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**Datasheet for the decision
of 9 January 2018**

Case Number: T 2113/14 - 3.2.08

Application Number: 00903298.8

Publication Number: 1150618

IPC: A61C7/08

Language of the proceedings: EN

Title of invention:

SYSTEM AND METHOD FOR PRODUCING TOOTH MOVEMENT

Applicant:

Align Technology, Inc.

Headword:

Relevant legal provisions:

EPC Art. 84

Keyword:

Claims - clarity - all requests (no)

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
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Case Number: T 2113/14 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 9 January 2018

Appellant: Align Technology, Inc.
(Applicant) 2820 Orchard Parkway
San Jose, CA 95134 (US)

Representative: Clark, Jane Anne
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 2 June 2014
refusing European patent application No.
00903298.8 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairwoman P. Acton
Members: C. Herberhold
I. Beckedorf

Summary of Facts and Submissions

- I. By way of decision posted on 2 June 2014, the Examining Division refused European patent application No. 00903298.8, on the grounds of Articles 53(c), 84 and 54(1), (2) EPC.
- II. The appellant (applicant) lodged an appeal against that decision in the prescribed form and within the prescribed time limit.
- III. Oral proceedings before the Board took place on 9 January 2018. For the course taken by the proceedings, in particular the issues discussed with the parties and the parties' initial requests, reference is made to the minutes of the oral proceedings.
- IV. At the end of the oral proceedings the requests of the appellant were as follows:

That the decision under appeal be set aside and that a patent be granted on the basis of any of the requests filed

- as auxiliary request 1 with letter dated 4 August 2010,
- as auxiliary requests 1A and 1B during the oral proceedings,
- as auxiliary request 2 and 3 with letter dated 4 August 2010, and
- as auxiliary requests 5, 5a to 8 and 10 and 11 with letter dated 8 December 2017.

V. Independent claims of the requests:

The identifiers "**Appliance A**", "**Appliance B**", "**Appliance C**", emphasis and underlining have been introduced by the Board.

(a) Claim 1 of auxiliary request 1 reads as follows:

"A system for repositioning teeth from an initial tooth arrangement to a desired tooth arrangement, said system comprising:

a plurality of dental position adjustment appliances, to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments, said appliances each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth having a root, a crown, a center of rotation and a longitudinal axis with portions passing through the root, the crown and the center of rotation, wherein the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein the appliance is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth to move a tooth toward a desired location with the root leading in the direction of the desired location, the plurality of dental position appliances comprising:

(Appliance A) at least one appliance with cavities shaped to apply force to rotate at least one tooth around its center of rotation so that the axis portion passing through the root is closer to the desired location than the axis portion passing through the crown, **prior to** or during the movement of the tooth

toward the desired location with the root leading in the direction of the desired location;

(Appliance C) at least one appliance with cavities shaped to apply force to rotate **the repositioned tooth** around its center of rotation at the desired location to straighten the tooth so that it is in its upright position, during or subsequent to movement of the tooth toward the desired location with the root leading in the direction of the desired location."

(b) Claim 1 of auxiliary request 1A differs from claim 1 of auxiliary request 1 in the deletion of its last two paragraphs and in the insertion of the two-part form (insertion underlined):

"A system for repositioning teeth from an initial tooth arrangement to a desired tooth arrangement, said system comprising:

a plurality of dental position adjustment appliances, to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments, said appliances each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth having a root, a crown, a center of rotation and a longitudinal axis with portions passing through the root, the crown and the center of rotation, wherein the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein the appliance is resilient to accommodate or conform to misaligned teeth characterised in that the plurality of dental position adjustment appliances are shaped to apply resilient force against such misaligned teeth to move a tooth toward a desired location with the root leading in the direction of the desired location."

(c) Claim 1 of auxiliary request 1B differs from claim 1 of auxiliary request 1 in the following amendment (underlined):

"A system for repositioning teeth from an initial tooth arrangement to a desired tooth arrangement, said system comprising:

a plurality of dental position adjustment appliances, to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments, said appliances each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth having a root, a crown, a center of rotation and a longitudinal axis with portions passing through the root, the crown and the center of rotation, wherein the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein the appliance is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth to move a tooth toward a desired location with the root leading in the direction of the desired location, the plurality of dental position appliances comprising:

(Appliance A) at least one appliance with cavities shaped to (i) conform to a tooth with the axis portion passing through the root closer to the desired location than the axis portion passing through the crown or (ii) to apply force to rotate at least one tooth around its center of rotation so that the axis portion passing through the root is closer to the desired location than the axis portion passing through the crown, prior to or during the movement of the tooth toward the desired

location with the root leading in the direction of the desired location;

(Appliance C) at least one appliance with cavities shaped to apply force to rotate **the repositioned tooth** around its center of rotation at the desired location to straighten the tooth so that it is in its upright position, during or subsequent to movement of the tooth toward the desired location with the root leading in the direction of the desired location."

