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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HTC CORPORATION AND HTC AMERICA, INC.,
Petitioners,

v.

ELECTRONIC SCRIPTING PRODUCTS, INC.,
Patent Owner.

Case IPR2018-01031
Patent 9,235,934 B2

Before ANDREI IANCU, *Director of the United States Patent and Trademark Office*, WILLIAM M. FINK, *Vice Chief Administrative Patent Judge*, and ROBERT J. WEINSCHENK, *Administrative Patent Judge*.

FINK, *Vice Chief Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

HTC Corporation and HTC America, Inc. (collectively, "Petitioner") filed a Petition pursuant to 35 U.S.C. §§ 311–319 requesting an *inter partes* review of claims 1–12 of U.S. Patent No. 9,235,934 B2, issued on January 12, 2016 (Ex. 1002, "the '934 patent"). Paper 2 ("Pet."). Electronic Scripting Products, Inc. ("Patent Owner") filed a Preliminary Response. Paper 5 ("Prelim. Resp."). We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted unless the information presented in the petition "shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition."

For the reasons set forth below, we deny the Petition.

I. BACKGROUND

A. Related Proceedings

The parties inform us that the '934 patent and a related patent, U.S. Patent No. 8,553,935 B2 (Ex. 1001), are the subject of a patent infringement lawsuit in the U.S. District Court for the Northern District of California, *Electronic Scripting Products, Inc. v. HTC America, Inc.*, No. 3:17-cv-05806-RS (N.D. Cal. filed Oct. 9, 2017). Pet. 1–2; Paper 4, 2.

B. The '934 Patent (Ex. 1002)

The '934 patent relates to determining an absolute pose of a manipulated object in a real three-dimensional environment, particularly of a manipulated object used by human users to interface with the digital world. Ex. 1002, 1:24–28. An object's pose is its position and orientation. *Id.* at 46:14. More specifically, an object's pose combines the three linear displacement coordinates (x, y, z) of any reference point on the object and

the three orientation angles, also called the Euler angles (φ, θ, ψ), that describe the object's pitch, yaw, and roll. *Id.* at 1:46–50.

Figure 23 of the '934 patent is reproduced below:

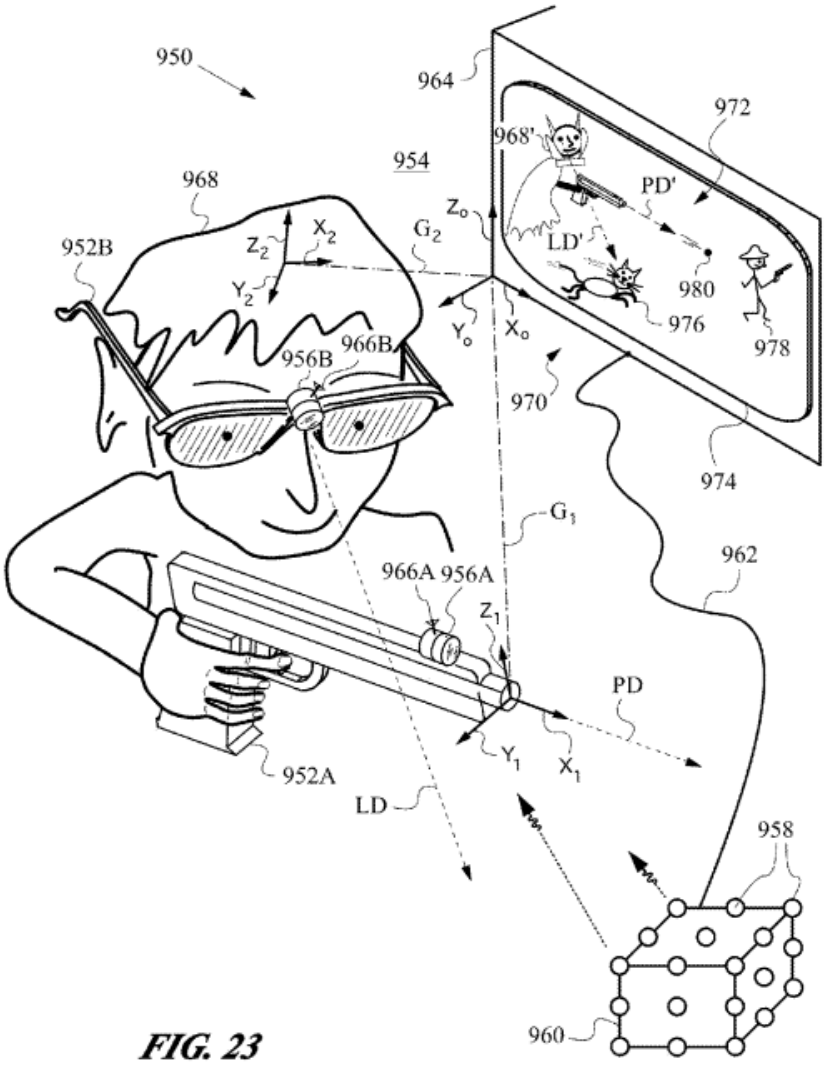

FIG. 23

Figure 23 illustrates an embodiment having virtual reality simulation program 970 running on computer 964. *Id.* at 40:15–16.

User or military trainee 968 interfaces with program 970 using manipulated objects 952A and 952B. *Id.* at 39:38–40. For example, "[o]bject 952B is a wearable article, in this case a pair of glasses worn by military trainee 968." *Id.* at 40:3–4. Glasses 952B are equipped with on-

board optical measuring arrangement 956B for sensing light emitted from beacons 958, which are disposed in a 3-D grid pattern and modulated by computer 964. *Id.* at 39:41–46, 39:50–51; *see also* 21:41–54. Using a lens and a position-sensing device (PSD), on-board optical measuring arrangement 956B infers its own absolute pose by viewing beacons 958. *Id.* On-board optical measuring arrangement 956B then transmits absolute pose data (x, y, z, φ, θ, ψ) to computer 964. *Id.* at 40:35–37, 40:57. Using the absolute pose data, a combat scenario including avatar 968′, corresponding to trainee 968, is displayed on display 974 to monitor the progress of trainee 968. *Id.* at 40:16–18, 40:24–26, 40:37–38. The inferred absolute pose of on-board optical measuring arrangement 952B also allows for the looking direction of trainee 968 to be automatically inferred, tracked, and visualized on display 974. *Id.* at 40:6–11, 40:23–24.

C. Illustrative Claim

Of the challenged claims, claims 1 and 7 are independent. Claim 1 is illustrative of the claims at issue and is reproduced below:

> 1. A wearable article cooperating with a first plurality of predetermined light sources disposed in a known pattern, said wearable article comprising:
>
> a) a photodetector configured to detect said first plurality of predetermined light sources and generate photodetector data representative of the positions of said first plurality of predetermined light sources; and
>
> b) a controller configured to identify a derivative pattern of said first plurality of predetermined light sources from said photodetector data, wherein said derivative pattern is indicative of the position of said photodetector.

Ex. 1002, 51:6–16.

D. Evidence of Record

Petitioner relies on the following references and declaration (*see* Pet. 3):

Reference or Declaration	Exhibit No.
Greg Welch, et al., *High-Performance Wide-Area Optical Tracking*, PRESENCE: TELEOPERATORS AND VIRTUAL ENVIRONMENTS, Feb. 2001, at 1 ("Welch-HiBall")	Ex. 1004
Greg Welch, et al., *Tracking: Beyond 15 Minutes of Thought*, SIGGRAPH 2001 CONFERENCE (Aug. 12, 2001) ("SIGGRAPH 2001")	Ex. 1005
Declaration of Dr. Gregory Welch ("Welch Decl.")	Ex. 1003

E. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable on the following grounds (*see* Pet. 27, 49):

Claims Challenged	Basis	Reference(s)
1–12	§ 102(a)	Welch-HiBall
1–12	§ 103(a)	Welch-HiBall and SIGGRAPH 2001

II. ANALYSIS

A. Claim Construction

Petitioner proposes construction of the terms "photodetector," "derivative pattern," "controller configured to identify a derivative pattern," and "auxiliary motion detection component" according to the broadest reasonable interpretation standard. Pet. 15–22. Petitioner contends its proposed constructions would be the same under either the broadest reasonable interpretation (BRI) claim construction standard, or the claim construction standard applicable in a civil action to invalidate a patent, as set forth in the USPTO's May 9, 2018 notice of proposed rulemaking. *Id.* at 15

(citing 83 FR 21221). Patent Owner does not address Petitioner's claim constructions except as set forth below. Prelim. Resp. 5.

