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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 16 / 82

DECISION

of the Technical Board of Appeal 3.2.1

of 28.03.1983

Appellant: Engström, Gunnar Helmer
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Representative: Sven Bergvall
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Decision under appeal: Decision of Examining Division 127 of the European Patent Office dated 26 August 1981 refusing European patent application No 78 900 300.1 pursuant to Article 97(1) EPC

Composition of the Board:
Chairman: G. Andersson
Member: M. Huttner
Member: P. Ford

Summary of Facts and Submissions

I. The European patent application No. 78 900 300.1 filed on 29 November 1978 as international application PCT/SE78/00086 claiming priority from a national Swedish application of 5 December 1977, and published under the International Publication No. WO 79/00344 was refused by a decision of Examining Division 127 of the European Patent Office dated 26 August 1981. The decision was based on claims 1 to 3 received on 15 April 1981.

The reason given for the refusal was that in view of the prior art disclosed by US-C-1 307 446 and DE-C-949 002 the subject matter of claim 1 did not involve an inventive step within the meaning of Article 56 EPC and the claim was thus not allowable under Article 52 (1) EPC.

II. On 21 October 1981 the appellant lodged an appeal against the decision. The appeal fee was duly paid and the statement of grounds was received in due time together with new claims 1 and 2.

The appellant argued that a person skilled in the art could not deduce the subject matter of the invention from anything disclosed in the state of the art.

III. As a result of objections raised by the Board of Appeal during the procedure before the Board the appellant submitted one single new claim, a new description and new drawings and requested the Board to allow the application.

IV. The new claim reads as follows:

A root canal file for manual operation for widening the root canal of a tooth by cutting away material in the root canal and transporting it out, which file comprises a towards its tip conically tapering working part, characterized in that the working part comprises two continuous cutting edges (8,10), ground in the outer surface thereof in such a way that they extend helically along the outer surface of a core, said cutting edges being displaced in relation to each other in the longitudinal direction of the working part, so that each turn in one of the cutting edge helices is situated between two consecutive turns of the other cutting edge helix, and in that the working part is formed so that its cross-section perpendicular to its longitudinal axis has the shape of two, along their diameters neighbouring, equal semi-circles, which are mutually displaced a certain distance along the common diameter, the diametrically opposed, projecting edges between arc and diameter of each semi-circular shape forming the cutting edges (8,10), said file being designed such that the relationship

$$H_n = H_o \cdot e^{n \cdot 2\pi \cdot \sin\alpha \tan\beta}$$

is valid between

H_n, the distance from the top (22) of the cone enclosing the working part and the n^{th} spiral counted from the tip (12) of the working part, H_o, the distance between said top of the cone and said tip, n, the number of spirals on the working part disposed along a length $H_n - H_o$ from the tip, α, half the cone angle and β, the cutting angle.

Reasons for the decision

1. The appeal complies with Articles 106 to 108 EPC and with Rule 64(a) EPC.

In the notice of appeal the appellant does not explicitly state the extent to which amendment or cancellation of the impugned decision is requested. However, it is clear from the circumstances of the case that the appellant is asking for cancellation of the decision.

Therefore, the appeal can be considered as complying with the provisions of Rule 64(b) EPC (cf. decision by the Board of Appeal 3.3.1 of 14 December 1982, Case Number T 07/81, not yet published).

2.1 Of the documents uncovered by the search report, only DE-C-949 002, DE-B-2 046 623 and US-C-1 307 446 are concerned with dental tools designed for clearing the root canal of teeth. DE-B-2 046 623 is concerned with a drill having a helical groove on a tapered working part and not with a file, while US-C-1 307 446 reveals a flexible K-type file of small size having a polygonal cross-section and more than two cutting edges. DE-C-949 002, on the other hand, discloses in Figure 3 a manually operated, conically tapered, flexible root canal file of the H-file type with one cutting edge only.

The application also presents in Figure 2 of the original drawings a prior art file of the H-file type. The

Board's statement, in its second communication, that this file is practically identical with the one illustrated in Figure 3 of DE-C-949 002 has not been contested by the appellant.

2.2 The subject-matter of the application as set out in the present claim 1 proves to be new, in view of the fact that there is no root canal file disclosed in the prior art having a conically tapering working part with two continuous helical cutting edges ground into the outer surface thereof and having a cross-sectional configuration as set forth in claim 1.

3. Apart from different features, the two types of files mentioned above also have partly different functions. In practice, thus, the light, fine and flexible so-called K-file is first moved by spiral movement down into the somewhat curved root canal to provide a small passage only, since it has a limited cutting effect and low debris-clearing capacity. Subsequently the H-file, having a helical groove ground into a tapered file blank, is introduced for widening the root canal.

The necessity of using in many cases both types of files for properly treating a root canal has been considered a disadvantage by the appellant. Thus, according to the description, the problem to be solved by the appellant's invention resides in the provision of a single tooth file having greater flexibility to follow the curved root canal of the tooth readily without causing breakage and also having increased material removing capacity.

4. The prior publication DE-C-949 002 which the appellant also acknowledged as constituting the closest prior art

from which the invention sets out, clearly reveals in Figure 3 a file having a cutting edge ground into the outer tapered surface of the working part in such a way that it extends helically along the outer surface thereof. Moreover, the appellant has failed to establish that the helical cutting edge does not trace the curve described by the mathematical equation specified in the characterising portion of the present claim.

5.1 As can be gathered by comparing the wording of the claim with the file referred to in DE-C-949 002, the only difference consists in a second helically arranged cutting edge situated between two consecutive turns of the other cutting edge, and in the cross-section exhibiting two equal and opposite but offset semicircles with overlapping diameters, the offset portions of the diameters providing two diametrically opposed cutting edges.

5.2 With respect to the features covering the cross-sectional configuration of the working part, it must be pointed out that the cross-section of the prior art device (see the original Figure 2 of the application compared with the Figure 3 of DE-C-949 002) discloses a sharp cutting edge provided by the radial segment connecting the inner and outer ends of a spiral line. By adding a second cutting edge circumferentially displaced by 180° one inevitably arrives at the cross-section of Figure 3 of the application, having two cutting edges of the same sharpness. Therefore the specific feature of the cross-sectional configuration is merely the consequence of the "double thread" or two-start arrangement of two cutting edges, each associated with a groove.

5.3 Taking advantage of a two-start arrangement amounts to simple routine work for a person skilled in the art in view of the teachings of Figure 1 of DE-C-949 002, which already discloses two cutting edges for a drill in the same publication. These two edges are also mutually displaced by 180° circumferentially so that each helix is situated between two consecutive turns of the other helix. Although DE-C-949 002 states that the twisted file blank of the double helix drill according to Figure 1 is not sufficiently flexible, it is also emphasised that the tooth canal file with the single helical groove and cutting edge already has several advantages identical to the ones claimed, such as flexibility, a sharp cutting edge for shaving the canal walls as well as material transporting capacity (lines 15-19). Adding an additional cutting edge of the same configuration (shape) entails automatically an additional groove associated therewith. This leads unquestionably to a doubled cutting power and, provided the groove depth remains the same, to a doubled material removing capacity. Furthermore, if the pitch is to be maintained unchanged, then the lead of the helix is automatically doubled and the cutting angle correspondingly increased. Hence, the directly expected result from this increase is the reduction of the area of the cross-section with a reduced moment of resistance, i.e. higher bending flexibility.

The person skilled in the art would be expected to realise immediately that by simply adding one more edge and groove, these properties would unquestionably be enhanced for any given size of the working part, and the advantages achieved thereby can be readily forseen by a person skilled in the art without any difficulties whatsoever and hence are not surprising.

5.4 The appellant in his submissions further claimed that the increasing lead of the helical cutting edges results in a chipping space for the cut material which is gradually increasing from the tip of the file upwards. This affords an improved material transport capacity. However, in view of the fact that the mathematical formula included in the claim applies to any helix located on a conically tapered file, a fact not successfully repudiated by the appellant, there is no doubt that the groove of the conical working part of the file disclosed in Figure 3 of DE-C-949 002 also has a similarly increasing space and transport capacity. Thus, no surprising effect can be seen in applying this teaching in the device claimed.

5.5 Furthermore, US-C-1 307 446 refers to a small-sized flexible tooth canal file having a polygonal cross-section, i.e. more than two cutting edges. Therefore it amounts to nothing more than a straightforward interpolation of the prior art to select two cutting edges out of a sequence of one, three and more cutting edges of known files, inasmuch as the effects achieved thereby are to be expected by a person skilled in the art.

5.6 The appellant has argued that since the publication of the most pertinent art some considerable time has passed before the appellant stepped in with his invention but, in the absence of any information as to the necessity for replacement of the previously known files, this simple fact has no significance in establishing an inventive step.

5.7 A basis for refuting the obviousness of the subject-matter of the claim can likewise not be gathered from the test results submitted with the grounds of appeal.

5.8 For the reasons outlined above the subject-matter of the claim is obvious from the state of the art and thus does not involve an inventive step (Article 56). The claim is thus not allowable in accordance with Article 52(1) EPC.

For these reasons,

it is decided that:

The appeal against the decision of the Examining Division of the European Patent Office dated 26 August 1981 is dismissed.

The Chairman:

The Registrar: