

United States Patent and Trademark Office
Before the Patent Trial and Appeal Board

Valve Corporation

(Petitioner)

v.

Immersion Corporation

(Patent Owner)

Inter Partes Review

No. IPR2024-00714 | **U.S. Patent No. 10,627,907**

Petitioner's Demonstrative Exhibits

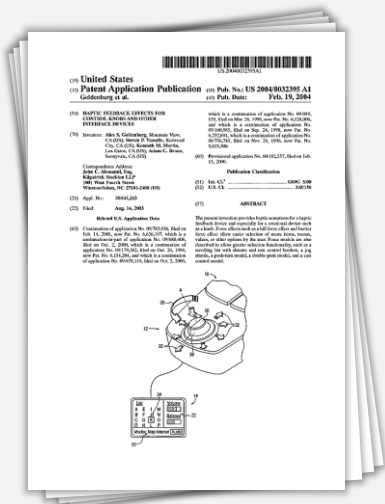
July 29, 2025

Valve Exhibit 1117
Valve v. Immersion
IPR2024-00714

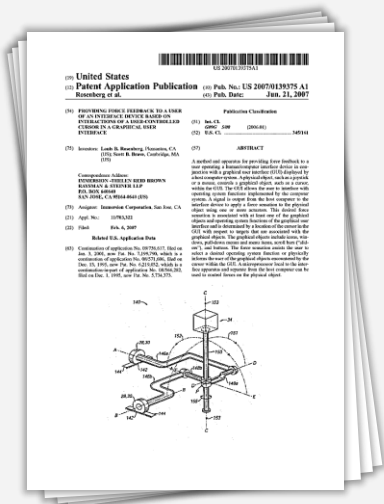
Overview of the Petition's Grounds

GROUND	CLAIMS	BASIS
1. Goldenberg (EX1016)	1-6, 8-13, 15-19	102/103
2. Goldenberg, Cruz-Hernandez (EX1005)	7, 14, 20	103
3. Rosenberg (EX1017)	1-4, 6, 8-11, 13, 15-17, 19	102/103
4. Roberts (EX1018), Rosenberg	5, 12, 18	103
5. Roberts, Rosenberg, Cruz-Hernandez	7, 14, 20	103
6. Levin (EX1006)	1, 3-4, 6, 8, 10-11, 13, 15, 17, 19	102/103

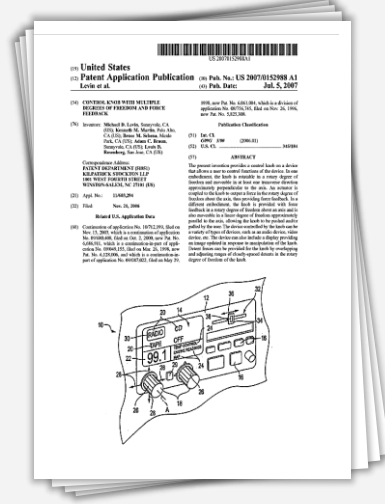
Goldenberg



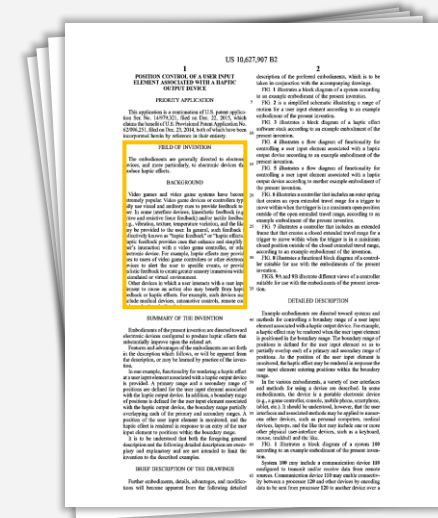
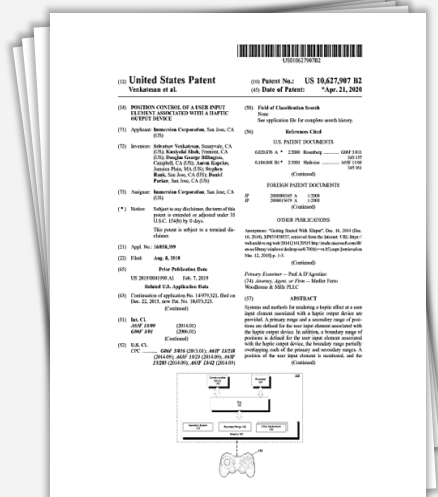
Rosenberg



Levin



Overview of U.S. Patent No. 10,627,907



FIELD OF INVENTION

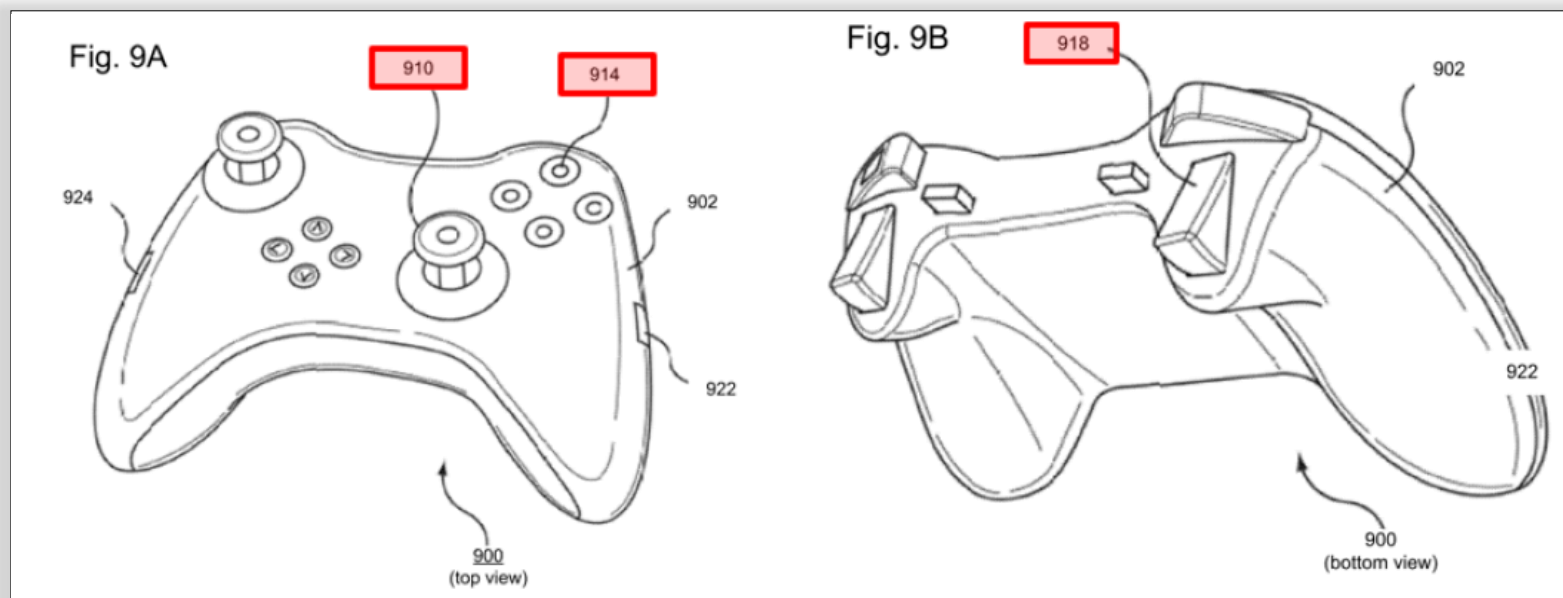
The embodiments are generally directed to electronic devices, and more particularly, to electronic devices that produce haptic effects.

BACKGROUND

Video games and video game systems have become extremely popular. Video game devices or controllers typically use visual and auditory cues to provide feedback to a user. In some interface devices, kinesthetic feedback (e.g., active and resistive force feedback) and/or tactile feedback (e.g., vibration, texture, temperature variation, and the like) may be provided to the user. In general, such feedback is collectively known as “haptic feedback” or “haptic effects.” Haptic feedback provides cues that enhance and simplify a user’s interaction with a video game controller, or other electronic device. For example, haptic effects may provide cues to users of video game controllers or other electronic devices to alert the user to specific events, or provide realistic feedback to create greater sensory immersion within a simulated or virtual environment.

EX1001, 1:13-33 (Pet., 1-3)

'907 Patent: Exemplary User Input Elements



FIGS. 9A and 9B illustrate different views of a controller 900 suitable for use with the embodiments of the present invention. As shown in FIG. 9A and FIG. 9B, controller 900 may include a variety of components such as housing 902, analog or digital joy stick 910, button(s) 914, trigger 918, and rumble actuators 922 and 924.

Housing 902 is shaped to easily accommodate user gripping of controller 900. Controller 900 is an example embodiment of a controller, and the embodiments of the invention may be readily applied to other controller shapes.

Accordingly, the embodiments of the present invention extend the range and capabilities of user input elements. In addition, a wider range of haptic effects can be achieved by rendering the haptic effects at definable positions of the user input elements.

EX1001, Fig. 9A, 13:27-32 (Pet., 3)

'907 Patent: Defining Ranges of Motion

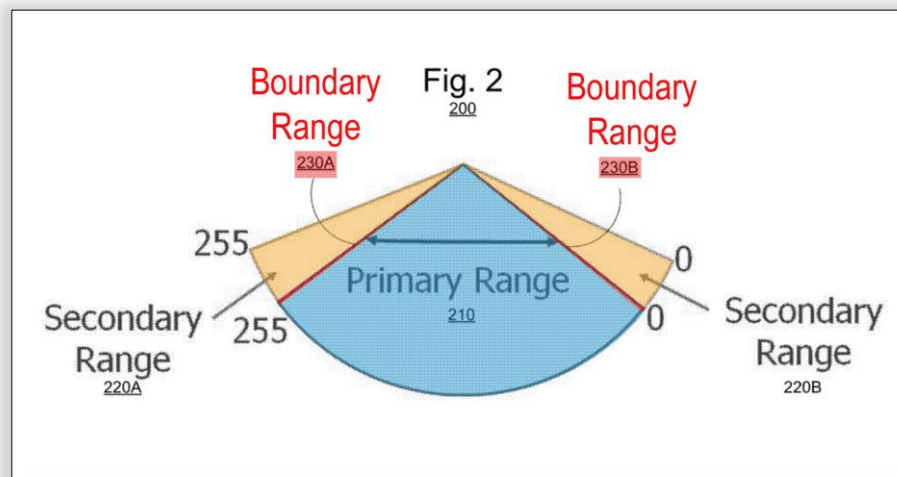


FIG. 2 is a simplified schematic illustrating a range of motion 200 for a user input element according to an example embodiment of the present invention. Although range of motion 200 relates to a trigger input element, the embodiments of the invention may be readily applied to a variety of user input element types.

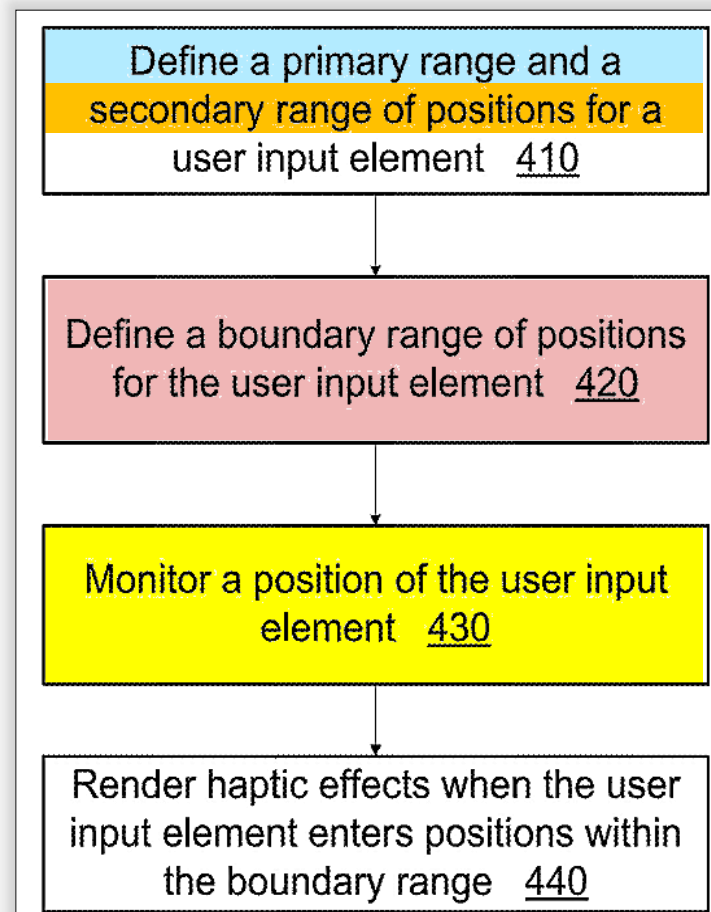
As shown in FIG. 2, range of motion 200 may include a primary range 210 and secondary ranges 220A, 220B. In addition, boundary ranges 230A, 230B may be defined so as to partially overlap primary range 210 and secondary ranges 220A, 220B. In some instances, primary range 210 may be

EX1001, Fig. 2, 4, 5:13-23 (Pet., 4-5)

'907 Patent: Defining Ranges and Rendering Haptic Effects

FIG. 4 illustrates a flow diagram of functionality 400 for controlling a user input element associated with a haptic output device according to an example embodiment of the present invention. In some instances, the functionality of the flow diagram of FIG. 4 (and FIG. 5 below) may be implemented by software stored in memory or other computer readable or tangible media, and executed by a processor. In

At the outset, functionality 400 may define a primary range and a secondary range of positions for the user input element associated with the haptic output device, at 410. Next, at 420, functionality 400 may define a boundary range of positions for the user input element associated with the haptic output device, the boundary range partially overlapping each of the primary and secondary ranges. After the various ranges are defined, functionality 400 monitors the position of the user input element, at 430. Lastly, haptic effect(s) may be rendered when the user input element enters positions within the boundary range, at 440. Here, the haptic effect(s) may extend the position of the user input element into one of the secondary ranges. In addition, haptic instructions to render the haptic effect(s) may be generated by a software application, such as a gaming application. By employing functionality 400, the range and capabilities of the user input elements are extended, and a wider range of haptic effects can be experienced by an end user.



EX1001, Fig. 4, 9:8-39 (Pet., 4-5)

The Prior Art Defined Position Ranges Using “Force Profiles”

[0103] Another type of force sensation process does not use algorithms to model a force, but instead uses force values that have been previously calculated or sampled and stored as a digitized “force profile” in memory or other storage device. These force values may have been previously generated using an equation or algorithm as described above, or provided by sampling and digitizing forces. For

Rosenberg (EX1017) at [0103] (Pet., 34)

[0049] Also, the magnitude of the force detents can differ based on the value being controlled. For example, a radio

preprogrammed station or preferred setting. Also, different sets of detent force profiles can be stored in a memory device on the device 30 and a particular set can be provided on the knob 18 by a microprocessor or other controller in the device 30.

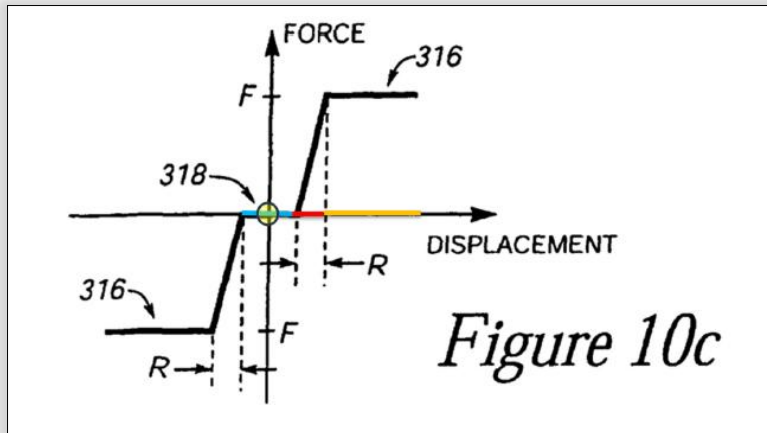
Levin (EX1006) at [0049] (Pet., 69)

[0066] For example, in one force feedback embodiment, host microprocessor 224 can provide low-level force com-

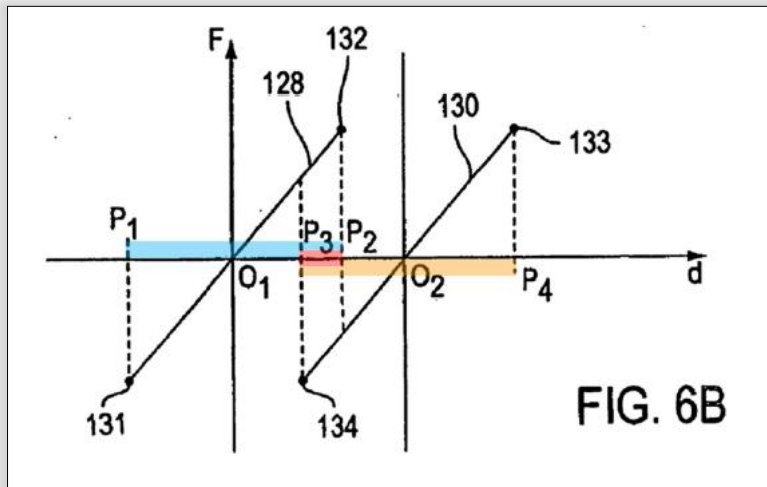
puter. In the local control embodiment, the microprocessor 202 can independently process sensor signals to determine appropriate output actuator signals by following the instructions of a “force process” that may be stored in local memory 206 and includes calculation instructions, formulas, force magnitudes (force profiles), and/or other data. The force process can command distinct force sensations, such as vibrations, textures, jolts, or even simulated interactions between displayed objects. Such operation of local micro-

Goldenberg (EX1016) at [0066] (Pet., 10)

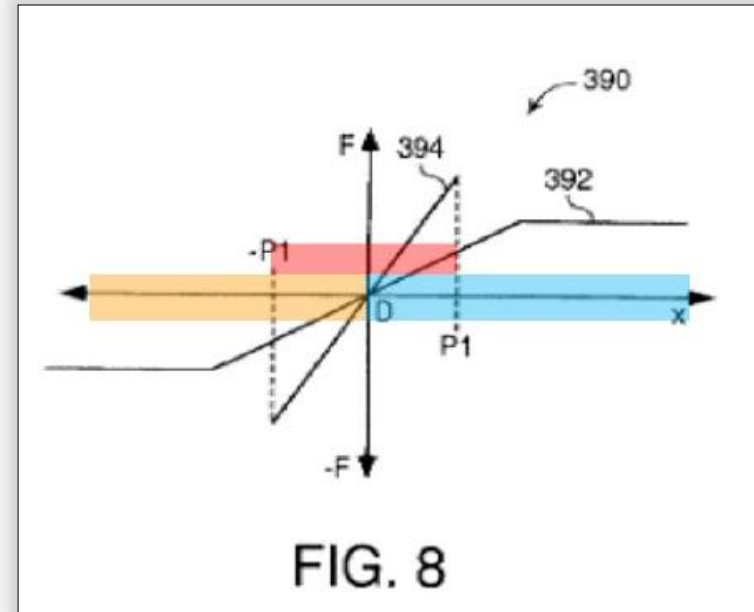
The Prior Art Defined Position Ranges Using “Force Profiles”



Rosenberg (EX1017) at Fig. 10c
(Annotations Added at Pet., 39)



Levin (EX1006) at Fig. 6B
(Annotations Added at Pet., 68)



Goldenberg (EX1016) at Fig. 8
(Annotations Added at Pet., 12)

Overview of Disputes for Each Ground

- **Grounds 3-5 (Rosenberg): One dispute**

- Does Rosenberg disclose “defining position and range information for the user input element”?

- **Grounds 1-2 (Goldenberg): Two Disputes**

- Does Goldenberg disclose “defining position and range information for the user input element”?
- Does Goldenberg disclose the three (i.e., primary, secondary, and boundary) claimed ranges?

- **Ground 6 (Levin): Three Disputes**

- Does Levin disclose “defining position and range information for the user input element”?
- Does Levin disclose the claimed “boundary range of positions”?
- Does Levin disclose “rendering a haptic effect in response to an entry of the user input element to one more positions within the boundary range”?

Key Claim Construction Dispute

- **Claim Construction Dispute:** Impacts all Grounds

Question: Should the Board adopt Immersion's proposed narrow construction of "defining position and range information"?

- **If the Board rejects Immersion's proposed construction:**
 - Petitioner prevails on Rosenberg, and the Board need not consider any other Grounds.
 - Petitioner prevails on limitation 1[A] for all Grounds.
- **If the Board adopts Immersion's proposed construction:**
 - Petitioner still prevails on Rosenberg.

“Defining Position and Range Information”

Defining Position and Range Information: Overview of Dispute

Claim Term	Petitioner's Position	PO's Proposed Construction
"defining position and range information" (Claims 1, 8, and 15)	No construction necessary.	"A step taken by, or a feature allowing, a user or device to change the settings of a controller to adjust the claimed ranges based on user input." Primary issues: • Does the claim language require that the ranges be user modifiable? • Does it exclude pre-defined ranges/force profiles?

At institution, the Board correctly rejected PO's proposed construction

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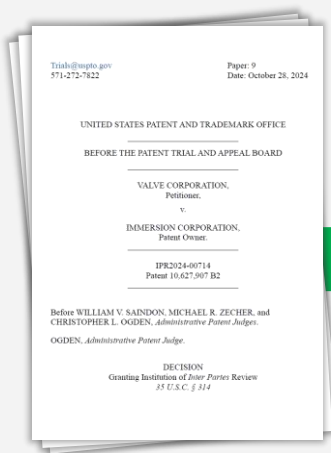
There is No Basis For a “User-Modifiable” Requirement

Reply, 2-3

The specification teaches that the ranges may be fixed—i.e., unmodifiable.

In some embodiments, primary range 210 and secondary ranges 220A, 220B may be fixed or variable.

EX1001, 5:29-30 (Reply, 2)

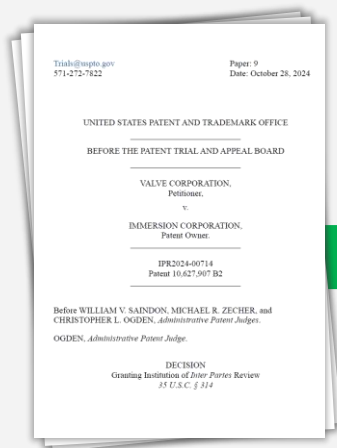


Further, the '907 patent discloses that the primary and secondary ranges at least “may be fixed or variable.” Ex. 1001, 5:29–30. This suggests that an embodiment in which all the range information is fixed (i.e., unalterable by a user) would be within the scope of the claimed invention.

Institution Decision at 10

The ID Found the “User-Modifiable” Requirement Lacks Support

Reply, 2-5



Institution Decision at 8-11

At this stage, we disagree with Patent Owner that the term *defining* in claim 1 requires that the recited position and range information must be user-modifiable. Although claims 8 and 15 (not claim 1) recite a “program comprising instructions for . . . defining position and range information,” nothing in these claims explicitly requires that this program has any interaction with a user. Ex. 1001, 14:24–25, 14:64–65.

Also, although the '907 patent disclosure refers to computer architecture components for rendering a haptic effect within a boundary range, Patent Owner has not pointed to any disclosure in the '907 patent suggesting that range settings must be user-modifiable.

Institution Decision, 10

The Board’s ID correctly found PO “has not pointed to any disclosure in the '907 patent suggesting that range settings must be user-modifiable”

Immersion's Reliance on the Specification Fails

Reply, 8

must be considered meaningful.”). Moreover, as explained in Section II.A, in the context of the '907 patent, a range may be “fixed” or variable” (EX1001, 5:29-30) because the ranges can be defined as either being fixed ranges that do not change after being set (*see, e.g., id.*, 5:30-38) or variable ranges which are initially set but may change based on various factors (*see id.*, 9:44-51). Both embodiments require the defining of the ranges based on present user input, not predetermined profiles.



Requiring user input for “fixed” **and** “variable” ranges ignores the plain meaning of each term.

POR at 22-23

In some embodiments, primary range 210 and secondary ranges 220A, 220B may be fixed or variable. For example, secondary range 220A may have a range of motion of 7 degrees from a maximum outward position to a nominal position, primary range 210 may have a range of motion of 29 degrees from the nominal position to a finger grounding position, and secondary range 220B may have a range of motion of 3 degrees from the finger grounding position to a trigger grounding position. In this example, range of motion 200 may total 39 degrees (7+29+3).

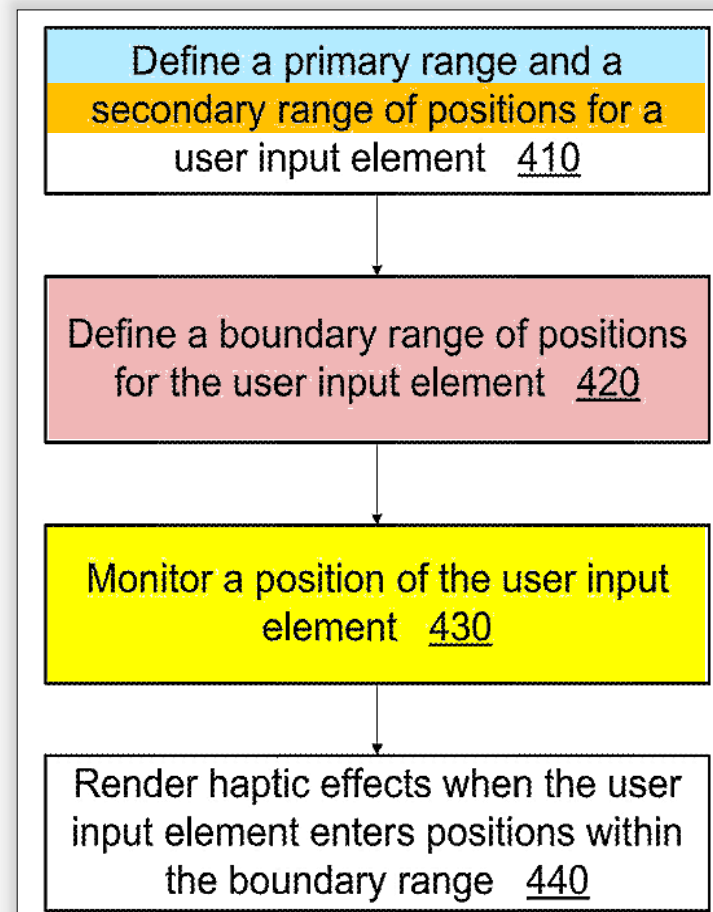


The specification cited by the POR ***neither addresses nor requires user input.***

EX1001, 5:30-38 (Reply, 8)

Figure 4 Confirms There is No “User-Modifiable” Requirement

At the outset, functionality 400 may define a primary range and a secondary range of positions for the user input element associated with the haptic output device, at 410. Next, at 420, functionality 400 may define a boundary range of positions for the user input element associated with the haptic output device, the boundary range partially overlapping each of the primary and secondary ranges. After the various ranges are defined, functionality 400 monitors the position of the user input element, at 430. Lastly, haptic effect(s) may be rendered when the user input element enters positions within the boundary range, at 440. Here, the haptic effect(s) may extend the position of the user input element into one of the secondary ranges. In addition, haptic instructions to render the haptic effect(s) may be generated by a software application, such as a gaming application. By employing functionality 400, the range and capabilities of the user input elements are extended, and a wider range of haptic effects can be experienced by an end user.



EX1001, Fig. 4, 9:8-39 (Pet., 4-5)

Defining Position and Range Information: Overview of Dispute

Claim Term	Petitioner's Position	PO's Proposed Construction
"defining position and range information" (Claims 1, 8, and 15)	No construction necessary.	"A step taken by, or a feature allowing, a user or device to change the settings of a controller to adjust the claimed ranges based on user input." Primary issues: - Does the claim language require that the ranges be user modifiable? - Does it exclude pre-defined ranges/force profiles?

At institution, the Board correctly rejected PO's proposed construction

The Claim Language Does Not Exclude Predefined Ranges

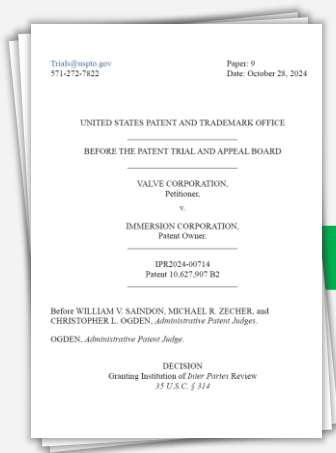
Reply, 3-7

1. A method for controlling a user input element associated with a haptic output device, the method comprising:
defining position and range information for the user input element associated with the haptic output device,

8. A non-transitory computer readable storage medium storing a program configured to be executed by a processor, the program comprising instructions for:
defining position and range information for a user input element associated with the haptic output device,

15. A device comprising:
a processor; and
a memory storing a program for execution by the processor, the program including instructions for:
defining position and range information for a user input element associated with the haptic output device,

EX1001, Claims 1, 8, 15



Institution Decision at 10-11

As to Patent Owner's argument that *defining* would exclude something that is pre-defined, Patent Owner provides no evidence of this in the '907 patent, its prosecution history, or extrinsic evidence. We find the proposition that something "pre-defined" is not "defined" illogical, and we see nothing in the challenged claims explicitly limiting *when* the recited ranges of positions must be defined. The ranges evidently could, for example, be defined in firmware.

Immersion's Purported Plain and Ordinary Meaning Also Fails

2. The plain and ordinary meaning of “defining...” excludes predetermined position and range information loaded into memory.

If the Board rejects Patent Owner’s construction, it must nevertheless give “defining position and range information” its plain and ordinary meaning in light of its surrounding claim language. *Apple Inc. v. MPH Techs. Oy*, 28 F.4th 254, 261-62 (Fed. Cir. 2022). Setting aside whether user input is required or not, the intrinsic record establishes that predetermined position and range information that is loaded into memory is excluded from the claim scope.

Patent Owner Sur-Reply at 6

Immersion’s Sur-Reply repackages its proposed construction as the “plain and ordinary meaning.”

This fails for the same reasons.

Immersion **Fails** to Justify Departing from the ID's Conclusion

Immersion's Four POR Arguments Supporting its Proposed Construction: Each Fails

1.	The '907 Patent does not claim “force profiles”	
2.	Grammar precludes the use of predetermined force profiles	
3.	Proposed construction is consistent with the intrinsic evidence	
4.	Proposed construction is consistent with extrinsic evidence	

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4.	Proposed construction is consistent with extrinsic evidence	

Force Profiles Are Described by the Prior Art

[0103] Another type of force sensation process does not use algorithms to model a force, but instead uses force values that have been previously calculated or sampled and stored as a digitized “force profile” in memory or other storage device. These force values may have been previously generated using an equation or algorithm as described above, or provided by sampling and digitizing forces. For

Rosenberg (EX1017) at [0103] (Pet., 34)

[0049] Also, the magnitude of the force detents can differ based on the value being controlled. For example, a radio

preprogrammed station or preferred setting. Also, different sets of detent force profiles can be stored in a memory device on the device 30 and a particular set can be provided on the knob 18 by a microprocessor or other controller in the device 30.

Levin (EX1006) at [0049] (Pet., 69)

[0066] For example, in one force feedback embodiment, host microprocessor 224 can provide low-level force com-

puter. In the local control embodiment, the microprocessor 202 can independently process sensor signals to determine appropriate output actuator signals by following the instructions of a “force process” that may be stored in local memory 206 and includes calculation instructions, formulas, force magnitudes (force profiles), and/or other data. The force process can command distinct force sensations, such as vibrations, textures, jolts, or even simulated interactions between displayed objects. Such operation of local micro-

Goldenberg (EX1016) at [0066] (Pet., 10)

Force Profiles Provide Force Feedback

Pet., 34-35

Force profiles illustrate defined sets of position and range information stored in memory

[0103] Another type of force sensation process does not use algorithms to model a force, but instead uses force values that have been previously calculated or sampled and stored as a digitized “force profile” in memory or other storage device. These force values may have been previously generated using an equation or algorithm as described above, or provided by sampling and digitizing forces. For

computer 12 to calculate the force values. In addition, previously-stored force values can be output with respect to other parameters to provide different types of forces and force sensations from one set of stored force values. For example, using system clock 18, the stored force values can be output in sequence according to a particular time interval that can vary depending on the desired force. Or, different retrieved force values can be output depending on the current position of user object 34.

[0164] FIGS. 10a-c are graphs illustrating force versus displacement profiles for a restoring force. The force in

[0165] A restoring force applied to user object 34 always points back towards an origin position O (or “neutral position”) of the user object along a degree of freedom. For

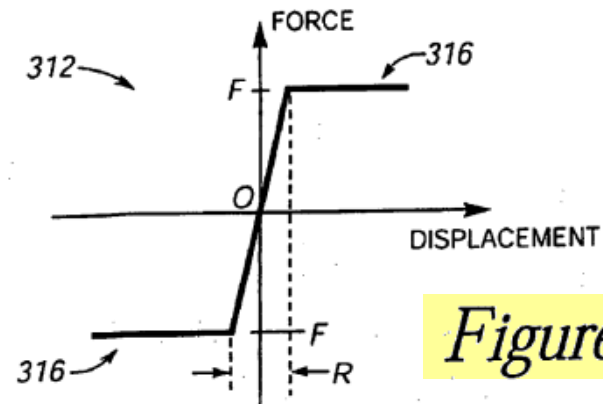


Figure 10a

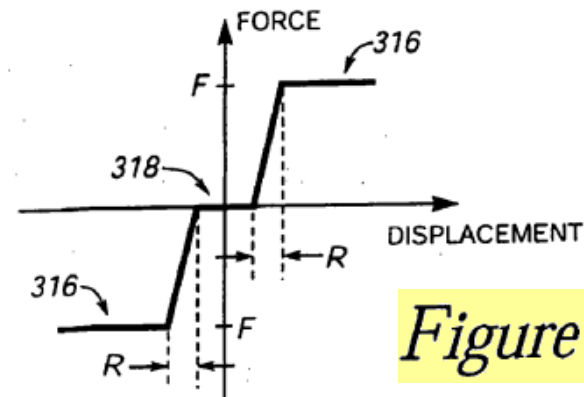


Figure 10c

Immersion's "Force Profiles" Argument Fails

Reply, 12-13

1. The '907 patent does not claim "force profiles"

By mapping "force profile" from Patent Owner's other patents to the claimed "defining input position and range information," Petitioner improperly broadens the scope of the claim term to a construction that is unsupported by the intrinsic evidence. Indeed, neither the '907's specification nor the claims mention the term "force profile" or "haptic profile." The only "profile" that the '907 patent teaches and recites is the separate *ADC input* profile which is defined for the user input element—not a *force* profile. *See, e.g.*, EX1001, Fig. 5, 9:44-10:13.

In other words, the '907 patent does not teach force profiles. EX2004, ¶35. The absence of the term "force profile" was not unintentional. When Patent Owner intended to cover the concept of "force profiles," it did so by clearly stating the term in certain of its other applications. For example, one of Patent Owner's other

Immersion attempts to carve out the prior art.

This amounts to a disclaimer argument.

POR at 14-15

The Claims Do Not Exclude Prior-Art Force Profiles



A disclaimer or disavowal of claim scope must be “clear and unmistakable.”
Luminara Worldwide, LLC v. Liown Electronics Co., 814 F.3d 1343, 1353 (Fed. Cir. 2016)

Cited in Reply, 12



“Thus, in accord with our settled practice we construe the claim as written, not as [Immersion] wish[es] they had written it.” *Chef Am., Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1374 (Fed. Cir. 2004)

Cited in Reply, 13

Absent clear disclaimer of prior art force profiles, the claims are not limited to exclude them

1. The '907 patent does not claim "force profiles"

element—not a *force* profile. *See, e.g.*, EX1001, Fig. 5, 9:44-10:13. Thus, the '907 patent should not be improperly construed to include force profiles. *See e.Digital Corp. v. Futurewei Techs., Inc.*, 772 F.3d 723, 726-727 (Fed. Cir. 2014) (unrelated patents, even from the same patentee, with different written descriptions disclosing different inventions require a new claim construction inquiry); *see also In re Berg*,

In other words, the '907 patent does not teach force profiles. EX2004, ¶35. The absence of the term "force profile" was not unintentional. When Patent Owner intended to cover the concept of "force profiles," it did so by clearly stating the term in certain of its other applications. For example, one of Patent Owner's other

Relies on irrelevant case law and applies wrong legal standard

POR at 14-15

PO's Case Law Does Not Support Excluding Force Profiles



“The ’108 patent discloses a separate invention, includes a distinct prosecution history, and is supported by a different written description[.] These distinctions reinforce the well-understood notion that claims of unrelated patents must be construed separately.” *e.Digital Corp. v. Futurewei Technologies, Inc.*, 772 F.3d 723, 726-727 (Fed. Cir. 2016).

Cited in POR, 14

Valve relies on the
'907 patent intrinsic
evidence, not
unrelated patents

Immersion's assertion that "*position and range information*" must be capable of being "change[d]" or "adjust[ed]" by during use (POR, 14) is refuted by the specification's disclosure that ranges "may be *fixed* or variable." EX1001, 5:29-30; DI, 10. The Board noted (DI, 10) this disclosure "suggests that an embodiment in which all the range information is fixed (i.e., unalterable by a user) would be within the scope of the claimed invention."

Reply at 7

PO's Case Law Does Not Support Excluding Force Profiles



“We see nothing in the intrinsic record that would have suggested to one of ordinary skill that ‘communications path’ refers to wireless communications. To the contrary, the intrinsic record militates powerfully against that understanding.

Ruckus Wireless v. Innovative Wireless, 824 F.3d 999, 1003-1004 (Fed. Cir. 2016).

- Invention described as “particularly concerned” with “two wire lines such a telephone subscriber lines”
- Every embodiment used telephone wires and invention described as reaching any *wired* connection

Cited in POR, 16

Conversely, the '907 patent does not discourage construing the claims to cover “force profiles”

Citing *Ruckus Wireless v. Innovative Wireless*, 824 F.3d 999 (Fed. Cir. 2016), Immersion argues that construing the claims to cover “force profiles” would “improperly broaden[] claim scope in a way that lacks any support in the written description.” POR, 16. But construing the disputed term in *Ruckus* to cover wireless communications was *contrary* to both the term’s plain meaning and the specification’s teachings. 824 F.3d at 1003-04. Here, construing “*defining*” to include pre-defined information is *consistent* with both the plain meaning of “*defining*” (*supra* §II.A.1) and the specification’s teachings (*supra* §II.A.2).

Reply at 13

Immersion **Fails** to Justify Departing from the ID's Conclusion

Immersion's Four POR Arguments Supporting its Proposed Construction: Each Fails

1.	The '907 Patent does not claim “force profiles”	
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4.	Proposed construction is consistent with extrinsic evidence	

POR at 17-20

2. As a matter of grammar, the claim term, “defining,” excludes the use of predetermined profiles.

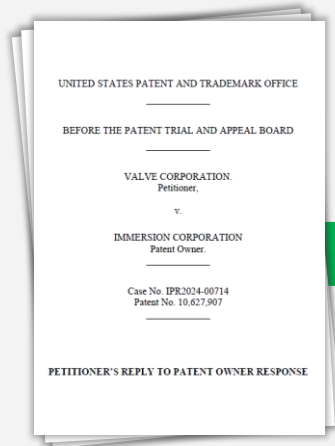
The claim term “defining,” as it is used in the independent claims, is the present continuous tense of “define” as shown by the suffix “ing.” See *Ex parte Ivo Nelson, et al.*, Appeal 2012-010369, 2015 Pat. App. LEXIS 8061, at *23 (PTAB Aug. 31, 2015) (concluding that present continuous tense “is a critical fact” for construing the meaning of the term); EX2004, ¶¶37-39. The present continuous tense (i.e., “defining”) is used to refer to an event happening *now*, as opposed to the past tense (i.e., “defined,” etc.), which refers to an event that has already happened. *Id.*; EX2007, 3, 6. Therefore, the user or device must be capable of “defining position and range information” in the present rather than using information that was already predetermined as in the prior art. EX2004, ¶¶37-39; see, e.g., EX1016, cl. 1 (Goldenberg claiming “predetermined position in the degree of freedom”), ¶[0107] (“a change in the output of a force model or effect when the rotational velocity of acceleration of the knob is outside a particular, predetermined range”). This is only possible if the ranges can be set during use based on user inputs as in the '907 patent.