(d) Claim 1 of auxiliary request 2 reads as follows (amendments with respect to claim 1 of auxiliary request 1 are underlined):

"System for repositioning teeth from an initial tooth arrangement to a desired tooth arrangement, said system comprising:

a plurality of dental position adjustment appliances, to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments, said appliances each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth having a root, a crown, a center of rotation and a longitudinal axis with portions passing through the root, the crown and the center of rotation, wherein the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein the appliance is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth to move a tooth toward a desired location with the root leading in the direction of the desired location, the plurality of dental position appliances comprising:

(Appliance A) at least one appliance with cavities shaped to apply force to rotate at least one tooth around its center of rotation so that the axis portion passing through the root is closer to the desired location than the axis portion passing through the crown, **prior to** or during the movement of the tooth toward the desired location with the root leading in the direction of the desired location;

(Appliance B) at least one appliance with cavities shaped to translate the at least one tooth towards the desired location along a gingival plane, with the root leading in the direction of the desired location;

(Appliance C) at least one appliance with cavities shaped to apply force to rotate **the repositioned tooth** around its center of rotation at the desired location to straighten the tooth so that it is in its upright position relative to the gingival plane, during or subsequent to movement of the tooth toward the desired location with the root leading in the direction of the desired location."

(e) Claim 1 of auxiliary request 3 differs from claim 1 of auxiliary request 1 in the following amendments (underlined):

"System for repositioning teeth from an initial tooth arrangement to a desired tooth arrangement, said system comprising:

a plurality of dental position adjustment appliances, to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments, said appliances each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth having a root, a crown, a center of rotation and a longitudinal axis with portions passing through

the root, the crown and the center of rotation, wherein the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein the appliance is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth to move at least one tooth from a first location (A) toward a desired location (B) with the root leading in the direction of the desired location, the plurality of dental position appliances comprising:

(Appliance A) at least one appliance with cavities shaped to apply force to rotate the at least one tooth around its center of rotation at the first location (A) into a root first position so that the axis portion passing through the root is closer to the desired location (B) than the axis portion passing through the crown, **prior to** or during the movement of the tooth toward the desired location with the root leading in the direction of the desired location;

(Appliance B) at least one appliance with cavities shaped to translate at least one tooth towards the desired location (B) along a gingival plane, with the root leading in the direction of the desired location, wherein these cavities comprise a cavity shaped with a horizontal misfit relative to the root first position of the at least one tooth at the first location (A);

(Appliance C) at least one appliance with cavities shaped to apply force to rotate **the repositioned at least one tooth** around its center of rotation at the desired location to straighten the at least one tooth so that it is in its upright position, during or subsequent to movement of the tooth toward the desired location (B) with the root leading in the direction of the desired location."

(f) Claim 1 of auxiliary request 5 reads as follows:

"A system for repositioning teeth said system comprising:

a series of dental position adjustment appliances (300), to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments through a series of intermediate configurations to a final desired configuration, said appliances (300) each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth (100) having a root (103), a crown (102), a center of rotation (106) and a longitudinal axis (107) with portions passing through the root (103), the crown (102) and the center of rotation (106), wherein each appliance (300) is arranged to fit over all teeth present in a patient's upper or lower jaw (301) and the cavities generally conform to a patient's teeth in an initial tooth configuration but certain cavities are out of alignment with the initial tooth configuration, and wherein each appliance (300) is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth, the series of dental position adjustment appliances (300) comprising:

(Appliance A) at least one appliance (300) with cavities shaped to apply force to rotate at least one tooth (100) around its center of rotation (106) so that the axis (107) portion passing through the root (103) is closer to a desired location than the axis (107) portion passing through the crown (102), **prior to** or during the movement of the tooth (100) toward the

desired location with the root (103) leading in the direction of the desired location;

(Appliance B) at least one appliance (300) with cavities shaped to translate the at least one tooth (100) towards the desired location along a gingival plane (101), with the root (103) leading in the direction of the desired location;

(Appliance C) at least one appliance (300) with cavities shaped to apply force to rotate **the repositioned tooth** (100) around its center of rotation (106) at the desired location to straighten the tooth (100) so that it is in its upright position relative to the gingival plane (101), subsequent to movement of the tooth (100) toward the desired location with the root (103) leading in the direction of the desired location."

(g) Claim 1 of auxiliary request 5A differs from claim 1 of auxiliary request 5 in that the following is deleted (in the second paragraph of the claim):

"... and the cavities generally conform to a patient's teeth ~~in an initial tooth configuration but certain cavities are out of alignment with the initial tooth configuration, ...~~"

(h) Claim 1 of auxiliary request 6 reads as follows:

"A system for repositioning teeth from an initial tooth arrangement to a desired tooth arrangement, said system comprising:

a plurality of dental position adjustment appliances (300), to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments, said appliances each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth (100) having a root (103), a crown (102), a center of rotation (106) and a longitudinal axis (107) with portions passing through the root (103), the crown (102) and the center of rotation (106), wherein the appliances (300) are arranged to fit over all teeth present in a patient's upper or lower jaw (301) and the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein each appliance (300) is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth to move a tooth (100) toward a desired location with the root (103) leading in the direction of the desired location, the plurality of dental position appliances (300) comprising:

(Appliance A) at least one appliance (300) with cavities shaped to apply force to rotate at least one tooth (100) around its center of rotation (106) so that the axis (107) portion passing through the root (103) is closer to the desired location than the axis (107) portion passing through the crown (102), **prior to** or during the movement of the tooth (100) toward the desired location with the root (103) leading in the direction of the desired location;

(Appliance C) at least one appliance (300) with cavities shaped to apply force to rotate **the repositioned tooth** (100) around its center of rotation (106) at the desired location to straighten the tooth

(100) so that it is in its upright position, during or subsequent to movement of the tooth (100) toward the desired location with the root (103) leading in the direction of the desired location."

(i) Claim 1 of auxiliary request 7 reads as follows:

"A system for repositioning teeth from an initial tooth arrangement to a desired tooth arrangement, said system comprising:

a plurality of dental position adjustment appliances (300), to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments, said appliances (300) each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth (100) having a root (103), a crown (102), a center of rotation (106) and a longitudinal axis (107) with portions passing through the root (103), the crown (102) and the center of rotation (106), wherein the appliances (300) are arranged to fit over all teeth present in a patient's upper or lower jaw (301) and the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein each appliances (300) is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth to move a tooth (300) toward a desired location with the root (103) leading in the direction of the desired location, the plurality of dental position appliances (300) comprising:

(Appliance A) at least one appliance (300) with cavities shaped to apply force to rotate at least one tooth (100) around its center of rotation (106) so that

the axis (107) portion passing through the root (103) is closer to the desired location than the axis (107) portion passing through the crown (102), **prior to** or during the movement of the tooth (100) toward the desired location with the root (103) leading in the direction of the desired location;

(Appliance B) at least one appliance (300) with cavities shaped to translate the at least one tooth (100) towards the desired location along a gingival plane (101), with the root (103) leading in the direction of the desired location;

(Appliance C) at least one appliance (300) with cavities shaped to apply force to rotate **the repositioned tooth** (100) around its center of rotation (106) at the desired location to straighten the tooth (100) so that it is in its upright position relative to the gingival plane (101), during or subsequent to movement of the tooth (100) toward the desired location with the root (103) leading in the direction of the desired location."

(j) Claim 1 of auxiliary request 8 reads as follows:

"A system for repositioning teeth from an initial tooth arrangement to a desired tooth arrangement, said system comprising:

a plurality of dental position adjustment appliances (300), to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments, said appliances (300) each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth (100) having a root (103), a crown (102), a

center of rotation (106) and a longitudinal axis (107) with portions passing through the root (103), the crown (102) and the center of rotation (106), wherein the appliances (300) are arranged to fit over all teeth present in a patient's upper or lower jaw (301) and the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein each appliance (300) is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth to move at least one tooth (100) from a first location (A) toward a desired location (B) with the root (103) leading in the direction of the desired location, the plurality of dental position appliances (300) comprising:

(Appliance A) at least one appliance (300) with cavities shaped to apply force to rotate the at least one tooth (100) around its center of rotation (106) at the first location (A) into a root (103) first position so that the axis (107) portion passing through the root (103) is closer to the desired location (B) than the axis (107) portion passing through the crown (102), **prior to** or during the movement of the tooth (100) toward the desired location with the root (103) leading in the direction of the desired location;

(Appliance B) at least one appliance (300) with cavities shaped to translate at least one tooth (100) towards the desired location (B) along a gingival plane (101), with the root (103) leading in the direction of the desired location (B), wherein these cavities comprise a cavity shaped with a horizontal misfit relative to the root first position of the at least one tooth (100) at the first location (A);

(Appliance C) at least one appliance (300) with cavities shaped to apply force to rotate **the repositioned at least one tooth** (100) around its center of rotation (106) at the desired location (B) to straighten the at least one tooth (100) so that it is in its upright position, during or subsequent to movement of the tooth (100) toward the desired location (B) with the root (103) leading in the direction of the desired location."

(k) Claim 1 of auxiliary request 10 reads as follows:

"A system for repositioning teeth from an initial tooth arrangement to a final desired configuration, said system comprising:

a plurality of dental position adjustment appliances (300), to be worn successively by a patient in order to achieve tooth repositioning of misaligned teeth by a plurality of incremental position adjustments through a series of intermediate configurations to the final desired configuration, said appliances (300) each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth (100) having a root (103), a crown (102), a center of rotation (106) and a longitudinal axis (107) with portions passing through the root (103), the crown (102) and the center of rotation (106), wherein the appliances (300) are arranged to fit over all teeth present in a patient's upper or lower jaw (301) and the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein each appliance (300) is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth to move a tooth (100) toward a desired

location with the root (103) leading in the direction of the desired location, the plurality of dental position appliances (300) comprising:

(Appliance A) at least one appliance (300) with cavities shaped to apply force to rotate at least one tooth (100) around its center of rotation (106) so that the axis (107) portion passing through the root (103) is closer to the desired location than the axis (107) portion passing through the crown (102), **prior to** or during the movement of the tooth (100) toward the desired location with the root (103) leading in the direction of the desired location;

(Appliance B) at least one appliance (300) with cavities shaped to translate the at least one tooth (100) towards the desired location along a gingival plane (101), with the root (103) leading in the direction of the desired location;

(Appliance C) at least one appliance (300) with cavities shaped to apply force to rotate **the repositioned tooth** (100) around its center of rotation (106) at the desired location to straighten the tooth (100) so that, in the final desired configuration, it is in its upright position relative to the gingival plane (101), subsequent to movement of the tooth (100) toward the desired location with the root (103) leading in the direction of the desired location."

(1) Claim 1 of auxiliary request 11 reads as follows:

"1. A system for repositioning teeth from an initial tooth arrangement to a desired tooth arrangement, said system comprising:

a plurality of dental position adjustment appliances (300), to be worn successively by a patient in order to achieve tooth repositioning by a plurality of incremental position adjustments, said appliances (300) each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth, each tooth (100) having a root (103), a crown (102), a center of rotation (106) and a longitudinal axis (107) with portions passing through the root (103), the crown (102) and the center of rotation (106), wherein the appliances (300) are arranged to fit over all teeth present in a patient's upper or lower jaw (301) and the cavities generally conform to a patient's teeth but certain cavities are out of alignment with the initial tooth arrangement and wherein each appliance (300) is resilient to accommodate or conform to misaligned teeth and is shaped to apply resilient force against such misaligned teeth to move at least one tooth (100) from a first location (A) toward a desired location (B) with the root (103) leading in the direction of the desired location (B), the plurality of dental position appliances (300) comprising:

(Appliance A) at least one appliance (300) with cavities shaped to apply force to rotate the at least one tooth (100) around its center of rotation (106) at the first location (A) into a root (103) first position so that the axis (107) portion passing through the root (103) is closer to the desired location (B) than the axis (107) portion passing through the crown (102), **prior to** or during the movement of the tooth (100) toward the desired location (B) with the root (103) leading in the direction of the desired location, wherein the cavities further comprise an undercut (405) to extrude the at least one tooth (100) relative to the gingival plane (101);

(Appliance B) at least one appliance (300) with cavities shaped to translate the at least one tooth (100) towards the desired location (B) along the gingival plane (101), with the root (103) leading in the direction of the desired location (B), wherein these cavities comprise a cavity shaped with a horizontal misfit relative to the root (103) first position of the at least one tooth (100) at the **first** location (A);

(Appliance C) at least one appliance (300) with cavities and a vertical misfit shaped to apply force to rotate **the repositioned at least one tooth** (100) around its center of rotation (106) and intrude the repositioned at least one tooth (100) relative to the gingival plane (101) at the desired location to straighten the at least one tooth (100) so that it is in its upright position, during or subsequent to movement of the tooth (100) toward the desired location (B) with the root (103) leading in the direction of the desired location."

VI. The following documents play a role in the present decision:

D1: US-A-4,983,334;

Annex 3: "Two Invisalign Complex Cases", Align Technology, Inc.

VII. The essential arguments of the appellant can be summarised as follows:

Auxiliary requests 1, 2, 3, 5, 5A, 6, 7, 8, 10 and 11

Claim 1 of each of these requests defined the effect of a sequence of appliances on the tooth arrangement. Admittedly, when defining the effect of the very first appliance on the initial tooth arrangement, a reference to the initial tooth arrangement was going to be always necessary. However, the effect of a sequence of successive appliances was derivable by comparing the form of successive appliances without any reference to the tooth arrangement. Thus, the subject-matter was clearly defined, even in view of the diversity of individual initial tooth arrangements.

Auxiliary request 1B

Of course, wearing the appliances had an effect on the initial tooth configuration. As defined in the claim, the constant application of the force rotated the tooth around its centre of rotation, such that after some time, the tooth was aligned with the cavity of the respective appliance, which then could not apply a rotational force anymore, but simply held the tooth in the position reached till the successive appliance took over. This was something the skilled person was aware of and would take into account when interpreting the claim. However, to remove any possible unclarity in this respect, claim 1 of auxiliary request 1B explicitly defined that the cavity may also be shaped to only conform to a tooth in the root-first position by introducing feature (i), according to which - as an alternative to being shaped for applying rotational force, the cavities are shaped to conform to a tooth

with the axis portion passing through the root closer to the desired location than the axis portion passing through the crown.

Auxiliary request 1A

While the definition of the inventive feature was admittedly functional, this was the most concise and precise definition possible. The skilled person would immediately envisage how the successive adjustment appliances had to be shaped in order to fulfil the function claimed. The structural features were thus implicit in the functional definition.

Moreover, the skilled person would be able to verify on a sequence of appliances whether or not the functional criteria were met.

Conversely, precisely defining the structure of the respective appliances' cavities, which required precise definition of their dimensions, would unduly restrict the scope of the claim.

Thus, claim 1 of auxiliary request 1A fulfilled the requirements of Article 84 EPC.

Reasons for the Decision

1. Auxiliary requests 1, 2, 3, 5, 5A, 6, 7, 8, 10 and 11

Claim 1 of each of these requests comprises the definition of at least one appliance (**Appliance A**) with cavities shaped to apply force to rotate at least one tooth around its centre of rotation so that the axis portion passing through the root is closer to a/the desired location than the axis portion passing through

the crown, i.e. the cavities are shaped to bring the tooth into a "root-first position".

This rotation may in particular take place **prior to** movement of the tooth towards the desired location, with the root leading in the direction of the desired location (referred to as "translation" and for example brought about by **Appliance B**), and **before** uprighting of **the repositioned tooth** (as brought about by **Appliance C**). The rotation brought about by Appliance A is referred to as Phase 1 in the typical 3 phase treatment described (see page 9, line 5 - page 10, line 11).

Appliance A is thus, in particular, the first appliance of the plurality of appliances to be worn successively by the patient. With the claim defining "at least one" such appliance, Appliance A may also be the only appliance with cavities shaped to apply force to rotate the at least one tooth around its centre of rotation into a root first position.

As illustrated in Figure 10B of the application, the rotational force on a particular tooth and the rotational movement effectuated thereby depend on the rotational misfit of the cavity with respect to the position of the tooth. As pointed out at the oral proceedings, depending on the rotational misfit, one and the same cavity of one and the same appliance may rotate a tooth counter clockwise, clockwise, or - if there is no misfit - not rotate the tooth at all.

The rotational force applied by the initial appliance thus depends on the initial tooth arrangement of the respective patients, which - in the present field - typically have highly non-aligned and highly individual

tooth arrangements (see for example Annex 3, pages 1, 3, 4 and 6: "before").

The appellant argued that by identifying in the sequence of appliances the cavities receiving a particular tooth and the respective cavities' relative movement within the appliance sequence, it was possible to derive whether or not a force to rotate the at least one tooth around its centre of rotation into a root-first position was applied by the appliances. This may be true if there is indeed a plurality of Appliances A. However, the claims comprise systems for repositioning teeth with only one single Appliance A ("at least one"), for which no such analysis of consecutive Appliances A with respect to the rotational force and resulting movement is available.

Hence, since Appliance A is defined in respect to a physical entity (the tooth arrangement) which is not part of the claimed invention, claim 1 of the above mentioned requests is not clear and does not fulfil the requirements of Article 84 EPC.

2. Auxiliary request 1B

In claim 1 of auxiliary request 1B the definition of Appliance A has been amended as follows:

"... (**Appliance A**) at least one appliance with cavities shaped to (i) conform to a tooth with the axis portion passing through the root closer to the desired location than the axis portion passing through the crown or (ii) to apply force to rotate at least one tooth around its center of rotation so that the axis portion passing through the root is closer to the desired location than the axis portion passing through the crown, prior to or

during the movement of the tooth toward the desired location with the root leading in the direction of the desired location;..."

This amendment is intended to take into account the fact that Appliance A, after having applied force to the tooth for some time, will have rotated said tooth towards the desired root-first position, such that the Appliance A will no longer apply force to rotate the tooth.

The amendment does, however, not change the situation discussed in point 1 above. Depending on the initial tooth configuration the cavity may have effect (i), (ii), or may even result in a rotation inverse to the one defined in (ii). Hence, claim 1 according to auxiliary request 1B does not comply with the requirements of Article 84 EPC for the reasons set out above.

3. Auxiliary request 1A

Claim 1 of auxiliary request 1A overcomes the clarity problems discussed in points 1 and 2 above by omitting the features relating to appliance(s) A and C.

It is common ground that the preamble defines the state of the art and that the invention is characterized in that

"the plurality of dental position adjustment appliances are shaped to apply resilient force against such misaligned teeth to move a tooth toward a desired location with the root leading in the direction of the desired location."

Thus the invention is defined by the functional effect of the appliances on the misaligned teeth.

According to the established jurisprudence of the boards of appeal (see Case Law of the Boards of Appeal, 8th edition 2016, II.A.3.4) functional features defining a technical result are permissible in the claim if, from an objective viewpoint such features could not otherwise be defined more precisely without restricting the scope of the invention and (ii) if these features provided instructions which were sufficiently clear for the expert to reduce them to practice without undue burden, if necessary with reasonable experiments.

The appellant has argued that the skilled person would immediately derive the required form and location of the cavities in the successive appliances from the claimed functional feature. Consequently, defining the invention through the functional feature was the most concise and clear possible way, while defining the invention by structural features comprising the exact geometry of the appliances would have unduly limited the scope of the claim. The skilled person derived structural criteria from the functional definition which could then be verified on the appliance.

It is correct that structural criteria can in principle be derivable from the claimed function. Among such criteria are for example a certain orientation of the cavities with respect to the gingival plane (such that the tooth is oriented root first) or an incremental misfit of the cavities towards the desired location in successive appliances (such that the tooth is moved).

However, there is no reason not to directly define the subject-matter by such verifiable structural features, instead of deriving them indirectly and possibly inaccurately from a not directly verifiable functional definition. In fact, the appellant had already partly employed such structural features in the wording of e.g. auxiliary request 3 with respect to appliance(s) B.

Furthermore, such structural characteristics of the cavities represent the very techniques for effectuating root-first movement, which are described in the application with respect to adjustment appliances, each having a polymeric shell with cavities shaped to receive and resiliently reposition a patient's teeth (see e.g. Figures 9-11). Their structural definition thus does not unduly limit the claim.

Conversely, an exact definition of the dimensions of each and every cavity in the appliances - which would indeed unduly limit the scope of the claim - is not required.

The Board thus comes to the conclusion that the subject-matter of the invention can (and should) from an objective viewpoint be defined more precisely than by the functional definition employed in the characterising portion, without unduly limiting the scope of the claim.

Therefore, claim 1 of auxiliary request 1A does not fulfil the requirements of Article 84 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairwoman:



C. Moser

P. Acton

Decision electronically authenticated