’042 Patent further confirms the nature of the invention to relate to “methods and systems for ***providing virtual detents through vibrotactile feedback***.” EX1001, 1:48-49.

Petitioner also confirmed this understanding by proposing to construe “virtual detent” in the district court as “***vibrotactile feedback*** that ***simulates a mechanical detent***.” EX2003, 19. And the Board has also twice already confirmed this understanding:

Appellant’s Invention [...] The invention on appeal concerns vibrotactile feedback systems [...] The method includes the steps of [...] receiving a detent profile comprising haptic data associated with a virtual detent and corresponding to one of the systems, and generating a vibrotactile signal. (Spec., ¶¶2, 5-7; Abstract.)

EX1002, 588 (Decision on Appeal, 2).

the '042 patent discloses methods and systems for providing virtual detents through vibrotactile feedback.

DI, 3.

Petitioner's characterization in its Preliminary Reply ("PR")—"providing haptic feedback to input device via an actuator," (PR, 3),—is impermissibly broad and ignores the patent's express statements, the claims, and the Board's stated understanding. *See Wang Laboratories, Inc. v. Toshiba Corp.*, 993 F.2d 858, 864 (Fed. Cir. 1993). In *Wang Laboratories*, which is directly on point, the Federal Circuit held that the relatively narrow characterization of "computer memory" was too broad because it ignored the patent's requirement for "compact modular memories." *Id.* Here, Petitioner's overbroad characterization captures all haptic feedback provided on an input device (like Wang's "computer memory") and ignores the '042 Patent's specific types of haptic feedback—vibrotactile effects—for detents. *Id.* This is the field of invention the patent is directed to. Akl Declaration ("EX2007"), ¶¶87-91. Petitioner's characterization should be rejected for being overbroad and contrary to law.

The Knob Prior Art does not share "the same field of endeavor" as the '042 Patent because none of them relate to providing virtual detents through vibrotactile

feedback. **Levin** is concerned with providing mechanical detents for physical input controls such as knobs and sliders. Levin's Abstract explains: "[t]he present invention provides a control knob on a device that allows a user to control functions of the device." EX1016, Abstract. Levin's knob "is rotatable in a rotary degree of freedom and moveable in at least one transverse direction approximately perpendicular to the axis." *Id.* An actuator is coupled to the knob to **output a force** in the rotary degree of freedom about the axis, thus providing force feedback. *Id.* Further as described in §III.B, not only does Levin not have anything to do with simulating mechanical detents with virtual detents, but Levin also does not disclose the use of vibrotactile effects to simulate or replace force feedback detents. Moreover, the display in Levin's FIG. 2 is only to show visual images rather than for touch-based input, i.e., touch-screen. EX1016, 7:32-34 ("FIG. 2 is an example showing images which can be displayed on display 14 to assist the user in selecting options with [physical] knobs 18 and/or slider control 32"). Thus, A POSA would understand that the '042 Patent and Levin are from different fields of endeavor. EX2007, ¶92.

Wang is directed to providing non-vibrational force feedback mechanical detents to physical objects, not virtual detents provided through vibrotactile effects. In fact, Wang does not mention vibrotactile effects, vibration, or similar concepts. *See generally* EX1022. Instead, Wang teaches providing force feedback only.

EX1022, 5:18-22. Every embodiment relates to force feedback for a physical input device. *See* EX1022, FIG. 2 (force feedback provided to physically rotatable knob and slider), FIG. 3, FIG. 4. Thus, Wang's field of endeavor relates to force feedback on physical control knobs, not virtual detents through vibrotactile effects. EX2007, ¶93.

Goldenberg also teaches providing force feedback to physically grip-able objects, not virtual detents through vibrotactile effects. EX2007, ¶94. Goldenberg states: "the present invention provides haptic sensations for a rotational haptic feedback device such as a knob." EX1007, 2:6-10; *see also, e.g., id.*, 6:21-25 ("user preferably grips or contacts the circumferential surface of the knob"). Like Levin and Wang, Goldenberg is concerned with a physical input device *rather than a virtual device* as in the '042 Patent. Thus, Wang is not in the same field of endeavor. EX2007, ¶94.

In its Preliminary Reply, Petitioner contends that the Knob Prior Art has "knobs" in common with the '042 Patent, thereby satisfying the test. PR, 1-3. The '042 Patent's mention of physical knobs does not mean the field of endeavor is directed to that. Indeed, the challenged claims were amended to expressly require touchpads, thereby excluding physical knobs— notwithstanding the specification's discussion of a knob-based embodiment limited to a rotary knob distinguishable from the Knob Prior Art because it outputs vibrotactile effects. EX1002, 138

(distinguishing “touch-pad” from physical interfaces); *see, e.g., Wang Laboratories*, 993 F.2d at 864 (“field of endeavor” test focuses on claims). But even if physical knobs were in the same field, the Knob Prior Art still lacks virtual detents and vibrotactile effects. *In re Bigio*, 381 F.3d at 1325 (requiring the same, not merely overlapping, fields of endeavor). Any alleged commonality at best shows partially overlapping, rather than identical fields of endeavor. The Federal Circuit has repeatedly found that partial overlap fails to meet the field of endeavor test. *See Wang Laboratories*, 993 F.2d at 864.

C. The Knob Prior Art lacks detent virtualization, and therefore is not reasonably pertinent to the problem or purpose of the '042 Patent

The Knob Prior Art is also not pertinent to the problem being solved because they relate to real detents (i.e., force feedback) that the '042 Patent claims sought to *virtualize* on touchpads with virtual vibrotactile detents. This alone confirms they are directed to different purposes, and thus, not reasonably pertinent. *See In re Clay*, 966 F.2d at 659 (“If [a reference] is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.”). Each of the Knob Prior Art’s teachings confirm that improvements to force feedback detents are not relevant to simulating detents via virtual detents.

Levin’s rotary force mechanisms can only be implemented on physical control knobs and are inapposite to the '042 Patent as Levin’s force mechanism

cannot produce virtual detents. EX2007, ¶96. Moreover, Levin's force mechanism cannot be implemented on virtual input devices with virtual controls (e.g., touchpads) because it is impossible to apply Levin's rotary force on a 2-dimensional touch-pad. *Id.*

Wang is not reasonably pertinent, because a POSA would not find Wang's physical knob overlaid on a display surface relevant to the problem of simulating detents for virtual controls on touch-pads. EX2007, ¶97. The unidirectional rotary and linear force feedback in Wang are only possible on physical, 3-dimensional knobs/sliders. A POSA would recognize it is not possible to employ unidirectional rotary and linear forces through a touch-pad. *Id.* Therefore, Wang's force feedback is not pertinent to the '042 Patent because these types of forces are not useful to the problem relating to touch-pads. *Id.* More suitable feedback sensations for touch-pads are vibrotactile feedback. X2007, ¶97. Moreover, as with Levin, Wang's purpose is to provide mechanical, non-vibrational detents rather than virtual, vibrational detents. Non-vibrational, force feedback mechanical detents would not be helpful to solving a problem relating to vibrational, virtual detents. Accordingly, Wang would not be reasonably pertinent to the problem solved by the '042 Patent.

A POSA would not find Goldenberg's physical knob reasonably pertinent. EX2007, ¶98. Goldenberg's feedback is specific to physical, 3-dimensional mechanical knobs such as a "thumb-stick" (EX1007, FIG. 1) that a user can grip; it

would not be applicable to 2-dimensional touch-pads. *Id.* Therefore, Goldenberg's force effects on physical knobs is not relevant because these forces would not help the inventors solve their problems with touchpads. *Clay*, 966 F.2d at 659; EX2007, ¶97.

Petitioner broadly characterizes the problem as the “need to provide haptic feedback to an input device using an actuator rather than via physical mechanisms like click-stops.” PR, 4. This ignores the express teachings of the patent. The '042 Patent does not suggest that the problem relates to using actuators generally to create generic haptic feedback. In fact, it never mentions actuator-produced force feedback at all. Rather, it repeatedly and exclusively discusses vibrotactile virtual detents. EX1001, 1:14-17. Thus, while the Knob Prior Art solves a haptics-related problem, it is not pertinent to the problem relating to vibrational virtual detents. *Schott Gemtron Corp. v. SSW Holding Co.*, IPR2014-00367, Paper 62 at 17 (May 26, 2015) (analogous art must be “pertinent to *the entire problem* being solved by the challenged patent.”). Therefore, the Knob Prior Art is non-analogous.

V. CLAIM CONSTRUCTION

A. Person of Ordinary Skill in the Art (POSA)

Petitioner identifies a 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., 8 (citing Ward, ¶¶37-43).

Immersion submits that a POSA at the time of the '042 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. EX2007, ¶30. Also, a person could have qualified as a POSA with more formal education and less practical or industry experience, or vice versa. In any event, the challenged claims of the '042 Patent are patentable under either Petitioner's or Immersion's definition of a POSA.

B. “virtual detent”

Under the ordinary meaning of this term in the context of the patent specification, a POSA would understand the differences between the meanings of a “[mechanical] detent” and a “virtual detent.” EX2007, ¶¶51-53. A “detent” is a physical feature that uses force feedback to mechanically “resist or arrest” movement. *Id.* In contrast, a “virtual detent” includes a simulated mechanical detent created through vibrotactile feedback.” *Id.*; EX1001, 3:6-9. A POSA would understand that “a virtual detent” uses haptic (touch-based) feedback to simulate the sensation of a mechanical detent without the need for actual mechanical

components.” *Id.* Thus, a virtual detent provides “a sense of mechanical resistance produced through vibrotactile feedback.” EX1001, 3:6-8.

The specification and file history confirm this fundamental difference between a detent and a “virtual detent.” EX2007, ¶ 52; EX1001 at 3:6-14 (“Such simulated mechanical detents, or virtual detents, may provide useful feedback to a user.”), 5:54-6:31 (“Specifically, in some embodiments the actuator 108 may be configured to provide the perception of a detent (i.e. a virtual detent) without the traditional means necessary for a mechanical detent”), 7:66–8:4, 8:38-46, 9:33-38, 9:59-10:49, 11:55-63, 12:33-38, 12:45-55, 13:35-14:57, Abstract; EX1002 (Patent Board Decision), 590 (“As explained by Appellant, *a detent provides a sense of mechanical resistance while operating a virtual control for a virtual device.*”).

In the parallel district court proceeding, Petitioner agreed with Patent Owner insofar as “virtual detent” must be vibrotactile, proposing the construction: “vibrotactile feedback that simulates a mechanical detent.” EX2003, 19.

C. “detent profile”

Under the ordinary meaning of this term in the context of the patent specification, a POSA would understand that “detent profile” is tied to “vibrotactile effect” because it defines the nature of the “vibrotactile effect.” For example, a POSA would understand the plain meaning of a “detent profile” as including the specific characteristics or parameters that define how virtual detents behave in an

input device for simulating the tactile feedback that one might feel when using mechanical controls, such as the clicks felt when turning a knob or pushing a button that physically moves into discrete positions through **vibrotactile feedback**. EX2007, ¶54; EX1001, 13:37-57.

A POSA would understand that the claims require the “detent profile” to comprise “haptic data.” EX1001, 15:7-8. The specification discloses examples of such haptic data including: the type of vibrotactile effect felt by the user (e.g., sine wave, square wave, triangular wave, spring effect, damper effect), the magnitude of the effect, and its duration. EX1001, 14:51-54. Accordingly, the “detent profile” must comprise haptic data relating to vibrotactile effects.

In the district court proceeding, Petitioner proposed “detent profile” to be construed as “computer code or actuator characteristics that represent a virtual detent.” EX2003, 28. Thus, Petitioner indirectly agreed that “detent profile” represents a vibrotactile effect, because Petitioner defines “virtual detent” as “vibrotactile feedback that simulates a mechanical detent.”

D. “input device configured to control a plurality of systems”

In Grounds 3 and 4, the Rosenberg reference(s) does not disclose this claim limitation—specifically “a plurality of systems” under its plain and ordinary meaning because Rosenberg only discloses a single computer system. But Petitioner attempts to overcome this deficiency by using a special construction for the term that

is improperly based on an erroneous interpretation of Patent Owner's infringement contentions in the district court. Pet., 52. Petitioner's erroneous construction is not based on any intrinsic evidence at all. Instead it is based solely on a misinterpretation of Patent Owner's infringement contentions in the district court proceeding. Pet., 52. Petitioner cites to no claim language or other intrinsic evidence to support that a "plurality of systems" categorically equates to software applications.

Petitioner's approach to claim construction is fundamentally improper. As a matter of well settled law, claims may not be construed by reference to the ***accused product***. *Neomagic Corp. v. Trident Microsystems*, 287 F.3d 1062 (Fed. Cir. 2002) ("It is well settled that claims may not be construed by reference to the accused device."). There are multiple reasons why this is a fundamental canon of claim construction. First and foremost, Petitioner has misunderstood Patent Owner's reading of the claim term in its infringement contentions to mean that all applications constitute the claimed "plurality of systems."

This is how improperly relying on infringement contentions to construe a claim leads to incorrect claim constructions, and this is why the standard for claim construction requires two separate steps of first construing the claims ***without reference to the accused products***, and then applying the construction to the product or prior art—not the other way around, as Petitioner does. Moreover, claim

construction must occur at the time of the invention and not in light of present day infringement.

Petitioner's reliance on the *10X Genomics* case is misplaced. *10X Genomics* merely states that a Petitioner may rely on Patent Owner's ***claim construction***. *10X Genomics, Inc. v. Bio-Rad Labs*, IPR2020-00086, Paper 8 (Apr. 27, 2020). Here, Patent Owner did not propose a construction in the district court. Indeed, Patent Owner only now proposes a construction to clarify Petitioner's misunderstanding of the infringement theory. To properly apply *10X Genomics* would mean that Petitioner agrees with Patent Owner's clarifying construction here (*supra* §V.D).

Indeed, Patent Owner has not read or construed the term to mean that “all applications” are the claimed systems. Rather, as explained further below, the specification teaches that the claimed plurality of systems *or software applications* must provide the ***context*** for virtual detents. Therefore, even though Rosenberg fails to disclose the limitation under its plain and ordinary meaning, Patent Owner offers the following construction that reflects how the term is understood in light of the intrinsic evidence in order to clarify the proper meaning of the claim term in contrast to Petitioner's erroneous construction.

To clarify the meaning of the claim term, it should be properly construed as “an input device configured to control a plurality of systems, where each system to be manipulated provides context for virtual detents.” First, a POSA would

understand that “a plurality of systems” means a plurality of “systems to be manipulated” in contrast to the containing system, e.g., the host computer. EX2007, ¶¶35-37.

Starting with the claims, as mentioned above, claim 15 recites “a system comprising” “an input device configured to control one of a plurality of systems.” That is, a preamble or containing computer system comprises a plurality of subsystems. The plurality of subsystems does not claim antecedent basis to the preamble system. Accordingly, the containing, preamble system and plurality of subsystems are distinct and separate.

The specification likewise confirms that the recited plurality of systems are subsystems *in addition* to the containing system. For example, the specification repeatedly sets out a containing system with a processor and input device and distinct systems to be manipulated:

The processor 106 may be in **communication with a system to be manipulated** 110 or controlled. In some embodiments, the processor 106 may be configured to generate a system signal. The system signal may be provided to the system to be manipulated 110.

EX1001, 4:61-65. FIGS. 1 and 2 illustrate subsystems to be manipulated in addition to the containing system which is shown below. Figure 1 shows a first containing

system comprising a “system to be manipulated” (i.e., a subsystem). Figure 2 shows a second containing system comprising a plurality of subsystems to be manipulated.

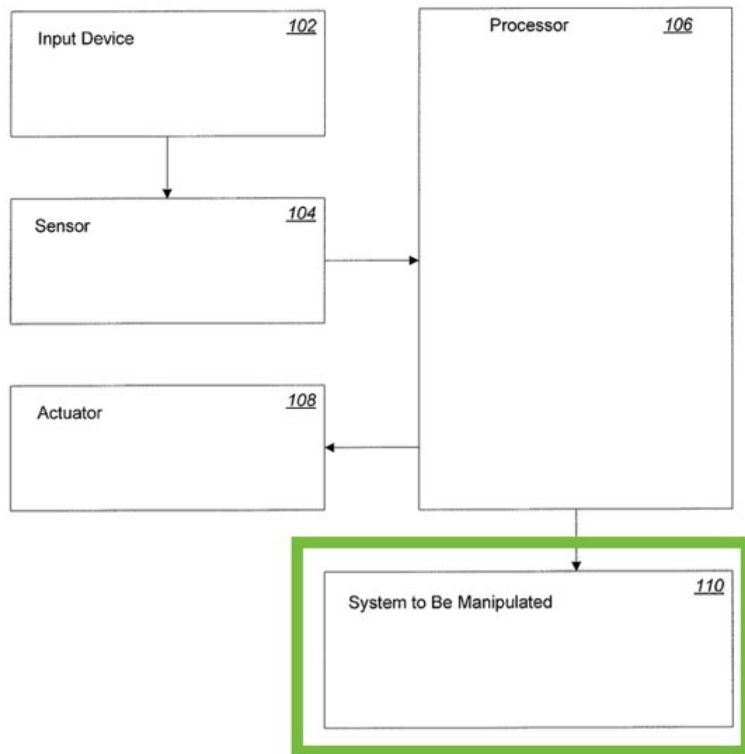


Figure 1

EX1001, FIG. 1.

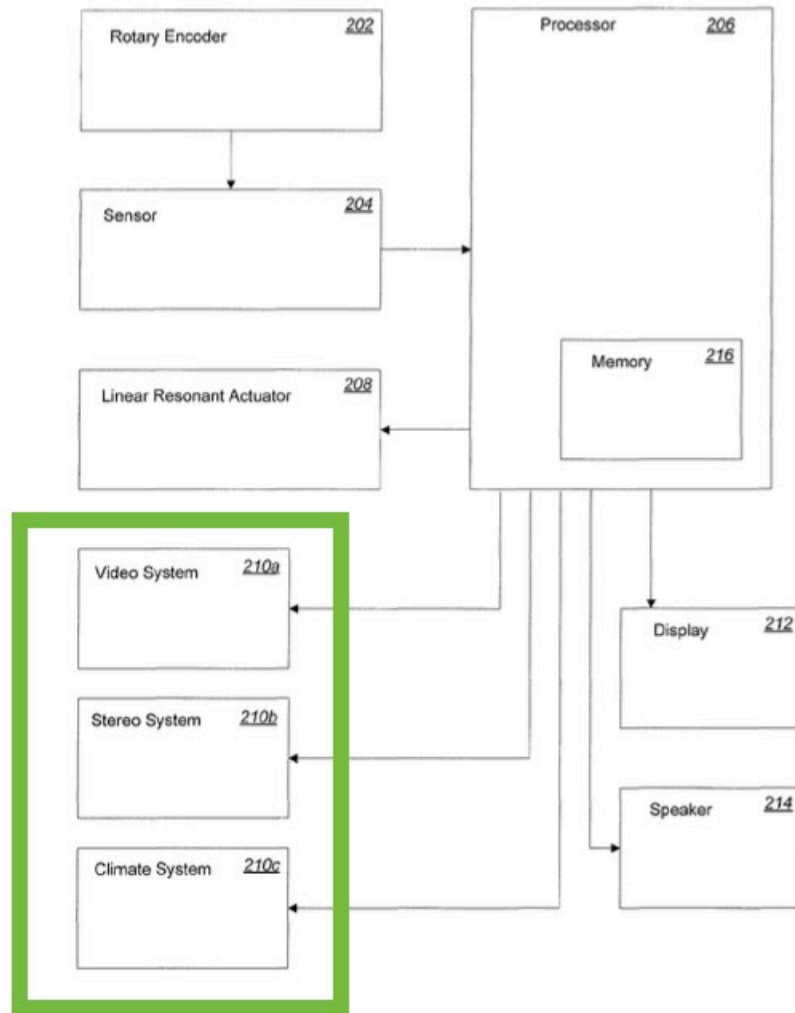


Figure 2

EX1001, FIG. 2.

Next, the specification further confirms that the controlled sub-system provides the *context* for virtual detents. For example, an air conditioner subsystem provides a different context for virtual detents as opposed to a stereo subsystem.

The processor 206 can be configured to determine a specific detent signal to generate. The **detent signal may be based at**

least in part on the system which is actively being controlled.

For example, if the **video system 210a is being controlled**, the processor 206 may generate **one type of detent signal**. Such as a click effect. Alternatively, if the **stereo system 210b is being controlled**, the processor 206 may generate **a second type of detent signal**. Such as a hard stop virtual detent.

EX1001, 8:38-46.

In addition to the video, stereo, and climate subsystems, which are readily understood as systems to be manipulated, the '042 Patent also contemplates in a novel way that applications can be “systems to be manipulated.” EX2007, 38. Specifically, the '042 Patent describes that software applications *can be* systems to be manipulated if those applications provide *context* for virtual detents:

the processor 106 may process **software code running as an application** on the processor and utilize the input signal in the **context of the software code to generate signals configured to cause virtual detents**.

EX1001, 4:30-34.

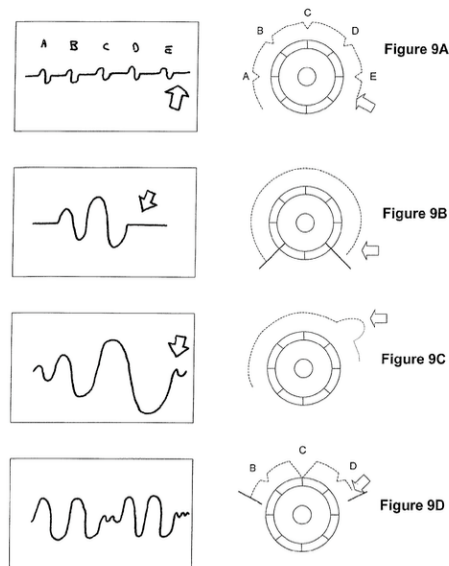
Accordingly, a POSA would understand the “plurality of systems” to be systems (e.g., subsystems such as video, stereo and climate systems) or applications to be manipulated distinct from the containing system. EX2007, ¶¶35-37. “Input device configured to control a plurality of systems” means “input device configured to control a plurality of systems, where each system to be manipulated provides

context for virtual detents.” That is, the “plurality of systems” comprise subsystems “to be manipulated” that each provide context for virtual detents.

To provide such contexts, the specification teaches storing detent profiles in memory, which the processor selectively accesses once it determines which subsystem is being manipulated:

As shown in FIG. 2, the processor 206 comprises memory 216. The memory 216 can be a high-speed cache memory, and configured to store vibrotactile feedback effects, such as virtual detent profiles. In one embodiment, the **processor can access an effect profile stored in memory 216** after the processor 206 has determined what type of vibrotactile effect to generate.

EX1001, 8:47-53. FIG. 9 illustrates examples of such virtual detent profiles:



That the processor accesses a specific profile from memory confirms that sub-systems associated with those profiles provide the context for virtual detents rather than the containing system providing such context. EX2007, ¶46.²

The prosecution history further demonstrates that both Applicant and the Board understood that controlled sub-systems correspond to respective detent profiles, thereby supporting Patent Owner's proposed construction. For example, the Board characterized the invention as a detent profile "corresponding to one of the systems":

Appellant's Invention [...] concerns vibrotactile feedback systems [...] The method includes the steps of [...] receiving a detent profile comprising haptic data associated with **a virtual detent and corresponding to one of the systems**, and generating a vibrotactile signal. (Spec., ¶¶2, 5-7; Abstract.)

EX1002, 588 (Decision on Appeal, 2).

Applicant distinguished the invention over the prior art by explaining that different sub-systems provide the context for detent profiles:

² As a clarification, the claims do not require that each profile be uniquely associated with each subsystem. For example, the audio system and the temperature system may both end up using virtual detent 9A. This is independent of the specifications teaching that the audio and temperature subsystems nevertheless still provide their own contexts for this same virtual detent.

Such functionality enables the claimed device to receive **one detent profile may be associated with one system controlled by the input device (e.g., an audio system), and another type of profile may be used when a different system (e.g., a temperature system) is being controlled by the input device.**

EX1002, 214 (10/20/2011 OA Response, 9).

The Board agreed with Applicant that the picking of disparate pieces, such as the general disclosure of vibrotactile feedback and a virtual knob, did not sufficiently describe detent profiles for a *particular* system/device:

However, we agree with Appellant that merely providing a general disclosure of vibrotactile feedback (Grant and Nyysönen) and a virtual knob (Nyysönen) **does not sufficiently describe detent profiles for a particular system/device.**

EX1002, 590 (Decision on Appeal, 4).

Accordingly, the term “input device configured to control a plurality of systems” means “input device configured to control a plurality of systems, where each system to be manipulated provides context for virtual detents.”

VI. GROUND 1: THE ICHINOSE-LEVIN COMBINATION DOES NOT RENDER THE CHALLENGED CLAIMS OBVIOUS

Ground 1 should be rejected for at least three reasons: (1) Levin is not analogous art; (2) neither Ichinose nor Levin discloses providing vibrotactile effects

as required by claim 1; and (3) Petitioner fails to demonstrate a motivation to combine.

A. Levin is Not Analogous Art

As explained in §IV, Levin is not analogous art, and thus, Levin+Ichinose does not render the challenged claims obvious..

B. Neither Ichinose nor Levin Discloses Vibrotactile Feedback

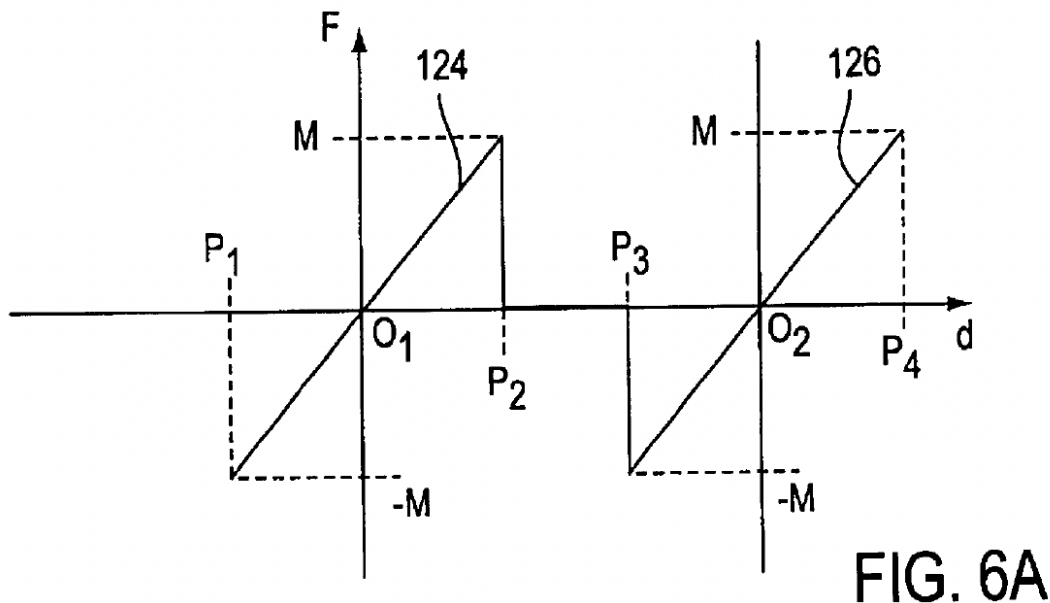
1. Neither Ichinose nor Levin alone or in combination discloses “a Virtual Detent”

The plain and ordinary meaning of “virtual detent” includes a simulated mechanical detent created through *vibrotactile feedback*. See *supra* §V.B. In the district court, Petitioner agreed that “virtual detent” must include “vibrotactile feedback that simulates a mechanical detent.” EX2003, 19. Now, Petitioner attempts to map Levin’s force feedback to “virtual detent.” But force feedback does not include vibrotactile effect. The former exerts a continual force or pressure against the user such as when a user presses a brake pedal and feels a continual, normal force exerted by the pedal mechanism. “Normal forces” are contact forces that a solid object exerts in a direction opposite to which a user pushes against. EX2007, ¶100. This force is not vibrational as it does not oscillate in direction (e.g., forward and backward) and magnitude. On the other hand, vibrotactile effects are by nature

vibrational because the force or pressure exerted oscillates in different directions and magnitudes. *Id.*

Petitioner ignores this distinction and maps Levin's non-vibrational, force feedback to the vibrotactile effect required by "virtual detent." Pet., 19 (citing EX1016, 14:30-45); *see also* Pet., 20 (citing Ward, ¶¶135-136). But this mapping fails because continual force is not the same as vibrotactile effect. A POSA would understand that Levin's force feedback comprises a normal, continual force rather than an oscillating or vibrational sensation. EX2007, ¶101.

Levin expressly confirms that its physical knob based detent force does not include vibrotactile feedback in FIG. 6A:



EX1016, FIG. 6A, 14:46-59 (detent force profile in which force assists user in moving knob clockwise and force resists motion in increasing manner until knob is

moved to position P1). A POSA would understand this to mean Levin's detent force is not vibrational and that such continual assistive and resistive forces exert a consistent pressure to assist or resist knob turning. *See id*; EX2007, ¶102.

Petitioner also contends that a POSA would have understood a similar detent profile *could* include the “magnitude of the vibration” that the actuator outputs to simulate the detent. Pet., 20. Levin does not support this reading. The only support Petitioner provides is Levin's statement that “force detents can be simple jolts.” *Id.* (citing EX1016, 10:16-17); *id.*, 15 (citing EX1016, 7:65 (“detent force (e.g., jolt)”). Reliance on this statement is misplaced and contradicts Levin's express disclosure that jolts are a *force feedback* effect—not vibrational.

Petitioner's citation to Levin is incomplete and taken out of context: “a basic force sensation is force detents that are output at particular rotational positions of the knob to inform the user how much the knob has rotated and/or to designate a particular position of the knob. *The force detents can be simple jolts.*” *Id.*, 10:14-18. The paragraph actually begins, however, by expressly stating that “[t]he *force feedback output* on knob 18 can include a variety of different force sensations”—not vibrational. EX1016, 10:11-12.

Levin does not disclose that jolts are vibrations. Instead, Levin merely describes jolts as a kind of force feedback detent that are “stronger in magnitude than *normal detents*”—not as a virtual detent. *Id.*, 11:62-63. Indeed, Levin does not

contemplate or use the word “virtual.” There is no disclosure in Levin for use of vibration effects for mechanical detents. The only use of vibration remotely related to detents is where vibration effects can *augment*—not simulate—detent effects to provide the user with more information. *See* §VI.B (vibrational effects superimposed on force feedback detents to indicate increase in fan speed adjustment). Thus, Levin does not disclose vibrotactile effects used to simulate detent effects.

Petitioner also maps Ichinose's vibration to “virtual detent.” Pet., 18. This mapping also fails because these vibrations are not used to *simulate a mechanical detent*, which Petitioner has also admitted. EX2003, 19. Ichinose's vibration is responsive to cursor interaction with interface elements, but not for simulating mechanical detents. EX1015, 4:7-17 (Feedback device 80 provides vibration as the user interacts with touchpad 10 and moves the cursor with his finger); EX2007, ¶106. When a user experiences Ichinose's vibration, they are not provided with a simulated experience of rotating a dial or sliding a slider with click stops. Nowhere in Ichinose is there disclosure of using vibrational effects for simulating a mechanical detent. Mere teachings of generally outputting vibrations in response to cursor interactions with icons and user interface elements does not disclose simulating a mechanical detent. Indeed, Ichinose does not mention or contemplate detents at all.

2. Neither Ichinose nor Levin Alone or in Combination Discloses “a detent profile comprising haptic data associated with a virtual detent”

Because Levin does not teach a virtual detent, it also does not teach a detent profile comprising haptic data associated with the virtual detent. Levin teaches a profile associated with force feedback—the type of force it uses for its physical knob based detent; not vibrotactile feedback. *See supra* §VI.B.1. Thus, Levin does not disclose this claim limitation.

Petitioner implicitly acknowledges that “detent profile” must be for a **vibrotactile** effect because the “virtual detent” that the profile comprises is vibrotactile. *Supra* §V.B; EX2003, 19. A POSA would understand this based on the plain claim language because the virtual detent requires a vibrotactile effect: “the **vibrotactile effect** comprising the virtual detent.” *See* '042 Patent, cl. 1. Thus, the claimed “detent profile” must comprise haptic data associated with vibrotactile effects. EX2007, ¶108; EX1001, 1:15-17; *supra* §V.C. A force feedback profile cannot meet the claimed “detent profile” for the same reasons force feedback cannot meet vibrotactile feedback. *Id.*

As with “virtual detent,” Petitioner similarly maps Levin’s force feedback profile to the “detent profile,” but fails to show how such force feedback profile includes haptic data associated with **vibrational haptic data**. *See* Pet., 20. Petitioner argues that a detent profile would have included “magnitude of the vibration” that

the actuator outputs to simulate a click because Levin states that “force detents can be simple jolts.” *Id.*, 20 (citing EX1016, 10:16-17). But the Petition does not provide any evidence that a jolt is a vibrational effect. Levin does not disclose that such jolts vibrate. Levin merely states that “a jolt force can be output that is stronger than normal detents, which informs the user that the end of the frequency range has been reached.” Thus, Levin does not disclose or render obvious this claim limitation. EX2007, ¶¶107-08.

3. Neither Ichinose nor Levin Alone or in Combination Discloses “generating a vibrotactile signal ...”

For the same reasons detailed above, the Ichinose-Levin combination also does not disclose this claim element.

C. Petitioner Has Not Demonstrated a Motivation to Combine Ichinose and Levin with a Reasonable Expectation of Success

1. Petitioner has failed to show that a POSA would be motivated to modify Ichinose with Levin

Petitioner also fails to provide adequate reasoning for why a POSA would have thought to modify Ichinose's 2-dimensional touchscreen with Levin's rotary and linear force feedback mechanical detent, which require 3-dimensional input devices such as knobs and sliders. A POSA would not have reason to modify a 2-dimensional touchscreen with rotary and linear force feedback with 3-dimensional appendages. EX2007, ¶¶109-11. Obviousness requires “a reason that would have

prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *Johns Manville Corp. v. Knauf Insulation, Inc.*, IPR2018-00827, Paper 9, 13 (Oct. 18, 2018).

Petitioner's reason is that vibrotactile feedback is beneficial to both Levin and Ichinose. Pet., 13-14. However, this only explains how feedback, in general, is beneficial to both references without a specific reason why a POSA would seek to modify Ichinose's 2-dimensional touchscreen with Levin's rotary/linear forces used for mechanical detent that require 3-dimensional knobs. EX2007, ¶110. The mere fact that Ichinose recognized the benefits of vibrotactile feedback (which it already employed) is not sufficient reason why a POSA would have further modified it with physical knob-based detents from Levin, much less modified it to incorporate detents at all.

Petitioner's contention that Levin's force detents were “known variations” in Ichinose's 2-dimensional touchscreens (Pet., 14) is conclusory and unsupported by any evidence. *See In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). But Petitioner has not offered any evidence for why Levin's non-vibrational force detents were considered “known variations.”

Further, Petitioner provides no evidence that implementing rotary and linear forces in 2-dimensional touchscreens were “known techniques.” Pet., 14. To the contrary, a POSA would not think to implement Levin's force feedback mechanism

in the form factor of a touchpad. EX2007, ¶111. Mr. Ward's supporting declaration is similarly conclusory and devoid of evidence or analysis. EX1003, ¶125.

2. Petitioner improperly applies hindsight bias in its proposed combination of Levin and Ichinose

Even if Petitioner offered a plausible explanation why a POSA would have thought to produce rotary and linearly resistive forces on a 2-dimensional touch-pad (which it did not), Petitioner cannot do so without using the claims as a roadmap for hindsight reconstruction. Hindsight reconstruction of a patent claim using multiple prior art references in piecemeal fashion is impermissible to show obviousness. *See Grain Processing Corp. v. Am.-Maize Prods. Co.*, 840 F.2d 902, 907 (Fed. Cir. 1988).

Here, Petitioner uses the '042 Patent as a blueprint to explain why a POSA would combine Ichinose's touch-pad with Levin's force detents. Petitioner alleges that "POSAs had reasons to implement Ichinose's system such that it used Levin's 'force detents' to simulate common mechanical detents like a simple mechanical 'click.'" Pet., 13. This alleged rationale comes from the '042 Patent itself: "Such an illustrative embodiment may be advantageously employed to simulate mechanical detents through vibrotactile feedback. Such simulated mechanical detents, or virtual detents, may provide useful feedback to a user." EX1001, 3:6-9.

Petitioner fails to cite any reasoning from the references themselves speaking to a need or desire to modify a touch-pad with rotary/linear forces. Although Petitioner explains Ichinose contemplates variations of vibrational feedback on its touch-pad, Petitioner fails to explain why one of those variations should be implementing rotary/linear force feedback on a touch-pad. Pet., 14. Similarly, although Petitioner explains that Levin contemplates physical “force detents,” Petitioner fails to explain why this suggests a motivation to apply virtual “force detents” on a 2-dimensional surface. *Id.*, 13-14. Petitioner also does not explain why knowledge or skill of the POSA would have motivated the application of rotary and linear force feedback to a 2-dimensional surface. *See generally id.*, 13-17.

3. Petitioner fails to demonstrate a reasonable expectation of success

Petitioner also fails to demonstrate a reasonable expectation of success in implementing Levin's linear and rotary detents on Ichinose's 2-dimensional touchscreen. Petitioner argues: “POSAs would have reasonably expected success in implementing any of the above implementations because Levin's ‘force detents’ are executed by a processor (Levin, 19:54-20:3), like Ichinose's command processor, and can be output by ‘any of a variety of different types of actuators’ (Levin, 10:1-5), which Ichinose's system includes.” Pet., 24. Petitioner alleges a reasonable expectation of success simply because both references use processors and actuators.

It does not, however, explain why a POSA would expect success when implementing Levin's rotary actuators ("DC motor, voice coil, pneumatic or hydraulic actuator, magnetic particle brake, etc." EX1016, 10:2-5) or linear actuators ("linear voice coil actuator 104." *Id.*, 12:40-41) with Ichinose's touchpad. EX2007, ¶¶112-14. A POSA would not have expected success because it would not have been possible at the time of the patent (or at present for that matter) to apply rotary and linear force feedback on a touch-pad. *Id.* A POSA would have understood that a 2-dimensional touch-pad cannot physically exert rotary or linearly resistant forces and would not expect to be able to do so. *Id.*

Also, Mr. Ward contends that the force detents output on a physical knob or slider can include vibrations or jolts. EX1003, ¶127. But as explained above, Levin's vibrations or jolts are used to augment or overlay a force detent rather than used as a force feedback detent itself. EX1016, 8:11-26, 10:11-32, 11:37-65, 12:12-18; *see also supra* §VI.B. Mr. Ward also fails to explain how a POSA could achieve rotary and linearly resisting forces on a 2-dimensional surface without undue experimentation. Petitioner fails to show the combination is obvious.

VII. GROUND 2: THE WANG-ICHINOSE COMBINATION DOES NOT RENDER THE CHALLENGED CLAIMS OBVIOUS

Ground 2 suffers from similar deficiencies as Ground 1: (1) Wang is not analogous art; (2) neither Wang nor Ichinose, individually or in combination,

discloses providing vibrotactile effects; and (3) Petitioner fails to show a motivation to combine.

A. Wang is Not Analogous Art

As explained in §IV, Wang is not analogous art, and thus, Wang+Ichinose does not render the challenged claims obvious..

B. Neither Ichinose nor Wang Discloses Vibrotactile Feedback

1. Neither Ichinose nor Wang alone or in combination discloses “a Virtual Detent”

The Wang-Ichinose combination also fails to teach a “virtual detent” under its ordinary meaning (*supra* §V.B) because the alleged combination only teaches force feedback, not vibrotactile feedback. Ichinose does not disclose detent effects at all and Wang does not disclose vibrational detent effects.

Petitioner maps Wang's non-vibratory rotational and linear force feedback to the “virtual detent.” Pet., 37 (citing, e.g., EX1022, 7:21-22; 8:6-9 (“Force effects to emulate the feel of a mechanical rotary knob or a slider...”)). But, rotational and linear forces, are not the same thing as vibrotactile effects because the former exerts consistent unidirectional forces while the latter provides oscillating forces. EX2007, ¶¶116-18; *supra* §VI.B.1. Petitioner's own description of Wang confirms that the haptic device provides non-vibratory “force effects,” not vibrotactile effects. Pet., 32.

A POSA would understand that Wang does not disclose the claimed virtual detent. EX2007, ¶¶116-18. Wang provides a sensation of resistance to the user by way of contact force effects that are exerted in the degrees of freedom that the overlaid haptic device (i.e., physical control appendages) is moved around on the surface of the virtual device panel. EX1022, 7:23-26 (haptic feedback actuator generating force effects in each of the **active degrees-of-freedom**), 7:26-31. Neither reference discloses this element. Thus the combination is not obvious over Claim 1.

2. Neither Ichinose nor Wang alone or in combination discloses “a detent profile comprising haptic data associated with a virtual detent” and “generating a vibrotactile signal configured to cause an actuator to produce a . . . virtual detent”

For the same reasons detailed above, the Ichinose-Wang combination also does not disclose these claim elements—i.e., because Wang does not teach a virtual detent, it also does not teach “a detent profile . . .,” nor does it teach “generating a vibrotactile signal.”

C. Petitioner Has Not Demonstrated a Motivation to Combine Wang and Ichinose

1. A POSA would not be motivated to modify Wang with Ichinose and Petitioner has not demonstrated otherwise

Petitioner merely states that a POSA would have used Ichinose's touchpad to implement Wang's haptic device as a substitution. Pet., 34. Here, Petitioner fails to acknowledge that it is not possible to implement physical knobs and sliders that

provide rotational and linear force feedback on a touch-pad. EX2007, ¶¶121-23. Any explanation would involve hindsight bias because that is the very point of the invention—to provide a simulation of mechanical detents on a touch-pad using virtual detents. *Id.*

Second, Petitioner's assertions of simple substitution and design choice are irrelevant because these substitutions do not arrive at the challenged claim. Petitioner alleges that using Ichinose's touchpad to implement Wang's haptic device would have been a substitution. Pet., 34-35. However, a POSA would understand that substitution of Wang's physical rotary knob haptic device with Ichinose's touch-pad would result in a touch-pad without any ability to provide detents. EX2007, ¶123. Substitutions that do not arrive at the challenged claim, no matter how simple, are not relevant. To arrive at the challenged claim, Ichinose's touch-pad and Wang's physical input object would require additional modification for virtual detents. *Id.* Wang's physical knob haptic device and force feedback effect would need to be virtualized on Ichinose's touch-pad, e.g., by representing them as virtual controls and virtual, **vibrational** effects. This is not a simple substitution. *See Intel Corp. v. PACT XPP Schweiz AG*, IPR2020-00518, Paper 34, 45 (Aug. 9, 2021) (substitution that requires further modification of references are not "simple substitution."). Moreover, this substitution is hindsight reconstruction of the claimed invention. Accordingly, Petitioner has not demonstrated a motivation to combine.

2. Petitioner fails to demonstrate a reasonable expectation of success

As with the Ichinose-Levin combination in Ground 1, Petitioner also fails to demonstrate a reasonable expectation of success in implementing Wang's physical knob with force feedback detents on Ichinose's 2-dimensional touch-pad. Petitioner contends there is reasonable expectation of success because touch-pads were known and share common components such as actuators. Pet., 35. This conclusory rationale is not sufficient to demonstrate a reasonable expectation of success. EX2007, ¶124.

VIII. GROUND 3: ROSENBERG DOES NOT ANTICIPATE THE CHALLENGED CLAIMS

A. Claim [1A] “receiving an input signal comprising information associated with a manipulation of an input device configured to control a plurality of systems, wherein the input device comprises a touch-pad;”

1. Rosenberg does not disclose “an input device configured to control a plurality of systems”

a) “a plurality of systems”

Rosenberg-I does not disclose “a plurality of systems.” Instead it only discloses a single system. To demonstrate anticipation, Petitioners must show “that the four corners of a single, prior art document describe every element of the claimed invention.” *Xerox Corp. v. 3Com Corp.*, 458 F.3d 1310, 1322 (Fed. Cir. 2006). Rosenberg-I only discusses a “system” when referring to the containing “computer

system” or the computer’s operating system. EX1009, 1:20-21, 1:66-67, 3:47, 6:7-13, 7:8-9. Rosenberg-I does not disclose any other additional, plurality of systems:

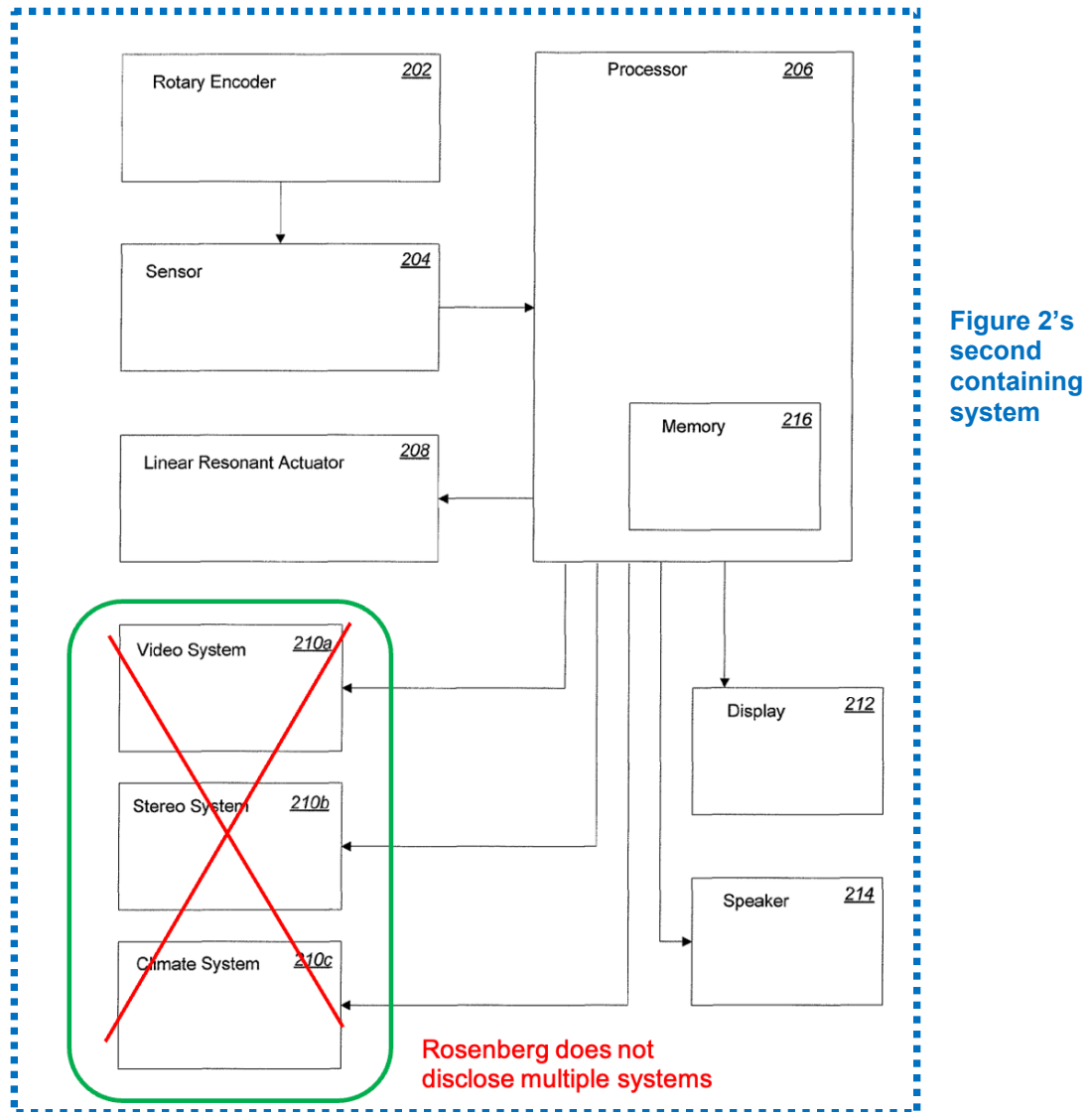


Figure 2

EX1001, Fig. 2 (annotated). Accordingly, Rosenberg-I fails to disclose this element within its “four corners” under the plain and ordinary meaning of the term. *See id*; EX2007, ¶¶125-27; *Xerox Corp.*, 458 F.3d at 1322. For this reason alone, Rosenberg-I does not anticipate the '042 Patent.

To address this deficiency, Petitioner nevertheless contends this limitation is met by assigning a special construction to the term “a plurality of systems” to categorically cover all software applications running on the containing computer system. Petitioner’s erroneous construction is not based on any intrinsic evidence at all. Instead, it is based solely on a ***misinterpretation*** of Patent Owner’s infringement contentions in the district court proceeding. Pet., 52. Petitioner cites to no claim language or other intrinsic evidence to support that a “plurality of systems” categorically equates to software applications. As explained above in §V.D, this approach by Petitioner is fundamentally contrary to the canons of claim construction—claim construction requires two separate steps of first construing the claims ***without reference to the accused products***, and then applying the construction to the product or prior art—not the other way around, as Petitioner does. *See Neomagic Corp.*, 287 F.3d at 1074 (Fed. Cir. 2002) (“It is well settled that claims may not be construed by reference to the accused device.”). Moreover, claim construction must occur at the time of the ***invention*** and not in light of present day ***infringement***. For this second, separate reason alone, Petitioner has also failed to establish anticipation.

Thus, although Rosenberg fails to disclose this claim term under its plain and ordinary meaning, Patent Owner offers a clarifying construction to clear up Petitioner’s misunderstanding, as detailed in §V.D. As explained further below,

Rosenberg-I does not disclose this claim element under either its plain and ordinary meaning (as discussed above) or under Patent Owner's clarifying construction that properly reflects the intrinsic evidence and is consistent with the proper reading of the infringement contentions.

The proper clarifying construction of “an input device configured to control a plurality of systems” is “input device configured to control a plurality of systems, where each system to be manipulated provides context for virtual detents.” *Supra* §V.D; EX2007, ¶¶38-49, 128-29. As explained previously (*supra* §V.D), the specification makes clear that whether the recited “plurality of systems” are hardware subsystems or software applications, they are subsystems to be manipulated that provide the context for virtual detents, such that for example, the virtual detents can vary on a per-application basis.³ EX2007, ¶¶35-49, 128-29; *supra* §V.D; EX1001, 8:38-4, 4:30-34. In the case of hardware subsystems, the specification discloses specific detents that are determined **contextually** based on the subsystem (e.g., video system, stereo system) being controlled. EX1001, 8:38-46. Likewise, in the case of software applications, the specification also teaches using

³ However, the specification does not require each detent profile to be uniquely associated with an application, i.e., while two applications can have the same detent profile, each application still has an associated detent profile.

the **context** of the application's software code to generate virtual detents. EX1001, 4:30-34.

This inventive concept of a plurality of subsystems to be manipulated that provide respective context for virtual detents is key to virtualizing controls of differing systems. EX2007, ¶129. A POSA would understand that each of the plurality of manipulated subsystems—not the containing system—provides context for virtual detents. *Id.* In contrast, Rosenberg's software applications are not "systems" under the proper clarifying construction of the term.

Even if the applications disclosed in Rosenberg constitute such systems (which they do not), Rosenberg does not teach providing different vibrotactile feedback that simulates a mechanical detent in the context of the application being used, e.g., a detent profile corresponding to a particular application. Petitioner also has not identified how the **applications** provide a context for these virtual detents. Again, the '042 patent teaches having different simulated mechanical detents based on the particular system, e.g., a video system versus a stereo system. Rosenberg does not disclose providing virtual detents in the context of a given application.

Just like the cited art previously rejected by the Board (EX1002, 589-91), Rosenberg separately teaches tactile sensations and software applications without describing any relationship between them. EX2007, ¶135. Just as the Board found

then, untethered teachings of vibrotactile effects and a system's knob "does not sufficiently describe detent profiles for a particular system/device." EX1002, 590.

Similarly, by merely disclosing untethered components, Rosenberg-I does not teach an "input device configured to control a plurality of systems, where each system to be manipulated provides context for virtual detents."

