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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* ANDREAS RICHTER, BORIS VELICHKOVSKY,  
SEBASTIAN PANNASCH, JENS HELMERT, and GEORGI PASCHEW

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Appeal 2018-008167  
Application 14/331,239  
Technology Center 2600

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Before MICHAEL J. STRAUSS, IRVIN E. BRANCH, and  
ADAM J. PYONIN, *Administrative Patent Judges*.

BRANCH, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE<sup>1</sup>

Pursuant to 35 U.S.C. § 134(a), Appellant<sup>2</sup> appeals from the Examiner’s decision to reject claims 1–12. *See* Final Act. 1. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> We refer to the Specification, filed July 15, 2014 (“Spec.”); Final Office Action, mailed August 30, 2017 (“Final Act.”); Appeal Brief, filed January 18, 2018 (“Appeal Br.”); and Examiner’s Answer, mailed May 17, 2018 (“Ans.”).

<sup>2</sup> We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Technische Universität Dresden. Appeal Br. 3.

CLAIMED SUBJECT MATTER

The claims are directed to a process and apparatus for haptic interaction with visually presented data. Claim 1, reproduced below with disputed limitations emphasized in *italics*, is illustrative of the claimed subject matter:

1. An intermodal 3D percept system for *generating a user's percept* that virtual three-dimensional objects are real three-dimensional objects that can be touched by a user's hand and seen three-dimensionally in real time comprising:
  - at least one device for capturing three-dimensional data of a virtual object in real time,
  - at least one second device for *capturing in real time three-dimensional data of the user's hand, comprising hand pose and position data*,
  - at least one data-processing device for processing and rendering the captured three-dimensional data of the virtual object and of the user's hand and for generating a merged visual representation of the three-dimensional data of the virtual object and of the user's hand and for determining a collision point between the visually presented user's hand and the visually presented virtual object,
  - at least one visual subsystem with a display device for visual presentation of the three-dimensional data of the virtual object and of the user's hand, wherein the user's hand is also reproduced in the visual subsystem as a visual reproduction,
  - at least one tactile subsystem with a haptic element for interaction with the user comprising a tactile display unit that can be *tilted and positioned in accordance with a surface to be touched*, wherein the haptic element imitates the surface characteristics of the object in a collision area of the user's hand and the virtual object and reproduces, when said surface characteristics exist, hardness, height, textures, reliefs, edges and tactile constraints in the tactile area which are coordinated in time with pseudo-color presentations, textures and visual contrasts reproducing material characteristics in the visual subsystem, and wherein the visual subsystem is arranged above the tactile subsystem and the distance between the visual subsystem and the

tactile subsystem is  $50\text{ cm} > x > 15\text{ cm}$ , preferably  $40\text{ cm} > x > 20\text{ cm}$ , as a special preference  $35\text{ cm} > x > 25\text{ cm}$ .

### REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Cruz-Hernandez ("Hernandez")	US 2010/0231550 A1	Sept. 16, 2010
Karlsson	US 2012/0188179 A1	July 26, 2012
Banerjee	US 2014/0088941 A1	Mar. 27, 2014
Mikhailov	US 2016/0129346 A1	May 12, 2016
Paschew	DE 102006036867 A1	Feb. 7, 2008

### REJECTIONS

Claims 1–3, 7, 8, and 12 stand rejected under 35 U.S.C. § 103 as unpatentable over the combination of Banerjee, Mikhailov, and Hernandez. Final Act. 8–17.

Claims 4–6 stand rejected under 35 U.S.C. § 103 as unpatentable over the combination of Banerjee, Mikhailov, Hernandez, and Paschew. Final Act. 17–18.

Claims 9–11 are rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Banerjee, Mikhailov, Hernandez, and Karlsson. Final Act. 19–28.

### ANALYSIS

We have reviewed the Examiner's rejections in light of Appellant's arguments. We have considered in this Decision only those arguments Appellant actually raised in the Briefs. Any other arguments Appellant could have made but chose not to make in the Briefs are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(iv).

To the extent consistent with our analysis herein, we adopt as our own the findings and reasons set forth by the Examiner in (1) the action from which this appeal is taken (Final Act. 8–28) and (2) the Examiner’s Answer in response to Appellant’s Appeal Brief (Ans. 3–52) and concur with the conclusions reached by the Examiner. We highlight the following for emphasis.

### OPINION

With respect to the obviousness rejection of independent claim 1, Appellant contends that the combination of Banerjee, Mikhailov, and Hernandez does not teach or suggest the claimed invention because these references do not consider “at all” “the things that are required to ‘trick’ a person and to convey an impression of genuineness to that person” of “the ‘materialization’ of virtual objects in a virtual world in a form in which they can be touched with one’s bare hand.” Appeal Br. 8. Appellant contends that “[t]he percept and the data on the fixed tolerances between the actual position of one’s own hand and the projected position of one’s own hand, and also that of the object in the virtual world, are unique features.” *Id.*

Specifically, Appellant argues that Banerjee’s merely providing “force feedback” to the user imparts “no sense of actually touching a real object” and thereby “teaches away in a sense from the idea of forming a percept that the object is real.” *Id.* at 9. We are not persuaded.

According to Appellant’s Specification, “[a] perception experience, and thus the subjectively experienced, real-life, conscious (phenomenal) result of a perception process, is called a [‘]percept[’] in psychology. In the process, visual and kinesthetic impressions are combined by the brain into an overall experience that is interpreted as real by the brain.” Spec. 4–5.

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Appellant’s contention that mere force feedback is insufficient to impart a precept—a sense of actually touching a real object—is not supported with sufficient persuasive argument or evidence to convince us that the contention is true, let alone that it “teaches away” from forming a precept. Whether a precept is formed in the mind of a beholder based on mere force feedback is potentially unknowable outside the user’s mind. Appellant’s mere assertion does not convince us that Banerjee’s force feedback imparts “no sense of actually touching a real object.” Appeal Br. 9. Accordingly, this argument fails to persuade us of reversible error.

Appellant further argues that the cited references do not teach or suggest “the capture of the hand pose data and the tilting and position of the tactile display unit in accordance with a surface to be touched.” Appeal Br. 10. We find this unpersuasive in view of the Examiner’s findings as follows:

Examiner is relying on Mikhailov to teach the concept of hands being rendered to be able to reach into the scene to provide the appearance that the user is actually present in the 3d scene where the user is holding a controller and the scene presented has a simulated object (steering as shown in Fig. 5a and 5b).

Hernandez teaches providing texture to the haptic device as taught in Figs. 6a to 6h as disclosed in [0073] to [0081] based on the display. Thus, it would have been obvious to one of ordinary skill in the art, before the effective filing date of the application, to combine the teachings of Banerjee as modified by Mikhailov and Hernandez to provide a feel for the texture of the simulated haptic device in order to provide a more realistic experience for the augmented reality when using Banerjee’s stylus 27 or holding the controller (simulated steering wheel) of Mikhailov.

Ans. 32. We agree the combination of Mikailov’s disclosure of rendering a user’s hands holding a simulated device and Hernandez’s texture-producing

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haptic device teaches or suggests the argued limitation of the capture of the hand pose data and the tilting and positioning of the tactile display unit in accordance with a surface to be touched. We see no error and no persuasive rebuttal to the Examiner's findings and conclusion.<sup>3</sup>

Appellant also contends that "Hernandez, in fact, teaches away from the visual subsystem of the instant application; the user's hand could not be shown in the haptic device of Hernandez." Appeal Br. 10. We disagree. "Obviousness may be defeated if the prior art indicates that the invention would not have worked for its intended purpose or otherwise teaches away from the invention." *Meiresonne v. Google, Inc.*, 849 F.3d 1379, 1382 (Fed. Cir. 2017) (citing *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009)). The prior art teaches away "when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken" in the claim. *Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013). However, a reference that "merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into" the claimed invention does not teach away. *Id.* Appellant does not explain how Hernandez's device being incapable of showing a user's hand, even if true, criticizes, discredits, or discourages investigation into Appellant's claimed invention. Furthermore, the Examiner cites Mikhailov, not Hernandez, for a user's hands being rendered in the 3D scene (i.e., "capturing in real time three-dimensional data of the user's hand, comprising hand pose and position data"). Ans. 32.

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<sup>3</sup> Appellant did not file a Reply Brief.

Appellant's contention that "Mikhailov still does not teach a capture of the hand *pose* data . . . because Mikhailov does not concern itself at all with an object to be felt by the hand" (Appeal Br. 11 (citing Mikhailov Figs. 5A and 5B)) is belied by the Examiner's finding that Mikhailov's disclosure of hands being rendered to be able to reach into the scene to provide the appearance that the user is actually present in the 3D scene where the user is holding a controller. Final Act. 12–13.

Appellant argues that "[t]he specific dimensions in claim 1 . . . for forming the surprising result of a percept - a feeling of reality - in the user and were developed for that reason . . . were not stated in any of the cited references." Appeal Br. 12. This argument is unconvincing of error because it does not persuasively rebut the Examiner's finding that the dimension is at least suggested by Banerjee. Ans. 33–34 ("It would have been obvious to one of ordinary skill in the art to have those distance[s] in a work station similar to Banerjee's for ergonomic reasons.").

Appellant also argues that "[a] statement that it would have been obvious to combine references to get to some of the missing features of the instant claims is a conclusory statement." Appeal Br. 14. "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (quoting *Kahn*). "The pertinence of each reference, if not apparent, must be clearly explained." 37 C.F.R. § 1.104(c)(2). The Examiner finds the reason for combining the teachings of references is to give the user an enhanced virtual reality experience and to merge actions in the physical and virtual environments. Final Act. 14, 15. In light of the



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absence of evidence to rebut the Examiner's findings and conclusion, we find the Examiner has articulated reasoning with rational underpinnings sufficient to justify the legal conclusion of obviousness and are unpersuaded by Appellant's argument that the Examiner's combination of references is inadequate or improper. *Kahn*, 441 F.3d at 988.

Appellant also argues as follows:

[B]road areas of features are missing from a first cited reference (in addition to the overall point of the instant application), and other references are then cited to specifically fill in these broad areas of missing features. The other references could not in reality be joined together, as explained above, and none of them have any teaching or suggestion of the overall objective. Additionally, elements (e.g. collision points) are still missing, even in the combination of all of the references. All of this strongly suggests that a search was simply done in an attempt to find many of the features of the instant claims and that hindsight was employed at least in part to get to the features of the instant claims.

Appeal Br. 14.

Appellant further argues:

[A] prior patent cited as a § 103 reference must be considered in its entirety, "*i.e.* as a *whole*, including portions that lead away from the invention." *Id.*

That is, the Examiner must recognize and consider not only the similarities, but also the critical differences between the claimed invention and the prior art as one of the factual inquiries pertinent to any obviousness inquiry under 35 U.S.C. § 103. *In re Bond*, 910 F.2d 831, 834 [15 USPQ2d 1566, 1568] (Fed. Cir. 1990) (emphasis added).

...

With regard to the instant application, many elements themselves are non-obvious, but the synergistic whole makes unexpected and advantageous results possible, for instance the creation of a realistic "percept" for the user.

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*Id.* at 15 (some emphasis omitted).

We find these arguments unavailing. We understand Appellant to argue that the features of the cited references could not be bodily incorporated with one another. “The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference. . . . Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.” *In re Keller*, 642 F.2d 413, 425 (CCPA 1981); *In re Nievelt*, 482 F.2d 965, 968 (CCPA 1973) (“Combining the teachings of references does not involve an ability to combine their specific structures.”).

As to Appellant’s contention that determining “collision points” is missing from the cited reference, it is unconvincing (Appeal Br. 15, 18) because it does not persuasively address and rebut the Examiner’s finding that Banerjee discloses this disputed feature (Final Act. 8–9 (citing Banerjee ¶¶ 30, 38)).

We also do not find Appellant’s contention that “many elements themselves are non-obvious, but the synergistic whole makes unexpected and advantageous results possible, for instance the creation of a realistic ‘percept’ for the user” amounts to an argument against obviousness. Appeal Br. 15. We do not find “many elements” to be “non-obvious” for the reasons discussed above.

For the foregoing reasons, we do not find error in the Examiner’s rejection of claim 1. We sustain the rejection of claim 1 and we sustain the rejections of the remaining claims, which are either argued on a similar basis or are not argued separately with particularity. Appeal Br. 16–22.

DECISION SUMMARY

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>References</b>	<b>Affirmed</b>	<b>Reversed</b>
1-3, 7, 8, 12	103	Banerjee, Mikhailov, Hernandez	1- 3, 7, 8, 12	
4-6	103	Banerjee, Mikhailov, Hernandez, Paschew	4-6	
9-11	103	Banerjee, Mikhailov, Hernandez, Karlsson	9-11	
<b>Overall Outcome</b>			1-12	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED