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File Number: T 17/91 - 3.2.2

Application No.: 83 903 805.6

Publication No.: 0 126 128

Title of invention: Razor blades

Classification: B26B 21/56

D E C I S I O N
of 26 August 1992

Proprietor of the patent: The Gillette Company

Opponent: Wilkinson Sword GmbH

Headword: Razor blades/GILETTE

EPC Article 54, 56, 114(2)

Keyword: "Late submission of public prior use" - "Inventive step - yes"

Headword

I. An assertion of public prior use, based on the opponent's own activities and submitted after the expiry of the opposition period and in the absence of good reasons for the delay, represents an abuse of the proceedings and a breach of the principle of "good faith" which all parties are expected to observe. Therefore, this kind of assertion cannot be deemed to have been submitted in due time, and it is to be disregarded under Art. 114(2) EPC irrespective of its potential relevance (cf. point 5 of the Reasons).

II. As soon as evidence is in the possession of the Opponent and it is recognisable that it could be highly relevant to the validity of the patent it should be submitted in the proceedings.

Case Number : T 17/91 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 26 August 1992

Appellant : The Gillette Company
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Respondent : Wilkinson Sword GmbH
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Representative : Patentanwälte
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Decision under appeal : Decision of Opposition Division of the European Patent Office dated 12 November 1990 revoking European patent No. 0 126 128 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : G.S.A. Szabo
Members : J.B.F. Kollar
J.H. Van Moer

Summary of Facts and Submissions

- I. The Appellant is proprietor of the European patent No. 0 126 128 which was granted on 24 June 1987 on the basis of European patent application No. 83 903 805.6.
- II. Claim 1 according to the granted version reads as follows:
- "1. A razor blade having a cutting edge tip of stainless steel, the cross-sectional shape of which up to a distance of 40 μm from the extreme edge is substantially described by the equation: $w=ad^n$ in which w is the thickness in μm of the top at a distance d in μm from the extreme edge of the blade; wherein a and n are constants, a is defined as a factor of proportionality not greater than 0.8 and n is defined as an exponent having a value in the range 0.65 to 0.75."
- III. An opposition against the European patent was filed on 13 March 1988 on the basis of GB-A-1 465 697 (D1) arguing that the subject-matter of the claims of the patent lacked an inventive step.
- IV. After expiry of the time allowed for filing the Notice of Opposition, an allegation of prior use was also submitted with observations filed on 26 July 1990. The prior use claim was based on measurements carried out on a single blade supposedly manufactured by the Respondent (former Opponent) himself and sold in 1979.
- V. An oral hearing was appointed before the Opposition Division. According to the minutes the matters

discussed were on the one hand presence of an inventive step in the subject-matter of Claim 1 with regard to the disclosure of D1 and, on the other hand, the alleged prior public use.

The Appellant requested that the allegation of prior use "should be rejected without further consideration" since it had been filed 2 years after the original opposition, at which time the evidence upon which the prior use was based had already been in the Opponent's possession (cf. Minutes of the oral proceedings, page 3, lines 30-33). The Respondent did not dispute this during the oral proceedings.

VI. By its decision taken at the end of the oral proceedings and issued in written form on 12 November 1990, the Opposition Division revoked the patent for lack of inventive step with regard to Claim 1 in view of document D1 without further dealing with the alleged prior use.

The reason given for the decision was that the invention defined in Claim 1 of the patent in suit was within easy reach of a man of ordinary skill in the art by following a course of routine trial and experiment with blades having tip dimensions within the limits taught by D1.

VII. The Appellant (Proprietor) filed an appeal against this decision on 31 December 1990, the appeal fee being paid on the same day. The Statement of Grounds was filed via facsimile on 18 March 1991 and confirmed by letter received on 20 March 1991.

VIII. The arguments presented by the Appellant in support of the appeal can be summarised as follows:

It is evident that the basic teaching of D1 is that the blade thickness should be uniformly reduced over the entire region up to 40 μm from the edge extremity. Such teaching is entirely consistent with the conventional thinking that making a blade thinner will in general make it sharper. There was nothing in D1 to point away from this teaching. A very significant distinction between the blades according to Claim 1 of the patent in suit and those belonging to the prior art is a relative increase in thickness, i.e. the chord width values, over a small distance from the extremity and a reduction in thickness over the remaining distance up to 40 μm from the extremity. This modification of the shape of the blade was no more within easy reach by routine trial and experiment than it was predictable to the skilled person in the absence of any hint in the prior art, the disclosure of D1 included, which would have led him to think or even suspect that such small changes might provide a better blade and hence an improved shaving performance. Therefore, even with the knowledge of D1 the person skilled in the art would not be led inevitably to the contested invention.

