

IPR2023-00495
U.S. Patent No. 8,696,113

Magic Leap, Inc.

v.

Percept Technologies Inc.

May 8, 2024

Roadmap

- **'113 Patent**
- **Claim Interpretation**
- **Osterhout (Ground 1)**
- **Mann '526, Vaissie (Ground 2)**

'113 Patent

'113 Patent: Challenged Claims

Challenged Claims	Prior Art
1-3, 12-14	Osterhout
1-3, 12-14	Mann '526, Vaissie

'113 Patent



US08696113B2

(12) **United States Patent**
Lewis

(10) **Patent No.:** US 8,696,113 B2
(45) **Date of Patent:** *Apr. 15, 2014

(54) **ENHANCED OPTICAL AND PERCEPTUAL DIGITAL EYEWEAR**

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(72) Inventor: **Scott W. Lewis**, Las Vegas, NV (US)

(73) Assignee: **Percept Technologies Inc.**, Las Vegas, NV (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.
This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/841,141**

(22) Filed: **Mar. 15, 2013**

(65) **Prior Publication Data**
US 2013/0208234 A1 Aug. 15, 2013

Related U.S. Application Data

(60) Continuation of application No. 13/739,929, filed on Jan. 11, 2013, which is a continuation of application No. 13/078,589, filed on Apr. 1, 2011, now Pat. No. 8,353,594, which is a continuation of application No. 12/621,423, filed on Nov. 18, 2009, now Pat. No. 7,918,556, which is a continuation of application No. 12/029,068, filed on Feb. 11, 2008, now Pat. No. 7,758,185, which is a division of application No. 11/245,756, filed on Oct. 7, 2005, now abandoned.

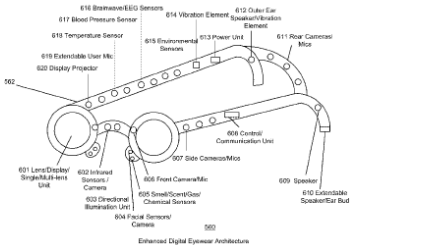
(51) **Int. Cl.**
G02B 27/01 (2006.01)

(52) **U.S. Cl.**
USPC 351/158; 345/8; 359/630

(58) **Field of Classification Search**
USPC 351/158; 385/8; 359/13; 630-633; 345/7-9
See application file for complete search history.

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Primary Examiner — Darryl J Collins
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(57) **ABSTRACT**
Improved wearable optics is disclosed. The wearable optics comprises a frame member and a lens. The wearable optics also includes circuitry within the frame member for enhancing the use of the wearable optics. A system and method in accordance with the present invention is directed to a variety of ways to enhance the use of eyeglasses. They are: (1) media focus, that is, utilizing the wearable optics for its intended purpose and enhancing that use by using imaging techniques to improve the vision of the user; (2) telecommunications enhancements that allow the eyeglasses to be integrated with telecommunication devices such as cell phones or the like; and (3) entertainment enhancements that allow the wearable optics to be integrated with devices such as MP3 players, radios, or the like.

17 Claims, 28 Drawing Sheets



Magic Leap, Inc. Exhibit 1001 Page 1

A wearable optics device and method of use is disclosed. In a first aspect a method comprises utilizing dynamic eye tracking with a wearable optics device; wherein parameters personalized to a user can be provided based upon the dynamic eye tracking.

'113 patent (Ex. 1001), 1:52-56

In a second aspect, a wearable optics device comprises a lens and a dynamic eye tracking mechanism in communication with the lens. Parameters personalized to a user can be provided based upon the dynamic eye tracking.

'113 patent (Ex. 1001), 1:57-60

FIG. 6 illustrates the parts of an eye that may be utilized with the eye tracking mechanism of an embodiment. In an embodiment, the iris, retina cornea, pupil, ciliary, and lens can all be utilized either singly or in combination to enable the dynamic eye tracking mechanism.

'113 patent (Ex. 1001), 9:42-46

'113 Patent

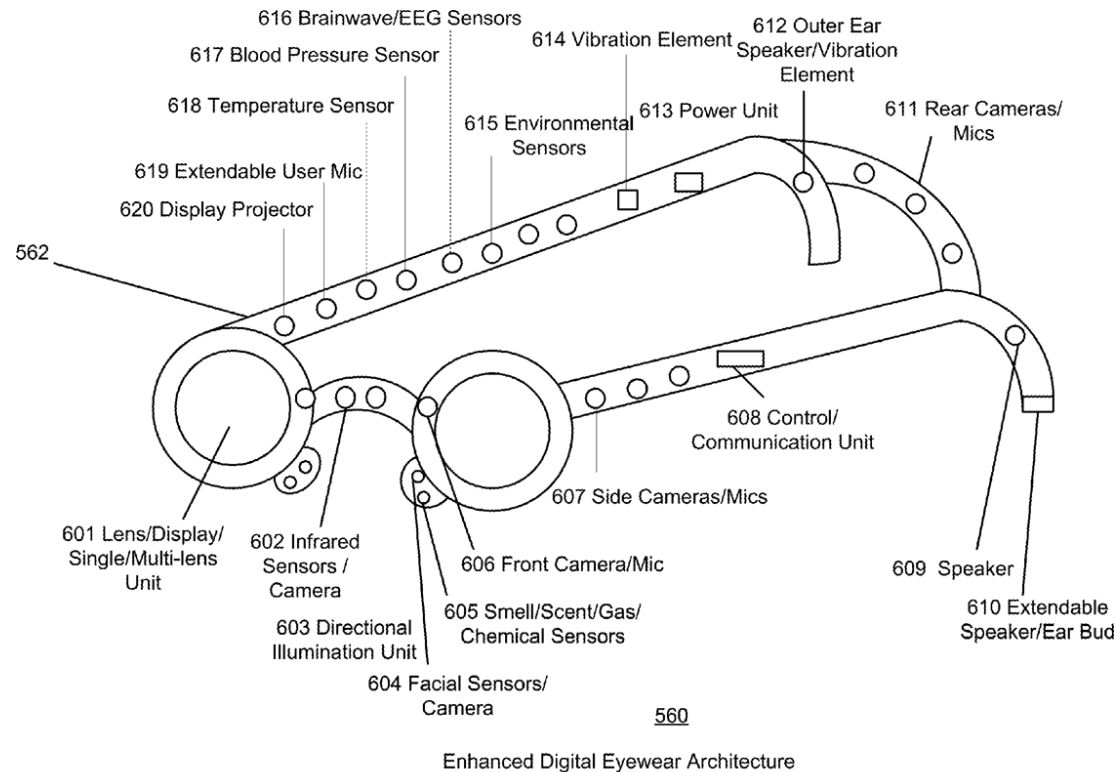


Figure 5C

FIG. 5C illustrates a wearable optics device architecture **560** in accordance with an embodiment. The architecture includes a frame **562** which includes a plurality of sensors on various areas thereon. Biometric sensors include a blood pressure sensor **617**, temperature sensor **618**, EEG sensor **616** and the like. Environmental sensors **615** are also provided. There are microphone sensors **606, 607, 611** on various areas of the frame. Included on the frame **562** are cameras rear, front and side **606, 607, 611** to detect objects. Within the lens is a lens display **601**. A display projector **620** is provided thereon to project images on the lens display **601**. The lens

'113 patent (Ex. 1001), 7:35-45

'113 patent (Ex. 1001), Fig. 5C

'113 Patent

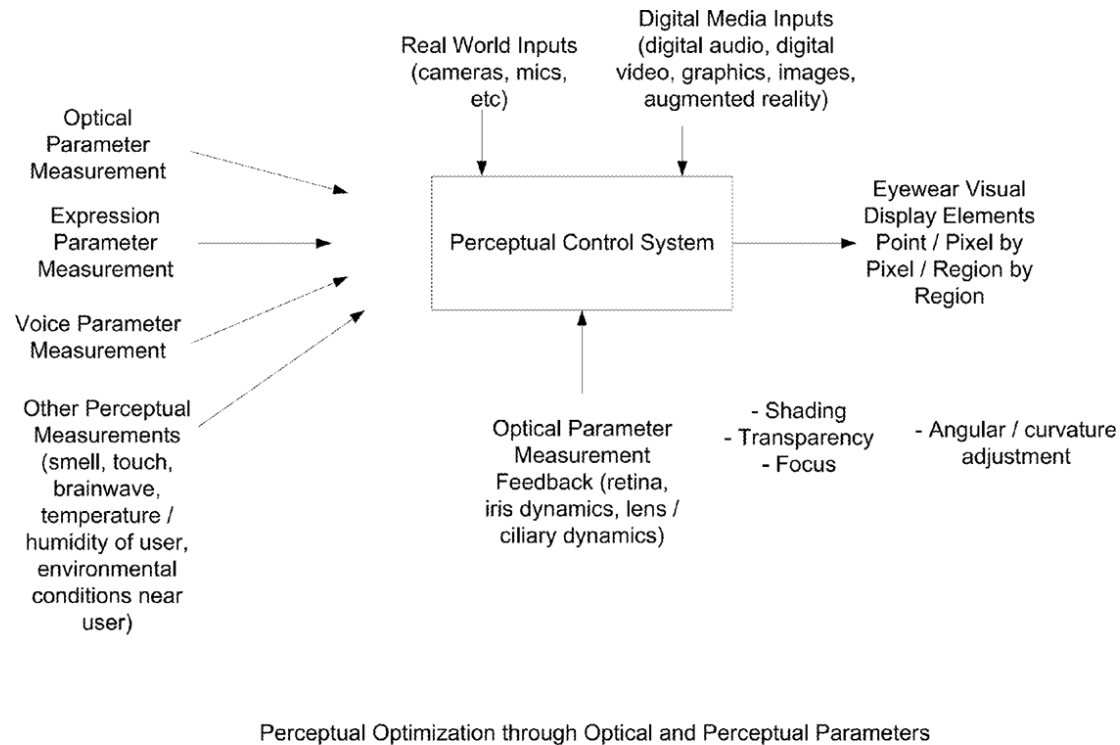


Figure 5B

FIG. 5B illustrates a perceptual optimization system 550. The perceptual optimization system 550 receives a variety of inputs including optical parameter measurements, real world inputs, digital media inputs, expression parameter measurements, optical parameter measurement feedback, other parameter measurements to provide wearable optics visual display elements. Optical parameter measurements include for example, ciliary, pupil, corneal, lens, iris, eye lid, retina measurements. Real world inputs could be for example inputs from one or more microphones or cameras. Digital media inputs could be for example from digital audio, digital video, graphics, images and augmented reality.