As a clarification, in the Institution Decision, the Board found that the claim language does not require a "unique" association between the detent profile and one of the systems. That is, the relationship of detent profile to systems is not one-to-one. DI, 24. While this relationship need not be unique, the intrinsic evidence teaches that in order for each system to provide the context for virtual detents, each system uses a corresponding detent profile—whether unique or shared with another subsystem. EX2007, ¶131. Rosenberg teaches none of these concepts. As explained further below, Rosenberg does not teach detent profiles or virtual detents at all. Rosenberg only discloses the untethered components of generic applications and force commands. Ex. 1009, 6:7-23; EX2007, ¶¶131-32. Accordingly, not only does Rosenberg fail to disclose applications that provide context, it lacks the components that would even allow such functionality. *See id.* Thus, Rosenberg fails to anticipate.

B. Claim [1B]: “receiving a detent profile associated with one of the systems, the detent profile comprising haptic data associated with a virtual detent”

1. Rosenberg does not disclose “virtual detent”

A “virtual detent” is a sense of mechanical resistance produced through vibrotactile feedback. *Supra* §V.B; EX1001, 3:6-8; EX1002 (Patent Board Decision), 590; EX2003, 19 (Petitioner’s proposed construction in district court). Rosenberg does not disclose vibrotactile effects that simulate a mechanical detent, i.e., a sense of mechanical resistance. EX2007, ¶¶136-39. For example, Petitioner’s reliance on Rosenberg-I’s “ticks” or “pulses” (Pet., 53) fails because Rosenberg-I never teaches that they provide **a sense of mechanical resistance**. EX2007, ¶¶136-39. Namely, Rosenberg-I teaches that pulses indicate information such as certain locations within a range or events, but never as a way to simulate mechanical resistance vibrationally. EX1009, 12:53-59 (pulse indicates information); 13:3-5 (pulse indicates occurrence of event), 13:39-40 (pulse indicates occurrence of event).

Rosenberg I’s ticks are even more distinguishable because they, unlike pulses, are not even physical effects or sensations. EX2007, ¶139. Rosenberg I’s ticks are disclosed to be visual markers to which its pulses correspond: Pulse sensations can be used to indicate the *location of the “ticks”* for discrete values or settings in the adjusted range. EX1009, 12:56-58. A POSA would understand “ticks” in this context to be visual marks to which pulse sensations are synchronized with. EX2007, ¶139.

Petitioner's remaining arguments do not show disclosure of "virtual detents" that simulate mechanical resistance. For example, Petitioner argues that Rosenberg I's variable "strength and/or frequency" vibrations corresponds to the challenged patent's "hill virtual detent." Pet., 54. However, Rosenberg does not teach that merely varying the "strength and/or frequency" of vibrotactile effects simulates mechanical resistance. EX2007, ¶140. A POSA would understand that varying the strength and/or frequency of vibrations generally, without any explanation on how that is used, **does not** teach simulating mechanical resistance. *Id.*; *Xerox Corp.*, 458 F.3d at 1322 (to anticipate, the claimed invention must be described within the four corners of the prior art).

Similarly, Petitioner argues that Rosenberg I's "pulses" corresponds to the '042 Patent's "click effect." Pet., 53. Again, Rosenberg does not teach that such "pulses" simulate mechanical resistance. EX2007, ¶141. A POSA would understand that generic "pulses," without explanation, does not teach simulating mechanical resistance. *Id.* Accordingly, Rosenberg does not disclose "virtual detent."

2. Rosenberg does not disclose a "detent profile"

As discussed above, Rosenberg-I fails to teach a "virtual detent," and therefore cannot teach a "detent profile" "comprising haptic data associated with" the "virtual detent." EX2007, ¶¶136-42.

Further, Petitioner relies on Rosenberg-II on for “detent profile,” but that does not disclose profiles that comprise haptic data associated with a virtual detent. Rosenberg-II makes clear that its profiles are “force profiles” that only store data for *force* feedback—not *vibrotactile* feedback. EX2007, ¶143. Accordingly, the Rosenberg references do not disclose a “detent profile” for virtual detents—i.e., a *virtual* detent profile. Thus, Rosenberg’s disclosure of force feedback detent profiles does not satisfy this claim limitation. *Net MoneyIN, Inc.*, 545 F.3d at 1369 (to anticipate, art must disclose elements as arranged in the challenged claim).

Petitioner contends that “Rosenberg-I also discloses that its haptic feedback, i.e., simulated detents, is generated using ‘force profiles’ stored in memory ... and each profile *would have* been associated with one of the mimicked mechanical detents.” Pet., 54. But the fact that Petitioner uses the wording “*would have*” to describe the association between detents and profiles confirms that Rosenberg does not disclose this element. EX2007, ¶144. Thus, Rosenberg does not anticipate the claim.

3. Rosenberg does not disclose “receiving a detent profile associated with one of the systems”

Rosenberg fails to disclose this limitation. First, as discussed above, Rosenberg does not teach “a detent profile.” EX2007, ¶¶142-45. Second, a POSA would understand that the detent profile is “associated with one of the [plurality of]

systems.” EX2007, ¶146. Claim 1 recites a “plurality of systems” and “receiving a detent profile associated with one of the systems.” “One of the systems” has antecedent basis to the “plurality of systems.” As discussed above, these “plurality of systems” refer to subsystems, not the containing system (which Rosenberg also fails to disclose). *Supra* §V.D, §VII.A.1.b; EX1001, 8:38-46.

The Board previously confirmed this understanding. EX1002, 588 (Appellant’s invention includes detent profiles corresponding to one of the systems); *supra* §V.D. The Board reversed the Examiner’s rejection because the cited art did not disclose any relationship between detent profiles and manipulated systems. EX1002, 589-91. There, the primary reference Grant taught vibrotactile effects (*e.g.*, EX2008, ¶17, FIG. 2). The secondary reference Nyysönen disclosed a virtual knob and vibrotactile feedback (EX2009, ¶57) and vibro-tactual feedback (*id.*, ¶ 53). The Board agreed with Applicant that Nyysönen’s vibrotactile feedback was untethered from anything else in the disclosure and therefore could not teach “receiving a detent profile associated with one of the systems.” EX1002, 520 (Reply Brief, 2), 590 (Decision) (finding the cited reference did not disclose any relationship between detent profiles to particular systems). Prior art lacking correspondence between the detent profile and the manipulated system did not anticipate the claim.

In this proceeding, the Board similarly understood the requirement that the received detent profile must *correspond to at least one of the systems* (although such

correspondence need not be unique). DI, 24-25; EX2007, ¶147. Also, Rosenberg only discloses a single host containing system and not a plurality of controlled subsystems. And the software applications disclosed in Rosenberg do not constitute such systems as detailed above. But even if it did, Rosenberg does not provide different vibrotactile feedback that simulates a mechanical detent based on the application being used, e.g., a detent profile corresponding to a particular application. *Xerox Corp.*, 458 F.3d at 1322 (to anticipate, the claimed invention must be described within the four corners of the prior art).

Petitioner also has not identified how these virtual detents are associated with the *applications* it alleges are the “plurality of systems.” Again, the ’042 Patent teaches having different simulated mechanical detents based on the particular system, e.g., a video system versus a stereo system, or different applications. Rosenberg does not disclose providing virtual detents in the context of a particular application. Rather, like the cited art previously rejected by the Board (EX1002, 589-91), Rosenberg-I and II teach haptic effects and software applications separately without describing any relationship between them. EX2007, ¶¶151-52. Just as the Board found then, untethered teachings of vibrotactile effects and a system’s knob “does not sufficiently describe detent profiles for a particular system/device.” EX1002, 590.

If unrelated teachings of vibrotactile feedback and systems and their controls were insufficient to demonstrate obvious during prosecution, the same is true here for Petitioner's anticipation Ground. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (in order for a reference to anticipate, it must not only disclose all elements of the claim within the four corners of the document, but also disclose those elements arranged as in the claim). Rosenberg does not anticipate the claims.

IX. GROUND 4: THE ROSENBERG-GOLDENBERG COMBINATION DOES NOT RENDER ANY OF THE CHALLENGED CLAIMS OBVIOUS

A. Goldenberg is Not Analogous Art

As explained in §IV, Goldenberg is not analogous art, and thus,

Rosenberg+Goldenberg does not render the challenged claims obvious.

B. Neither Rosenberg-I nor Goldenberg Alone or in Combination Discloses “manipulation of an input device configured to control a plurality of systems”

As demonstrated above for Ground 3, Rosenberg-I does not disclose “an input device configured to control a plurality of systems.” Petitioner does not rely on Goldenberg for this element; Petitioner only introduces Goldenberg for the claimed “detent profiles.” Pet., 70 (“lone distinction between Ground 3 and Ground 4 is the latter's use of Goldenberg's ‘force detent profiles’”). Thus, Rosenberg I-Goldenberg

combination does not disclose “an input device configured to control a plurality of systems.” This combination does not render Claim 1 obvious.

C. Neither Rosenberg-I nor Goldenberg Alone or in Combination Discloses “a detent profile associated with one of the systems, the detent profile comprising haptic data associated with a virtual detent”

1. The combination fails to teach “a virtual detent”

Goldenberg does not teach “virtual detent,” i.e., a sense of mechanical resistance produced through vibrotactile feedback (*see* § V.B). EX2007, ¶155. Importantly, Petitioner does not rely on Goldenberg to teach “a virtual detent,” (Pet., 70). Indeed Goldenberg does not disclose virtual detents nor does it mention vibrotactile feedback. EX2007, ¶155. Goldenberg only discloses force feedback applied to a 3-dimensional knob, not vibrotactile effects that simulate mechanical resistance. *See* §V.B-C; EX2007, ¶155. Accordingly, the combination does not teach “a virtual detent.”

2. The combination fails to teach “a detent profile associated with one of the systems”

As with Ground 3, Goldenberg teaches profiles associated with generic user interface interactions and not specific profiles corresponding to each of the manipulated sub-systems. Although Petitioner contends that Goldenberg teaches “a plurality of systems,” that is based on an erroneous construction untethered from the patent and improperly based solely on a misinterpretation of the infringement

contentions. Goldenberg does not teach that profiles should correspond to those alleged systems (applications)—only to specific *interactions* across those applications. EX2007, ¶156; EX1007 at 2:40-42, 16:15-19, 21:48-51, 22:52-57.

Indeed, Petitioner's mapping highlights this deficiency:

when adjusting the volume in a videogame or scrolling through a menu list presented on an Internet browser, Rosenberg-I's processor would receive from memory Goldenberg's 'force detent profile' associated with that *function*.

Pet., 70. Here, Petitioner explicitly associates Goldenberg's profile to the generic *function* of scrolling through menu lists rather than one of the alleged *systems*, e.g., videogame or Internet browser. *Id.* That is because Goldenberg does not teach that the alleged profiles correspond to the alleged systems. EX2007, ¶¶156-58.

Rather in Goldenberg, these alleged profiles would produce the same behavior across the video game and Internet browser applications, further indicating the lack of specific correspondence to one of the particular *systems*. EX2007, ¶¶156-58. Each of Petitioner's citations to Goldenberg confirms this correspondence of the alleged profile with a global *function* across multiple systems rather than for a particular *system*. See EX1007, 2:40-42 ("detent force can be output when the cursor moves from one menu item to a different menu item."), 16:15-19, 21:48-51 ("each item has a force detent effect associated with it, where the detent biases knob motion to the

center of the item”), 22:52-57. Thus, Goldenberg only discloses profiles corresponding with generic interactions with objects and not specifically corresponding with one of a plurality of systems. EX2007, ¶¶156-58.

D. Petitioner Has Not Demonstrated a Motivation to Combine

1. A POSA would not be motivated to modify Rosenberg with Goldenberg and Petitioner has not demonstrated otherwise

The proposed Rosenberg I-Goldenberg combination fails to disclose key claim limitations as detailed above. But even if the combination satisfied all claim limitations, Petitioner fails to show why a POSA would have thought to combine the two references. Rosenberg-I discloses a touchpad input device (just like Ichinose) and Goldenberg teaches a physical knob (just like Levin and Wang). Petitioner fails to show why a POSA would seek to modify Rosenberg's touchpad with Goldenberg's knob. For example, Petitioner does not explain why a POSA would modify Rosenberg's touchpad, which is 2-dimensional and not capable of exerting resistive or assistive force feedback, with Goldenberg's 3-dimensional knob. To the contrary, a POSA would not be motivated to attempt to apply Goldenberg's resistive and assistive forces on a two-dimensional touchpad because they would recognize a 2-dimensional touchpad is not capable of supporting such forces nor would a POSA implement such force feedback mechanisms in the form factor of a touchpad. EX2007, ¶¶159-62.

None of Petitioner's motivation to combine rationales satisfies its burden. Petitioner's first motivation to combine rationale merely explains why "force detents" are beneficial generally, but not why a POSA would see a specific benefit to a touchpad. Petitioner contends that Goldenberg teaches that force detents provide a better user experience, and thus, a POSA would have sought to improve the user experience of Rosenberg-I by using Goldenberg's force detents. Pet., 67. Here, Petitioner does not explain specifically how or why a POSA would modify Rosenberg's touchpad with a mechanical force detents mechanism that requires a physical knob.

Petitioner's second motivation to combine rationale explains why Goldenberg's force effects are beneficial, but not why a POSA would see a specific benefit to modifying Rosenberg's touchpad with it. Pet., 67-68. Moreover, Petitioner erroneously equates combinability with motivation to combine. Pet., 68; *see Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) ("[O]bviousness concerns whether a skilled artisan not only could have made but would have been motivated to make the combination").

Petitioner's last alleged motivation is that the combination "is no more than the combination of familiar elements according to known methods" without providing any evidence. Pet., 68. This kind of reasoning without evidence was recently rejected by the Federal Circuit. *Virtek Vision Int'l ULC v. Assembly*

Guidance Sys., Inc., 2024 U.S. App. LEXIS 7185, *9 (Fed. Cir. Mar. 27, 2024) (reversing Board's finding of a motivation to combine the primary reference's angular direction system and the secondary reference's 3D coordinate system, which the Board reasoned was obvious to try).

2. Petitioner fails to demonstrate a reasonable expectation of success

As with the Ground 1 and 2 combinations, Petitioner fails to demonstrate a reasonable expectation of success. Specifically, Petitioner does not address how a POSA would apply resistive and assistive forces, which require 3-dimensional knobs and sliders, to Rosenberg I's 2-dimensional touchpad. Instead, Petitioner simply argues that both systems use computers, processors, and actuators. Pet., 69. The fact that both Rosenberg-I and Goldenberg employ processors and actuators does not demonstrate an expectation of success in applying Goldenberg's forces to Rosenberg-I's touchpad. EX2007, ¶163. To the contrary, a POSA would not have expected success in modifying Rosenberg I's touchpad to exert Goldenberg's force effects. *Id.*

X. CONCLUSION

Petitioner has not met its burden to show Claims 1-19 of the '042 Patent are unpatentable. Thus, the challenged claims should be affirmed.

Patent Owner's Response
IPR2024-00478 (U.S. Patent No. 9,430,042)

Respectfully Submitted,

Dated: October 17, 2024

/David D. Schumann/

David D. Schumann (Reg. No. 53,569)
Palani P. Rathinasamy (Reg. No. 63,541)
Moses Xie (Reg. No. 74,491)
Cliff Win (Admitted *Pro Hac Vice*)
Folio Law Group PLLC
1200 Westlake Ave N., Suite 809
Seattle, WA 98109
Tel: (206) 880-1802

Timothy Dewberry (Reg. No. 62,947)
Folio Law Group PLLC
13492 Research Blvd. Ste. 120, No. 177
Austin, TX 78750
Tel: (737) 234-0201

(Case No. IPR2024-00478)

Attorneys for Patent Owner

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 12,858 words per Microsoft Word, which complies with the requirement of 14,000 words allowed under 37 C.F.R. § 42.24(d).

Respectfully submitted,

Date: October 17, 2024.

/David D. Schumann/

David D. Schumann (Reg. No. 53,569)
Palani P. Rathinasamy (Reg. No. 63,541)
Moses Xie (Reg. No. 74,491)
Cliff Win (Admitted *Pro Hac Vice*)
Folio Law Group PLLC
1200 Westlake Ave. N., Suite 809
Seattle, WA 98109
Tel: (206) 880-1802

Timothy Dewberry (Reg. No. 62,947)
Folio Law Group PLLC
13492 Research Blvd. Ste. 120, No. 177
Austin, TX 78750
Tel: (737) 234-1802

(Case No. IPR2024-00478)

Attorneys for Patent Owner

CERTIFICATE OF SERVICE

As authorized by Patent Owner's Mandatory Notice, I hereby certify that on October 17, 2024, a copy of this document has been served in its entirety by electronic mail on Petitioner's lead and backup counsel.

Richard F. Guinta
Rguinta-PTAB@wolfgreenfield.com

Thomas F. Foley
TFoley-PTAB@wolfgreenfield.com

Nathan R. Speed
NSpeed@wolfgreenfield.com

Dated: October 17, 2024

/David D. Schumann/
David D. Schumann (Reg. No. 53,569)
Palani P. Rathinasamy (Reg. No. 63,541)
Moses Xie (Reg. No. 74,491)
Cliff Win (Admitted *Pro Hac Vice*)
Folio Law Group PLLC
1200 Westlake Ave N., Suite 809
Seattle, WA 98109
Tel: (206) 880-1802

Timothy Dewberry (Reg. No. 62,947)
Folio Law Group PLLC
13492 Research Blvd. Ste. 120, No. 177
Austin, TX 78750
Tel: (737) 234-0201

(Case No. IPR2024-00478)

Attorneys for Patent Owner