At the time of this Decision, in an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016). However, only terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). Except for the following claim construction issue, we determine that it is unnecessary to construe any claim terms expressly at this time to resolve the disputed issues before us.

1. Construction of "wearable article comprising: . . . a controller configured to identify a derivative pattern"

The parties' contentions touch upon a claim construction issue that we need to resolve for purposes of this Decision: whether the term "wearable article" of the preamble is a limitation and, if so, whether it requires the location of the recited "controller configured to identify a derivative pattern" to be included with the "wearable article" recited in the preamble of independent claims 1 and 7. *See* Pet. 37 ("The claims do not require the 'controller' to be in a particular location, at least because the term 'wearable article' appears only in the non-limiting preamble and because the claims' transitional phrase 'comprising' is open ended."); Prelim. Resp. 6 ("The preamble specifies a wearable article cooperating with light sources, rather than an entire system for determining pose. The preamble also makes clear

that the same wearable article comprises, i.e., has on-board, the photodetector of limitation l(a) and the controller of limitation l(b).").

We determine that the preambles of claims 1 and 7, which recite "[a] wearable article cooperating with a first plurality of predetermined light sources disposed in a known pattern," are limiting. "Preamble language that merely states the purpose or intended use of an invention is generally not treated as limiting the scope of the claim." *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2006). However, "[w]hen limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention." *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003).

Here, the term "a first plurality of predetermined light sources disposed in a known pattern" in the preamble of claim 1 provides antecedent basis for "said first plurality of predetermined light sources" in the body of that claim. Specifically, the body of claim 1 recites "a photodetector configured to detect said first plurality of predetermined light sources and generate photodetector data representative of the positions of said first plurality of predetermined light sources." Ex. 1002, 51:9–12. Moreover, the preamble requires the predetermined light sources of the preamble to be disposed in a "known" pattern, which is necessary to the invention because the "knowledge of the spatial relationship between the object and these invariant features enables one to compute the object's pose." *Id.* at 1:41–45; *see also id.* at 15:13–14 ("A number of invariant features Bl-B7 are placed at known locations in real three-dimensional environment 108 . . . ."). The

body of claim 1 then makes use of "the positions of said first plurality of predetermined light sources." *Id.* at 51:11–12.

Similarly, the claim 1 preamble term "wearable article" provides antecedent basis for the term "wearable article" in dependent claims 2–6. For example, dependent claim 2 recites that the wearable article of claim 1 is "deployed in an augmented reality application," and claim 3 recites that the wearable article of claim 2 comprises glasses. Ex. 1002, 51:17–20. As Patent Owner points out, the "wearable article" described in the specification is the embodiment in Figure 23, which comprises glasses 952B, as required by claim 3. *Id.* at 40:3–4 ("Object 952B is a wearable article, in this case a pair of glasses worn by military trainee 968."); *see* Prelim. Resp. 10. Because the preamble terms "wearable article" and "first plurality of predetermined light sources" provide antecedent basis for and are necessary to understanding the positive limitations in the body of claim 1 and dependent claims 2–6, we determine that the preamble is limiting. *See Pacing Techs., LLC v. Garmin Int'l, Inc.*, 778 F.3d 1021, 1023–24 (Fed. Cir. 2015) (holding preamble of independent claim is limiting where preamble terms provide antecedent basis for terms in the body of the independent and dependent claims).

Although we determine the preamble term "wearable article" to be a limitation, we have considered Petitioner's contention that the use of the "open-ended" transitional term "comprising," as in "said wearable article comprising," means that the controller need not be in a particular location. Pet. 37. Patent Owner responds,

> The transitional phrase "comprising" defines the scope of the claim with respect to <u>what unrecited additional limitations</u>, i.e., components or steps, can be present (see MPEP §2111.03).

> In other words, "comprising" is employed in order not to exclude additional, as yet unrecited elements.

Prelim. Resp. 8.

We agree with Patent Owner. "The transitional term 'comprising', which is synonymous with 'including,' 'containing,' or 'characterized by,' is inclusive or open-ended and does not exclude additional, unrecited elements or method steps." MPEP § 2111.03 (citing *Mars, Inc. v. H.J. Heinz Co.*, 377 F.3d 1369, 1376 (Fed. Cir. 2004)). Thus, the recitation of the "wearable article comprising: a photodetector . . . and a controller" means simply that the wearable article must, at a minimum, "include" or "contain" the "photodetector" and the "controller," as recited in claim 1, although it may include other, unrecited elements.

In construing the preamble term "wearable article" to be limiting and necessarily including a "controller configured to identify a derivative pattern," we have also considered the intrinsic evidence cited by the parties. *See Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989) ("The effect preamble language should be given can be resolved only on review of the entirety of the patent to gain an understanding of what the inventors actually invented and intended to encompass by the claim."). The intrinsic record can include related patents from which the '934 patent claims priority. *See Laitram Corporation v. Morehouse Indus., Inc.*, 143 F.3d 1456, 1460 n.2 (Fed. Cir. 1998) (noting prosecution history extends to patents in the same family).

According to Petitioner, "the only embodiment in the specification described as a 'controller' is located separately from the tracked object, which shows that the controller need not be in a particular location." Pet. 37 (citing Ex. 1002, 43:26–37, Fig. 25A).

As Patent Owner points out, however, the specification of the '934 patent is not limited to a single off-board controller embodiment. For example, Patent Owner notes that the term "controller" is used in describing the Figure 29 embodiment in which the "controller resid[es] in electronic device 1102 or *even on-board*" the movable device 1110. Prelim. Resp. 9; Ex. 1002, 49:3–10 (emphasis added). Patent Owner further notes that the Figure 23 embodiment (reproduced above) explicitly teaches a "wearable article" in the form of glasses 952B, which performs pose recovery by "arrangement 956B" on-board glasses 952B. Prelim. Resp. 9–10 (citing Ex. 1002, 40:3–12, Fig. 23). This description supports the claimed requirement for the on-board controller because it describes the wearable article performing its own pose-determination, which is consistent with the claim 1 requirement for the "controller configured to identify a derivative pattern of said first plurality of predetermined light sources from said photodetector data." *See, e.g.*, Ex. 1002, 40:35–37 (element 956B (of glasses 952B) infers its absolute pose), 40:38–40 (object 952B reports its absolute pose data). Indeed, the title of the '934 patent is "Computer Interface Employing a *Wearable Article with an Absolute Pose Detection Component.*" *Id.* at [54] (emphasis added); *see also id.* at [57] (Abstract).

We have also considered the fact that claim 1 does not cover the embodiments that are not wearable or have an off-board controller, such as depicted in Figure 25A. As an initial matter, not every claim needs to cover every embodiment. *See Pacing Techs.*, 778 F.3d at 1026 ("[I]n a case such as this, where the patent describes multiple embodiments, every claim does not need to cover every embodiment."). Regardless, U.S. Patent No. 8,897,494 B2 (Ex. 3001), the parent to the '934 patent, has claims directed

to a "system comprising . . . a controller configured to identify a derivative pattern," and, therefore, may not be limited to embodiments specifically reciting a wearable article and/or having an on-board controller. *See* Ex. 3001, 51:2–12. We find the exclusion of scope in the claims of the '934 patent to be logically consistent with the entire record.

For the foregoing reasons, we construe the preamble of claim 1 (and claim 7, which recites the same limitations in pertinent part), including the "wearable article," as limiting and necessarily including a "controller configured to identify a derivative pattern of said first plurality of predetermined light sources from said photodetector data."

B. Alleged Anticipation of Claims 1–12 by Welch-HiBall

Petitioner contends that claims 1–12 are anticipated by Welch-HiBall. Pet. 27–48. Petitioner relies on the declaration of Dr. Welch for support. *See* Welch Decl. ¶¶ 128–177. Patent Owner disputes Petitioner's contentions. Prelim. Resp. 6–13. We provide a brief description of Welch-HiBall before turning to the parties' contentions.

1. Welch-HiBall (Ex. 1004)

Welch-HiBall is an article titled "High-Performance Wide-Area Optical Tracking" that describes a system for head or hand tracking in virtual and augmented environments. Ex. 1004 ¶¶ 1, 9.

Figure 6 of Welch-HiBall is reproduced below:

Figure 6 depicts the HiBall Tracking System, which consists mainly of optical sensing units called HiBalls, infrared LEDs fixed on the ceiling, and a Ceiling-HiBall Interface Board (CIB) connected to a host computer. *Id.* ¶ 14. The CIB provides communication and synchronization between the host computer, HiBalls, and LEDs. *Id.* ¶ 23. In order to track the pose of the user, the HiBalls are attached to, for example, a head-worn display or drill. *Id.* ¶¶ 9, 50, 53, 64, Figs. 4, 13. The HiBalls observe sequentially-flashed LEDs on the ceiling using lateral-effect photodiode (LEPD) silicon photodetectors. *Id.* ¶¶ 14–15, 17–18. The raw LEPD measurements are digitized, packetized and communicated to the CIB and host computer to generate pose estimates of the HiBalls using a Kalman-filter-based prediction-correction approach known as single-constraint-at-a-time (SCAAT) tracking. *Id.* ¶¶ 8–9, 15, 19, 31.

2. Claims 1 and 7

Claim 1 recites, in relevant part, a "wearable article comprising: . . . a controller configured to identify a derivative pattern." Claim 7 recites a similar limitation.

According to Petitioner, Welch-HiBall discloses the recited "wearable article" of claims 1 and 7 in the form of a "head-mounted display" for a virtual reality system having a HiBall detector affixed to it. Pet. 32–33 (citing, e.g., Ex. 1004 ¶¶ 3, 7, 49, Figs. 3–4; Welch Decl. ¶¶ 141–142). For the recited "controller," Petitioner contends "Welch-HiBall teaches circuitry on board the *HiBall detector and a host computer which is configured to identify the 'derivative pattern'* of light sources from the ceiling LEDs." *Id.* at 38 (emphasis added) (citing Ex. 1004 ¶ 14, Fig. 6). According to Dr. Welch, Petitioner's declarant,

> it is my opinion that *Welch-HiBall teaches circuitry on board the HiBall detector and a host computer which is configured to identify the 'derivative pattern' of light sources from the ceiling LEDs*. Welch-HiBall teaches that the overall system includes internal electronics within the HiBall, a 'Ceiling-HiBall Interface Board' (CIB), and a host computer.

Welch Decl. ¶ 154 (emphasis added). In other words, according to Petitioner and Dr. Welch, the reference teaches circuitry on *both* the host computer and the HiBall, the HiBall being attached to the wearable article. *See* Ex. 1004 ¶¶ 8–9 (referring to "user-worn HiBall"), Figs. 4, 13.

Patent Owner argues that "[i]n Welch's system the function of the closest element to a controller as claimed in 1(b) is performed by the 'Ceiling-HiBall Interface Board' (CIB), which is not on-board a worn article. Further, the CIB is used in conjunction with a stationary host

computer or host PC, which is also not on-board the worn article and is even separate from the CIB." Prelim. Resp. 7 (citation omitted).

We agree with Patent Owner. "[A] prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements 'arranged as in the claim.'" *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (citation omitted).

Here, Petitioner does not dispute that the claimed "controller configured to identify a derivative pattern" is located at least in part on a separate host computer. Indeed, Petitioner is correct that the HiBall packetizes raw data collected from each of the LEPDs and sends that packetized data to the CIB and the host computer. Pet. 35 (citing Ex. 1004 ¶ 19 ("The digitized LEPD data are organized into packets for communication back to the CIB.")); *see also* Ex. 1004, Fig. 9 (showing "Packet MODEM" as last processing step before data is sent "to CIB"). Petitioner maps this packetized output of the HiBall to the second half of claim limitation 1a: "a photodetector configured to . . . generate photodetector data representative of the positions of said first plurality of predetermined light sources." *See* Pet. 35 ("Therefore, the data output from Welch-HiBall's LEPDs on the HiBall is representative of the detected positions of the predetermined light sources."). But Petitioner goes on to map the functions of the controller in claim limitation 1b to the CIB and the host computer. *See* Pet. 38 ("Welch-HiBall teaches circuitry on board the HiBall detector and a host computer which is configured to identify the 'derivative pattern' of light sources from the ceiling LEDs. Welch-HiBall teaches that the overall system includes internal electronics within the

HiBall, a 'Ceiling-HiBall Interface Board' (CIB), and a host computer."). In other words, under Petitioner's analysis, the function of the HiBall is coextensive with claim limitation 1a, while the CIB and host computer perform the function of the recited controller in claim limitation 1b.

Accordingly, the controller element must, if anywhere, reside on the CIB or the host computer. As shown in Figure 6 (reproduced above), the host computer is separated from the HiBall (on the alleged "wearable article") by the CIB and neither component is alleged to be included on the wearable article. Because the claims require the wearable article to include the controller for identifying the derivative pattern (*see* Section II.A), Welch-HiBall does not anticipate claim 1.[1]

Independent claim 7 also recites a "wearable article comprising: . . . a controller configured to identify a derivative pattern." For the same reasons discussed above, Welch-HiBall does not disclose this limitation.

3. Conclusion

Accordingly, we determine that Petitioner has not established a reasonable likelihood that it would prevail in establishing that independent claims 1 and 7 are unpatentable as anticipated by Welch-HiBall. Because claims 2–6 and 8–12 depend from claims 1 and 7, respectively, Petitioner has not established a reasonable likelihood in prevailing with respect to these claims as well, for the same reasons.

[1] We have also considered Petitioner's argument that "Welch-HiBall teaches the 'derivative pattern' in the same way as the '934 Patent" (Pet. 41), but we do not find it persuasive. Even if Welch-HiBall obtains pose in a way that is substantially similar to the '934 patent's embodiments (*id.* at 39–41), that does not address where Welch-HiBall's "controller configured to identify a derivative pattern" is located.

C. Alleged Obviousness of Claims 1–12 over Welch-HiBall and SIGGRAPH 2001

Petitioner contends that claims 1–12 are obvious over Welch-HiBall and SIGGRAPH 2001. Pet. 49–67. Petitioner relies on the declaration of Dr. Welch for support. *See* Welch Decl. ¶¶ 178–210. Patent Owner disputes Petitioner's contentions. Prelim. Resp. 14–17.

Patent Owner argues that SIGGRAPH 2001 does not cure the deficiencies of Welch-HiBall with respect to the "wearable article comprising: . . . a controller configured to identify a derivative pattern," as required by independent claims 1 and 7. Prelim. Resp. 14.

We agree with Patent Owner. In its obviousness analysis, Petitioner does not contend that SIGGRAPH 2001 provides a teaching or suggestion that the wearable article includes a controller configured to identify the derivative pattern. *See* Pet. 49–61, 65–66. Therefore, based on Petitioner's contentions, SIGGRAPH 2001 does not overcome the deficiency identified above with respect to Welch-HiBall.

Accordingly, we determine that Petitioner has not established a reasonable likelihood that it would prevail in showing that independent claims 1 and 7 would have been unpatentable as obvious over Welch-HiBall and SIGGRAPH 2001. Because claims 2–6 and 8–12 depend from claims 1 and 7, respectively, Petitioner has not established a reasonable likelihood in prevailing with respect to these claims as well, for the same reasons.

III. SUMMARY

Because we determine that Petitioner has not shown a reasonable likelihood that it would prevail in establishing the unpatentability of claims 1–12 of the '934 patent, we deny institution of an *inter partes* review.

IV. ORDER

It is

ORDERED that the Petition is *denied* and *inter partes* review is not instituted.

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