'113 patent (Ex. 1001), 7:18-29

'113 patent (Ex. 1001), Fig. 5B

Claim 1

1. A wearable optics device comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes optical parameter measurements; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an optical/perceptual parameter based operating system is utilized, wherein the wearable optics device is controlled by the optical/perceptual based operating system.

'113 patent (Ex. 1001), 14:22-33

Claim 12

12. A wearable optics device comprising:

a lens; and

a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes optical parameter measurements; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an optical/perceptual parameter based operating system is utilized, wherein the lens includes a plurality of layers.

'113 patent (Ex. 1001), 15:10-20

Dependent Claims

2. The wearable optics system of claim **1**, wherein the dynamic eye tracking is utilized to control the optical/perceptual based operating system.

13. The wearable optics system of claim **12**, wherein the dynamic eye tracking is utilized to control the optical/perceptual based operating system.

3. The wearable optics system of claim **1**, wherein applications are utilized to control sensors and communication of the wearable optics device.

14. The wearable optics system of claim **12**, wherein applications are utilized to control sensors and communication of the wearable optics device.

'113 patent (Ex. 1001), 14:34-39, 15:21-16:3

Claim Interpretation

“in communication with”

	Petitioner’s Position	Patent Owner’s Position
Construction	Plain and ordinary meaning	Plain and ordinary meaning
What is the plain and ordinary meaning?	sending communication to or receiving communication from	active exchange of information between the dynamic eye tracking mechanism and the lens

“measurements”

	Petitioner’s Position	Patent Owner’s Position
Construction	Plain and ordinary meaning	Plain and ordinary meaning
What is the plain and ordinary meaning?	things that are measured	a size, length, or amount of something

Patent Owner Confirms: Plain and Ordinary Meaning

Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018). Accordingly, the claims should be construed consistent with their plain and ordinary meaning as understood by a person of ordinary skill in the art. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-17 (Fed. Cir. 2005). “The ordinary and customary meaning of a claim term is the meaning that the skill in the art in question at the time

Such a construction is appropriate because the phrase, as used in the ’113 patent, is readily understandable and does not require further interpretation. *See Phillips*, 415 F.3d at 1314. Indeed, the patentee did not

provide any meaning beyond the plain and ordinary meaning of this phrase in the specification of the ’929 patent. Accordingly, there is no clear reason to depart from the plain and ordinary meaning of this term.¹ *Ancora*

provide any meaning beyond the plain and ordinary meaning of this phrase in the specification of the ’929 patent. Accordingly, there is no clear reason to depart from the plain and ordinary meaning of this term.¹ *Ancora Technologies Inc. v. Apple Inc.*, 744 F.3d 732, 734 (Fed. Cir. 2014) (“A

Response (Paper 12), 5-6

“in communication with”: Plain and Ordinary Meaning

In the co-pending district court litigation, *Percept Technologies Inc. v. Magic Leap, Inc.*, 1:22-cv-00025 (DDE), the Court entered an order construing the recited “dynamic eye tracking mechanism” and “lens,” Ex. 1021 at 1, however, the Court’s order did not address the entirety of the phrase, “a dynamic eye tracking mechanism in communication with the lens of the wearable optics.” As to that entirety of the phrase, the Board should accord it its plain and ordinary meaning as understood by a person of ordinary skill in the art at the time of the invention of the ’113 patent; to wit, a dynamic eye tracking mechanism and a lens that engage in an active exchange of information with one another.

Response (Paper 12), 5-6

“measurements”: Plain and Ordinary Meaning

In addition to the above, the Board should construe the term “measurements,” as used in the phrase “the dynamic eye tracking mechanism utilizes optical parameter measurements,” Ex. 1001 at 14:25-26 (claim 1), 15:13-14 (claim 12), consistent with its plain and ordinary meaning as understood by a person of ordinary skill in the art at the time of the invention. *Phillips* 415 F.3d at 1313. A measurement is a size, length, or amount of something (*e.g.*, as established by the act of measuring). The term measurement is used at several places in the specification of the ’113 patent,

Response (Paper 12), 8-9

No Construction / Plain and Ordinary Meaning

Decision on Institution



For the foregoing reasons, we do not adopt Patent Owner’s proposed construction and instead construe “in communication with” according to its ordinary and customary meaning. Further, we determine that it is not necessary to expressly construe any other claim terms or phrases. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

DI (Paper 10), 12

“in communication with”: Patent Owner’s Redefinition

In particular, “in communication with,” as used in the context of the challenged claims, is indicating an active exchange of information between the dynamic eye tracking mechanism and the lens of the wearable optics. For example, the specification describes the dynamic eye tracking mechanism controlling chromatic, refractive, diffractive, transparency, and/or reflective properties of a lens. Ex. 1001 at 8:40-60. In cases such as this the lens and the dynamic eye tracking mechanism are exchanging information in order to

Response (Paper 12), 7

“measurements”: Patent Owner’s Redefinition

(claim 1), 15:13-14 (claim 12), consistent with its plain and ordinary meaning as understood by a person of ordinary skill in the art at the time of the invention. *Phillips* 415 F.3d at 1313. A measurement is a size, length, or amount of something (*e.g.*, as established by the act of measuring). The term measurement is used at several places in the specification of the ’113 patent, *see, e.g.*, Ex. 1001 at 7:18-29; 8:51-53; 9:27-30; 10:55-61; 13:19-21, and in

Response (Paper 12), 9

A POSITA Would Not Apply Patent Owner's Redefinition of "in communication with"



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21. I do not believe that the Response accurately represents the plain and ordinary meaning of the communication limitation to a POSITA after reading the '113 patent. I believe Patent Owner's proposed meaning of the communication limitation as requiring "active exchange of information" is too narrow to capture its plain and ordinary meaning to the POSITA. In my view, the POSITA would not have applied any specialized meaning to "in communication with" and instead would recognize the term to have a widely understood meaning: sending communication to or receiving communication from.

Suppl. LaViola Dec. (Ex. 1024), ¶ 21

“in communication with” the Lens

Patent Owner:

“That the light received by the camera [in Osterhout] may travel ...through the lens does not demonstrate that the camera is in communication with the lens, because the lens is not **actively** exchanging any information with the camera. **Instead, the lens merely acts passively as the light passes through it.**” *Response (Paper 12), 16-17*

“in communication with” the Lens

Patent Owner:

“That the light received by the camera [in Osterhout] may travel ...through the lens does not demonstrate that the camera is in communication with the lens, because the lens is not **actively** exchanging any information with the camera. **Instead, the lens merely acts passively as the light passes through it.**” *Response (Paper 12), 16-17*

The claims are not limited to *active* communication.



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22. In my view, the plain and ordinary meaning of “in communication with” to the POSITA does not require *active* communication, as suggested in the Response. The POSITA would recognize that, for example, communications (including communication to or from a lens) can be passive as well as active.

Suppl. LaViola Dec. (Ex. 1024), ¶ 22

“in communication with” the Lens

Patent Owner:

“That the light received by the camera [in Osterhout] may travel ...through the lens does not demonstrate that the camera is in communication with the lens, because the lens is not **actively** exchanging any information with the camera. **Instead, the lens merely acts passively as the light passes through it.**” *Response (Paper 12), 16-17*

Patent Owner’s redefinition is not supported by the patent specification.



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23. This is consistent with the '113 Patent itself. For example, at 6:59-67, the '113 Patent describes various types of lenses that can be used with digital eyewear. (EX-1001 at 6:59-67.) This passage explains that such lenses can include “*passive or active* display or projection based implementations.” (*Id.* at 6:66-67 (emphasis added).) Lenses with passive displays (which can passively communicate information) are thus expressly contemplated by the '113 Patent. Another example is described at 7:35-46 and shown in Fig. 5C: in a wearable

Suppl. LaViola Dec. (Ex. 1024), ¶ 23

“in communication with” the Lens

Patent Owner:

“That the light received by the camera [in Osterhout] may travel ...through the lens does not demonstrate that the camera is in communication with the lens, because the lens is not **actively** exchanging any information with the camera. **Instead, the lens merely acts passively as the light passes through it.**” *Response (Paper 12), 16-17*

Patent Owner’s redefinition is not supported by the patent specification.



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Another example is described at 7:35-46 and shown in Fig. 5C: in a wearable optics device, a display projector 620 is provided to project images on the lens display 601. (*Id.* at 7:35-46, Fig. 5C.) The lens display 601 is an example of a passive display that can passively receive and present images from the display projector. The ’113 Patent further discloses that this wearable optics device can be used with dynamic eye tracking. (*Id.* at 8:27-30.)

Suppl. LaViola Dec. (Ex. 1024), ¶ 23

“in communication with” the Lens

Patent Owner contradicts the position it took in the District Court.

Patent Owner,
District Court:

Figure 5C of the '113 Patent and its corresponding description broadly define the non-limiting types of lenses contemplated by the patentee.

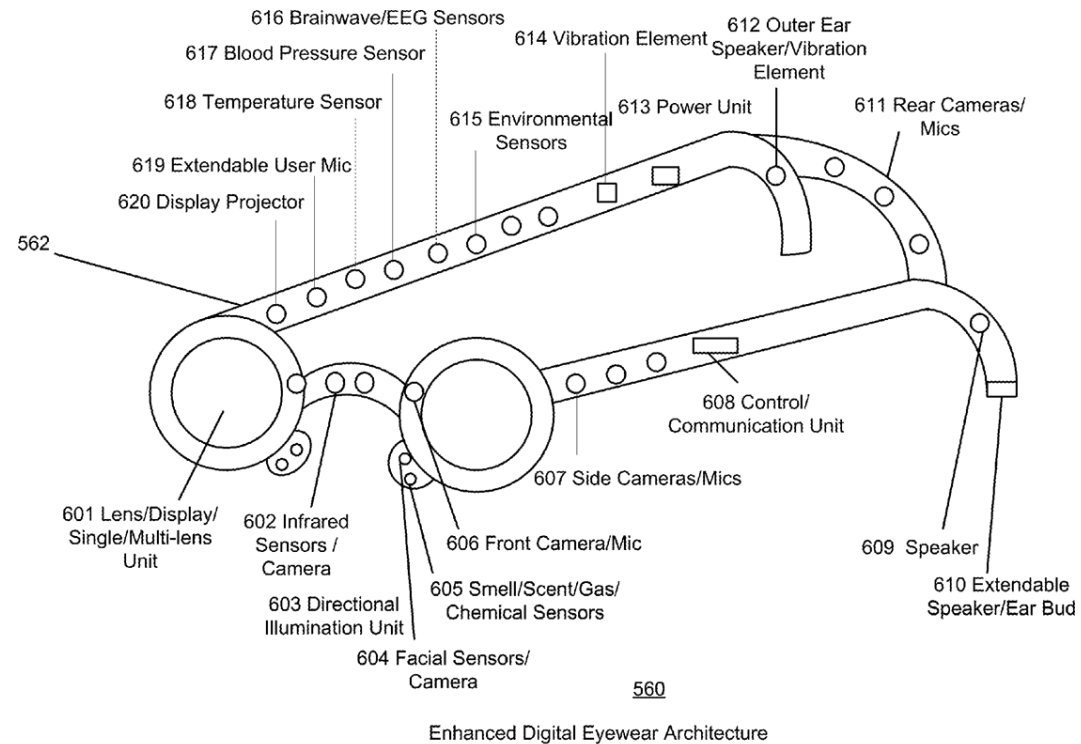


Figure 5C

Ex. 1008, 8

“in communication with” the Lens

Patent Owner contradicts the position it took in the District Court.

