

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

DENTAL MONITORING SAS,
Appellant

v.

ALIGN TECHNOLOGY, INC.,
Appellee

2025-1879, 2025-1881

Appeals from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in Nos. IPR2024-
00052, IPR2024-00110.

Decided: July 21, 2026

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Before LOURIE, SCHALL, and TARANTO, *Circuit Judges*.

LOURIE, *Circuit Judge*.

Dental Monitoring SAS (“Dental Monitoring”) appeals from two *inter partes* review (“IPR”) final written decisions of the United States Patent Trial and Appeal Board (“the Board”) determining that claims 1, 2, 4, 7–8, and 13–16 of U.S. Patent 11,049,248 (“the ’248 patent”) and claims 1, 2, and 4–6 of U.S. Patent 11,109,945 (“the ’945 patent”) had been shown to be unpatentable as obvious. *Align Tech., Inc. v. Dental Monitoring SAS*, IPR2024-00052, 2025 WL 1129266 (P.T.A.B. Apr. 16, 2025), J.A. 52–129 (“’248 patent IPR”); *Align Tech., Inc. v. Dental Monitoring SAS*, IPR2024-00110, 2025 WL 1129290 (P.T.A.B. Apr. 16, 2025), J.A. 1–51 (“’945 patent IPR”). For the following reasons, we *affirm*.

BACKGROUND

Dental Monitoring owns the ’248 and ’945 patents, which are directed to methods for evaluating and assessing the shape of an orthodontic aligner. See ’248 pat., Abstract; ’945 pat., Abstract. The ’248 patent claims a method for assessing the shape of an orthodontic aligner by measuring the separation between a tooth and aligner by (1) acquiring an image of an aligner on the teeth; and (2) analyzing the image using a “deep learning device.” ’248 pat., col. 32 ll. 6–23. A “deep learning device” is a device that uses deep learning to “progressively learn[] to recognize patterns on an image.” ’248 pat., col. 16 ll. 40–41. The ’945 patent claims a method for “evaluating the shape of an orthodontic aligner worn by a patient,” where the steps of the method comprise (1) acquiring an image of teeth and an image of the aligner on the teeth; (2) comparing the two images; (3) determining teeth outlines on the images using image processing software; and (4) comparing the tooth outlines to compute a score which may indicate separation between the tooth and the aligner. ’945 pat., col. 13 l. 59–col. 14 l. 17; *id.* col. 11. l. 63–col. 12 l. 5.

Align Technology, Inc. (“Align”) filed two petitions for IPR with the Board, challenging claims 1, 2, and 4–6 of the ’945 patent and claims 1, 2, 4, 7–8, and 13–16 of the ’248 patent. *See* ’945 patent IPR, 2025 WL 1129266, at *1; ’248 patent IPR, 2025 WL 1129266, at *1. The Board instituted both IPRs. *See* ’945 patent IPR, 2025 WL 1129266, at *1; ’248 patent IPR, 2025 WL 1129266, at *1.

Claim 1 of each patent, representative of the claims for their respective IPRs, is reproduced below. Claim 1 of the ’248 patent reads as follows:

A method for assessing the shape of an orthodontic aligner, said method comprising the following steps:

a) more than 1 week after the start of the treatment with the aligner, acquisition of at least one image at least partially representing the *aligner in a service position* in which it is worn by a patient, called “analysis image”, the analysis image being a photograph, or an image extracted from a film;

b) *analysis of the analysis image by means of a deep learning device, trained by means of a learning base, so as to determine a value for at least one tooth attribute of an “analysis tooth zone” representing, at least partially, a tooth on said analysis image, the tooth attribute relating to a separation between the tooth represented by the analysis tooth zone, and the aligner represented on the analysis image,*

in the step a), a cellphone is used to acquire the analysis image.

’248 pat., col. 32 ll. 6–23 (emphases added).

Claim 1 of the '945 patent reads as follows:

A method for evaluating the shape of an orthodontic aligner worn by a patient, said method comprising the following steps:

1) acquisition of at least one two-dimensional image of teeth of said patient, referred to as “updated image”, under actual acquisition conditions;

at least one updated image referred to as “aligner image”, at least partially representing *the aligner in a service position* in which it is worn by said teeth; and at least one updated image referred to as “dentition image”, identical to or different from the aligner image, representing said teeth,

2) if the dentition image is different from the aligner image, conversion of the dentition image so that it represents said teeth as seen under the acquisition conditions used during the acquisition of the aligner image in step 1);

3) *determination, by means of image processing software, for each of a plurality of teeth represented on the dentition and aligner images, of interior and exterior tooth outlines representing the outline of the free end of said tooth on the dentition and aligner images, respectively;*

4) *comparison of the interior and exterior tooth outlines, so as to determine at least one score according to said comparison.*

'409 pat., col. 13 l. 59–col. 14 l. 17 (emphases added).

In the '248 *patent IPR*, the Board determined that claim 1 of the '248 patent was unpatentable as obvious over

the combination of four prior art references: (1) U.S. patent application 2017/0281313 (“Kim”), J.A. 6274; (2) a clinic monitoring guide published by Align for its Invisalign products (“Invisalign”), J.A. 6308; (3) WO 2016/066651 (“Salah”), J.A. 6373; and (4) a published paper on convolutional neural networks (“Maninis”), J.A. 6359. *’248 patent IPR*, 2025 WL 1129266, at *30. In the *’945 patent IPR*, the Board determined that claim 1 of the *’945 patent* was unpatentable as obvious over Kim, Invisalign, and Salah. *’945 patent IPR*, 2025 WL 1129266, at *21.

In deciding both IPRs, the Board relied on testimony from Align’s expert, Dr. Hassan Foroosh, who it determined qualified as a skilled artisan due to his advanced degrees in computer science and his work experience with, *inter alia*, deep learning. *’248 patent IPR*, 2025 WL 1129266, at *5–6; *’945 patent IPR*, 2025 WL 1129266, at *5–6.

Dental Monitoring timely appealed. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

DISCUSSION

Dental Monitoring makes two main arguments challenging the Board’s obviousness determinations: (1) the prior art does not disclose the relevant limitations of the challenged claims of each patent; and (2) even if the prior art made such disclosures, the challenged claims would not have been obvious. Open. Br. 36–37. We address each in turn. But before we do, we note that claims 1 and 14 of the *’248 patent* have already been determined to be directed to ineligible subject matter. *Dental Monitoring SAS v. Align Tech., Inc.*, No. 2024-2270, 2026 WL 1959297, at *6 (Fed. Cir. July 7, 2026). We therefore exclude those claims from our analysis here as they are already invalid. *Id.*

I

We review the Board’s determinations as to what the prior art discloses for substantial evidence. *See HD Silicon*

Sols. LLC v. Microchip Tech. Inc., 127 F.4th 919, 923 (Fed. Cir. 2025). Substantial evidence is “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938).

The Board determined that (1) Salah and Maninis taught a “deep learning device, trained by means of a learning base, so as to determine a . . . tooth attribute relating to a separation between the tooth . . . and the aligner” (“the ‘deep learning device’ limitation”), see *’248 patent IPR*, 2025 WL 1129266, at *23–25; (2) Kim—or in the alternative, the combination of Kim, Invisalign, and Salah—taught the limitation of requiring an image of an aligner in the service position for analysis by a computer (“the service position limitation”), see *id.* at *17–20; and (3) Kim, Invisalign, and Salah taught “determination, by means of image processing software, for each of a plurality of teeth represented on the dentition and aligner images, of interior and exterior tooth outlines representing the outline of the free end of said tooth on the dentition and aligner images, respectively,” (“the determination limitation”) and “comparison of the interior and exterior tooth outlines, so as to determine at least one score according to said comparison,” (“the comparison limitation”), see *’945 patent IPR*, 2025 WL 1129266, at *13–16. We conclude that each determination is supported by substantial evidence.

First, substantial evidence supports the Board’s determination that Salah and Maninis teach the “deep learning device” limitation. See *’248 patent IPR*, 2025 WL 1129266, at *23–25. Maninis discloses a deep learning architecture in the form of a “convolutional neural network.” J.A. 6359 (citation modified). The *’248 patent* provides a non-limiting list of neural networks which could be the deep learning device, including “networks specializing in the classification of images, called . . . ‘convolutional neural networks.’” *’248 pat.*, col. 16 ll. 5–11. Maninis further teaches using neural networks to classify objects. See J.A. 6359 (stating

that convolutional neural networks “fostered the appearance of systems . . . for image classification”). When combined with Salah’s teaching of using deep learning to determine “[d]iscriminant information” such as “contour” or “distance information,” *see* J.A. 6407–09, substantial evidence supports the Board’s conclusion that the references teach the “deep learning device” limitation because the convolutional neural network could be used to classify teeth and determine separation information.

Second, substantial evidence supports the Board’s determination that, at a minimum, the combination of Kim, Salah, and Invisalign teach the service position limitation. *See* ’248 pat., col. 32 ll. 9–11; ’945 pat., col. 13 ll. 65–67. Salah teaches using a cell phone to acquire an image of a patient’s teeth for image analysis. J.A. 6375 (stating that its “method for checking the positioning and/or shape of teeth . . . c[ould] also be carried out by a . . . cell phone”). Invisalign demonstrates a photograph of teeth wearing an aligner—*i.e.*, the aligner in the service position—to assess aligner fit on the teeth. *See* J.A. 6313 (image of aligner on teeth). And Kim teaches imaging of a patient’s teeth remotely to assess aligner fit. J.A. 6274 (“a method and system for providing remote teeth alignment services”). Substantial evidence thus supports the Board’s determination that the combination of the three references teaches the service position limitation.

