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D E C I S I O N
of 23 April 2003

Case Number: T 0541/00 - 3.2.4

Application Number: 92906956.5

Publication Number: 0577656

IPC: A46B 7/06

Language of the proceedings: EN

Title of invention:
Toothbrush with resiliently flexible head

Patentee:
SmithKline Beecham Consumer Healthcare GmbH

Opponents:
The Procter & Gamble Company
Colgate-Palmolive Company

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - no"

Decisions cited:
-

Catchword:
-

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Case Number: T 0541/00 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 23 April 2003

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 10 May 2000 concerning maintenance of European patent No. 0 577 656 in amended form.**

Composition of the Board:

Chairman: C. A. J. Andries
Members: M. G. Hatherly
H. Preglau

Summary of Facts and Submissions

I. The opposition division's interlocutory decision that the amended European patent No. 0 577 656 met the requirements of the EPC was posted on 10 May 2000.

Appellant I (opponent I) filed an appeal on 19 May 2000, paid the appeal fee on 30 May 2000 and filed a statement of grounds on 5 September 2000.

Appellant II (opponent II) filed an appeal and paid the appeal fee on 19 June 2000, and filed a statement of grounds on 8 September 2000.

II. The version of the patent found in the interlocutory decision of the opposition division to meet the requirements of the EPC is the only version on file in the appeal proceedings. Claim 1 thereof reads:

"A toothbrush, having a handle (12, 23, 33) and at one end thereof a bristle-bearing head (11, 21, 31) in the form of at least two segments (15, 27, 37) flexibly and resiliently linked to each other and also to the handle (12, 23, 33), one or more of the segments (15, 27, 37) being bristle-bearing, *characterised* in that the head (11) has bristles (16) mounted on a first face, and the opposite face has at least three grooves (14) therein, each of the said at least two segments (15) being a land between two grooves (14), the grooves (14) being wholly or partly filled with an elastomeric material (17), and the flexibility and resilience of the toothbrush head being such that the toothbrush head can flex under the action of toothbrushing so as to accommodate itself to the differing profiles of individual users' teeth."

III. The documents relevant to this decision are

D2: US-A-3 188 672, and

D3: DE-C-3 923 495.

IV. The appellants and the respondent (proprietor) attended oral proceedings on 23 April 2003.

In the appeal proceedings the appellants argued essentially that the patent should be revoked for insufficiency of disclosure and for lack of inventive step e.g. on the basis of it being obvious to modify the toothbrush head of D2 using the teachings of D3 and thereby to arrive at the subject-matter of the present claim 1.

The respondent countered their arguments.

V. The appellants request that the decision under appeal be set aside and that the patent be revoked.

The respondent requests that the appeal be dismissed and that the patent be maintained as per the interlocutory decision.

Reasons for the Decision

1. The appeal is admissible.

2. *Novelty - the present claim 1*

The board and all the parties agree that there is no document on file which discloses all the features of

the present claim 1.

The board thus finds the subject-matter of the present claim 1 to be novel (Articles 52(1) and 54 EPC).

3. *D2*

D2, the closest prior art or starting point for assessing inventive step, discloses a toothbrush having a handle 10 and at one end thereof a bristle-bearing head 11 in the form of segments 13 to 16 linked to each other and also to the handle. The segments 13 to 16 are bristle-bearing. The head 11 has bristles 22 mounted on a first face, and the opposite face has grooves therein, each of the segments 13 to 16 being a land between two grooves.

Lines 15 to 23 of column 2 of D2 explain that the articulating webs form flexible joints between the segments and bend when the brush head is pressed against the teeth during brushing, causing the segments to assume such relative angularity as to cause the brush head to curve, so that the bristles will conform substantially to the contour of the teeth. It is implicit that the brush head will regain its shape after brushing which means that the joints are not only flexible but are also resilient.

Accordingly, as agreed by the respondent, the toothbrush defined by the present claim 1 differs from that disclosed by D2 only in that the grooves of the former are wholly or partly filled with an elastomeric material.

4. *Problem and solution*

4.1 Over the years there have been many attempts to modify toothbrushes to improve their brushing action. It is to be expected that the skilled person looking at the toothbrush of D2 would not regard it as the last word in toothbrush design but would wish to improve it e.g. by optimising the flexibility of the head so it could better adapt itself during brushing to the concave and convex curves of the teeth while retaining adequate but not excessive pressure thereon.

4.2 In lines 5 to 9 of the third paragraph on page 2 of the letter of 16 March 2001, the respondent refers to "three further problems addressed by the present invention, i.e. (d) a toothbrush that reaches all parts of the teeth, (e) maintenance of an optimum angle between the teeth and the toothbrush head, and (f) avoiding excessive brushing pressure. These problems are dealt with by the resilient and flexible linking between head segments provided by the claimed head construction."

Problem (e) is included in section 4.1 above. The D2 head already has resilient and flexible linking between head segments and so it appears that the above cited problems (d) and (f) are already solved by the D2 toothbrush even though D2 does not specifically mention them. Therefore the problems (d) and (f) are not problems that face the skilled person when starting from the D2 toothbrush.

4.3 The toothbrush defined by the present claim 1 is a further step towards the optimum toothbrush. By wholly or partly filling, with an elastomeric material, the grooves in the head on the opposite face to that bearing the bristles, the flexibility of the head (both

itself and relative to the handle) becomes dependent not only on the form and number of the segments and grooves (numbered 15 and 14 respectively on the present Figure 1C for example) but also on the spring effect of the elastomeric material (numbered 17 on the present Figure 1C) both in compression (as shown in the present Figure 1D) and in tension.

Further, as explained in column 2, lines 34 to 39 of the present description, wholly or partly filling the grooves with an elastomeric material reduces or avoids the deposition of toothpaste in the grooves (at least on the non-bristle bearing face).

5. *Inventive step - the present claim 1*

5.1 Column 1 of D2 explains between lines 12 and 36 that the invention of D2 starts from "a toothbrush with an articulated head made up of separate, equally spaced bristle-carrying sections which are interconnected by flexible webs of uniform thickness. These webs are generally in the form of a spring insert or inserts which are separate from the sections. ... During the molding operation, the spring insert or inserts may be displaced accidentally, thus resulting in a defective toothbrush. Moreover, since the portions of the spring insert between the bristle-carrying sections of the head of the brush are substantially of uniform length, width, and thickness, and since, during use of the toothbrush, the bending stresses on these portions of the spring insert increase as the distances of these portions from the outer end of the toothbrush head increase, the head does not bend uniformly, and the insert portions do not suffer material fatigue to the same extent."

Column 1 of D2 between lines 37 and 51 states that the objects of the invention of D2 are to provide a "toothbrush of the articulated type which can be manufactured at comparatively low cost with substantially uniform accuracy, thus materially reducing the number of rejects", for the toothbrush to have "a comparatively long life" and to have "connecting webs between bristle-carrying sections which are designed to control the bend and material fatigue in these portions in accordance with a predetermined pattern."

Describing the invention of D2, lines 15 to 70 of column 2 explain that the articulating webs form flexible joints between the segments and bend when the brush head is pressed against the teeth during brushing. "The bending moment on the webs 17, 18, 19 and 20 vary according to the distance of these webs from the outer end of the brush head" and so "the thicknesses and the widths of the webs are relatively dimensioned to retain a predetermined pattern of flexing and fatigue. ... As a result, the innermost web 17 which is the thickest and the narrowest of the webs has the greatest rigidity and, notwithstanding the fact that it is subjected to the greatest bending moment, will not flex to a substantially greater degree of angularity than will the other webs".

Thus in D2 the two parameters of the thickness and width of the webs are varied along the brush head to achieve the desired bending pattern.

5.2 As stated in section 4.1 above, it is to be expected that the skilled person looking at the toothbrush of D2 would wish to further improve (i.e. optimise) or

control the flexibility of the head. The skilled person with his knowledge of developments in the toothbrush art would be certain to know of D3 (all the more so because it was published only two months before the priority date of the present patent). The skilled person would carefully look at D3, partly because it originates from a major toothbrush manufacturer and partly because even the first paragraph of its description alerts him that it concerns elastic flexibility in toothbrushes.

5.3 Figures 11 and 12 of D3 show and lines 29 to 56 of column 4 describe a toothbrush with slots 45, 46 and 47 in the region between the handle 1 and the neck 2 with such a depth that elastic bridges 48 remain that contribute to the elasticity in this region. These slots are filled with elastic plastic portions 25, 26 and 27 which are either stretched or compressed when brushing depending on which side of the head the bristles are mounted (see the alternatives 24 or 28 in Figure 11). Lines 47 to 53 of column 3 state that the thickness and shape of the bridge and the size and shape of the openings and the various elasticities of the rubber-like plastic filling the openings can be so varied in manufacture that in the end result the individual desired elasticity is achieved. While the last cited passage is part of the description of Figures 1 and 2, the board considers that it implicitly applies also to the toothbrush of Figures 11 and 12. Moreover in D3, claim 1 (which covers all embodiments, i.e. also Figures 11 and 12) states that the desired elasticity of the elastic region is predominantly determined by the choice of the elastic plastic material.

5.4 Thus the elastic flexibility of the D3 toothbrush is optimised by varying the dimensions and shape of the bridges and openings (i.e. two parameters) and by filling the openings with a rubber-like plastic material (i.e. a polymeric material) of a chosen elasticity (a third parameter). Thus different brush elasticities can be arrived at merely by choosing different plastic materials to fill the openings without needing to modify the shape (and thus the expensive mould) of the brush body (see column 2, lines 47 to 52). When discussing the prior art, D3 mentions a cleaning problem caused by toothpaste deposits (see column 1, lines 26 to 28) but the toothbrush which is the invention in D3 solves this problem (see column 2, lines 37 and 38) in that the openings are filled with plastic material.

5.5 For adjusting toothbrush elasticity, D2 discloses two parameters for the openings in the head while D3 discloses the same two parameters plus the parameter of varying the rubber-like plastic material for the openings in the neck. The board considers that the skilled person would appreciate that the teachings of D3 would be applicable to the toothbrush of D2.

5.6 The respondent argues that D2 contains no pointers towards the solution of the present invention and indeed proposes a unitary construction whereas the inventive toothbrush comprises two materials.

5.6.1 The prior art discussion in D2 (see column 1, lines 12 to 36) concerns

(a) the disadvantage of the previously known spring inserts being displaced accidentally during

moulding, resulting in defective toothbrushes,

(b) and the disadvantage of the portions of the spring inserts between the bristle-carrying sections being of substantially uniform length, width and thickness.

These disadvantages are overcome by the D2 toothbrush and remain overcome even when the D2 toothbrush is modified according to the teachings of D3. Thus these listed disadvantages would not discourage the skilled person from making use of the teachings of D3.

5.6.2 The objects of the invention in D2 (see column 1, lines 37 to 55) are

(a) manufacture at comparatively low cost,

(b) manufacture with substantially uniform accuracy, thereby reducing the number of rejects,

(c) comparatively long life, and

(d) providing connecting webs between the bristle-carrying sections D2 which control the bend and material fatigue according to a predetermined pattern.

Concerning the above object (a), the manufacturing costs for the D2 toothbrush will of course be increased if it is modified according to the teachings of D3. However the skilled person knows that advantages often come at a price and so would not reject the D3 modification out of hand. Moreover the total cost would presumably be less than that of the toothbrushes in the

prior art discussion in D2 where spring inserts are embedded in the head. Furthermore, different elasticities can be obtained with only one mould, which can also contribute to cost reduction.

The objects (b) to (d) are also met by the D2 toothbrush as modified according to the teachings of D3.

5.6.3 The reference in claim 1 of D2 (column 3, line 34) to the brush head being made in one piece might be thought to be a discouragement to the skilled person to apply the teachings of D3.

However, starting in D2 from a toothbrush with spring inserts liable to be displaced accidentally during moulding, it is clearly preferable to move to a one piece construction for manufacturing reliability and cost. However a modern manufacturing process involving filling the grooves in the D2 head (which is in fact a one piece construction) with elastomeric material is neither excessively costly nor unreliable.

5.7 The respondent points out that D2 deals with stresses in the head but that D3 deals with different stresses in the handle, since the D2 head bends to accommodate the teeth contour while the result of the bending of the D3 handle is to shift the whole head. The respondent maintains that the skilled person might vary the shape of the grooves in the D2 head to adapt its flexibility but would not be led to apply the D3 handle area solution to the D2 head area. He mentions the example of stresses in the wings and in the undercarriage of an aircraft being completely different and dealt with by different skilled persons who would

not be led one by the other. He adds that although there is space in the handle of D3 for an elastomeric material, the space in the grooves in the D2 head is much more limited.

The board does not consider that the respondent's aircraft example is applicable to the present case and cannot see that there is a different skilled person for designing a flexible head to that for designing a flexible handle. The toothbrush head and handle are close to each other and the skilled person would be aware of developments in both areas. While it might be difficult to apply elastomeric material to the grooves on the bristle-carrying face of the D2 head, the board does not see that the applying it to the opposite face would pose a problem and it is this opposite face that is specified by the present claim 1 as containing the elastomeric material. Although the D2 might be adapted in other obvious ways, the board considers that, in view of D3, adaption by filling the grooves with an elastomeric material is an obvious option to the skilled person. Thus the board finds that it would be obvious for a person skilled in the art to use not only two parameters for controlling the elasticity of a toothbrush head but also to use a third parameter, namely the choice of material to be included in the head grooves.

5.8 Thus the board considers that it would be obvious for the skilled person to apply the teachings of D3 to the toothbrush of D2, by filling the grooves in the toothbrush head of D2 with the rubber-like plastic material (i.e. a polymeric material) known for filling the openings in the neck of the toothbrush of D3.

In doing so, he would arrive at a toothbrush as defined by the present claim 1. Thus the subject-matter of this claim lacks an inventive step.

6. The independent claim 1 of the sole request on file is therefore unallowable. Therefore the patent is to be revoked. It is unnecessary to comment on either the dependent claims of the sole request or on the other documents cited in the appeal proceedings.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

G. Magouliotis C. Andries