

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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**EXOCAD GMBH AND EXOCAD AMERICA, INC.**  
Petitioner,

v.

**3SHAPE A/S,**  
Patent Owner.

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Patent No. 9,336,336  
Issue Date: May 10, 2016  
Title: 2D IMAGE ARRANGEMENT

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*Inter Partes* Review No. IPR2018-00788

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**SUPPLEMENTAL DECLARATION OF JOSEPH L. MUNDY, Ph.D.**

1. I previously prepared a declaration in this *inter partes* review, which was submitted as Exhibit 1002. I incorporate that declaration into this one.

2. I have reviewed the Board’s Decision [Granting] Institution of *Inter Partes* Review, Paper 7, dated October 3, 2018 (the “Decision” or “Paper 7”). In the portion of the Decision addressing anticipation by Wiedmann (Ex. 1007) and obviousness based on Wiedmann and Sachdeva (Ex. 1005), the Board found that Wiedmann does not disclose that the 3D model in Wiedmann is of “at least part of an oral cavity of the patient” because it is from a database rather than the patient’s pre-restoration oral cavity. Paper 7 at 31-32. I had construed “3D virtual model of at least part of an oral cavity of the patient” to mean “a digital representation... ***with or without a restoration*** ....” Ex. 1002 ¶¶ 61-62 (emphasis added). In Wiedmann, the image taken from a database is of the patient’s cavity post-restoration. The Board, however, construed the phrase to mean a “pre-restoration” digital representation. Paper 7 at 9-10.

3. While I understand that the Board has not made its final determination on claim construction, to the extent this claim construction is ultimately adopted by the Board, it is my opinion that the combination of Wiedmann and Sachdeva renders the claim obvious because the only difference with Wiedmann is that the 3D virtual model comes from an image of the patient (as taught in Sachdeva) rather than a database.

4. Sachdeva meets this claim limitation, as I have previously explained. Ex. 1002 ¶¶ 319-322.

5. The source of the 3D model – whether a database or another known method such as the patient’s pre-existing oral cavity, as in Sachdeva (*e.g.*, Ex. 1005 at 14:20-28, Fig. 6) – does not change the operation of Wiedmann. Both Wiedmann and Sachdeva describe software that aligns and visualizes a 2D image(s) with a 3D model(s). That works the same in the software, whether the 3D model comes from a database or elsewhere. The 3D format of both would be the same. A POSITA reading Wiedmann would understand that cutting, scaling, translating, rotating and visualizing the 2D-3D arrangement, and then designing the tooth shape (Ex. 1002 ¶¶ 110, 124, 128-29, 135, 140, 143, 147) is the same, whether the 3D model is from a database or elsewhere.

6. A POSITA would have had various reasons to combine Wiedmann and Sachdeva to allow the 3D model to be from the oral cavity of the patient. Initially, Wiedmann and Sachdeva are in the same field and apply the same approach of combining 2D images of the patient’s face and 3D dental models (including teeth) during design and so that the proposed treatment can be seen by a user before being done. Ex. 1002 ¶ 449.

7. With both Wiedmann and Sachdeva recognizing that visualization is useful, there are only two options for the 3D dental model – pre-restoration or post-

restoration. *Post-restoration* could include using a tooth model from a database, which would fit the patient, and which may or may not be modified. A second option is that the 3D model is of the *pre-restoration* oral cavity of the patient. It is my opinion that a POSITA would have tried those different design choices, resulting in this modification to Wiedmann.

8. A POSITA would have recognized that there are reasons to use a 3D model of the patient's pre-restoration oral cavity in Wiedmann. A model from a database makes sense if all teeth are being replaced. If less than a restoration of all the anterior teeth is done, such as when a single broken or lost tooth is to be replaced, using a pre-restoration model may be preferable so that visualization can be done using the existing teeth that will remain. A POSITA would have realized that this was a reason to modify Wiedmann in that manner. Since it would require little to no change in the operation of the software, nor any technical challenge, a POSITA would have easily expected success.

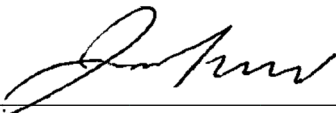
9. A POSITA would also have realized that, in the context of Wiedmann, it was desirable to have as many options as possible for viewing different types of 2D images and 3D models. Sachdeva teaches this, including use of a 3D model, before, during and after designing restorations, as well as drawing from a patient image or from a database . Ex. 1002 ¶¶ 326-29 & ¶¶ 332-35 & ¶ 453; Ex. 1005 at 18:43-65; 43:52-55; 20:41-45 & 40:34-37; 40:63-66; 50:13-25;

39:4-6; 39:17-26). Sachdeva provided a reason to add the ability to use a pre-restoration 3D model of the patient to Wiedmann.

10. I hereby declare that all statements made herein are of my own personal knowledge; all statements made on information and belief are believed to be true; and all statements were made with the knowledge that willful false statements and the like so made are punishable by fined or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on November 16, 2018

  
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Joseph L. Mundy, Ph.D