And finally, substantial evidence supports the Board’s determination that Kim, Invisalign, and Salah teach the determination and comparison limitations. *See* ’945 patent *IPR*, 2025 WL 1129266, at *13–16. Salah teaches using image processing to detect contours of objects in the mouth. J.A. 6391 (“Image processing enables discriminant information to be extracted and quantified.”); J.A. 6387 (“discriminant information is selected from the group consisting of contour information . . .”). That teaching, in combination with Kim teaching remote alignment assessment, J.A. 6274, and Invisalign teaching measurement of tooth

and aligner separation, J.A. 6313, constitutes substantial evidence supporting the Board's determination.

Dental Monitoring's arguments on appeal as to each point are unavailing. Throughout its briefing, it attacks each reference individually, instead of focusing on the combination of the references. *See, e.g.*, Open. Br. 40 (“[n]either Salah nor Maninis even mentions any aligner”); *id.* at 46 (“Salah does not disclose *any* image of an aligner . . . [a]nd Invisalign does not use the image for any computer analysis”) (emphasis in original); *id.* at 47–48 (discussing Kim, Invisalign, and Salah individually). But “obviousness focuses on what the combined teachings would have suggested.” *In re Mouttet*, 686 F.3d 1322, 1330 (Fed. Cir. 2012). Indeed, “one cannot show non-obviousness by attacking references individually where . . . the rejections are based on combinations of references.” *In re Keller*, 642 F.2d 413, 426 (CCPA 1981). As detailed above, the combination of the references teaches each claim limitation that Dental Monitoring challenges on appeal.

II

Dental Monitoring next argues that even if the prior art did make such disclosures, the challenged claims would not have been obvious. Specifically, it argues that: (1) Salah teaches away from deep learning and “low contrast regions” used in the claimed inventions; (2) Maninis was not publicly accessible before the prior art date; and (3) Align's expert, Dr. Foroosh, was not qualified as a skilled artisan. Open. Br. 48–54. We review the first two challenges for substantial evidence. *See HD Silicon*, 127 F.4th at 923; *M&K Holdings, Inc. v. Samsung Elecs. Co.*, 985 F.3d 1376, 1379 (Fed. Cir. 2021); *ATEN Int'l Co. Ltd., v. Uniclass Tech. Co.*, 932 F.3d 1364, 1367 (Fed. Cir. 2019). We review the third challenge for an abuse of discretion. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1078 (Fed. Cir. 2015). For the reasons below, Dental Monitoring's arguments are unavailing.

First, substantial evidence supports the Board's determination that Salah does not teach away from the proposed combination of references. Although Salah states that deep learning is "not preferred," J.A. 6408–6409, it explicitly states that deep learning "c[ould] also be used," *id.* That is not the type of criticism, discreditation, or discouragement that constitutes a "teaching away." *See Fulton*, 391 F.3d at 1201 ("[t]he prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage"). Furthermore, substantial evidence—in the form of Dr. Foroosh's testimony regarding Salah and examples showing sufficient contrast—supports the Board's conclusion that Salah does not teach away from "low contrast regions." *See '248 patent IPR*, 2025 WL 1129266, at *25.

Second, substantial evidence supports the Board's conclusion that Maninis was publicly accessible before the prior art date of July 21, 2027. In reaching its conclusion, the Board relied on archived snapshots of the website arXIV.org, along with expert declaration and testimony. *'248 patent IPR*, 2025 WL 1129266, at *13–15. The Board did not clearly err in crediting such evidence, which reasonably establishes that Maninis was submitted for publication on April 28, 2017, and that the publication timeline was likely between one to four days. *See* J.A. 6803 (publication timeline of one to four days); J.A. 5040–41 (testimony regarding reliability of publication timeline). Furthermore, an archived version of arXIV.org demonstrates that Maninis was available for download on May 3, 2017. *See* J.A. 6807; *'248 patent IPR*, 2025 WL 1129266, at *14. While Dental Monitoring quibbles with the indirect nature of the evidence, *see* Open. Br. 51–52, the evidence here constitutes substantial evidence to uphold the Board's factual finding. *See In re Morsa*, 713 F.3d 104, 109 (Fed. Cir. 2013) (upholding the Board's factual finding regarding

publication date of prior art despite reasons why the date may have been “suspect”).

And finally, the Board did not abuse its discretion in concluding that Align’s expert, Dr. Foroosh, qualified as a skilled artisan. The Board concluded that Dr. Foroosh qualified as a skilled artisan because he had an advanced degree in computer science, work experience in machine learning and computer vision as it applied to medical fields. *’945 patent IPR*, 2025 WL 1129266, at *5. And indeed, Dr. Foorosh has such qualifications. J.A. 5115, 5120, 5125–26. While Dental Monitoring argues he does not have experience in dentistry or orthodontics, Open. Br. 53, that is not required—Dr. Foroosh had the requisite education and background necessary such that the Board did not abuse its discretion in deeming him qualified as a skilled artisan.

CONCLUSION

We have considered Dental Monitoring’s remaining arguments but find them unpersuasive. For the foregoing reasons, we *affirm* the Board’s decisions.

AFFIRMED