IX. In his observations filed 17 September 1991 the Respondent submitted in essence that document D1 provided a satisfactory basis for arriving at the features of Claim 1 without departing from routine methods of trial and error. The conditions in the claim were no more than a mere optimisation of the formula already provided by document D1. In said observations the Respondent returned to the alleged prior public use

in that he merely referred to his submission relating to that matter in the first instance and reserved further substantiation in the appeal proceedings.

- X. The Appellant requests that the contested decision be set aside and the patent maintained as granted. The Respondent requests that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.
2. *Closest state of the art and novelty*
 - 2.1 It is common ground between parties and the Board that the closest prior art is disclosed in GB-A-1 465 697 (D1).

Document D1 describes a razor blade having an undisclosed composition and a cutting edge, the cross-sectional shape of which up to a distance of 40 μm from the tip being such that the chord widths lie between maximum and minimum limits substantially described by an experimental equation based on the distance from the tip and depending on a set of constants for proportionality and power, having distinct values to define the maximum and minimum limits respectively, one set of constants being applied for a distance \underline{x} from 0.5 to 25 μm from the tip and a second set for \underline{x} greater than 25 μm . There are therefore two curves arranged sequentially, representing a discontinuity in their parameters.

2.2 The subject-matter of Claim 1 differs from this prior art in that:

- the cutting edge tip is of stainless steel;
- the exponential equation is applied to describe the full and actual continuous profile up to a distance of 40 μm from the extreme edge and not only the maximum and minimum permissible limits on blade width;
- one single set of constants a and n is applied to define the profile for the blade all over the first 40 μm ; and
- limiting values $a < 0.8$ and $0.65 < n < 0.75$ are stipulated.

Blades defined in Claim 1 are therefore novel in view of differences in shape with respect to the prior art disclosure of D1.

3. *Problem to be solved*

Document D1 already recognised (cf. especially the framed tables on pages 1 and 2 and the corresponding part of the description) that the geometry of the first 40 μm of the blade tip back from the edge is the most important from the cutting point of view and consequently influences the shaving performance as well. Although the patent under appeal has acknowledged this document in its disclosure, there must have been a need for still further improvement, because the patent states in column 2, lines 55 to 61 that razor blades

having known tip geometries become dulled by edge bending during the normal shaving life, and persists in its aim (cf. paragraph bridging columns 2 and 3) to provide an improved cutting performance and shaving satisfaction. This was, therefore, the relevant technical problem to be solved.

4. *Inventive step*

4.1 The patent in suit points out in its general part (column 2, lines 10 to 29 and Figure 3) that during use of a razor blade the cut portion of the hair (which is on average about 100 μm in diameter), remains pressed in contact with the blade facets up to only about half the hair diameter. Beyond this, the hair can bend and contact away from the blade to relieve the wedging forces. The resistance to penetration through reaction between hair and blade facets therefore occurs only over about 50 μm of the blade tip back from the edge and the geometry of the tip in this region can be regarded as being the most important from the cutting point of view. This fact is already recognised in document D1 in which the values for the chord widths are indicated for distances ranging from 1 μm and 2 μm respectively up to 40 μm from the extreme edge (cf. the framed table and lines 40 to 45 on page 1 and the framed table introducing page 2 of D1).

4.2 The disclosure in the patent in suit further stresses (cf. column 2, lines 30 to 43) that a reduction in the included angle of the facets would correspondingly reduce the resistance to continued penetration of the blade tip into the hair. However, it follows from this that if the included angle were reduced too much, the

strength of the blade tip would be inadequate to withstand the resultant bending forces on the edge during the cutting process and the tip would deform plastically and so sustain permanent damage, which would impair its subsequent cutting performance i.e. the edge would become "blunt" or "dull". The prior art according to document D1 arrived at this conclusion as well and suggested (cf. page 2, lines 10 to 13) that in order to strengthen the top, the facets may have to be provided with one or more coatings of metals, alloys or refracting materials, after being given the final cross-sectional shape by stripping.

- 4.3 The Board accepts the argument put forward by the Appellant in his Statement of Grounds that the invention of the patent in suit resides in finding that the tip shape should be changed so that the chord widths close to the edge become larger and stronger than those on conventionally sharpened edges, while the chord widths further away from the edge should remain smaller than those on conventionally sharpened edges and that such blades provide superior shaving performance when compared with the relevant prior art represented by document D1. This is achieved in spite of the somewhat blunter peak region because the leaner or less quickly widening lower part may slide forward with less resistance. The Respondent did not refute the statement about the advantage involved. Keeping in mind the objective problem to be solved, i.e. to improve cutting performance and shaving satisfaction, the Board is satisfied that the subject-matter of Claim 1 solves the given problem.

4.4 The Respondent and the Opposition Division in its decision are of the opinion that document D1 nevertheless provides a basis for arriving at the features of Claim 1 without departing from routine methods of trial and error, Claim 1 is thus demonstrably devoid of inventive step.

4.5 The Board does not share this opinion for the reasons specified below:

4.5.1 Document D1 also uses an exponential expression of the form claimed in Claim 1 of the patent in suit, i.e. an equation of the form $w=ad^n$, to specify the conformity of the cutting edge of a razor blade. However, when considering document D1 as a whole there are, in the Board's view, the following important aspects of its disclosure to be recognised:

4.5.2 (A) The equation is used in this prior context only to define boundaries i.e. interpolation of disclosed tables as maximum and minimum limits within which the respective chord widths along the profile of the cutting edge tip may lie (cf. page 2, lines 40 to 66 of D1). These boundaries are furthermore divided into **two ranges** regarding distance d from the extreme edge of the cutting edge tip, namely the first range $0.5 < d < 25 \mu\text{m}$ and the second range $25 < d < 100 \mu\text{m}$, for which different values of parameter n are specified.

(B) Contrary to this, the patent in suit basically teaches (cf. column 5 and paragraph 4 of the Statement of Grounds) that a low value of the exponent n has a significant influence on the chord width value at distances d from the extremity less than one μm . To be

more precise, the lower the value of the exponent the more rounded and hence thicker this region of the tip would be. At a distance more than 1 μm from the edge extremity the effect of a smaller exponent value is, on the other hand, to reduce the blade thickness. The overall effect obtained by having a smaller value of the exponent in accordance with the invention of the patent in suit is illustrated in Figures 10 and 10A of the patent.

However, for the distances from 25 μm to 100 μm from the edge extremity document D1 proposes upper and lower limits for the chord widths which are defined by the same equation but with the exponent having a preferred value lower, i.e. 0.748, than for distances from 0.5 μm to 25 μm , i.e. preferably 0.825 (cf. especially the framed table on page 2, line 6 of D1). It is thus evident that the basic teaching of D1 follows the conventional thinking in that the blade region very close to the tip should also be made thin or at least not made thick, if shaving performance is to be improved, whilst the blade according to the present invention achieves still better results with a shape contrary to this principle.

(C) The patent in suit teaches that the cross-sectional shape of the cutting edge tip up to a distance of 40 μm from the edge is substantially described by the equation $w=ad^n$, emphasises that it is concerned with modification up to the extreme edge, and specifies in the example values for distances from 0.25 μm upwards (cf. column 5, lines 1-21).

Document D1 however declares on page 2, lines 67 to 75 that "the equation does not cover the distance back from the tip to 0.5 μm " and states further that "with the small dimensions involved it is only possible, and only necessary, to say that in this region the facet will be straight, or follow the line of the succeeding curve", i.e. the one discussed under (B) above.

