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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CRAIG A. ANDREIKO
and DANIEL E. EVEN

Appeal 2017-009983
Application 11/748,026
Technology Center 3700

Before JAMES P. CALVE, MICHELLE R. OSINSKI, and
JEREMY M. PLENZLER, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the decision of the Examiner to reject claims 1–15. Appeal Br. 2. We have jurisdiction under 35 U.S.C. § 6(b). Appellant appeared at an oral hearing conducted on November 7, 2019.

We REVERSE.

¹ “Appellant” refers to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Ormco Corporation. Appeal Br. 2.

CLAIMED SUBJECT MATTER

Claims 1, 2, and 12 are independent. Claim 1 is reproduced below with emphasis added to identify disputed limitations.

1. A method of providing a custom orthodontic appliance for an individual patient comprising:
 - obtaining digital information unique to the individual patient by scanning dental anatomy of the individual patient, or an impression thereof, wherein the digital information comprises actual dental anatomy of the individual patient;
 - designing with a computer, by processing the digital information, a custom orthodontic appliance for the individual patient *using the shape of the patient's anatomy, the geometry of the custom orthodontic appliance being calculated without regard to the geometries of pre-manufactured components*, and including a custom orthodontic archwire and a set of custom orthodontic brackets to be bonded to a plurality of the teeth of the individual patient to support the archwire, the appliance being designed to achieve an arrangement of the teeth of the individual patient by orthodontic treatment;
 - determining geometric parameters of orthodontic brackets for the designed custom orthodontic appliance; and
 - comparing the geometric parameters with corresponding parameters of a plurality of pre-manufactured orthodontic brackets and selecting one of the plurality based on the comparison.

REJECTIONS

Claims 1–6, 9, 10, and 12–15 are rejected under 35 U.S.C. § 102(e) as anticipated by Jordan (US 2003/0163291 A1, pub. Aug. 28, 2003) or, in the alternative, under 35 U.S.C. § 103(a) as unpatentable over Jordan.

Claims 7, 8, and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Jordan and Rubbert (US 2002/0180760 A1, pub. Dec. 5, 2002).

ANALYSIS

*Claims 1–6, 9, 10, and 12–15
Anticipated by or Unpatentable over Jordan*

Independent claims 1, 2, and 12 each involve designing “a custom orthodontic appliance” “using the shape of the patient’s anatomy” with “the geometry of the custom orthodontic appliance being calculated without regard to the geometries of pre-manufactured components.” The patient anatomy is digital information of “actual dental anatomy of the individual patient” obtained by “scanning dental anatomy of the individual patient.” *See* Appeal Br. 9–11 (Claims App.).

Appellant argues that “using the shape of the patient’s anatomy” in “the claims now require[s] the design of a custom appliance that uses the patient’s tooth shapes, and that the design proceed without using geometries of pre-manufactured components.” Reply Br. 2. Appellant argues that the claims require a computer to design a “custom orthodontic appliance” using “an accurate representation of the patient’s teeth” and “construction of an orthodontic appliance for . . . [the] digital representations of the actual dental anatomy of a patient” rather than for model teeth in Jordan. Appeal Br. 5–6.

Appellant further argues that

The present invention uses digital information of actual dental anatomy of a patient – not a “model” of the same, as suggested by Jordan. In the present claims, it is clearly and expressly stated that digital information of dental anatomy is “unique to an individual patient” and is obtained by “scanning” that anatomy or an impression of it. . . . Specifically, as recited in claims 1, 2 and 12, the digital information of the individual patient’s anatomy is used to design in a computer and generate geometric parameters for a “custom orthodontic appliance”.

Id. at 6.

The Examiner argues that a prior Board decision interpreted claim 1 as “includ[ing] no requirement that the digital information to be processed consist exclusively of the patient’s dental anatomy.” Ans. 5. However, the Board decision interpreted a version of claim 1 that did not require “using the shape of the patient’s anatomy” as claim 1 and the other independent claims now require. Previously, claim 1 recited in pertinent respect:

designing with a computer, by processing the digital information [of the patient], a custom orthodontic appliance for the individual patient that includes a custom orthodontic archwire and a set of custom orthodontic brackets . . .

See Ex Parte Andreiko, Appeal No. 2013-000658, slip op. at 3 (PTAB May 19, 2015) (reproducing claim 1). The Board held that “the claim does not recite any requirement that the appliance be designed from an exact replica of the patient’s dental anatomy.” *Id.* at 9.

The phrase “using the shape of the patient’s anatomy” was added to the claims by amendment after the decision in Appeal No. 2013-000658. *See Amdt*, filed Feb. 8, 2016, at 2, 4. This amendment also required the “geometry of the custom orthodontic appliance [to be] calculated without regard to the geometries of pre-manufactured components.” *Id.*

We interpret “using the shape of the patient’s anatomy” to require a custom orthodontic appliance to be designed for a patient’s actual dental anatomy using the patient’s *actual dental anatomy* obtained by scanning. This interpretation is consistent with claim language for designing “a custom orthodontic appliance [or archwire] for the individual patient” “calculated without regard to the geometries of pre-manufactured components,” which pre-manufactured components are not made custom for the patient’s actual dental anatomy. Appeal Br. 9–10, 11 (Claims App.).

The Specification describes how custom and standard appliance orthodontics both rely on each individual patient's anatomy to design an orthodontic appliance. Spec. ¶¶ 5, 7. However, thereafter, their design processes differ. A custom orthodontic appliance design uses custom pieces that usually are installed with custom jigs and other positioning devices or techniques provided with the custom appliances to ensure proper placement. *Id.* ¶ 5. In contrast to custom appliances, “non-custom” appliances involve an orthodontist selecting appliance components from an inventory or catalog of available inventories of pre-manufactured components. *Id.* ¶¶ 6, 7. This latter practice is time consuming and unable to select the pre-manufactured appliance components that best approximate features of custom orthodontic appliances that are most suitable for treating an orthodontic patient. *Id.* ¶ 8.

The invention's objective is to provide an orthodontic appliance of pre-manufactured or standard components that conforms closely to a custom orthodontic appliance that is configured to the patient's anatomy. *Id.* ¶ 10. This process takes advantage of custom orthodontic treatment and design available to a degree but at a proportionally lower cost by selecting optimal, existing orthodontic appliance components that closely carry out a custom orthodontic treatment plan by comparing component geometries of a custom appliance designed for a patient with the geometries of existing components “according to best-fit criteria.” *Id.* ¶¶ 11–13. Computer appliance design systems that can calculate custom appliances also can select standardized components from which an appliance can be made of the pre-manufactured components. *Id.* ¶¶ 16, 29. A computer derives parameters, characteristics, and properties of a custom orthodontic appliance and compares that data to stored geometric or other physical data of available components. *Id.* ¶ 19.

Jordan does not design an *actual* custom orthodontic appliance “using the shape of the patient’s anatomy” as we have interpreted that phrase to mean the actual dental anatomy of an individual patient being employed for the purpose of designing a custom orthodontic appliance. *See* Ans. 5–6. Instead, Jordan uses a predefined three-dimensional maloccluded tooth/arch *model* of teeth to design an orthodontic appliance with pre-made brackets and archwires selected to move the *model teeth* to the desired final positions based on prescription data. Jordan ¶¶ 19–22. Jordan may use a patient’s actual dental anatomy to select a model or to revise a model to represent a patient’s dental anatomy more closely. *Id.* ¶¶ 23, 45, 50, 51. However, Jordan emphasizes that “estimated models of teeth selected by the user . . . are sufficiently close to the patient’s actual teeth such that an exact replica of the patient’s teeth is unnecessary in the bracket selection method.” *Id.* ¶ 70; *see* Appeal Br. 5–7. Jordan explains that

generating exact replicas of teeth is complex and costly [and] designing and generating customized orthodontic products, such as brackets, from the exact replicas of the patient’s teeth is also a complex and costly process. As such, digitization of a patient’s teeth to provide exact models thereof along with production of customized orthodontic appliances may not necessarily be the preferred solution to providing effective orthodontic therapy.

Jordan ¶ 15. Jordan explains that such complexity and cost of a customized appliance is not justified if an orthodontist can select only predefined or pre-existing brackets to move the teeth. *Id.* ¶ 17.

Therefore, even if Jordan designs a custom orthodontic appliance, as the Examiner finds, the appliance is designed for a *model* of a patient’s teeth, rather than for the actual dental anatomy of a patient as claimed.

The Examiner is correct that the previous Board decision interpreted *former* claim 1 as “including no requirement that the digital information to be processed consist exclusively of the patient’s dental anatomy.” Ans. 5; (quoting *Andreiko*, Appeal No. 2013-000658, slip op. at 9). However, claim 1 now requires a custom orthodontic appliance to be designed using patient dental anatomy in digitized form so that the design is for the patient’s dental anatomy rather than a model dental anatomy as Jordan teaches. Crucial to the previous Board decision was their interpretation that “the broader phrase ‘designing with a computer, by processing the digital information, a custom orthodontic appliance for the individual patient’ [does not require] that the appliance be derived from the actual anatomy of the patient’s teeth.” *Andreiko*, Appeal No. 2013-000658, slip op. at 9. Because claim 1 now recites “using the shape of the patient’s anatomy,” which was added after the Board’s decision, claim 1 now requires a custom orthodontic appliance to be designed for, and derived from, the actual anatomy of the patient’s teeth.

We agree with the Examiner that Jordan defines *parameters* of an appliance that is customized for the predefined three-dimensional tooth/arch *model of teeth*. See Ans. 6 (citing *Andreiko*, Appeal No. 2013-000658, slip op. at 13–16). In this regard, Jordan generates a custom prescription for the *model* with bracket parameters for torque, angulation, rotation, in/out value, archwire slot dimensions, and materials and archwire parameters for shape, and dimensions as in the prior art. Jordan ¶¶ 6, 7, 71, 72.

The Specification describes the calculation of similar parameters for the brackets and archwire of the claimed custom appliance. Spec. ¶¶ 35, 36. The parameters include shape and cross-section of the archwire, and in-out dimension, torque, slot angle, and tip angle of the individual brackets. *Id.*

The claims also require a computer to design a custom orthodontic appliance for the patient's actual dental anatomy. The design determines geometric parameters of a custom orthodontic archwire and a set of custom orthodontic brackets to be bonded to the patient's teeth. The claims thus recite methods of designing *actual* dental orthodontic appliances to include archwires and brackets for the patient's actual teeth as represented by the scanned dental anatomy of the patient without regard to the geometries of pre-made components. Then, the geometric parameters of the actual, custom components are compared to geometric parameters of pre-made brackets and components.

We are not persuaded by the Examiner's proofs that Jordan designs actual orthodontic brackets and archwires. Instead, Jordan designs a custom *prescription* to move the model teeth to a prescribed final position. Jordan ¶¶ 21, 45, 51, 123. Jordan uses custom *prescription* data to select a bracket whose parameters match most closely to a *prescription* without also creating the actual custom components as claimed. *Id.* ¶¶ 123, 124. Nor does Jordan determine geometric parameters of actual custom components designed for a patient's dental anatomy as claimed. The Examiner's finding that "bracket selection criteria is assembled for a custom appliance before any search is done on the standardized or existing appliances in Jordan" (Ans. 6) does not explain adequately how Jordan teaches to calculate the *geometry* of an actual custom dental orthodontic appliance (including the geometry of a custom orthodontic archwire and custom orthodontic brackets) without considering the geometries of pre-manufactured components.

Accordingly, for the foregoing reasons, we do not sustain the rejections of 1–6, 9, 10, and 12–15 over Jordan.

*Claims 7, 8, and 11
Unpatentable over Jordan and Rubbert*

The Examiner's reliance on Rubbert to teach features of claims 7, 8, and 11 (Final Act. 4-5) does not cure the deficiency of Jordan as to claims 1 and 2 from which these claims depend respectively. Accordingly, we do not sustain the rejection of these claims either.

CONCLUSION

We reverse the rejections of claims 1-15.

Claims Rejected	35 U.S.C. §	Basis or Reference	Affirmed	Reversed
1-6, 9, 10, 12-15	102(e)	Jordan		1-6, 9, 10, 12-15
1-6, 9, 10, 12-15	103(a)	Jordan		1-6, 9, 10, 12-15
7, 8, 11	103(a)	Jordan, Rubbert		7, 8, 11
Overall Outcome				1-15

REVERSED