Patent Owner,
District Court:

Figure 5C of the '113 Patent and its corresponding description broadly define the non-limiting types of lenses contemplated by the patentee.

616 Brainwave/EEG Sensors

612 Outer Ear

With the introduction and use of new materials for lens and filter integration new enhancements and capabilities of the digital eyewear can be further realized. These materials include advances in OLED, LED, transparent LED, flexible LED, crystalline, prism, holographic, polarizing, and translucent material and the like to electrorefractive, electrodiffractive, electroreflective, composite refractive materials and the like, with one or more lens material layers and passive or active display or projection based implementations.

Camera

560

Enhanced Digital Eyewear Architecture

Figure 5C

Ex. 1008, 8

“in communication with” the Lens

Patent Owner contradicts the position it took in the District Court.

Patent Owner,
District Court:

Defendant nevertheless improperly proposes a narrow definition, construing “a lens” as “a transmissive optical device which focuses a light beam by refraction.” This litigation-driven definition is not found anywhere in the patent specification and does not include the broader scope contemplated by the patents. Defendant will likely argue that its use of multi-layered waveguide lenses do not constitute a lens. Defendant may also argue that the Magic Leap 1 does not focus a

Ex. 1008, 9

“in communication with” the Lens

Patent Owner:

“To be in communication *with* something ... **requires some participation from each entity**. ... Only if there is **some form of reply** can the sender be assured that it is actually in communication *with* the intended recipient.”

Sur-reply (Paper 14), 3-4

“in communication with” the Lens

Patent Owner:

“To be in communication *with* something ... **requires some participation from each entity**. ... Only if there is **some form of reply** can the sender be assured that it is actually in communication *with* the intended recipient.”

Sur-reply (Paper 14), 3-4

The Board already rejected limiting the communication to specific directions.

Decision on Institution



We do not agree with Patent Owner’s proposed construction because it imports limitations into the claim from the ’113 Patent Specification, namely, the specific direction of the communication from the dynamic eye tracking device to the lens. Although the ’113 Patent discloses eye sensor measurements are sent to a processor and corresponding display control signals are sent to a display on the lens (*see e.g.*, Ex. 1001, 12:25–30, Fig. 18), we decline to import limitations in to the claims as to the specific directionality of the communication, as proposed by Patent Owner.

DI (Paper 10), 11-12

“in communication with” the Lens

Patent Owner:

“To be in communication *with* something ... **requires some participation from each entity**. ... Only if there is **some form of reply** can the sender be assured that it is actually in communication *with* the intended recipient.”

Sur-reply (Paper 14), 3-4

The claims do not include these additional limitations.



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24. In my view, the plain and ordinary meaning of “in communication with” to the POSITA does not require an *exchange* of information, as suggested in the Response. The POSITA would recognize that, for example, a sender of information can be in communication with a recipient of the information, even if there is no *exchange* between the sender and the recipient. As a hypothetical

Suppl. LaViola Dec. (Ex. 1024), ¶ 24

“in communication with” the Lens

Patent Owner:

“To be in communication *with* something ... **requires some participation from each entity**. ... Only if there is **some form of reply** can the sender be assured that it is actually in communication *with* the intended recipient.”

Sur-reply (Paper 14), 3-4

Patent Owner’s redefinition is inconsistent with plain usage.



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there is no *exchange* between the sender and the recipient. As a hypothetical example, Alice can send an email to Bob, who receives the email but exchanges nothing in response. The ordinary artisan would understand that Alice is in communication with Bob, and Bob is in communication with Alice, by the plain meaning of the term, even though nothing has been *exchanged* in this one-way communication. As another example, a speaker who presents an oral lecture to an audience of listeners is in communication with the audience, even if the audience exchanges nothing in return with the speaker.

Suppl. LaViola Dec. (Ex. 1024), ¶ 24

“in communication with” the Lens

Patent Owner:

“To be in communication *with* something ... **requires some participation from each entity**. ... Only if there is **some form of reply** can the sender be assured that it is actually in communication *with* the intended recipient.”

Sur-reply (Paper 14), 3-4

Patent Owner’s redefinition is not supported by the patent specification.



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Instead, as Patent Owner characterizes it, the dynamic eye tracking mechanism is “controlling chromatic, refractive, diffractive, transparency, and/or reflective properties of a lens.” (Response at 7.) But the specification does not describe that adjusting these lens properties involves an exchange. For example, the specification does not describe that, upon the dynamic eye tracking mechanism controlling chromatic properties of the lens, the lens *exchanges* information with dynamic eye tracking mechanism. Instead, the passage cited by Patent Owner describes a one-way sending of information to the lens (i.e., to control various properties of the lens).

Suppl. LaViola Dec. (Ex. 1024), ¶ 25

“in communication with” the Lens

Patent Owner:

“To be in communication *with* something ... **requires some participation from each entity**. ... Only if there is **some form of reply** can the sender be assured that it is actually in communication *with* the intended recipient.”

Sur-reply (Paper 14), 3-4

Patent Owner’s redefinition would exclude embodiments from the specification.

Patent Owner:

lens communicates passively. *Id.* Referring to Fig. 5C, Magic Leap argues that a lens receiving and displaying images that are projected by a display projector is thereby *communicating*, but not in an active fashion. *Id.*

First, the embodiment cited by Magic Leap is not an example of a dynamic eye tracking mechanism in communication with a lens. If anything, the dynamic eye tracking mechanism is in communication with the projector, not the lens, in this example. Causing an image to be projected on a lens is not communication with the lens as there is no information exchange *with* the lens.

Sur-reply (Paper 14), 4

Optical Parameter “measurements”

Patent Owner:

“The term measurement is used at several places in the [’113] specification ... and in each instance ... seems to be indicating such a **determination of size or length**. Hence, this is the understanding that a person of ordinary skill in the art would have when reading the challenged claims.”

Response (Paper 12), 9

The claims are not limited to measurements of size, length, or amount.



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28. I do not believe that the Response accurately represents the plain and ordinary meaning of the measurements limitation to a POSITA after reading the ’113 patent. Patent Owner’s proposed plain and ordinary meaning of “measurements” is too narrow. The POSITA would understand the plain and ordinary meaning of “measurements” to refer, simply, to things that are measured.

Certainly, measurements (including optical parameter measurements) can include measurements of size, length, or amount. But as the POSITA would recognize, under the plain and ordinary meaning of measurements, there are many examples of measurements (including optical parameter measurements) that are not measurements of size, length, or amount.

Suppl. LaViola Dec. (Ex. 1024), ¶ 28

Optical Parameter “measurements”

Patent Owner:

“The term measurement is used at several places in the [’113] specification ... and in each instance ... seems to be indicating such a **determination of size or length**. Hence, this is the understanding that a person of ordinary skill in the art would have when reading the challenged claims.”

Response (Paper 12), 9

Patent Owner’s redefinition is not supported by the patent specification.



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Owner is incorrect: while these measurements may in some cases be determinations of size or length, such as a diameter of a pupil, the POSITA would understand there are other cases in which they are not. To give one example involving optical parameters, a direction of a user’s eye gaze can be measured (e.g., by a camera) based on a measured position of the pupil, not necessarily its size or length. To give another example, electrooculography techniques determine an eye movement by measuring an electrical potential between the cornea and the retina of the eye—not the size or length of the cornea or retina. And to give an example taken directly from the ’113 Patent itself, the ’113 Patent describes that an eye sensor “determines the position of the eye/pupil/retina”; the POSITA would understand determining the position of the eye/pupil/retina to include at least a measurement of that position, which is not limited to a size or length.

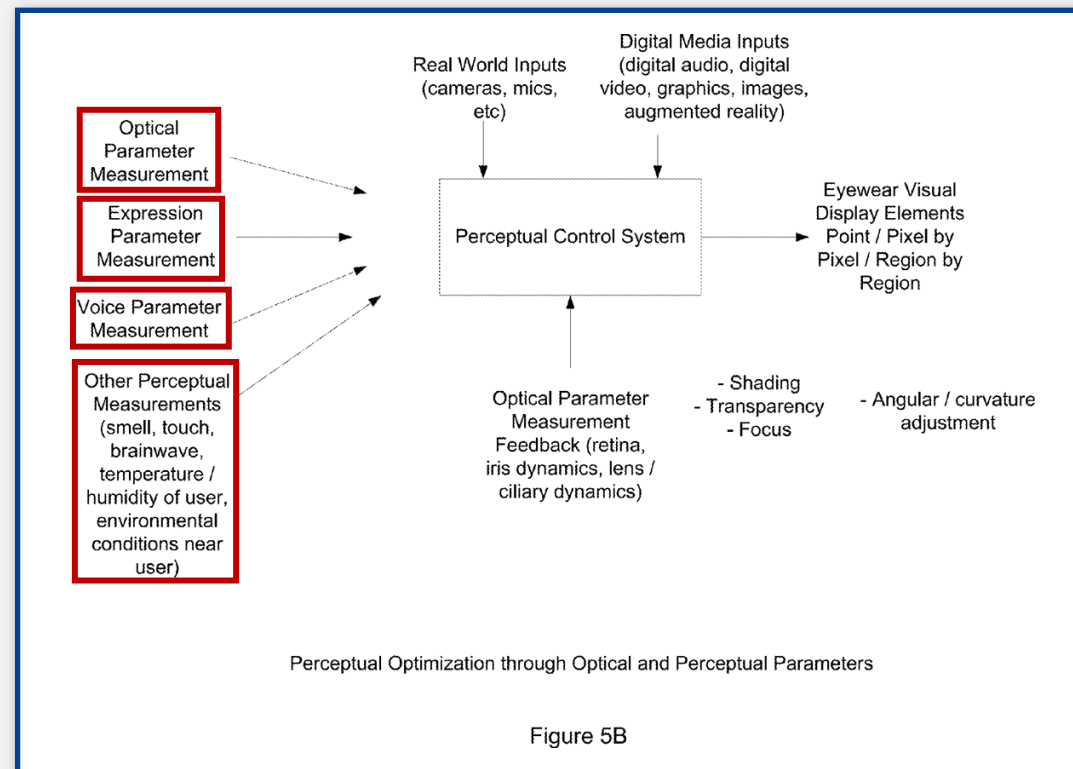
Suppl. LaViola Dec. (Ex. 1024), ¶ 29

Optical Parameter “measurements”

Patent Owner:

“The term measurement is used at several places in the [’113] specification ... and in each instance ... seems to be indicating such a **determination of size or length**. Hence, this is the understanding that a person of ordinary skill in the art would have when reading the challenged claims.”

Response (Paper 12), 9



Ex. 1001, Fig. 5B

Optical Parameter “measurements”

Patent Owner:

“The term measurement is used at several places in the [’113] specification ... and in each instance ... seems to be indicating such a **determination of size or length**. Hence, this is the understanding that a person of ordinary skill in the art would have when reading the challenged claims.”

Response (Paper 12), 9

Patent Owner contradicts its position in the District Court.

Patent Owner, District Court:

Magic Leap 2

The eye sensors of the Magic Leap 2 utilize at least pupil optical parameter measurements.

- **Eye Tracking Data:** Eye tracking data including eye measurements and information about where your eyes are looking, such as: pupil positions, gaze, vergence, center or rotation of eye, blink events, confidence of gaze and vergence, and eye behaviors (i.e., fixation, smooth pursuit, saccades).

Ex. 1023, 5

Optical Parameter “measurements”

Patent Owner:

“The term measurement is used at several places in the [’113] specification ... and in each instance ... seems to be indicating such a **determination of size or length**. Hence, this is the understanding that a person of ordinary skill in the art would have when reading the challenged claims.”

Response (Paper 12), 9

Patent Owner contradicts its position in the District Court.

Patent Owner,
District Court:

Magic Leap 1

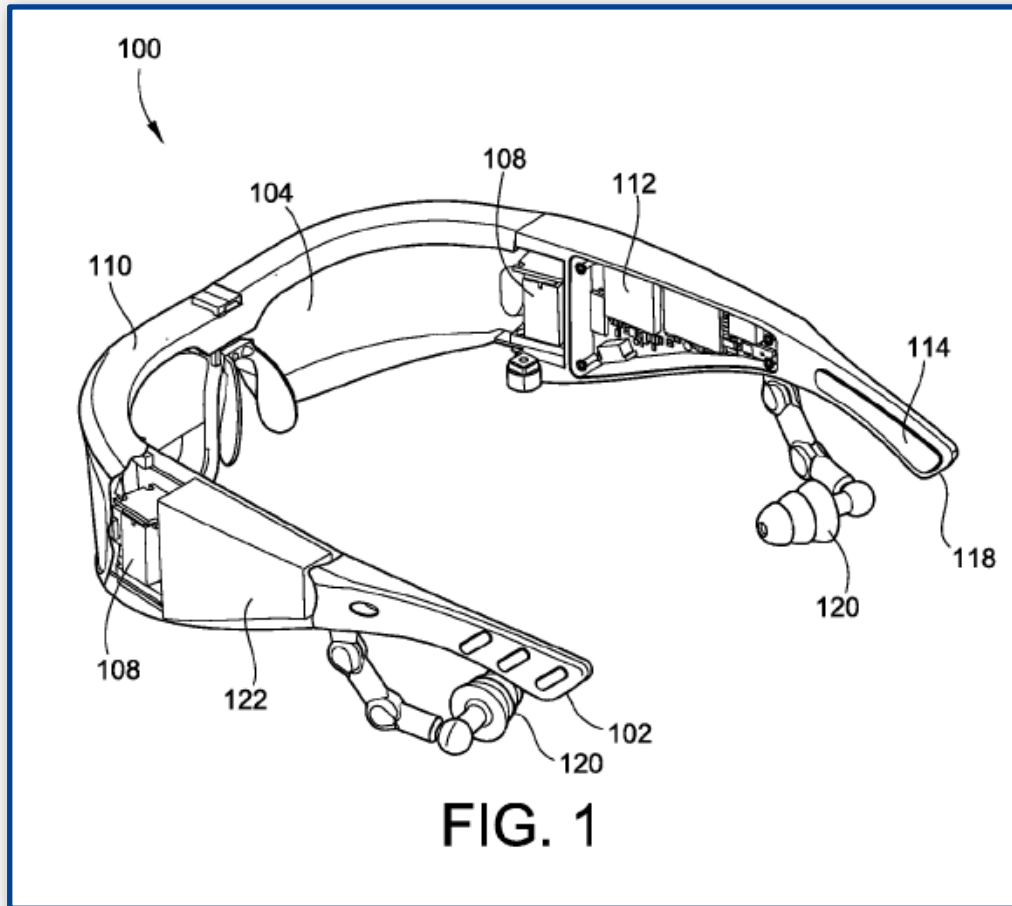
The eye sensors of the Magic Leap 1 utilize at least pupil and corneal optical parameter measurements.

- **Eye Tracking Data:** Eye tracking data may include eye measurements and information about where your eyes are looking when you use your Magic Leap 1 device, such as pupil measurements and pupil positions, cornea measurements and cornea positions, glint measurements, gaze, target, and vergence measurements. Magic Leap 1 device eye tracking data will not contain any images of your eyes or measurements of your eyes that we know could uniquely identify you.

Ex. 1022, 13

Osterhout (Ground 1)

Osterhout

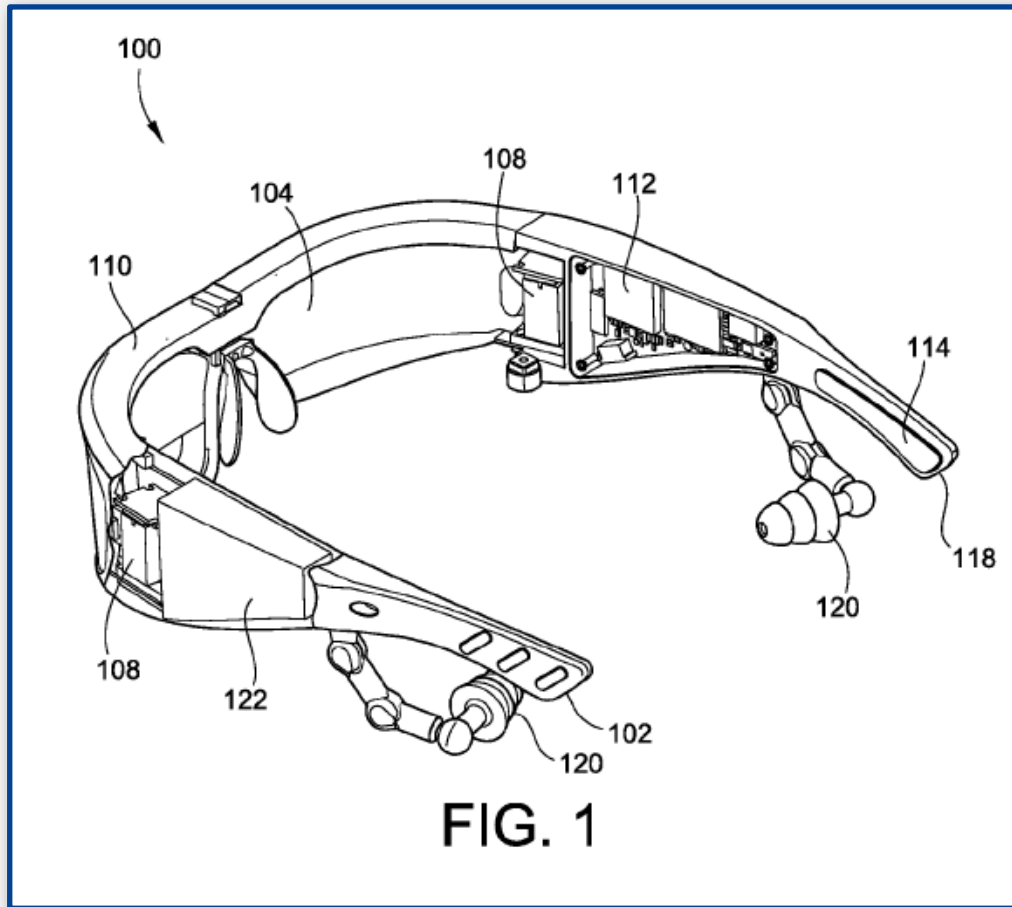


Ex. 1005, Fig. 1

“[A]n **interactive head-mounted eyepiece** worn by a user ... through which the user views a surrounding environment and displayed content.” (Ex. 1005, [0019].)

“[A]n **eye tracking facility** may use the **corneal reflection** and the **center of the pupil** as features to track over time; use reflections from the front of the cornea and the back of the lens as features to track; image features from inside the eye, such as the **retinal blood vessels**, and follow these features as the eye rotates; and the like.” (Ex. 1005, [0301].)

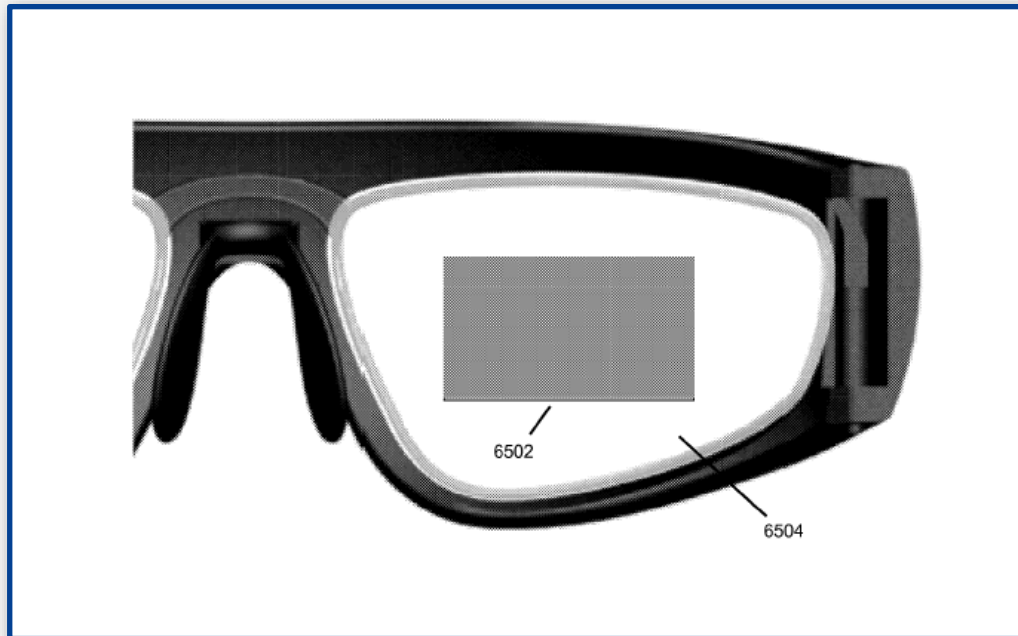
Osterhout



Ex. 1005, Fig. 1

“[E]ye control may **enable the viewer to focus on a certain point on the displayed image from the eyepiece**, and because the camera may be **able to correlate the viewing direction of the eye to a point on the display**, the eyepiece may be able to interpret commands through a combination of where the wearer is looking and an action by the wearer.” (Ex. 1005, [0304].)

Osterhout



Ex. 1005, Fig. 65

“The optical assembly may include an **electrochromic layer** that provides a display characteristic adjustment that is dependent on displayed content requirements and surrounding environmental conditions.” (Ex. 1005, [0193], Fig. 65.)

“[N]ight vision capability may be enabled by a black silicon SWIR sensor ... In this technique, a 300 nm deep **absorbing and anti-reflective layer** is added to the glasses.” (Ex. 1005, [0248].)

Osterhout

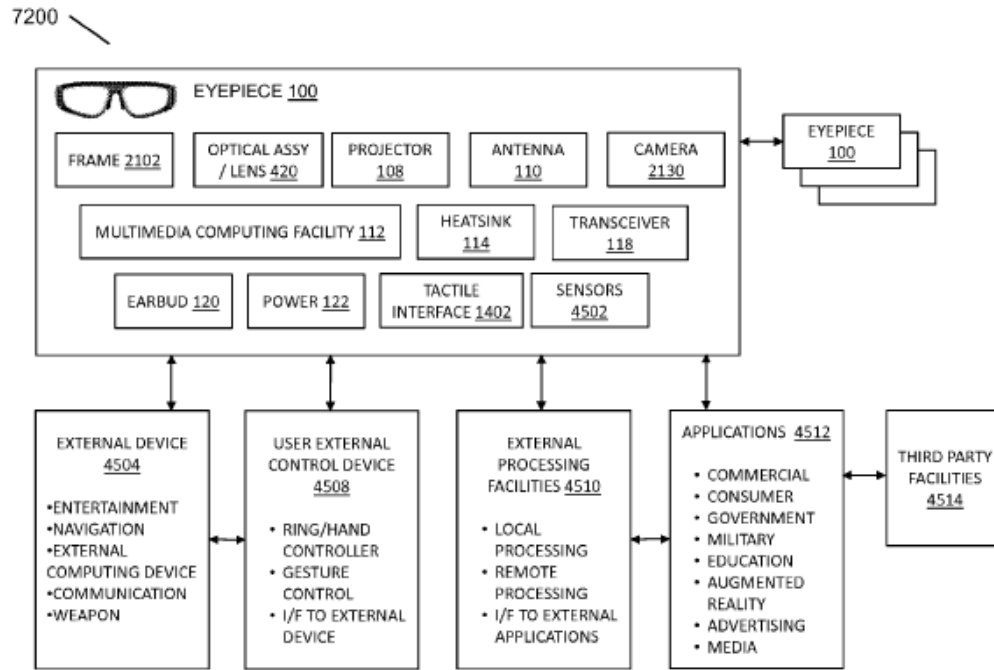


Fig. 72

Ex. 1005, Fig. 72

“The processor correlates the displayed content and the information from the sensor to indicate the eye’s line-of-sight relative to the projected image, and **uses the line-of-sight information relative to the projected image, plus a user command indication, to invoke an action.**” (Ex. 1005, [0045].)

Osterhout Meets the Claim Limitations

1. A wearable optics device comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes optical parameter measurements; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an optical/perceptual parameter based operating system is utilized, wherein the wearable optics device is controlled by the optical/perceptual based operating system.

'113 patent (Ex. 1001), 14:22-33

- “[A]n interactive head-mounted eyepiece worn by a user ... through which the user views a surrounding environment and displayed content.” (Ex. 1005, [0019].)
- “The eyepiece may include projection optics suitable to project an image onto a see-through or translucent lens, enabling the wearer of the eyepiece to view the surrounding environment as well as the displayed image.” (Ex. 1005, [0164].)

Osterhout Meets the Claim Limitations

1. A **wearable optics device** comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes **optical parameter measurements**; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an **optical/perceptual parameter based operating system** is utilized, wherein the wearable optics device is controlled by the optical/perceptual based operating system.

'113 patent (Ex. 1001), 14:22-33

- “[A]n eye tracking facility may use the **corneal reflection** and the **center of the pupil** as features to track over time; use reflections from the front of the cornea and the back of the lens as features to track; image features from inside the eye, such as the **retinal blood vessels**, and follow these features as the eye rotates; and the like.” (Ex. 1005, [0301].)
- “The processor correlates the displayed content and the information from the sensor to indicate the eye’s line-of-sight relative to the projected image, and **uses the line-of-sight information relative to the projected image, plus a user command indication, to invoke an action.**” (Ex. 1005, [0045].)

Osterhout Meets the Claim Limitations

1. A wearable optics device comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes optical parameter measurements; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an optical/perceptual parameter based operating system is utilized, wherein the wearable optics device is controlled by the optical/perceptual based operating system.

'113 patent (Ex. 1001), 14:22-33

1. “[E]ye control may enable the viewer to focus on a certain point on the displayed image from the eyepiece, and because the camera may be able to correlate the viewing direction of the eye to a point on the display, the eyepiece may be able to interpret commands through a combination of where the wearer is looking and an action by the wearer.” (Ex. 1005, [0304].)
2. “The eyepiece may include projection optics suitable to project an image onto a see-through or translucent lens, enabling the wearer of the eyepiece to view the surrounding environment as well as the displayed image.” (Ex. 1005, [0164].)

Osterhout Meets the Claim Limitations

1. A wearable optics device comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes optical parameter measurements; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an optical/perceptual parameter based operating system is utilized, wherein the wearable optics device is controlled by the optical/perceptual based operating system.

'113 patent (Ex. 1001), 14:22-33

3. “For instance, there may be a camera on the eyepiece that views back to the wearer's eye(s), where eye movements or actions may be interpreted as command information, such as ... gazing toward a fixed object (e.g. the corner of the lens of the eyepiece), through a certain portion of the lens, at a real-world object, and the like.” (Ex. 1005, [0304].)
4. “Alternatively, the eyepiece may use other techniques to track the motions of the eye, such as with components surrounding the eye, mounted in contact lenses on the eye, and the like. For instance, a special contact lens may be provided to the user with an embedded optical component, such as a mirror, magnetic field sensor, and the like, for measuring the motion of the eye.” (Ex. 1005, [0301].)

Osterhout Meets the Claim Limitations

12. A wearable optics device comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes optical parameter measurements; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an optical/perceptual parameter based operating system is utilized, wherein the lens includes a plurality of layers.

'113 patent (Ex. 1001), 15:10-20

1. “The optical assembly may include an **electrochromic layer** that provides a display characteristic adjustment that is dependent on displayed content requirements and surrounding environmental conditions.” (Ex. 1005, [0193].)
2. “The electrochromic lens may include integral chromic material or a **chromic coating** which changes the opacity of at least a portion of the lens ... there may be a **plurality of chromic areas** on the lens that may be controlled independently.” (Ex. 1005, [0193].)
3. “[N]ight vision capability may be enabled by a black silicon SWIR sensor ... In this technique, a 300 nm deep **absorbing and anti-reflective layer** is added to the glasses.” (Ex. 1005, [0248].)
4. “[A] special contact lens may be provided to the user with an **embedded optical component**, such as a mirror, magnetic field sensor, and the like.” (Ex. 1005, [0301].)

Osterhout Meets “in communication with” Even Under Patent Owner’s Narrowed Redefinition

Osterhout Meets “in communication with” Even Under Patent Owner’s Narrowed Redefinition

The Board recognized that the eye tracker is in *active* communication with the lens.

Decision on Institution



We do not agree with Patent Owner’s arguments at this stage of the proceeding because we understand Petitioner’s position to be that the eyepiece interprets commands based on the point of the display to which the eye tracking mechanism correlates the viewing direction because the display is projected on the lens by the eyepiece. In other words, we understand Petitioner’s position to be that the dynamic tracking mechanism is in communication with the lens by way of the eyepiece itself (e.g., a processor or controller of the eyepiece) which sends communications (i.e., the display projection) to the lens and receives communications (i.e., the viewing direction) from the dynamic eye tracking device and interprets commands based thereon. See Pet. 20, see also Pet. 23–24 (asserting Osterhout discloses the eyepiece has a processor with an operating system that handles the content for display to the user and sensor information, quoting Ex. 1005 ¶ 45; citing Ex. 1003 ¶¶ 68–69; Ex. 1005 ¶ 164).

DI (Paper 10), 16-17

Osterhout Meets “in communication with” Even Under Patent Owner’s Narrowed Redefinition

The eye tracker exchanges information with the lens at least via the lens display.



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46. In my view, even if the Board were to adopt Patent Owner’s versions of the communication and measurements limitations, the claims are still unpatentable as set forth in the Petition and described further below.

47. For example, with respect to the Osterhout grounds, the “active exchange of information” is met at least by the eye tracking mechanism in communication with the lens via a display projected on the lens. (Petition at 20; EX-1005 at [0164].) The eye tracking mechanism correlates the viewing direction of the eye to a point on the lens, which is then used to interpret commands. The exchange is active at least in that the viewing direction is used to interpret the

Suppl. LaViola Dec. (Ex. 1024), ¶¶ 46-47

Osterhout Meets “in communication with” Even Under Patent Owner’s Narrowed Redefinition

The eye tracker exchanges information with the lens at least via the lens display.

Further, Osterhout discloses that the dynamic eye tracking mechanism can “correlate the viewing direction of the eye to a point on the display,” and that the eyepiece can interpret commands based on that point on the display. (EX-1005, [0304]; EX-1003, ¶62.) Because the display is projected on the lens, EX-1005 at [0164], the dynamic eye tracking mechanism is thus further in communication with the lens at least by correlating the viewing direction to a point on the lens. (EX-1003, ¶62.)