**Patent Owner
Response**

Petitioner's Reply Showed PO's Grammar Arguments Are Wrong

Reply at 4-5



Petitioner's Reply

Initially, Immersion is wrong as a matter of grammar. The challenged claims *do not* use “*defining*” in the purported present-continuous tense. The present-continuous “is formed with a *be*-verb plus the main verb’s present participle.” (EX1116, 991) (emphasis original). For example, “I *am* eating dinner” or “we *are* walking,” are written in the present-continuous tense because they include a form of the verb “to be” (am, are) in front of the present participle of a verb (eating, walking), it is that *combination* that conveys the meaning that the action *is occurring* presently.

The claim language³ is written as “*defining*” rather than “*is defining*.” There is no *be*-verb in front of the present participle “*defining*.” Thus, in the claims, “*defining*” is not in the present-continuous tense.⁴ Instead, “*defining*” is used as a gerund which is a “present-participial form that functions as a noun.” EX1116, 1006. Claim 1 is a method reciting two steps (*i.e.*, two nouns) and those two steps are defined by the gerunds “*defining*” and “*rendering*.” Because gerunds function as nouns rather than verbs, *they have no verb tense. Id.*

Immersion's Sur-Reply Pivoted to New Flawed Arguments

Patent Owner Sur-Reply at 3

On reply, Petitioner ignores the full context of the claim language, focusing largely on what impact verb tense has on claim interpretation. Reply 3-7. Regardless of what verb tense “defining” is written in, what matters is that the claim language supports Patent Owner’s construction.

Immersion implicitly criticizes *its own* emphasis on grammar

Patent Owner Sur-Reply at 1-2

New argument relying on the preamble and citing *no factual or legal support*—quoting its own proposed construction

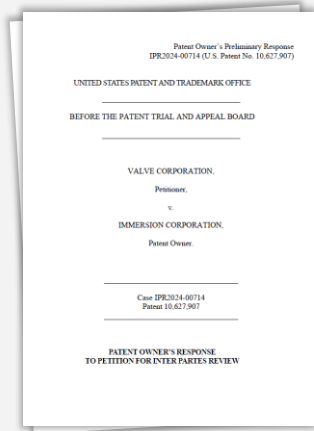
“[D]efining position and range information” appears in each of challenged independent claims 1, 8, and 15. Claim 1 is directed to “[a] method *for controlling a user input element*¹ ... comprising defining the position and range information for the user input element ...” EX1001 13:56-64. This “defining” step must therefore be performed as part of a method of “*controlling* a user input element”—there must be “control” by a user that in turn causes “the settings of a controller to adjust the claimed ranges.”

Immersion **Fails** to Justify Departing from the ID's Conclusion

Immersion's Four POR Arguments Supporting its Proposed Construction: Each Fails

1.	The '907 Patent does not claim “force profiles”	
2.	Grammar precludes the use of predetermined force profiles	
3.	Proposed construction is consistent with the intrinsic evidence	
4.	Proposed construction is consistent with extrinsic evidence	

Immersion's Third Argument Relies on Flawed Reasoning



POR at 20-23

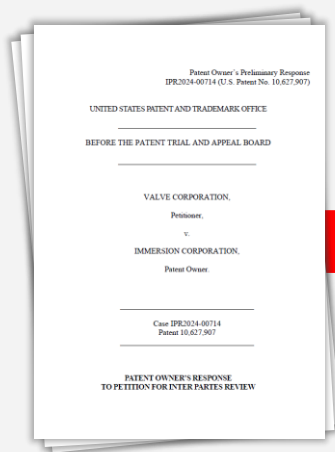


The Board notes that the '907 patent discloses that the primary and secondary ranges “may be fixed or variable” and states “[t]his suggests that an embodiment in which all the range information is fixed (i.e., unalterable by a user) would be within the scope of the claimed invention.” DI at 10. However, construing the claims to include range information that is unalterable by a user would improperly read the present continuing tense of “defining” out of the claims.

POR at 22

Immersion's third argument relies on the same grammar arguments already discussed

Immersion's Third Argument Mischaracterizes the Specification



**Patent Owner
Response**



This construction is also consistent with the specification. The only way of “defining the position and range information” disclosed by the ’907 patent requires the device to actively define (i.e., “defining”) such information based on user input. For example, the ’907 patent discloses “primary range, secondary range(s), and boundary range(s) may be initially set” and that these values may be “*based on the movement of the user input device* from the maximum position to the grounding position.” *Id.*, 9:44-51 (emphasis added). That is, for example, the range values may be set by pulling the controller trigger at runtime.

POR at 21

At the outset, the user input elements of the controller may be initialized, at 510. Here, functionality 500 may initially set position and range information for the user input elements. For example, primary range, secondary range(s), and boundary range(s) may be initially set. In some instances, these values may be calculated based on the movement of the user input device from the maximum out position to the grounding position.

EX1001, 9:44-51, (Reply, 9)



- Functionality 500—the software—sets the position and range information
- Calculations based on movement of “user input device” only contemplated “*[i]n some instances.*”

Immersion Misunderstands Figure 4

Reply, 10-11

In addition, Figure 4 of the patent contains a flow chart with steps described in language similar to the claims (e.g., “Define a primary range and a secondary range of positions for a user input element 410”). Figure 4 shows that the steps of defining the primary, secondary, and boundary ranges are immediately followed by monitoring the position of the user input element and then rendering haptic effects, which indicates that each of these steps are performed during use, not using predetermined profiles provided by, for example, the manufacturer. EX2004, ¶40.

POR at 21-22

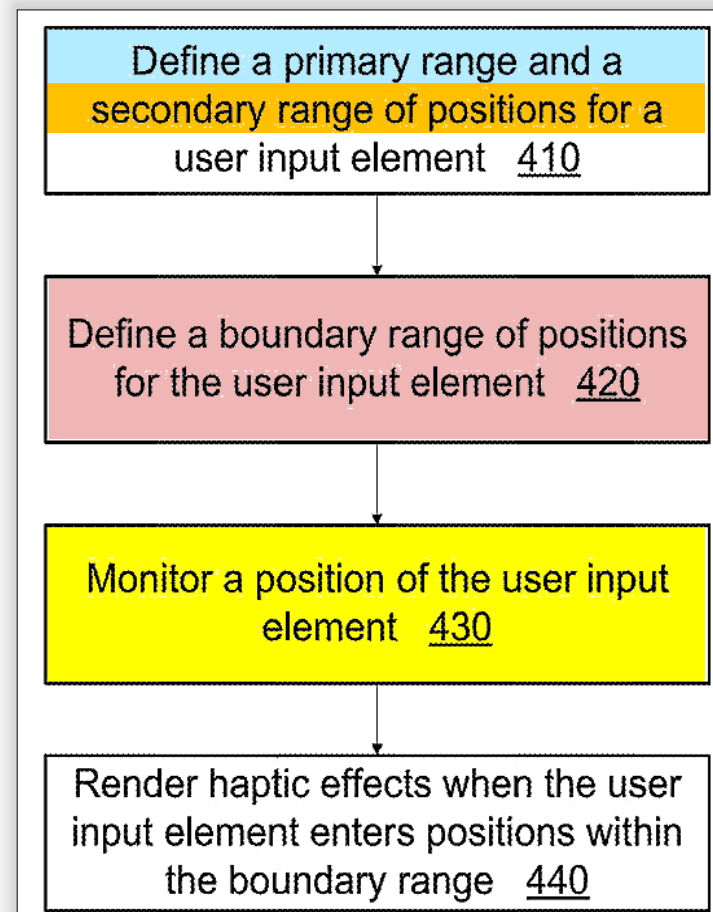
Figure 4’s functionality defines the primary and secondary ranges at step 410 and “[n]ext” defines the boundary range at step 420. EX1001, 9:21-27. There is no discussion of user input playing any part in defining the ranges. To the contrary, the specification states that “[a]fter the various ranges are defined, functionality 400 monitors the position of the user input element, at [step] 430.” *Id.*, 9:27-29, claim 6. Thus, Figure 4—which “contains a flow chart with steps described in language similar to the claims” (POR, 21)—describes the defining ranges *before* the position of the user input element is monitored. EX1001, 9:27-29.

Immersion’s assertion that Figure 4 “indicates that each of these steps are performed during use” is unsupported. POR, 21-22. Immersion cites nothing in the ‘907 patent to support this assertion. Indeed, “monitoring” the user input element is a limitation of the dependent claims (e.g., claim 6), which means that step is not even required for the independent claims.

Reply at 10-11

Figure 4 Confirms There is No “User-Modifiable” Requirement

At the outset, functionality 400 may define a primary range and a secondary range of positions for the user input element associated with the haptic output device, at 410. Next, at 420, functionality 400 may define a boundary range of positions for the user input element associated with the haptic output device, the boundary range partially overlapping each of the primary and secondary ranges. After the various ranges are defined, functionality 400 monitors the position of the user input element, at 430. Lastly, haptic effect(s) may be rendered when the user input element enters positions within the boundary range, at 440. Here, the haptic effect(s) may extend the position of the user input element into one of the secondary ranges. In addition, haptic instructions to render the haptic effect(s) may be generated by a software application, such as a gaming application. By employing functionality 400, the range and capabilities of the user input elements are extended, and a wider range of haptic effects can be experienced by an end user.



EX1001, Fig. 4, 9:8-39 (Pet., 4-5)

Immersion's Sur-Reply Pivoted to New Flawed Arguments

Patent Owner Sur-Reply at 2

That the “storage medium” and “device” contain instructions to perform the “defining” step makes clear these claims are not directed to “position and range information” preloaded into memory, but rather information “defin[ed]” by the claimed “program” based on input from a user of that device. POR 20.

Patent Owner Sur-Reply at 3

The dependent claims further support Patent Owner’s construction. Claims 2, 9, and 16 provide an example of a type of user input that can be used in the “defining” step: the three ranges can be “calculated *based on movement of the user input element* from a maximum out position to a grounding position.” EX1001 14:1-5, 14:35-40, 15:8-12. These claims describe the user moving a portion of the controller (“the user input element”) in a certain way, such that the “defining” step is *based on* this user input.

Immersion’s Sur-Reply makes further unsupportable conclusions about “user input”

Immersion's Sur-Reply Pivoted to New Flawed Arguments

Patent Owner Sur-Reply at 3

The dependent claims further support Patent Owner's construction. Claims 2, 9, and 16 provide an example of a type of user input that can be used in the "defining" step: the three ranges can be "calculated *based on movement of the user input element* from a maximum out position to a grounding position." EX1001 14:1-5, 14:35-40, 15:8-12. These claims describe the user moving a portion of the controller ("the user input element") in a certain way, such that the "defining" step is *based on* this user input.



2. The method of claim 1, wherein one of the primary range of positions, the secondary range of positions, and the boundary range of positions is calculated based on a movement of the user input element from a maximum out position to a grounding position.

The Dependent Claims Do Not Support Immersion

Reply, 3

2. The method of claim 1, wherein one of the primary range of positions, the secondary range of positions, and the boundary range of positions is calculated based on a movement of the user input element from a maximum out position to a grounding position.

9. The non-transitory computer readable storage medium of claim 8, wherein one of the primary range of positions, the secondary range of positions, and the boundary range of positions is calculated based on a movement of the user input element from a maximum out position to a grounding position.

16. The device of claim 15, wherein one of the primary range of positions, the secondary range of positions, and the boundary range of positions is calculated based on a movement of the user input element from a maximum out position to a grounding position.

EX1001, Claims 2, 9, 16

- No reference to being user-modifiable
- Based on the user input element, not user action
- No temporal restrictions prohibiting calculations performed prior to use

The Trigger Data Disclosure Does Not Dictate Otherwise

Patent Owner Sur-Reply at 5

Other portions of the specification describe how software (here, “[t]rigger engine 316”) “may modify the haptic data *based on user input data*, such as trigger data,” which “includes one or more parameters that indicate a position and/or range of one of more triggers of controller.” EX1001 7:1-6; POR 21. This passage indicates “trigger data,” a type of “user input data,” can be used in defining position and range information. That “trigger data [may] be collected by firmware” does not contradict Patent Owner’s construction (ID at 10); rather, what matters is that “trigger data,” which is based on user input, is what results in “defin[ition of] position and range information.” POR at 22.

Mischaracterizes
specification

- Trigger engine 316 may modify haptic data based on trigger data 323.
- Trigger data itself merely “indicate[s] a position.”

Trigger engine 316 may receive haptic data, such as a haptic effect definition, and may modify the haptic data based on user input data, such as trigger data 323. Trigger data is data that includes one or more parameters that indicate a position and/or range of one or more triggers of controller 330 (e.g., triggers L and R of FIG. 3). Trigger engine 316 may further transmit haptic instructions to controller 330. For example, trigger engine 316 may transmit haptic instructions to a variety of user-input elements of controller 330. As previously described, a haptic instruction may cause one or more targeted motors or targeted actuators of controller 330 to produce a haptic effect at one or more user-input elements of controller 330.

Immersion **Fails** to Justify Departing from the ID's Conclusion

Immersion's Four POR Arguments Supporting its Proposed Construction: Each Fails

1.	The '907 Patent does not claim “force profiles”	
2.	Grammar precludes the use of predetermined force profiles	
3.	Proposed construction is consistent with the intrinsic evidence	
4.	Proposed construction is consistent with extrinsic evidence	

Immersion's Reliance on Extrinsic Evidence Fails

POR at 23-24

4. Patent Owner's proposed construction is consistent with the extrinsic evidence.

Dictionaries treat the present tense and the past tense of "defining" as different words with different meanings. *Comaper Corp. v. Antec, Inc.*, 596 F.3d 1343, 1348 (Fed. Cir. 2010) ("In determining the ordinary and customary meaning of the claim term as viewed by a person of ordinary skill in the art, it is appropriate to consult a general dictionary definition of the word for guidance."). For example, the prefix "pre" modifies the meaning of a word to indicate something that happened earlier than, prior to, or before a time or an event. *See* EX2007, 4-5; EX2008, 3-4. Since "defining" is in the present continuous tense and describes an event happening now, it necessarily excludes something that uses only range information that already happened in the past, e.g.:

- "Define" means "to explain and describe the meaning and exact limits of something." EX2007, 6. But "predetermine" as in the prior art (e.g., EX1016, cl. 1, ¶[0107]) means "to decide or arrange something at an earlier time." EX2007, 1; *see also* EX2008, 1 ("to determine beforehand").

These definitions establish that "defining" requires an active step or function that can be performed in the present which excludes, for example, predetermined profiles created in the past.

Reply at 11-12

3. Immersion's Reliance on Extrinsic Evidence Fails

Immersion cites definitions of "define" and "predetermine," and argues they have different meanings. POR, 23-24. Immersion's definitions confirm the obvious: pre-determined/pre-defined information is defined at some earlier point. The definitions do not suggest that pre-defined information was never *defined* at some point.

Once Immersion's "present-continuous tense" mischaracterization of English grammar rules is stripped away, "*defining*" can be met by defining the position and boundary ranges at any point in time. Immersion does not meaningfully dispute that the ranges "predetermined" in the prior art were established by defining them at *some* point. The Board rightly concluded that the claims require nothing more. DI, 10-11.

Reply at 6-7

This understanding of "*defining*" is consistent with its plain meaning which simply means to "mark out the limits of." EX1114, 376; EX1115, 524 (similar). Nothing in that plain meaning limits when information can be defined. Anything pre-defined was actively defined at some point.

Other Claim Construction Disputes

The Board Need Not Resolve Other Claim Construction Disputes

Claim Term	Patent Owner's Proposed Construction
“partially overlaps” (Claims 1, 8, and 15)	Overlap between two ranges is less than total, such that neither range is completely overlapped by the other.
“in response to” (Claims 1, 8, and 15)	Plain and ordinary meaning, which requires a cause-and-effect relationship between a second event (e.g., a haptic effect) that occurs in reaction to a first event (e.g., entry of the user input element to one or more positions within the boundary range of positions).

POR at 13

B. “*partially overlaps*” and “*in response to*”

Immersion proposes express constructions for these terms and alleges that its “partially overlaps” construction avoids *Goldenberg* and *Levin*, while its “in response to” construction avoids *Levin*. POR, 13, 49-50, 61-71. The Board need not expressly construe either term because the prior art meets the claims even under Immersion’s constructions as discussed *infra* §§IV.B.2 and V.B-C.

Reply at 14

Grounds 3-5: Rosenberg

GROUND	CLAIMS	BASIS
1. Goldenberg (EX1016)	1-6, 8-13, 15-19	102/103
2. Goldenberg, Cruz-Hernandez (EX1005)	7, 14, 20	103
3. Rosenberg (EX1017)	1-4, 6, 8-11, 13, 15-17, 19	102/103
4. Roberts (EX1018), Rosenberg	5, 12, 18	103
5. Roberts, Rosenberg, Cruz-Hernandez	7, 14, 20	103
6. Levin (EX1006)	1, 3-4, 6, 8, 10-11, 13, 15, 17, 19	102/103

[0002] The present invention relates generally to interface devices for allowing humans to interface with computer systems, and more particularly to computer systems and computer interface devices that provide force feedback to the user.

[0062] Interface device 14 includes a local microprocessor 26, sensors 28, actuators 30, a user object 34, optional sensor interface 36, an optional actuator interface 38, and other optional input devices 39. Interface device 14 may also include additional electronic components for communicating via standard protocols on bus 24. In the preferred embodiment, multiple interface devices 14 can be coupled to a single host computer system 12 through bus 24 (or multiple buses 24) so that multiple users can simultaneously interface with the host application program (in a multi-player game or simulation, for example). In addition, mul-

[0063] Local microprocessor 26 is coupled to bus 24 and

includes a digital signal processor (DSP) chip. Local memory 27, such as RAM and/or ROM, is preferably coupled to microprocessor 26 in interface device 14 to store instructions for microprocessor 26 and store temporary and other data. Microprocessor 26 can receive signals from sensors 28 and provide signals to actuators 30 of the interface device 14 in accordance with instructions provided by host computer 12 over bus 24.

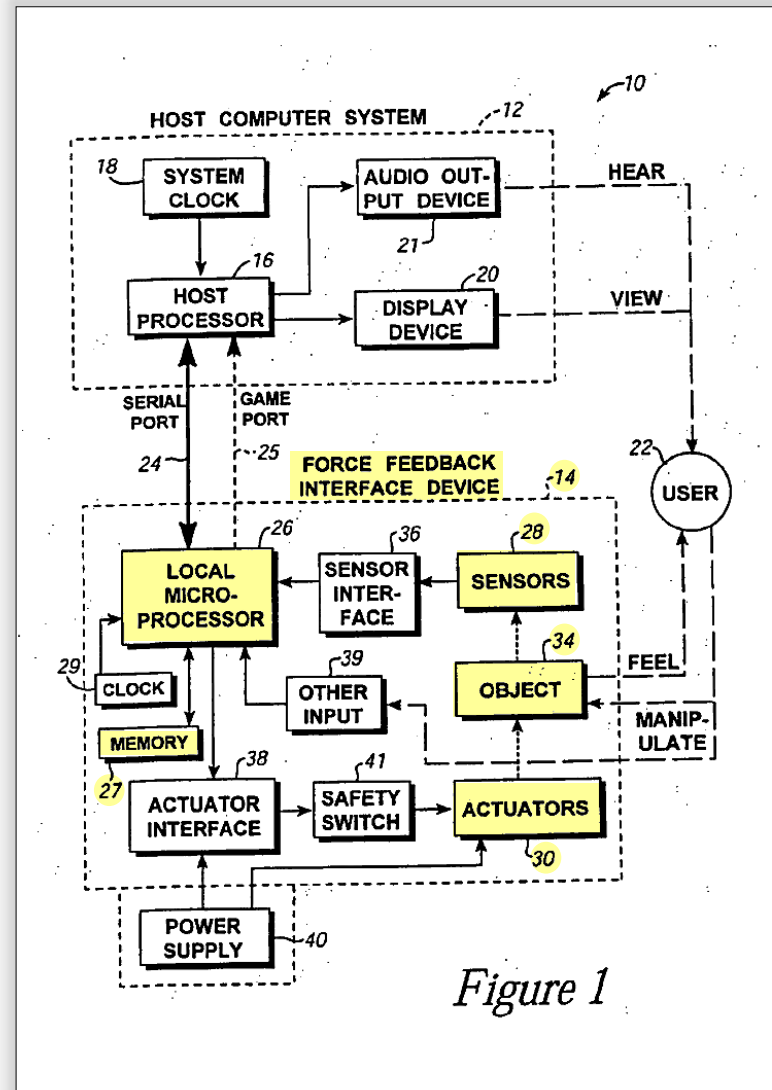


Figure 1

EX1017 at [0002], [0062], [0063], Fig. 1 (Pet., 32-33)

[0069] Sensors 28 sense the position, motion, and/or other characteristics of a user object 34 of the interface device 14 along one or more degrees of freedom and provide signals to microprocessor 26 including information representative of those characteristics. Examples of embodiments of user

[0103] Another type of force sensation process does not use algorithms to model a force, but instead uses force values that have been previously calculated or sampled and stored as a digitized "force profile" in memory or other storage device. These force values may have been previously generated using an equation or algorithm as described above, or provided by sampling and digitizing forces. For example, to provide a particular force sensation to the user, host computer 12 can be instructed by a force sensation process to retrieve successive force values from a certain storage device, such as RAM, ROM, hard disk, etc. These force values can be sent directly to an actuator in a low-level command to provide particular forces without requiring host computer 12 to calculate the force values. In addition, previously-stored force values can be output with respect to other parameters to provide different types of forces and force sensations from one set of stored force values. For example, using system clock 18, the stored force values can be output in sequence according to a particular time interval that can vary depending on the desired force. Or, different retrieved force values can be output depending on the current position of user object 34.

[0164] FIGS. 10a-c are graphs illustrating force versus displacement profiles for a restoring force. The force in

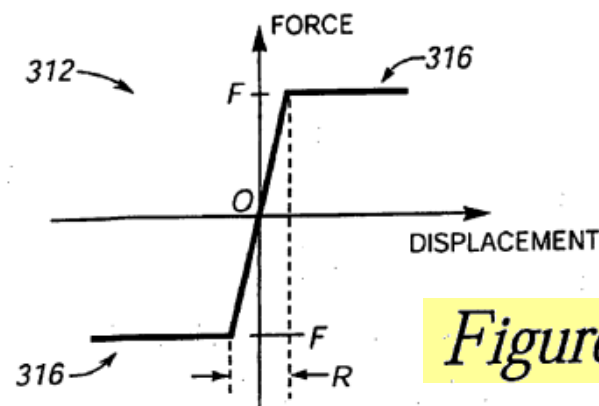


Figure 10a

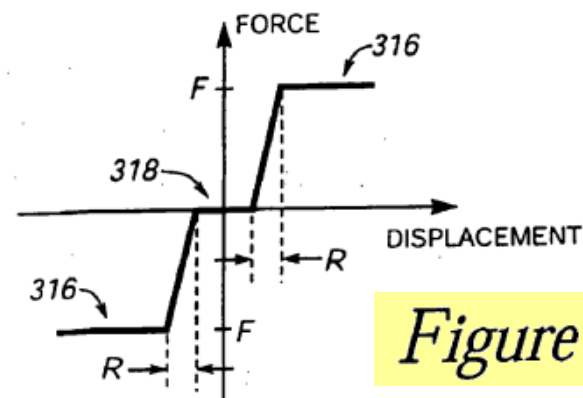


Figure 10c

Ground 3: Rosenberg Meets Claim 1 in Two Ways

Petition, 35-40

[0164] FIGS. 10a-c are graphs illustrating force versus displacement profiles for a restoring force. The force in graph 312 of FIG. 10a is bi-directional, where the force on the right side of the vertical axis is applied in one direction along a degree of freedom, and the force on the left side of the vertical axis is applied in the opposite direction along that degree of freedom. The force shown in graph 314 of

[0165] A restoring force applied to user object 34 always points back towards an origin position O (or “neutral position”) of the user object along a degree of freedom. For example, the origin position for a joystick can be the joystick’s center position, as shown in FIGS. 7 and 8. The magnitude of restoring force, specified by the magnitude command parameter, generally remains constant in either direction for the range 316 along the degree of freedom of the user object. The maximum force magnitude F is prefer-

[0166] In FIG. 10c, the restoring force is shown similarly to the force in FIG. 1a, except that the applied force is about zero in an extended region 318, about the origin position. Region 318 is known as a “deadband”, and allows the user to have some freedom to move object 34 for a short distance around the origin before forces are applied. The specification of deadband 318 for an applied restoring force can be a value included, for example, as a separate deadband command parameter, or, alternatively, as part of the style parameters 308 of the restoring force host command.

EX1017 at [0164]-[0166] (Pet., 36-40)

“Without Deadband”

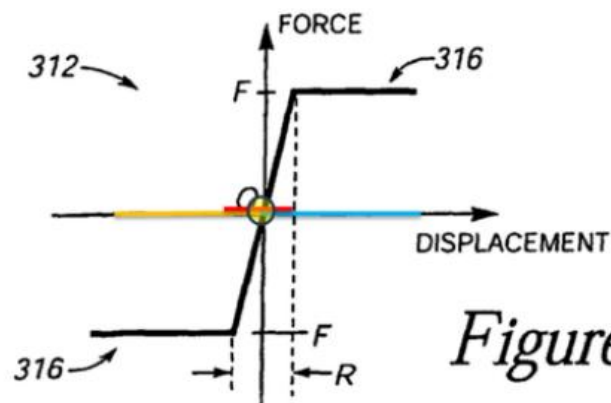


Figure 10a

“With Deadband”

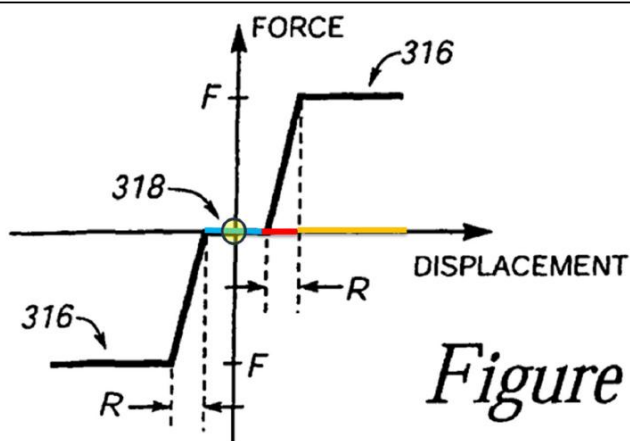


Figure 10c

EX1017, Figs. 10a, 10c (annotated at Pet., 39-40)

Ground 3 (Rosenberg): One Dispute

Label	Limitation	Disputed
[1PRE]	A method for controlling a user input element associated with a haptic output device, the method comprising:	No
[1A]	defining position and range information for the user input element associated with the haptic output device, including	Yes
[1A1]	a primary range of positions,	No
[1A2]	a secondary range of positions, and	No
[1A3]	a boundary range of positions, wherein the boundary range of positions partially overlaps each of the primary range of positions and the secondary range of positions; and	No
[1B]	rendering a haptic effect in response to an entry of the user input element to one or more positions within the boundary range of positions.	No

**Immersion disputes only
limitation [1A]**

POR at 55-58



VIII. GROUND 3: ROSENBERG DOES NOT ANTICIPATE OR RENDER OBVIOUS ANY OF THE CHALLENGED CLAIMS 55

- A. Claim [1A]: Petitioner Has Failed to Show that Rosenberg Teaches “Defining Position and Range Information for the User Input Element Associated with the Haptic Output Device” 55
- B. Claim [1A]: Petitioner Has Failed to Separately Map “Defining Position and Range Information for the User Input Element Associated with the Haptic Output Device” 58

POR at Table of Contents

Rosenberg Meets [1A] Regardless of Claim Construction

Rosenberg Grounds Prevail Regardless of Claim Construction

Claim Construction Outcome	[1A] Result
If the Board <u>rejects</u> Immersion's proposed construction: Rosenberg meets limitation [1A]	
If the Board <u>adopts</u> Immersion's proposed construction: Rosenberg still meets limitation [1A]	

POR at 56

But as previously discussed, the '907 patent does not teach or claim force profiles, and showing force profiles to meet the challenged claims is improper and insufficient.

Merely **repeats claim construction argument** and fails if the Board rejects Immersion's proposed construction

Rosenberg's Force Profiles Are Not Mere Illustrations

POR at 56

Merely describing “graphs,” “illustration[s],” and “diagram[s]” of various force effects relative to input ranges, i.e., force profiles, is not the same as the claimed “defining position and range information for the user element.”

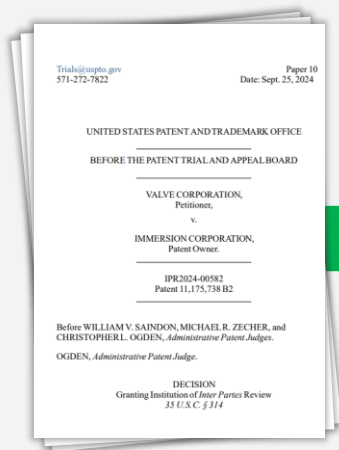


Mischaracterizes
Rosenberg and Petitioner's
arguments

Reply at 15

Immersion's only other dispute with the Rosenberg-based grounds mischaracterizes Rosenberg's force profiles as mere graphs/illustrations/abstract picture. POR, 56-57. Immersion asserts that using such profiles does not involve “*defining position and range information.*” Rosenberg *illustrates* its force profiles using graphs, but the profiles are values “that have been previously calculated or sampled and stored as a digitized ‘force profile’ in memory or other storage device.” Rosenberg, [0103].

The Board's ID Also Disagreed with Immersion's Characterization



Institution Decision at 24

We disagree with Patent Owner that Petitioner equates the step of “defining position and range information” with Rosenberg’s mere description of such information in Figures 10(a) and 10(c). Rather, we understand Petitioner’s argument to be that Rosenberg’s system explicitly defines and stores force profiles as reflected in Figures 10(a) and 10(c). *See, e.g.,* Pet. 34 (arguing that “Rosenberg’s system provides force feedback through ‘force profile[s]’ stored in memory.” (alteration in original) (quoting Ex. 1017 ¶ 103)).

Immersion's Sur-Reply Focuses Entirely on “Defining”

Patent Owner Sur-Reply at 20

A. The Petition does not show Rosenberg discloses this limitation under Patent Owner’s proposed construction.

Petitioner relies exclusively on two of Rosenberg’s embodiments for this limitation: a restoring force command with a deadband region (Fig. 10(c)) and without a deadband region (Fig. 10(a)). *Id.* 36-40; Reply 14-16. Petitioner alleges these restoring force commands define various points and ranges, but none of those points or ranges is defined *based on user input* of any kind. Petitioner admits, as it must, that Rosenberg uses “pre-defined sets of position and range information,” rather than information based on user input. Reply 16.

Patent Owner Sur-Reply at 20-21

B. The Petition fails to show Rosenberg discloses this limitation even if the Board does not adopt Patent Owner’s construction.

As with Goldenberg, Petitioner admits Rosenberg’s “position and range information” is pre-defined (*id.*), rather than defined according to instructions embodied in software and/or hardware that is part of Rosenberg’s system, as required by all challenged claims (*supra* §II.A.2). The Petition points to “the set of

But that “set of software instructions” does not “define” Rosenberg’s force profiles. That “Rosenberg stores force profiles in memory and uses the profiles to command an actuator to output force-feedback effects” does not help Petitioner. Reply 14. Here, Petitioner is pointing to software instructions that cause haptic effects to be output, rather than instructions that cause “position and range information” to be “defined.” As Petitioner admits, Rosenberg’s system merely “implements” the predetermined force profiles stored in memory. Pet. 50.

Rosenberg discloses switching between multiple force profiles based on user input

[0103] Another type of force sensation process does not use algorithms to model a force, but instead uses force values that have been previously calculated or sampled and stored as a digitized “force profile” in memory or other storage device. These force values may have been previously generated using an equation or algorithm as described above, or provided by sampling and digitizing forces. For

computer 12 to calculate the force values. In addition, previously-stored force values can be output with respect to other parameters to provide different types of forces and force sensations from one set of stored force values. For example, using system clock 18, the stored force values can be output in sequence according to a particular time interval that can vary depending on the desired force. Or, different retrieved force values can be output depending on the current position of user object 34.

EX1017 at [0103] (Pet., 34; Reply, 14-16)

[0121] The second branch from step 106 is concerned with the process of the host computer determining high-level force commands (“host commands”) to provide force feedback to the user manipulating object 34. The second branch starts with step 110, in which the host computer system checks if a change in the type of force applied to user object 34 is required. The “type” of force is a force sensation or profile produced by a particular reflex process or force value which the local microprocessor 26 can implement independently of the host computer. The host computer 12 deter-

program updated in step 106. As explained with reference to FIG. 4, the sensor data informs the host computer when forces should be applied to the object based on the object's current position, velocity, and/or acceleration. The user's manipulations of object 34 may have caused a new type of force to be required. For example, if the user is moving a virtual

be applied to the user object. Forces may be required on the user object depending on a combination of an application event and the sensor data read in step 108. Also, other input, such as a user activating buttons or other input devices 39 on interface device 14, can change the type of forces required on object 34.

EX1017 at [0121] (Reply, 16)

Immersion's Remaining POR Argument Also Fails

POR at 58

Petitioner does not separately map “defining position and range information” and the claimed ranges but rather maps both elements to the same figures in Rosenberg—i.e., Figs. 10a, 10c. Pet. 37-44; EX2004, ¶107. But each of the claimed ranges and the process or feature for defining them must be treated as separate terms. *See BENQ AM.*, 533 F.3d at 1371; EX2004, ¶107. Petitioner cannot meet its burden because it has failed to properly map “defining position and range information” separately from the claimed ranges.

Immersion's Sur-Reply appears to abandon this flawed argument

Institution Decision at 24

The Petition did not map “defining position and range information” to the figures.

We disagree with Patent Owner that Petitioner equates the step of “defining position and range information” with Rosenberg’s mere description of such information in Figures 10(a) and 10(c). Rather, we understand Petitioner’s argument to be that Rosenberg’s system explicitly defines and stores force profiles as reflected in Figures 10(a) and 10(c). *See, e.g.*, Pet. 34 (arguing that “Rosenberg’s system provides force feedback through ‘force profile[s]’ stored in memory.” (alteration in original) (quoting Ex. 1017 ¶ 103)).

Ground 3 (Rosenberg): Disputes are Identical for Independent Claims

Dispute for independent claims
8 and 15 is the same dispute as
independent claim 1



The bracketing labels shown in claim 1 refer to the labels used in the Petition for claim 1. Since independent claims 8 and 15 contain substantially the same limitations, all discussion below applies equally to claims 1, 8, and 15 unless otherwise stated.

POR at 9

Rosenberg discloses the
instructions for claims 8 and 15



“Local memory 27, such as RAM and/or ROM, is preferably coupled to microprocessor 26 in interface device 14 to store instructions for microprocessor 26 and store temporary and other data.” [0063]. Ward, ¶195.

Rosenberg’s local memory 27, which can be RAM and/or ROM ([0063]), is “a non-transitory computer readable storage medium storing a program configured to be executed by a processor,” where the program is the set of software instructions executed by Rosenberg’s microprocessor to implement its force profiles. [0125]

Rosenberg teaches (and Figure 1 shows) that the interface device includes a local microprocessor 26 ([0062]-[0063]) and a local memory 27 ([0063]). The memory 206 stores instructions, i.e., “program code,” for performing the steps recited in [1A]-[1B] for the reasons discussed in connection with claim 8. [0066];

Ward, ¶¶200-201; see supra §VII.C.7.

Petition at 50-52

Ground 3 (Rosenberg): Dependent Claims are Undisputed

Label	Limitation	Disputed
Claim 2	The method of claim 1, wherein one of the primary range of positions, the secondary range of positions, and the boundary range of positions is calculated based on a movement of the user input element from a maximum out position to a grounding position.	No
Claim 3	The method of claim 1, wherein a profile for the user input element is calculated by mapping each position of the user input element to an analog to digital conversion value.	No
Claim 4	The method of claim 3, wherein the profile for the user input element is an increasing profile or a decreasing profile.	No
Claim 5	The method of claim 1, wherein a normalized profile for the user input element is calculated by removing at least one of the secondary range of positions or the boundary range of positions from mapped analog to digital conversion values.	No
Claim 6	The method of claim 1, further comprising monitoring a position of the user input element.	No
Claim 7	The method of claim 1, further comprising adjusting a profile and a normalized profile of the user input element to adjust for a change to a resting position of the user input element.	No

Rosenberg Grounds 4-5 Disputes

Immersion has no separate disputes against Grounds 4-5

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

Ground 4 pertains to claims 5, 7, 12, 14, 18, and 20, which are dependent on independent claims 1, 8, or 15. For the reasons provided in Section IX with respect to claims 1, 8, and 15, the Rosenberg-Roberts combination does not disclose all required elements. EX2004, ¶108. Accordingly, Petitioner has not met its burden of demonstrating obviousness as to claims 5, 7, 12, 14, 18, and 20 in view of the Rosenberg-Roberts combination.

X. GROUND 5: THE ROBERTS-ROSENBERG-CRUZ-HERNANDEZ COMBINATION DOES NOT RENDER ANY OF THE CHALLENGED CLAIMS OBVIOUS

Ground 5 pertains to claims 7, 14, and 20, which are dependent on independent claims 1, 8, or 15. For the reasons provided in Section IX with respect to claims 1, 8, and 15, the Rosenberg-Roberts-Cruz-Hernandez combination does not disclose all required elements. EX2004, ¶109. Accordingly, Petitioner has not met its burden of demonstrating obviousness as to claims 7, 14, and 20 in view of the Rosenberg-Roberts-Cruz-Hernandez combination.

POR at 58-59

Grounds 1-2: Goldenberg

GROUND	CLAIMS	BASIS
1. Goldenberg (EX1016)	1-6, 8-13, 15-19	102/103
2. Goldenberg, Cruz-Hernandez (EX1005)	7, 14, 20	103
3. Rosenberg (EX1017)	1-4, 6, 8-11, 13, 15-17, 19	102/103
4. Roberts (EX1018), Rosenberg	5, 12, 18	103
5. Roberts, Rosenberg, Cruz-Hernandez	7, 14, 20	103
6. Levin (EX1006)	1, 3-4, 6, 8, 10-11, 13, 15, 17, 19	102/103

- **Grounds 1-2 (Goldenberg): Two Disputes**

- Does Goldenberg disclose “defining position and range information for the user input element” ([1A])?
- Does Goldenberg disclose the three (i.e., primary, secondary, and boundary) claimed ranges?
 - Does Goldenberg’s “first spring effect” disclose a single range or “primary” and “secondary” ranges ([1A1]-[1A2])?
 - Does Goldenberg’s “boundary range of positions partially overlap[] each of the primary range of positions and the secondary range of positions” ([1A3])?

Dispute 1: Goldenberg Meets Limitation [1A]

Goldenberg Meets Limitation [1A] Regardless of Claim Construction

Claim Construction Outcome	[1A] Result
If the Board <u>rejects</u> Immersion's proposed construction: Goldenberg meets [1A]	
If the Board <u>adopts</u> Immersion's proposed construction: Goldenberg still meets [1A]	

Patent Owner Advances the Same Disputes for [1A]

Reply, 18

POR at 39

Further, identification of incidental input ranges in a haptic force profile, or even using that range, does not disclose a method or device for actually “defining” that range during use, and the ranges and the process for defining them must be treated as separate terms. *See Bd. of Regents v. BENQ AM. Corp.*, 533 F.3d 1362,

Uses the same flawed construction for [1A]

POR at 42

information. EX2004, ¶80. Indeed, Petitioner’s citations to Goldenberg regarding the force profiles demonstrates that they are simply “graphs,” “illustration[s],” and “diagram[s]” of various force effects rather than disclosures of “defining position and range information for the user input element.” *See*, e.g., Pet., 10, citing EX1016,

Mischaracterizes force profiles

Reply at 18

(similar). If the Board rejects Immersion’s proposed (and “illogical”) construction (DI, 9-11; *supra* § II.A), Immersion’s argument that Goldenberg does not disclose “defining position and range information” fails.

Petitioner prevails for the reasons discussed

Goldenberg's force profiles illustrate defined sets of position and range information stored in memory

[0116] FIG. 7 is a force vs. position profile 390 illustrating a jog shuttle model of the present invention. To best simulate a mechanical jog shuttle having mechanical springs, the force feedback knob is preferably provided with two spring effects. The first spring effect, shown as curve 392, can be output over the entire range of the knob, and can have a medium amount of stiffness. The force resists motion away

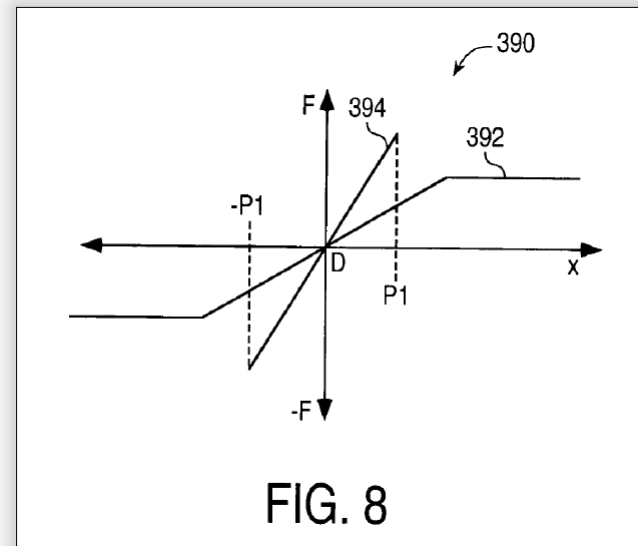
magnitude but still resists motion away from the origin. The second spring, shown as curve 394, can overlap the first spring effect but is only in effect over a small range between positions $-P1$ and $P1$ around the origin position. This provides the perception of a rotational preload. The second spring is preferably much stiffer than the first spring, requir-

EX1016 at [0116] (Pet., 10-11)

[0066] For example, in one force feedback embodiment, host microprocessor 224 can provide low-level force com-

puter. In the local control embodiment, the microprocessor 202 can independently process sensor signals to determine appropriate output actuator signals by following the instructions of a "force process" that may be stored in local memory 206 and includes calculation instructions, formulas, force magnitudes (force profiles), and/or other data. The

EX1016 at [0066] (Pet., 10; Reply, 19)



EX1016 at Fig. 8 (Pet., 10; Reply 19)

Goldenberg discloses switching between multiple force profiles based on user input

[0012] In another aspect of the present invention, a method for providing a scrolling list for use with a force feedback device includes causing a display of a menu on a display device, the menu including menu items, where at least one menu item is not displayed concurrently with other menu items. A cursor is displayed for highlighting one of the menu items, which can be selected using a manipulandum. The manipulandum, such as a knob, is moved to a border of the menu, and a spring force is output-resisting motion of the knob out of the menu. A rate control mode is entered when the knob is moved to the border of the menu, where at least one undisplayed menu item is scrolled onto the display device at a rate determined by a distance that the knob is moved past the menu border. A detent force can be output when the cursor moves from one menu item to a different menu item. A jolt or detent output force can be output on the knob when each of the undisplayed items is scrolled onto the display screen.

EX1016 at [0012] (Reply, 19)

Detent Model

[0108] The host processor implements the detent model by commanding detent effects to be output by the local processor (or directly output in other embodiments not including a local processor). This model can act as a base model

EX1016 at [0108] (Reply, 19)

Jog Shuttle Model

[0115] The jog shuttle model allows a user a different control paradigm for scrolling through a list or controlling a function or value. The output force effects provide a simu-

EX1016 at [0115] (Pet., 8; Reply, 19)

Ground 1 (Goldenberg): Disputes are Identical for Independent Claims

Dispute for independent claims 8 and 15 is the same as independent claim 1



The bracketing labels shown in claim 1 refer to the labels used in the Petition for claim 1. Since independent claims 8 and 15 contain substantially the same limitations, all discussion below applies equally to claims 1, 8, and 15 unless otherwise stated.

POR at 9

Goldenberg discloses the instructions for claims 8 and 15



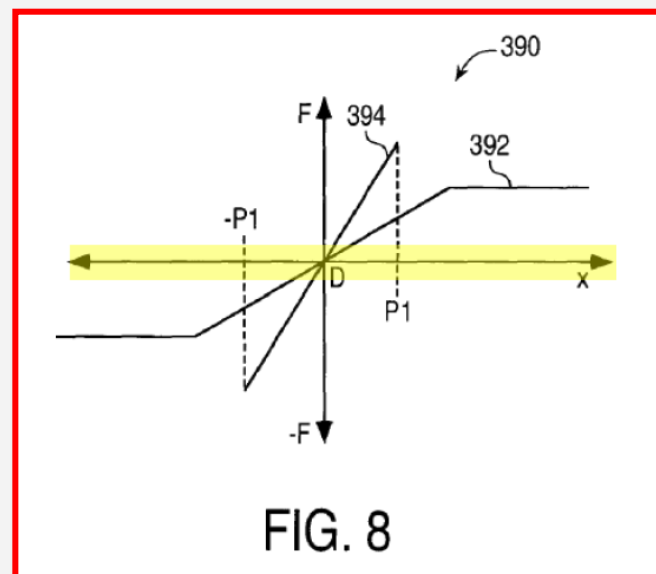
Goldenberg's force profiles (e.g., the jog shuttle profile/model) are implemented by "microprocessor 202" which "process[es] sensor signals to determine appropriate output actuator signals by following the instructions of a 'force process' that may be stored in local memory 206 and includes calculation instructions, formulas, force magnitudes (force profiles), and/or other data." [0066];

FIG. 3. The memory 206 stores instructions, i.e., "program code," for performing the steps recited in [1A]-[1B] for the reasons discussed in connection with claim 8. [0066]; Ward, ¶133; *supra* §VII.A.8.

Petition at 25-27

Dispute 2: Goldenberg Meets Limitations [1A1]-[1A3]

Mistakes Goldenberg's "first spring effect" as exclusively covering a single range



POR at 48

Misconstrues "partially overlaps" to exclude partial overlap with "each of" primary and secondary ranges

overlap would be total. EX2004, ¶¶92, 95. As explained in Section IV.B, the proper construction of "partially overlaps" excludes the total overlap disclosed by Goldenberg. Moreover, "boundary range" is its own claim term separate from the "primary range" and the "secondary range," and it too must be given effect such that the boundary range is not simply a part of the other two claimed ranges, regardless of the degree of overlap. See EX1001, 5:20-23 ("...boundary ranges 230A, 230B

POR at 49

A “Range” Can Consist of Smaller Ranges

Claim Term	Agreed Construction
“range” (Claims 1, 2, 5, 8, 9, 12, 15, 16, 18)	“a sequence, series, or scale between limits”

The examiner similarly explained during prosecution that “distances in proximity to boundaries” are ranges and that any range can “constitute first and second ranges.” EX1002, 100. Immersion argues the examiner’s statement should be afforded little weight because the applicants further amended the claims (POR, 46-47), but the examiner’s understanding of “range” is part of the intrinsic record that should be considered. *See Ventana Medical Sys., Inc. v. Biogenex Labs., Inc.*, 473 F.3d 1173, 1183 (Fed. Cir. 2006).

range fails. Valve does not disagree that the blue and orange ranges shown above *could* be considered as one larger range. But any such range would be comprised of two distinct smaller ranges—a first range (blue) corresponding to forces resisting clockwise rotation and a second range (orange) corresponding to forces resisting counterclockwise rotation. Pet., 11-12 (*citing* Goldenberg [0115]-[0117]). That the

Reply at 21

Goldenberg's "first spring effect" discloses "primary" and "secondary" ranges under the agreed construction of "range"

As the Petition explained, Goldenberg's Figure 8 depicts (i) a defined first range of positions to the right of the origin (blue) corresponding to forces resisting clockwise rotation; (ii) a defined second range of positions to the left of the origin (orange) corresponding to forces resisting counterclockwise rotation; and (iii) a defined boundary range (red) wherein a steeper force curve 394 is applied so the knob feels stiffer around the origin. Pet., 11-12 (*citing* Goldenberg, [0115]-[0117]).

Reply, 19-20

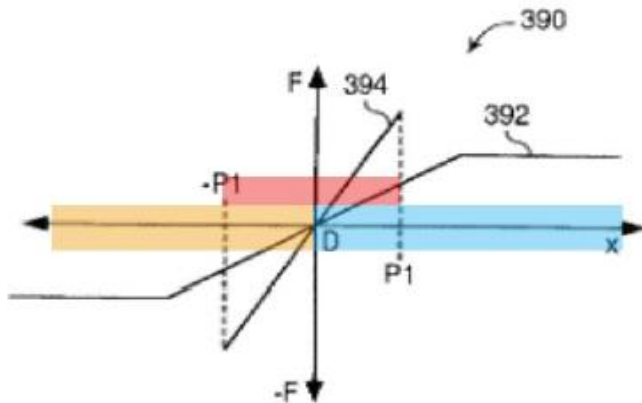


FIG. 8

Primary Range

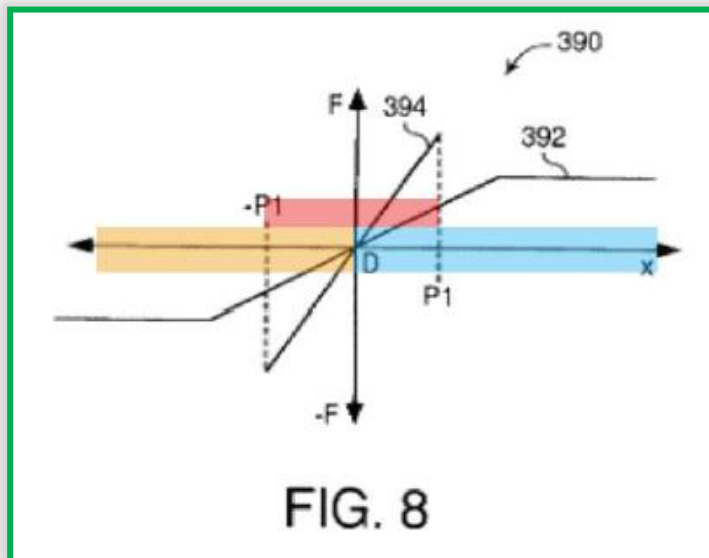
Boundary Range partially overlapping "each of" the other Ranges

Secondary Range

Goldenberg discloses a “boundary range” which “partially overlaps” other ranges under PO’s construction of “partially overlaps”

The claims require that the boundary range “*partially overlaps each of the primary...and secondary range.*” As seen below, Goldenberg’s range between -P1 and P1 (red) irrefutably “*partially overlaps each of*” the primary (blue) and secondary (orange) ranges. Using Immersion’s own plain-meaning terminology, the overlap between Goldenberg’s “*boundary range*” and “*each of*” the other two ranges is “not complete[.]” POR, 25. Immersion cannot meaningfully dispute this.

Reply, 22



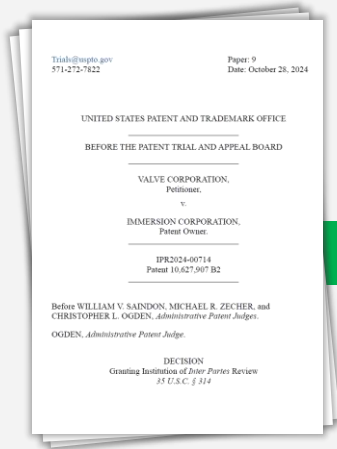
Primary Range

Boundary Range partially overlapping “each of” the other Ranges

Secondary Range

There is No Inconsistency In Goldenberg's Claimed Ranges

Reply, 25



Institution Decision at 19

secondary ranges. Ex. 1001, 13:60–64. Moreover, we find it reasonable, at this stage, to regard the positive and negative ranges of the horizontal axis in Figure 8 as separate ranges, given that the restorative force acting on the knob as it is turned away from the origin acts in a different direction (for both the first and second spring effects) depending on whether the knob is turned clockwise or counterclockwise. We also find nothing necessarily inconsistent about regarding the range between $-P1$ and $+P1$ as a single boundary range, given that this is the only range of knob positions in which the second spring effect (curve 394) is active.

The Board correctly rejected PO's arguments concerning purported inconsistency

Ground 1 (Goldenberg): Dependent Claims are Undisputed

Label	Limitation	Disputed
Claim 2	The method of claim 1, wherein one of the primary range of positions, the secondary range of positions, and the boundary range of positions is calculated based on a movement of the user input element from a maximum out position to a grounding position.	No
Claim 3	The method of claim 1, wherein a profile for the user input element is calculated by mapping each position of the user input element to an analog to digital conversion value.	No
Claim 4	The method of claim 3, wherein the profile for the user input element is an increasing profile or a decreasing profile.	No
Claim 5	The method of claim 1, wherein a normalized profile for the user input element is calculated by removing at least one of the secondary range of positions or the boundary range of positions from mapped analog to digital conversion values.	No
Claim 6	The method of claim 1, further comprising monitoring a position of the user input element.	No
Claim 7	The method of claim 1, further comprising adjusting a profile and a normalized profile of the user input element to adjust for a change to a resting position of the user input element.	No

Goldenberg Ground 2 Disputes

Immersion has no separate disputes against Ground 2

VII. GROUND 2: GOLDENBERG-CRUZ-HERNANDEZ DOES NOT RENDER OBVIOUS ANY OF THE CHALLENGED CLAIMS

Ground 2 pertains to claims 7, 14, and 20, which are dependent on independent claims 1, 8, and 15. For the reasons provided in Section VII with respect to claims 1, 8, or 15, the Goldenberg-Cruz-Hernandez combination does not disclose all required elements. EX2004, ¶97. Accordingly, Petitioner has not met its burden of demonstrating obviousness as to claims 7, 14, and 20 in view of the Goldenberg-Cruz-Hernandez combination.

POR at 54-55

Ground 6: Levin

GROUND	CLAIMS	BASIS
1. Goldenberg (EX1016)	1-6, 8-13, 15-19	102/103
2. Goldenberg, Cruz-Hernandez (EX1005)	7, 14, 20	103
3. Rosenberg (EX1017)	1-4, 6, 8-11, 13, 15-17, 19	102/103
4. Roberts (EX1018), Rosenberg	5, 12, 18	103
5. Roberts, Rosenberg, Cruz-Hernandez	7, 14, 20	103
6. Levin (EX1006)	1, 3-4, 6, 8, 10-11, 13, 15, 17, 19	102/103

- **Ground 6 (Levin): Three Disputes**

- Does Levin disclose “defining position and range information for the user input element” ([1A])?
- Does Levin disclose the claimed “boundary range of positions” ([1A3])?
- Does Levin disclose “rendering a haptic effect in response to an entry of the user input element to one more positions within the boundary range” ([1B])?

Dispute 1: Patent Owner Advances the Same Disputes for [1A]

Reply, 27

POR at 60

Levin fails to disclose “defining position and range information” because it uses pre-existing, predetermined force detent profiles stored in memory. EX1006, [0048]-[0049], [0070]; Pet. 69, citing Ward, ¶251; *see also* EX2004, ¶112. Under

Uses the same flawed construction for [1A]

POR at 60

EX1001, 5:29-30, 7:1-3, 8:10-14; EX2004, ¶112. Again, Petitioner incorrectly focuses on “force profiles,” but as previously discussed, the '907 patent does not teach or claim force profiles, and showing force profiles to meet the challenged claims is improper and insufficient. While Levin discloses instructions for implementing detent force profiles, the underlying input position and range information is predetermined. Moreover, those profiles are pre-existing and

Mischaracterizes force profiles

Reply at 27

Immersion says Levin does not “*defin[e] position and range information*” for the knob because the “position and range information [for the detent force profile] is *predetermined*.” POR, 60. This argument depends upon, and fails with, Immersion’s improper construction for “*defining*.”

Fails for the reasons discussed

Levin's force profiles illustrate defined sets of position and range information stored in memory

[0049] Also, the magnitude of the force detents can differ based on the value being controlled. For example, a radio

preprogrammed station or preferred setting. Also, different sets of detent force profiles can be stored in a memory device on the device 30 and a particular set can be provided on the knob 18 by a microprocessor or other controller in the device 30.

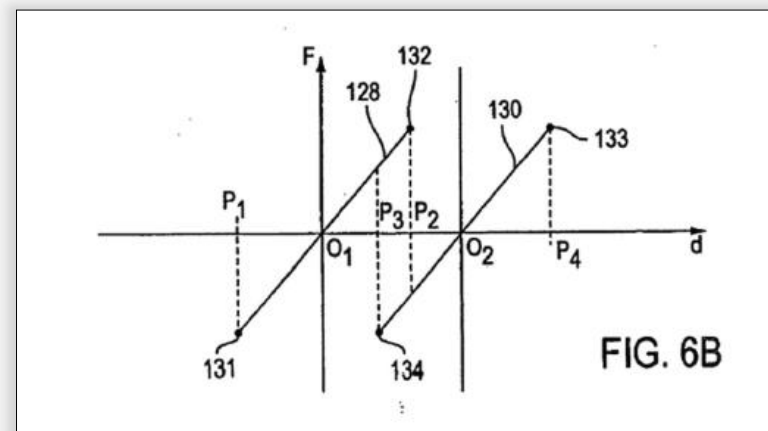
[0067] FIGS. 6a and 6b are diagrammatic illustrations illustrating detent force profiles suitable for use with the knobs of device 10. Detent force profiles can be implemented by a microprocessor or other controller based on instructions stored in a computer readable medium, such as a memory circuit, magnetic disk, optical disk, etc. In FIG.

indicates force in the opposite direction. The horizontal axis d represents the distance or position of the moved user object (knob) in a degree of freedom, where the origin position O indicates the position of the detent, a positive d is a position past the origin of the detent in one direction, and a negative d is a position past the origin of the detent in the opposite direction. The curve 124 represents the force output for a

EX1006 at [0049], [0067] (Pet., 69)

[0070] FIG. 6b shows a detent force profile of the present invention in which the detent forces of two successive detents are partially overlapped due to the detents, and provide a hysteresis-like force effect. The two detent curves 128 and 130 are identical, thus allowing a single force command to create the multiple detents if desired. Endpoint

EX1006 at [0070] (Pet., 69)



EX1006 at Fig. 6B (Pet., 69)

Ground 6 (Levin): Disputes are Identical for Independent Claims

Dispute for independent claims 8 and 15 is the same as independent claim 1



The bracketing labels shown in claim 1 refer to the labels used in the Petition for claim 1. Since independent claims 8 and 15 contain substantially the same limitations, all discussion below applies equally to claims 1, 8, and 15 unless otherwise stated.

POR at 9

Levin discloses the instructions for claims 8 and 15



Levin's "[d]etent force profiles can be implemented by a microprocessor or other controller based on instructions stored in a computer readable medium" (Levin, [0067]) which can be a "[l]ocal memory 206, such as RAM and/or ROM, ... to store instructions for microprocessor 202." Levin, [0089], Fig. 8. Levin's local memory

Levin's device 10 includes the microprocessor 202 and memory 206 discussed in connection with claim 8. [0086]-[0087], FIG. 8. The memory 206 stores instructions for performing the steps recited in [1A]-[1B] for the reasons discussed in connection with claim 8. [0049]; Ward, ¶282; *supra* §VII.F.6.

Petition at 80-82

Dispute 2: Levin Meets Limitation [1A3]

Misconstrues “partially overlaps” to exclude partial overlap with “each of” primary and secondary ranges

meaningless). If a boundary range recited in the challenged claims is simply the overlap between two other ranges, it would be an unnecessary claim term since it would add nothing to the claim that would be distinct from the primary and secondary ranges. EX2004, ¶118. “Boundary range” is its own claim term that, according to the ’907 patent specification and claims, is separate from, and has different functionality than, the primary and secondary ranges. *See, e.g.,* EX1001,

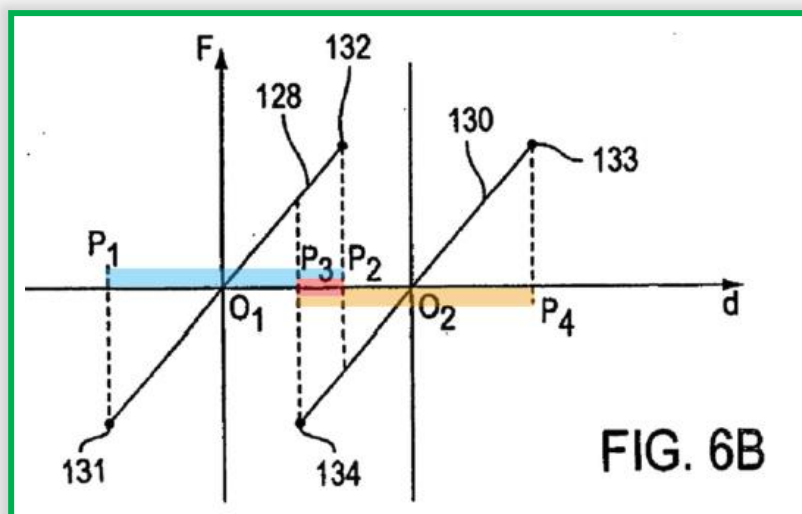
citing Ward, ¶¶259-260. But, if the boundary range were comprised entirely of the overlap between the two detent ranges, it would entirely overlap the primary and secondary ranges, thus reading the term “partially” out of the claims. *See Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1305 (Fed. Cir. 2014) (refusing to construe claim in a way that would read expressly recited term out of the claim); EX2004, ¶119. As discussed in Section IV.B, “partially overlaps” should be construed to complete overlap. EX2004, ¶119. Accordingly, Petitioner has not met its burden of showing that Levin discloses that the boundary range “partially overlaps” the first and second ranges.

POR at 64-65

Levin discloses a “boundary range” which “partially overlaps” other ranges under PO’s construction of “partially overlaps”

Valve agrees that “*partially*” means “less than total.” POR, 13. In the claims, “*partially overlaps*” means the “*boundary range*” positions include some but “less than” all the positions for “*each of*” the “*primary*” and “*secondary*” ranges. Levin’s Figure 6B profile meets the claims because the positions between P3 and P2 include some but not all the positions for the “*primary*” range (P1-P3) and some but not all the positions for the “*secondary*” range (P3-P4).

Reply, 28



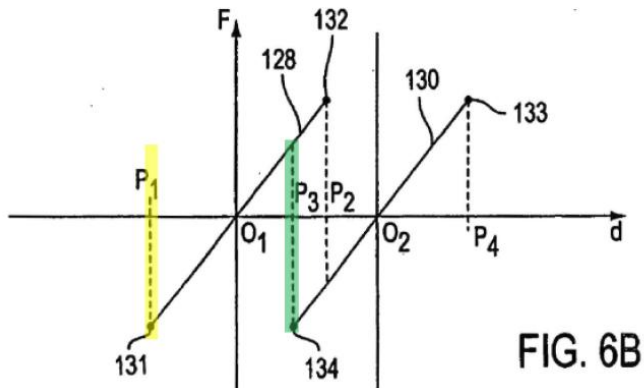
Primary Range

Boundary Range partially overlapping “each of” the other Ranges

Secondary Range

Dispute 3: Levin Meets Limitation [1B]

Mischaracterizes Levin's
haptic effect as mere
coincidence



POR at 67

This diagram demonstrates that the invention renders a haptic effect for the first detent 132 starting at P_1 , even though there are no prior detents overlapping with detent 132 at P_1 . EX2004, ¶122. Hence, the haptic effect of detent 132 is rendered in response to entry into the range of the first detent, even in the absence of an overlap. EX2004, ¶122. The same would be true for the second detent, because it is

teaching a separate boundary range. EX2004, ¶125. First, Levin discloses that “[t]he force output on the knob thus changes depending on the direction of the knob,” not a non-existent boundary range. EX1006, [0072]; EX2004, ¶125. Second, Levin describes force effects that begin or end at the endpoints of detent curves with no mention of haptic effects being rendered “in response to” the overlap between detents. EX1006, [0072] (“In FIG. 6d, starting from origin O_2 , the force at the beginning of the range of detent curve 128 is at point 136 having a magnitude of $0.5M$, which is one-half the magnitude M of the force at the other endpoint 131 of curve 128....”); EX1006, [0073]; EX2004, ¶125. The haptic effects might coincide with the overlap, but they are in response to reaching the end points of each detent.

POR at 67, 70-71

Levin's haptic effect is not coincidental and meets [1B] under PO's construction of "in response to"

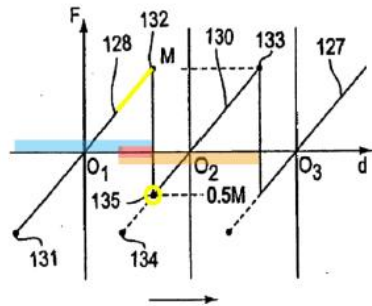


FIG. 6C

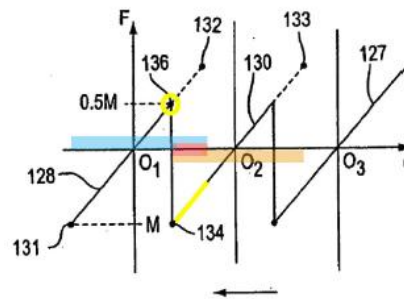


FIG. 6D

Reply, 30

Knob rotation-
direction
dependency is
unique to Levin's
Boundary Range

Reply, 29-30

At this stage, we disagree with Patent Owner's argument. In Levin's detent force profiles, there appears to be a haptic effect (a gradual increase and then a drop in magnitude from M to $0.5M$ and a change in the force direction) as the user turns the nob through the overlapping zone. See Ex. 1006 ¶¶ 71–73, Figs. 6c, 6d. Even though that effect is a consequence of the shape of curves 128 and 130 and how they are combined, Levin describes a deterministic consequence in which, whenever the knob enters the overlapping zone, this haptic effect will occur. See *id.* We therefore preliminarily regard this as being "in response to" the knob's entry into the boundary range. Patent Owner has not proposed a construction for the term

The Board's ID **correctly**
found Levin's haptic
effect were not
coincidental

Ground 6 (Levin): Dependent Claims are Undisputed

Label	Limitation	Disputed
Claim 2	The method of claim 1, wherein one of the primary range of positions, the secondary range of positions, and the boundary range of positions is calculated based on a movement of the user input element from a maximum out position to a grounding position.	No
Claim 3	The method of claim 1, wherein a profile for the user input element is calculated by mapping each position of the user input element to an analog to digital conversion value.	No
Claim 4	The method of claim 3, wherein the profile for the user input element is an increasing profile or a decreasing profile.	No
Claim 5	The method of claim 1, wherein a normalized profile for the user input element is calculated by removing at least one of the secondary range of positions or the boundary range of positions from mapped analog to digital conversion values.	No
Claim 6	The method of claim 1, further comprising monitoring a position of the user input element.	No
Claim 7	The method of claim 1, further comprising adjusting a profile and a normalized profile of the user input element to adjust for a change to a resting position of the user input element.	No