4.5.3 The Board is aware of the fact that only the upper limit for the parameter \underline{a} , i.e. 0.8, is specified in the equation in Claim 1. However, it lies within the normal consideration for the skilled person to choose a practically useful value within the given range below the limit which still maintains the above basic characteristics of the blade, i.e. a wider than usual tip and a thinner than usual base, and its performance, and at the same time would not be so low as to render the blade generally too fragile and breakable or insufficiently wide at the top. The definition of \underline{a} may be somewhat unclear without a lower limit but the above purposive interpretation enables the skilled person to have a properly functioning choice. It is also relevant in this respect that the tabulated example gives enough details for designs within the scope of the claim, and there can therefore be no suggestion that any uncertainty as to the limits of \underline{a} implies that, in consequence, the skilled person cannot carry out the invention. In such circumstances, and in view of the fact that lack of clarity is not a ground for opposition, the unamended Claim 1 is accepted as satisfactory for the purpose.

4.5.4 Considering the disclosure of D1 in its analysed aspects (A), (B) and (C), i.e. the deliberate splitting

of the equation into two parameter ranges (cf. aspect (A) above), the choice of parameters for the region very close to the extreme tip (see (B) above), and the acknowledged limited validity of the equation (see (C) above), and having regard to the aim of the present patent (see point 3 above), the Board comes to the conclusion that the teaching of document D1 leads away from the modification of the razor blade as claimed in Claim 1 of the patent in suit. Even exercising routine methods of trial and error with the knowledge of said document D1, the person skilled in the art thus would not be led inevitably to the contested invention. Even if one allows for the possible optimisation of the parameter values in document D1, this should not go contrary to the basis teaching, i.e. that there are two different regions with two separately optimised sets of parameters.

There are no further documents raised in the discussion which would have helped the skilled person to recognise the modifications involved in the claimed subject-matter involving the selection of a single set of parameters providing a certain kind of shape.

Therefore Claim 1 involves an inventive step.

4.5.5 Claims 2 to 4, which relate to preferred embodiments of the razor blade according to Claim 1, are also allowable.

5. *Prior use*

In view of the above, it is necessary for the Board to comment upon the objection raised by the Respondent in

the opposition proceedings on the ground of prior use. Because of its decision to revoke the patent on the basis of other submissions there was no necessity for the previous instance to consider this matter, this time it must be assessed as the remaining issue.

The allegation of prior use was made long time after the opposition period had expired and concerned own use by the Opponent himself. Whilst late submissions are not necessarily disregarded providing they represent evidence more critically relevant against the validity of the patent than anything else raised before (cf. T 156/84, OJ EPO 1988, 372), the discretionary power of the Boards to admit such late submitted evidence cannot be exercised in favour of the Opponent in cases where abuse or manipulation of the procedure is involved. It is therefore the view of the Board that an assertion of public prior use, based on the Opponent's own activities and submitted after the expiry of the opposition period and in the absence of good reasons for the delay, represents an abuse of the proceedings and a breach of the principle of "good faith" which all parties are expected to observe. Therefore, this kind of assertion cannot be deemed to have been submitted in due time, and is to be disregarded under Art. 114(2) EPC irrespective of its potential relevance. As soon as evidence is in the possession of the Opponent and it is recognisable that it could be highly relevant to the validity of the patent it should be submitted in the proceedings.

In the present case, the late submission of alleged own prior use was, inter alia, already characterised and thereby criticised by the Proprietor of the patent, as

having been in the "possession" of the Opponent right from the beginning (cf. Minutes of the oral proceedings, page 3, lines 30-32). An answer to the point was deliberately delayed by the Respondents in their submissions in the appeal proceedings although the matter of prior use was explicitly invoked by them but only by reserving their right to supplement the issue and render it more precise at a later stage (cf. letter dated 2 August 1991, page 2). In addition to being improper and unfair to manipulate the process of submitting evidence and arguments piecemealwise (cf. T 122/84, OJ EPO 1987, 177; T 271/84, OJ EPO 1987, 405 and T 173/89 of 29 August 1990, not published, as well as General Principles for Opposition Procedure in the EPO, OJ EPO 1989, 417), it is unacceptable to put forward unspecified statements about intentions to do something at a later stage when the need arises, if this has a dilatory effect on the procedure. In view of the above, the matter of alleged prior use is rejected as not being submitted in due time under Art. 114(2) EPC.

Order

For these reasons, it is decided that:

1. The decision of the first instance is set aside.
2. The case is remitted to the first instance with the order to maintain the patent with the claims as granted.

The Registrar:

The Chairman:

S. Fabiani

G.S.A. Szabo