Petition (Paper 2), 20

through a certain portion of the lens, at a real-world object, and the like. In addition, eye control may enable the viewer to focus on a certain point on the displayed image from the eyepiece, and because the camera may be able to correlate the viewing direction of the eye to a point on the display, the eyepiece may be able to interpret commands through a combination of where the wearer is looking and an action by the wearer (e.g. blinking, touching an interface device, movement of a position sense device, and the like). For example, the viewer may be able to look at an object on the display, and select that object though the motion of a finger enabled through a position sense device.

Ex. 1005, [0304]

[0164] The present disclosure relates to eyepiece electro-optics. The eyepiece may include projection optics suitable to project an image onto a see-through or translucent lens, enabling the wearer of the eyepiece to view the surrounding environment as well as the displayed image. The projection optics, also known as a projector, may include an RGB LED

Ex. 1005, [0164]

Osterhout Meets “in communication with” Even Under Patent Owner’s Narrowed Redefinition

The exchange is *active* by interpreting user commands, for presentation on an active display.



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47. For example, with respect to the Osterhout grounds, the “active exchange of information” is met at least by the eye tracking mechanism in communication with the lens via a display projected on the lens. (Petition at 20; EX-1005 at [0164].) The eye tracking mechanism correlates the viewing direction of the eye to a point on the lens, which is then used to interpret commands. The exchange is active at least in that the viewing direction is used to interpret the commands, an active process; and further, because Osterhout discloses the lens display can be an active display, such as an LCoS optical display, or projection optics with an RGB LED module. (EX-1005 at [0164].)

Suppl. LaViola Dec. (Ex. 1024), ¶ 47

Osterhout Meets “in communication with” Even Under Patent Owner’s Narrowed Redefinition

The exchange is *active* by interpreting user commands, for presentation on an active display.

Osterhout meets this element.⁶ (EX-1003, ¶68.) For example, Osterhout discloses that a processor of the eyepiece includes an operating system. (EX-1005, [0164]; EX-1003, ¶68.)

A POSITA would have understood the operating system of the eyepiece’s processor to meet the claimed optical/perceptual parameter based operating system. (EX-1003, ¶69.) The operating system of Osterhout is based on optical parameters and further based on perceptual parameters.⁷ For example, the processor with the operating system “handl[es] the content for display to the user,” and handles “sensor information from the sensor.” (EX-1005, [0045]; EX-1003, ¶69.)

Petition (Paper 2), 23-24

[0045] The eyepiece may further include a bi-directional optical assembly through which the user views a surrounding environment simultaneously with displayed content as transmitted through the optical assembly from an integrated image source and a processor for handling the content for display to the user and sensor information from the sensor, wherein the processor correlates the displayed content and the information from the sensor to indicate the eye’s line-of-sight relative to the projected image, and uses the line-of-sight information relative to the projected image, plus a user command indication, to invoke an action.

Ex. 1005, [0045]

tive to the blue and/or green image and so on. The image may thereafter be reflected into a two surface freeform waveguide where the image light engages in total internal reflections (TIR) until reaching the active viewing area of the lens where the user sees the image. A processor, which may include a memory and an operating system, may control the LED light source and the optical display. The projector may also include or be optically coupled to a display coupling lens, a condenser lens, a polarizing beam splitter, and a field lens.

Ex. 1005, [0164]

Osterhout Meets “measurements” Even Under Patent Owner’s Narrowed Redefinition

Osterhout’s eye tracker measures an *amount of* electrical potential.



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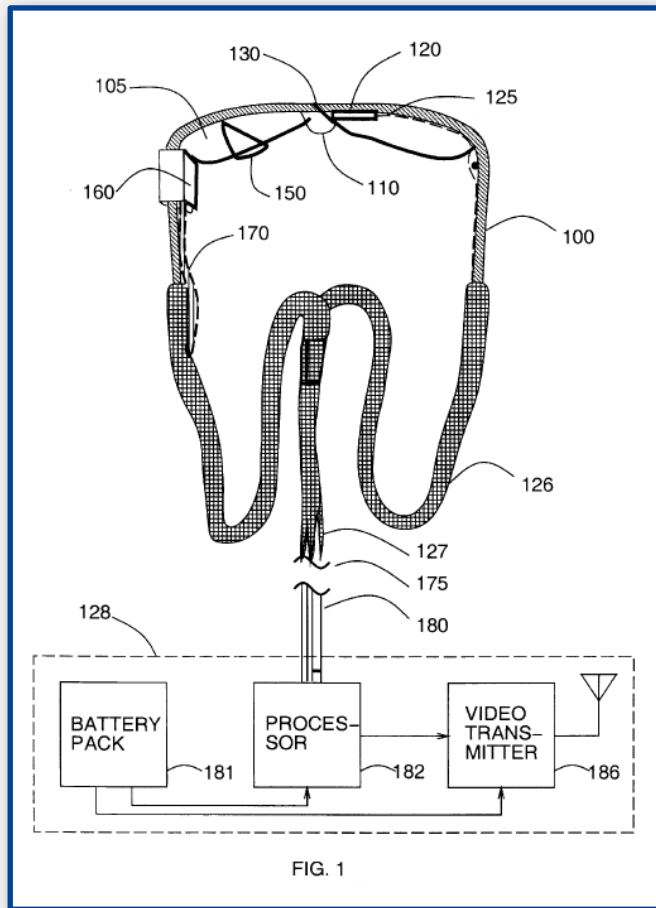
48. Moreover, a measurement of a “size, length, or amount of something”

(Response at 9) is met at least by Osterhout’s various disclosure of determining the user’s gaze or eye motion. For example, as described in the Petition, Osterhout discloses that electrical potentials of the cornea and retina are “measured and monitored.” (EX-1005 at [0301].) An electrical potential of the cornea or the retina is an “amount” measured by this process.

Suppl. LaViola Dec. (Ex. 1024), ¶ 48

Mann '526 / Vaissie (Ground 2)

Mann '526

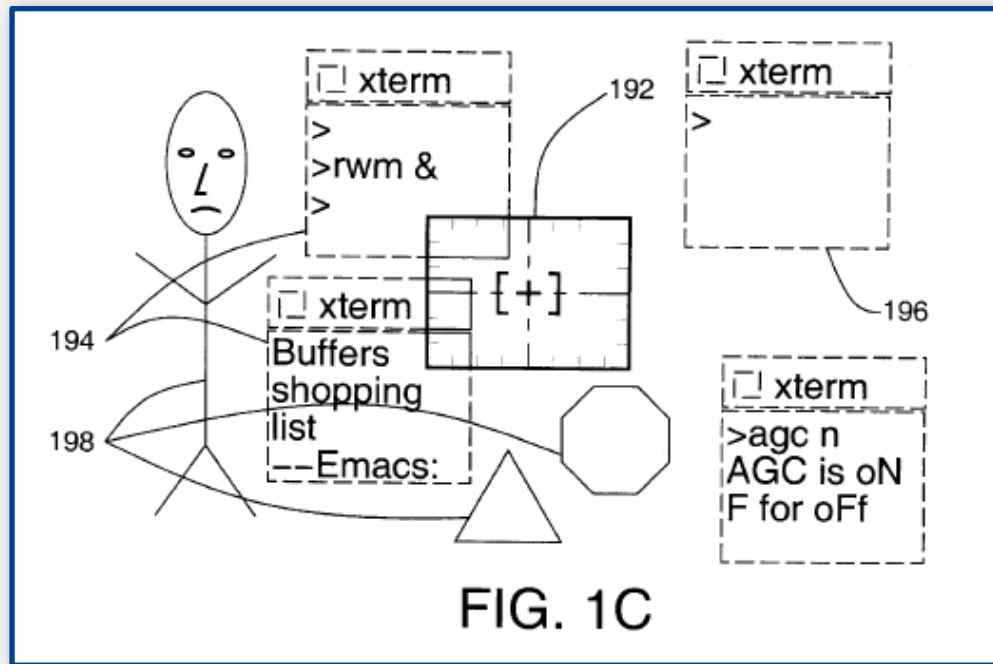


Ex. 1006, Fig. 1

“[A] body-worn portable electronic camera system with **wearable viewfinder means**.” (Ex. 1006, 1:5-8.)

“FIG. 1 shows an embodiment of the invention built into **eyeglass frames** 100, typically containing two **eyeglass lenses** 105.” (Ex. 1006, 11:30-32.)

Mann '526

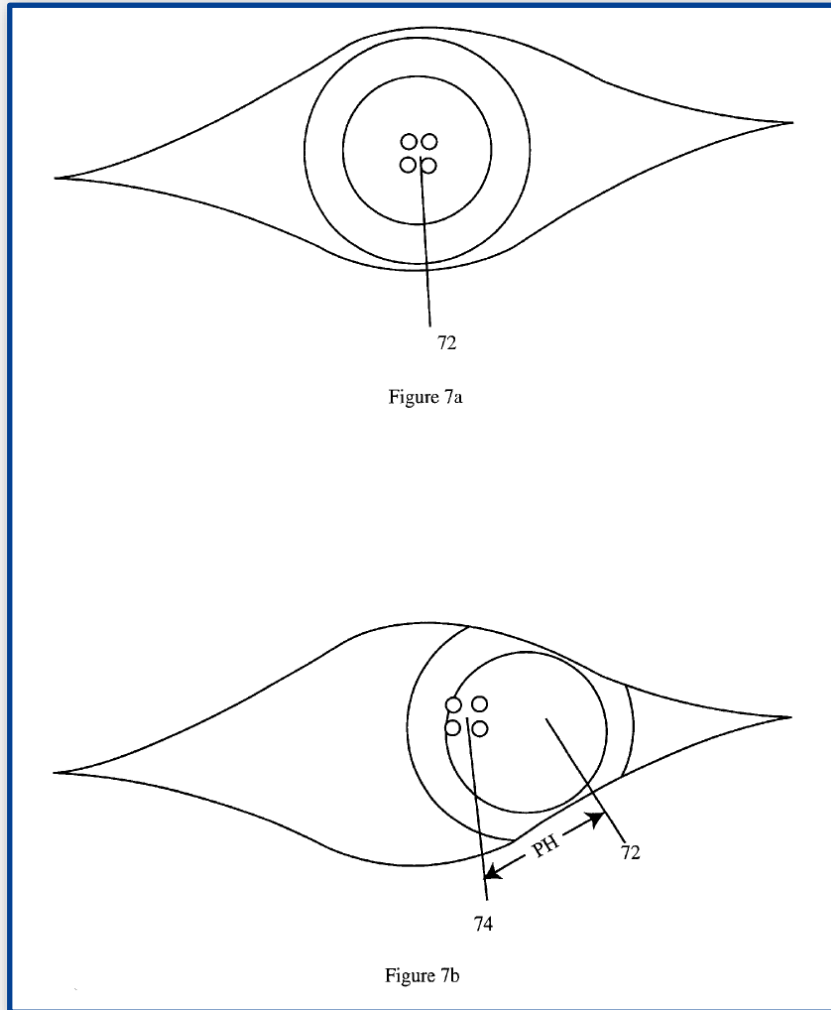


Ex. 1006, Fig. 1C

“[T]he apparatus comprises an **eye-tracking mechanism** that causes the focus of the camera to be based on where the user is looking.” (Ex. 1006, 6:25-27.)

“A **reality window manager** (RWM) ... may also be driven by the eyetracker, so that there can be an **independent head position (framing)** and **cursor position (where looking)**, rather than always having the cursor in the center of the viewfinder.” (Ex. 1006, 26:10-18.)

Vaissie

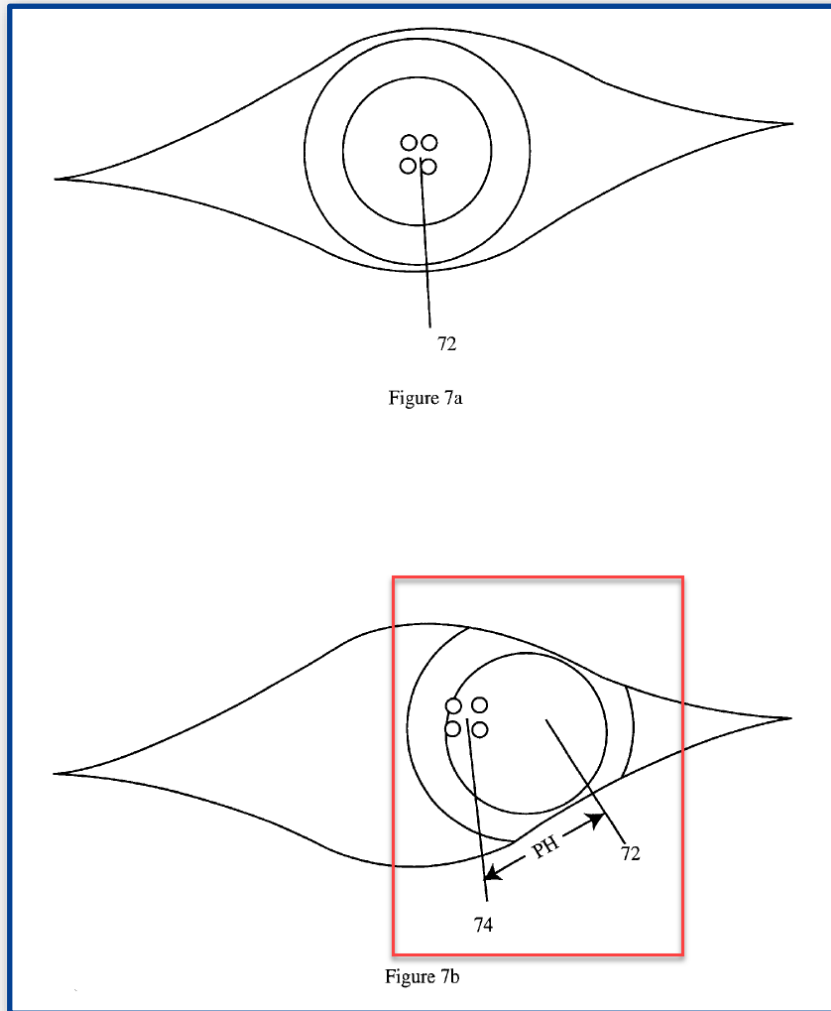


Ex. 1007, Figs. 7a-b

“[A] **head mounted display** that has an **integrated eye tracking function**.” (Ex. 1007, 1:56-58.)

“LEDs form **virtual images behind the cornea that are imaged on the CCD sensor** ... the processing of the location of those images on the sensor allows **determining the sight direction**.” (Ex. 1007, 3:5-10.)

Vaissie



Ex. 1007, Figs. 7a-b

“When the user is gazing off axis, the **reflections of the 4 LEDs on an image of the pupil, cornea and iris of the user’s eye** is represented in FIG. 7b. ... By computing the **location of the center 72 of the entrance pupil** and the **barycenter of the images of the LEDs**, one can derive the vector PH ... and determine the sight direction with respect to the axis of the reference point.” (Ex. 1007, 3:59-4:3.)

Mann '526 + Vaissie

Mann '526

*The eyetracker 1010 reports the direction of eye gaze and conveys this information as a signal 1012 to eye tracker processor 1030 which converts this direction into “X” and “Y” coordinates that correspond to the screen coordinates of viewfinder screen 340. **These “X” and “Y” coordinates, which are expressed as signal 1031, indicate where on the viewfinder screen 340 the wearer is looking.***

Ex. 1006, 25:7-13



Vaissie

*There exists a serious need for a **head-mounted, virtual image display system** that will cooperatively provide **eye tracking of the sight direction** whereby physically challenged people can interact with devices. The sight direction information is also needed to enhance local images displayed in head mounted devices, correct for some depth perception difficulties ... and increased resolution at the gaze point of visual displays. (Ex. 1007, 3:59-4:3.)*

Ex. 1007, 1:45-53

Mann '526 + Vaissie Meets the Claim Limitations

1. A **wearable optics device** comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes **optical parameter measurements**; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an **optical/perceptual parameter based operating system** is utilized, wherein the wearable optics device is controlled by the optical/perceptual based operating system.

'113 patent (Ex. 1001), 14:22-33

- “[A] **body-worn portable electronic camera system** with **wearable viewfinder means**.” (Ex. 1006, 1:5-8.)
- “FIG. 1 shows an embodiment of the invention built into eyeglass frames 100, typically containing two **eyeglass lenses** 105.” (Ex. 1006, 11:30-32.)

Mann '526 + Vaissie Meets the Claim Limitations

1. A **wearable optics device** comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes **optical parameter measurements**; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an **optical/perceptual parameter based operating system** is utilized, wherein the wearable optics device is controlled by the optical/perceptual based operating system.

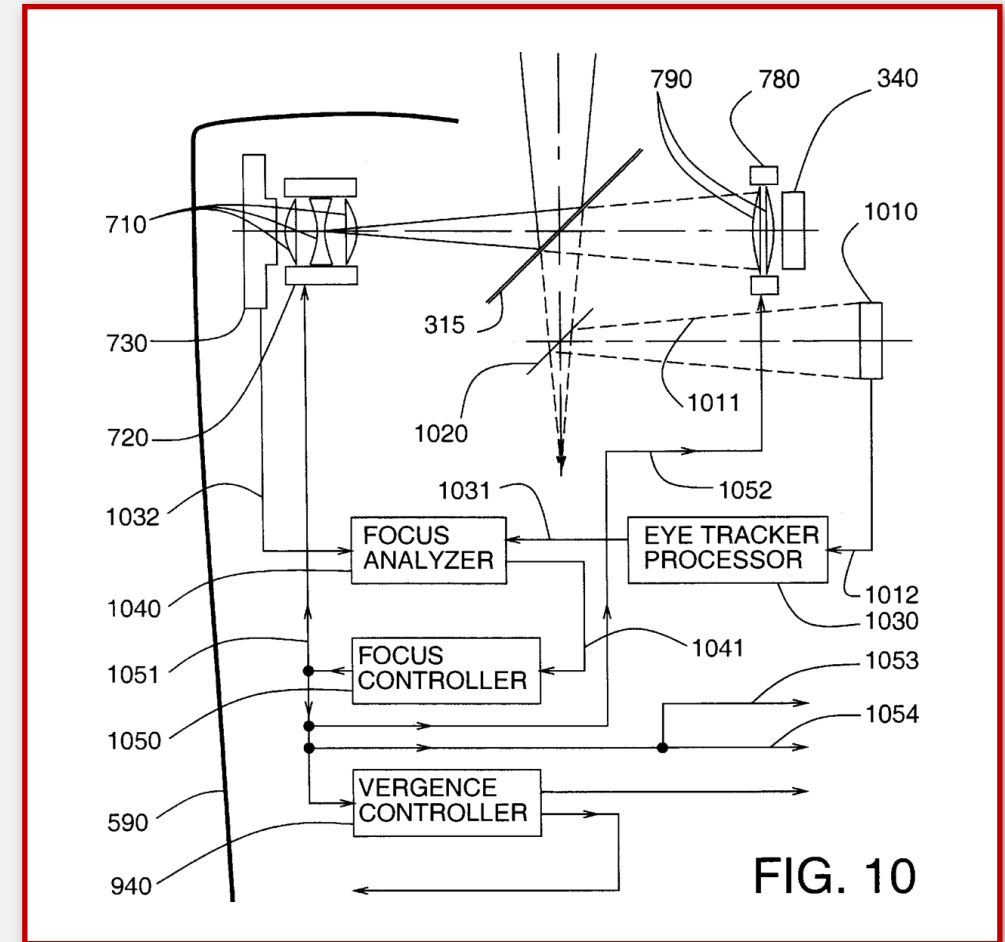
'113 patent (Ex. 1001), 14:22-33

- “By computing the **location of the center 72 of the entrance pupil** and the **barycenter of the images of the LEDs**, one can derive the vector PH ... and determine the sight direction with respect to the axis of the reference point.” (Ex. 1007, 3:59-4:3.)
- “A **reality window manager** (RWM) ... may also be **driven by the eyetracker**, so that there can be an **independent head position (framing)** and **cursor position (where looking)**, rather than always having the cursor in the center of the viewfinder.” (Ex. 1006, 26:10-18.)

Mann '526 + Vaissie Meets the Claim Limitations

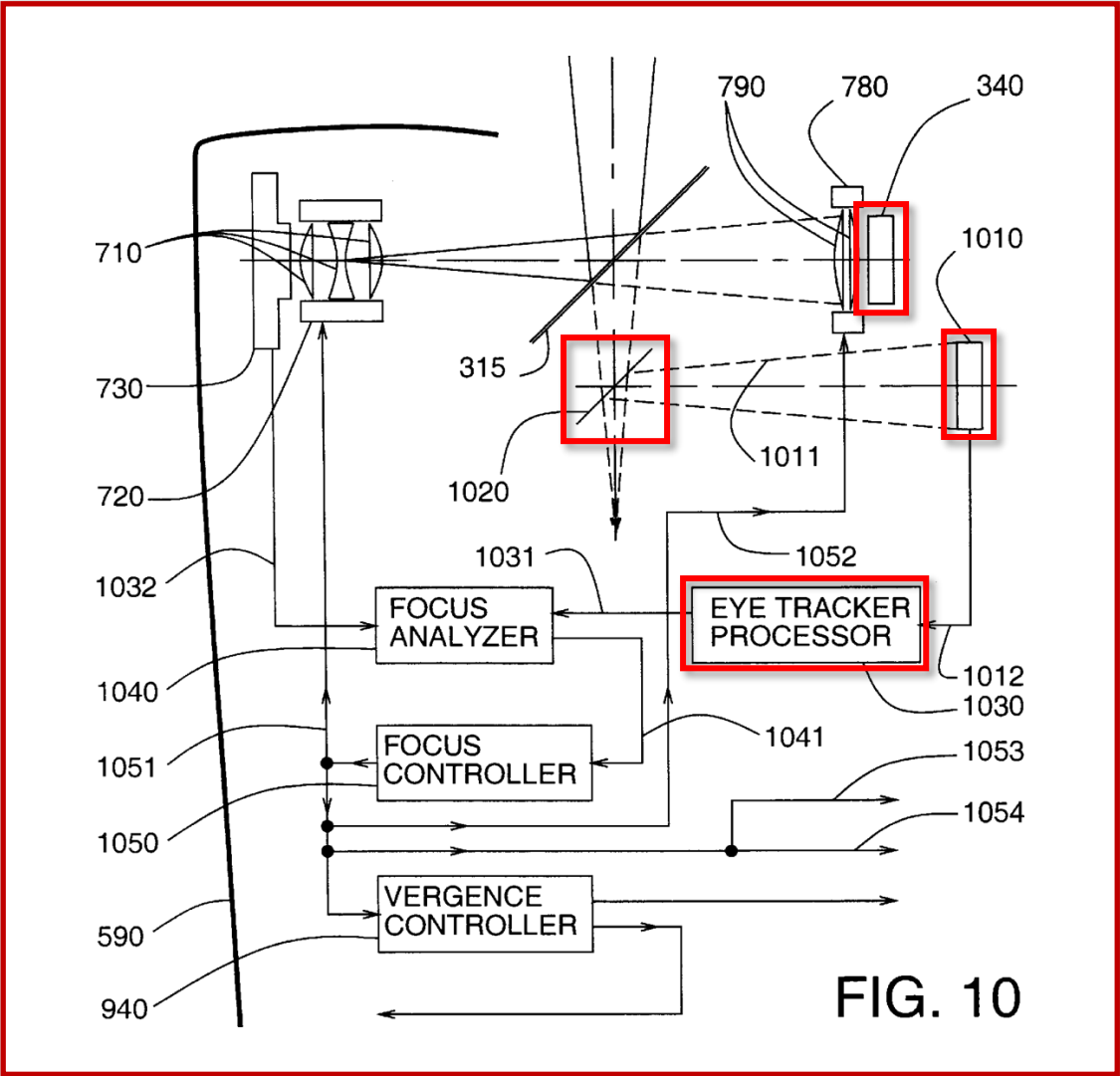
1. A wearable optics device comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes optical parameter measurements; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an optical/perceptual parameter based operating system is utilized, wherein the wearable optics device is controlled by the optical/perceptual based operating system.

'113 patent (Ex. 1001), 14:22-33



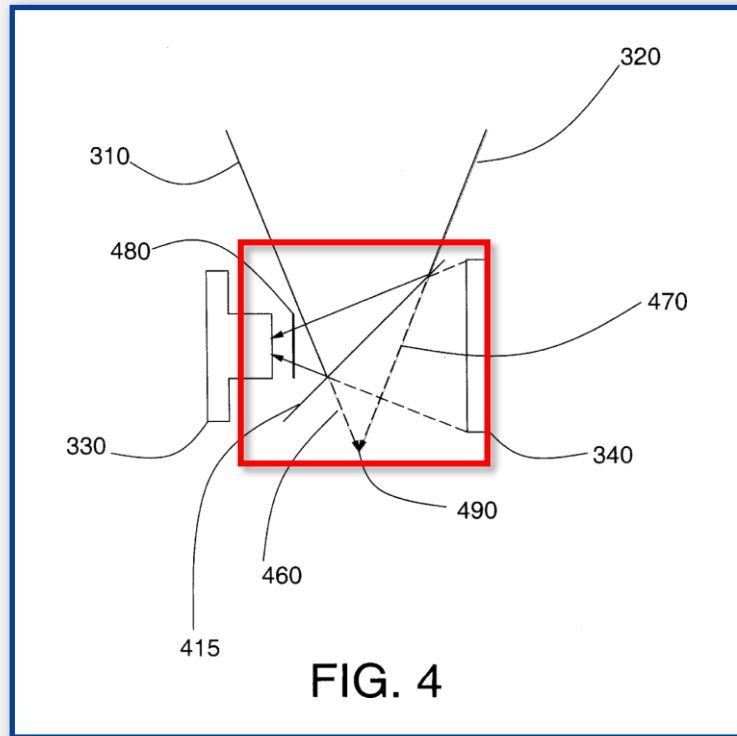
Ex. 1006, Fig. 10

a dynamic eye tracking mechanism in communication with the lens

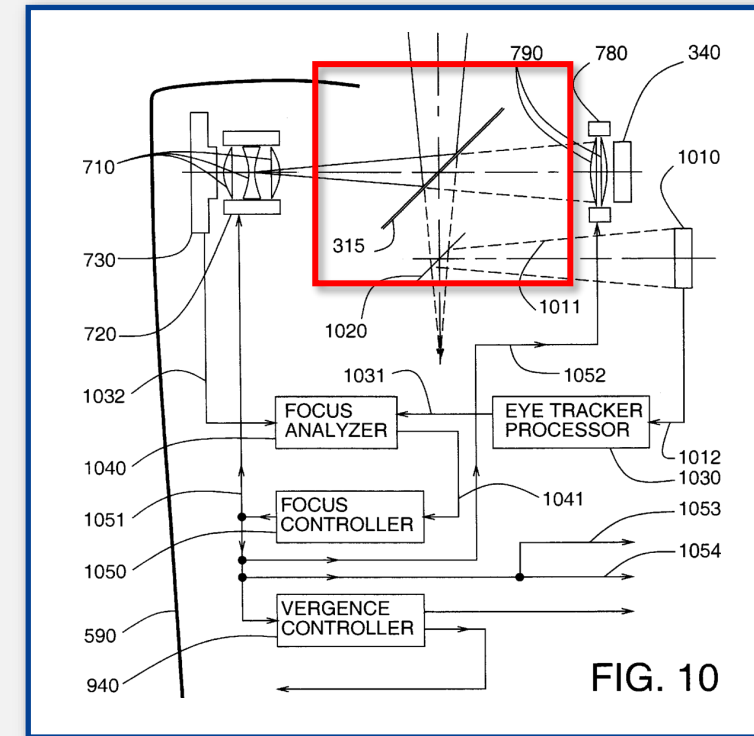
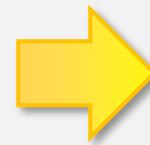


Ex. 1006, Fig. 10

a dynamic eye tracking mechanism in communication with the lens



Ex. 1006, Fig. 4



Ex. 1006, Fig. 10

“The apparatus of FIG. 3 does not permit others to make full eye-contact with the wearer. Accordingly, FIG. 4 depicts a similar apparatus in which **only a portion of the rays of the leftmost ray of light 310 is deflected by beamsplitter 415 which is installed in place of mirror 315.**” (Ex. 1006, 18:62-66.)

Mann '526 + Vaissie Meets the Claim Limitations

12. A wearable optics device comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes optical parameter measurements; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an optical/perceptual parameter based operating system is utilized, wherein the lens includes a plurality of layers.

'113 patent (Ex. 1001), 15:10-20

- “The entire apparatus is typically concealed in eyeglass frames in which the beamsplitter is ... **embedded in one or both glass lenses of the eyeglasses.**” (Ex. 1006, 20:22-25.)
- “The beamsplitter ... could conveniently be implemented as **a metallisation within a lens of the eyeglasses.** These beamsplitters and diverging lens 250 of FIG. 2 may be **embedded within the eyeglass lens** ... so that the embedded elements may appear to be a feature of bifocal eyeglasses.” (Ex. 1006, 22:55-57.)

Mann '526 + Vaissie Meets “in communication with” Even Under Patent Owner’s Narrowed Redefinition

The eye tracker exchanges information with the lens via the window manager.



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49. And with respect to the Mann/Vaissie grounds, the “active exchange of information” is met at least by the eye tracker 1010 receiving optical information from the lens, as described above; tracking the user’s eye to control a cursor position in a reality window manager; and presenting the window manager, with the cursor, in the electronic display of the lens. (Petition at 50-51; EX-1006 at 14:22-25, 26:10-19, Figs. 1C, 1D.) The communication is active at least in that tracking the cursor and presenting the reality window manager to the lens are active processes; and there is an exchange of information at least in that the lens communicates optical information to the eye tracker, and the eye tracker communicates cursor and display information to the lens.

Suppl. LaViola Dec. (Ex. 1024), ¶ 49

Mann '526 + Vaissie Meets “in communication with” Even Under Patent Owner’s Narrowed Redefinition

The exchange is active because cursor tracking and window display are active processes.



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49. And with respect to the Mann/Vaissie grounds, the “active exchange of information” is met at least by the eye tracker 1010 receiving optical information from the lens, as described above; tracking the user’s eye to control a cursor position in a reality window manager; and presenting the window manager, with the cursor, in the electronic display of the lens. (Petition at 50-51; EX-1006 at 14:22-25, 26:10-19, Figs. 1C, 1D.) The communication is active at least in that tracking the cursor and presenting the reality window manager to the lens are active processes; and there is an exchange of information at least in that the lens communicates optical information to the eye tracker, and the eye tracker communicates cursor and display information to the lens.

Suppl. LaViola Dec. (Ex. 1024), ¶ 49

Mann '526 + Vaissie Meets “measurements” Even Under Patent Owner’s Narrowed Redefinition

The measurement of vector PH in Vaissie is a “determination of size or length.”



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50. Further, as described above, “a determination of size or length” is met at least by the measurement of the vector PH—representing the distance and angle of the pupil in relation to the barycenter of the corneal reflections—to indicate the user’s gaze direction. Measuring the vector PH is a measurement of length at least because the measured distance of the pupil to the barycenter is a length.

Suppl. LaViola Dec. (Ex. 1024), ¶ 50

Certificate of Service (37 C.F.R. § 42.6(e)(4))

I hereby certify that the attached PETITIONER'S DEMONSTRATIVES were served via e-mail (by agreement) to the following counsel of record for the Patent Owner on April 29, 2024, and filed via the P-TACTS system as of the date below:

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Dated: May 2, 2024

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