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# Datasheet for the decision of 13 September 2017

**Case Number:** T 0861/13 - 3.4.02

**Application Number:** 10169649.0

**Publication Number:** 2255752

**IPC:** A61F2/16

**Language of the proceedings:** EN

**Title of invention:**
Multi-zonal monofocal intraocular lens for correcting optical aberrations

**Applicant:**
Abbott Medical Optics Inc.

**Relevant legal provisions:**
EPC Art. 54(1), 56, 76(1), 83, 84

**Keyword:**
Divisional application - Subject-matter extending beyond the content of the earlier application (no)
Clarity and support in the description (yes)
Sufficiency of disclosure (yes)
Novelty and inventive step (yes)

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**Case Number: T 0861/13 - 3.4.02**

# D E C I S I O N
## of Technical Board of Appeal 3.4.02
## of 13 September 2017

| | |
|---|---|
| **Appellant:** (Applicant) | Abbott Medical Optics Inc.<br>1700 E. St. Andrew Place<br>Santa Ana, CA 92705-4933 (US) |
| **Representative:** | Hoffmann Eitle<br>Patent- und Rechtsanwälte PartmbB<br>Arabellastraße 30<br>81925 München (DE) |
| **Decision under appeal:** | **Decision of the Examining Division of the European Patent Office posted on 20 November 2012 refusing European patent application No. 10169649.0 pursuant to Article 97(2) EPC.** |

**Composition of the Board:**

| | |
|---|---|
| **Chairman** | R. Bekkering |
| **Members:** | F. J. Narganes-Quijano |
| | G. Decker |

## Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 10169649.0 filed as a divisional application of the earlier patent application No. 04800995.5.

II. In its decision the examining division held with respect to the set of claims then on file that

- the subject-matter of claim 1 extended beyond the content of the earlier application as originally filed (Article 76(1) EPC),
- claim 1 was not clear and not supported by the description (Article 84 EPC), and
- the claimed invention was not sufficiently disclosed within the meaning of Article 83 EPC.

III. With the statement setting out the grounds of appeal the appellant filed amended application documents and requested that the decision under appeal be set aside and a patent be granted. The appellant also requested the reimbursement of the appeal fee in view of an alleged procedural violation.

IV. In a communication annexed to summons to oral proceedings the board presented a preliminary opinion on the appellant's case in appeal. In the communication reference was made to the following documents cited in the search report:

D1: EP 0 742 466 A
D2: US 4 906 246 A
D3: US2003/0199976 A
D4: US 6 126 286 A

D5: US 5 270 744 A,

and also to the following documents illustrating common general knowledge in the technical field of the invention:

A1: "Van Nostrand's Scientific Encyclopedia"; Wiley-Interscience, John Wiley & Sons Inc., 9th ed., 2002, Vol. 2; bibliographic pages, and pages 3420 and 3421; and

A2: "The Art and Science of Optical Design"; R. R. Shannon, Cambridge University Press, 1997; bibliographic pages, and pages 555 to 557.

V. In reply to the observations made by the board in its communication, the appellant filed with the letter dated 28 July 2017 amended application documents. With the same letter the appellant withdrew the request for reimbursement of the appeal fee.

In reply to a subsequent communication of the board, the appellant filed with the letter dated 15 August 2017 further amended application documents.

Following an invitation of the board to clarify the formulation of the main request, with the letter dated 4 September 2017 the appellant requested as a main request that the decision under appeal be set aside and a patent be granted on the basis of the following application documents:

- claims: No. 1 to 15 of the main request labelled "New Main Request" filed with the letter dated 15 August 2017;

- description: pages 1, 8, 11 and 13 labelled "New Main Request" filed with the letter dated 15 August 2017, pages 4, 12 and 18 labelled "New Main

Request" filed with the letter dated 28 July 2017, and pages 2, 3, 6, 7, 9, 10 and 14 to 17 as originally filed, pages 5 and 19 to 21 as originally filed being deleted; and

- drawings: sheets 1/5 to 5/5 as originally filed.

VI. In view of the application documents of the main request of the appellant, the oral proceedings were cancelled.

VII. Claim 1 and independent claim 10 of the main request read as follows:

" 1. A method of designing a multi-zonal monofocal ophthalmic intraocular lens (22, 60), the lens (22, 60) comprising:

a first lens surface (68a) and a second lens surface (68b) disposed opposite the first lens surface (68a);

the first lens surface (68a) comprising at least two zones (70, 72, 74) designated by successive integers *i*, the surface (68a) having a sag that varies, and

the zones (70, 72, 74) being configured to focus light entering the zones (70, 72, 74) from a distant point source to substantially a single point such that the light substantially falls within the range of the depth-of-focus of a spherical lens having an equivalent focal length,

characterized in that

the lens (22, 60) comprises a pair of haptics or fixation members (34, 64a, 64b) extending outward therefrom, and in that

the method comprises determining the sag using the equation:

$$Sag = \frac{C_i * r^2}{1+\sqrt{1-(1+K_i)*C_i^{\,2}*r^2}} + \sum_{j=0}^{M} B_{ij} * (r-r_i)^{2j} + \sum_{j=1}^{M} T_{ij} * (r-r_{i-1})^{2j}$$

wherein $C_i$ is a curvature of the *i*th zone, $K_i$ is an asphericity constant of the *i*th zone, $r_i$ is the height of the *i*th zone (70, 72, 74), and the $B_{ij}$ and $T_{ij}$ are boundary parameters selected to smoothly connect the zones (70, 72, 74), and M is an integer selected to provide a predetermined amount of smoothness over the transition between zones (70, 72, 74)."

" 10. A multi-zonal monofocal ophthalmic intraocular lens (22, 60) comprising:

a first lens surface (68a) and a second lens surface (68b) disposed opposite the first lens surface (68a);

the first lens surface (68a) comprising at least two zones (70, 72, 74) designated by successive integers *i*, the surface (68a) having a sag that varies, and

the zones (70, 72, 74) being configured to focus light entering the zones (70, 72, 74) from a distant point source to substantially a single point such that the light substantially falls within the range of the depth-of-focus of a spherical lens having an equivalent focal length,

characterized in that

the lens (22, 60) comprises a pair of haptics or fixation members (34, 64a, 64b) extending outward therefrom; and in that

the sag varies according to the relationship:

$$Sag = \frac{C_i * r^2}{1+\sqrt{1-(1+K_i)*C_i^{\,2}*r^2}} + \sum_{j=0}^{M} B_{ij} * (r-r_i)^{2j} + \sum_{j=1}^{M} T_{ij} * (r-r_{i-1})^{2j}$$

wherein $C_i$ is a curvature of the *i*th zone, $K_i$ is an asphericity constant of the *i*th zone, $r_i$ is the height of the *i*th zone (70, 72, 74), and the $B_{ij}$ and $T_{ij}$ are boundary parameters selected to smoothly connect the zones (70, 72, 74), and M is an integer, namely 3, selected to provide a predetermined amount of smoothness over the transition between zones (70, 72, 74)."

The set of claims of the main request includes dependent claims 2 to 9 and 11 to 15 referring back to independent claims 1 and 10, respectively.

## Reasons for the Decision

1. The appeal is admissible.

2. *Main request - Articles 76(1) and 123(2) EPC*

2.1 In its decision the examining division held that the feature of claim 1 of the request then on file according to which the multi-zonal lens surface described by the mathematical expression specified in the claim comprised "at least two zones" extended beyond the content of the earlier application as originally filed (Article 76(1) EPC). In particular, the examining division held that the mathematical expression defined in claim 1 directed to a multi-zonal lens was disclosed in paragraph [0049] of the description of the earlier application as originally filed (see publication WO 2005/046527) only in the context of a lens having a multi-zonal surface with three or more zones.

The objected feature was already present in claim 1 of the application as originally filed and is also present in independent claims 1 and 10 of the present main request.

2.1.1 The board, however, cannot follow the examining division's finding in this respect, the reasons being as follows:

The section of the description of the earlier application as originally filed preceding paragraph [0049] discloses multi-zonal monofocal lenses having a multi-zonal lens surface (see for instance paragraphs [0029], [0030] and [0046]) and, in particular, a multi-zonal lens surface having at least three zones (paragraph [0040] and Fig. 5A and 5B). Paragraph [0049] addresses then the question of the optical design of a lens surface having a multi-zonal structure (paragraph [0049], lines 1 to 3), and in particular (paragraph [0049], lines 3 to 6) of the lens surface having at least three zones previously disclosed in the preceding paragraphs. The design approach proposed in the paragraph consists in the use of the mathematical expression under consideration for describing the sag of each of the zones of the multi-zonal surface (paragraph [0049], last three lines on page 12, and lines 1 to 8 on page 13). The subsequent paragraph [0050] discloses embodiments of the implementation of the optical design and specifies in particular that "There are preferably at least three zones ($i \geq 3$) to achieve enhanced performance for a 6 mm diameter pupil size.".

In its decision the examining division adopted a narrow interpretation of paragraph [0049] of the earlier

application as referring exclusively to multi-zonal lens surfaces having at least three zones. However, in the view of the board the skilled person would read and understand paragraph [0049] in the mentioned context as referring, in general, to multi-zonal lens surfaces and, in particular, to a multi-zonal lens surface having at least three zones. This interpretation of the paragraph is further confirmed by the subsequent disclosure of paragraph [0050] according to which in the implementation of the optical design under consideration "There are preferably at least three zones [...]". The fact that a surface lens with at least three zones is qualified in this paragraph [0050] as preferred is - as submitted by the appellant - at variance with an interpretation of paragraph [0049] as being confined to lens surfaces having at least three zones.

It follows from the above considerations that the earlier application explicitly discloses lens surfaces having a multi-zonal structure and, as a preferred embodiment, lens surfaces having at least three zones. This disclosure also constitutes an implicit, but clear and unambiguous disclosure of the complementary, non-preferred embodiment, i.e. lens surfaces with a multi-zonal structure having less than three zones or, in other words, having two zones. The explicit disclosure of lens surfaces with at least three zones and the implicit disclosure of lens surfaces with two zones allow reformulating the generic disclosure of lens surfaces with a multi-zonal structure as lens surfaces having at least two zones.

The board concludes that the feature under consideration - also present in independent claims 1 and 10 of the present main request - according to which

the multi-zonal surface of the lens of the invention comprises "at least two zones" does not contravene the requirements of Article 76(1), second sentence, EPC.

2.1.2 As far as the remaining content of the application is concerned, the board is satisfied that the application as originally filed complies with the requirements of Article 76(1), second sentence, EPC. The same conclusion applies to the application as amended according to the present main request in view of the board's finding in point 2.2 below that the amendments comply with Article 123(2) EPC.

2.2 The board is also satisfied that the application documents amended according to the main request comply with the requirements of Article 123(2) EPC and also with the formal requirements of the EPC. In particular,

- claim 1 is based on claim 1 as originally filed together with paragraphs [0002], [0040] and [0049] of the description of the application as originally filed,
- independent claim 10 is based on claim 1 as originally filed together with paragraphs [0002], [0040] and [0052], and the example disclosed in Table 1 on page 14 of the description of the application as originally filed,
- dependent claims 2 to 9 are based on dependent claims 2 to 9 as originally filed, respectively, and
- dependent claims 11 to 15 are based on dependent claims 2 to 4, dependent claims 2 and 5, dependent claims 6 and 7, dependent claim 8, and dependent claim 9 as originally filed, respectively.

Furthermore, the description has been brought into conformity with the claimed invention as defined in the present claims (Article 84 and Rule 42(1) EPC), and the pertinent state of the art (document D1) has been

acknowledged in the introductory part of the description (Rule 42(1)(b) EPC).

3. *Main request - Clarity (Article 84 EPC)*

3.1 In its decision the examining division held with regard to claim 1 then on file that the claim did not indicate the values that the quantities $r_i$, $C_i$, $K_i$, $B_{ij}$ and $T_{ij}$ of the mathematical expression defined in the claim could take, and that for this reason the claim was unclear as it was impossible to determine the scope of the claimed invention. Present independent claims 1 and 10 also include the mentioned mathematical expression and the corresponding quantities.

The board first notes that the mathematical expression under consideration defines the sag, i.e. the surface profile as a function of the radius r, of each of the annular zones of a multi-zonal lens surface, each annular zone *i* being delimited by two radii $r_{i-1}$ and $r_i$. In addition,

- the first term of the right hand side of the mathematical expression involving the quantities $C_i$ and $K_i$ constitutes the expression conventionally used in this art for describing the sag of an aspherical, conical optical surface of curvature $C_i$ and of asphericity constant $K_i$ (see for instance document A2, page 555, last paragraph, and page 557, first and second paragraphs), and

- the two remaining terms constitute two Taylor's series of coefficients $B_{ij}$ and $T_{ij}$, each Taylor's series being centred at a respective one of the two edges of radii $r_{i-1}$ and $r_i$ of the lens zone.

The skilled person would therefore clearly understand the claimed mathematical expression and the technical meaning of the quantities $r_i$, $K_i$, $C_i$, $B_{ij}$ and $T_{ij}$.

In addition, although the claim does not define explicitly the specific values that the mentioned quantities can take, the claimed invention imposes clear restrictions to these values. In particular, the claimed condition according to which "the zones are configured to focus light entering the zones from a distant point source to substantially a single point such that the light substantially falls within the range of the depth-of-focus of a spherical lens having an equivalent focal length" implies that at least the quantities $K_i$ and $C_i$ of the different zones and determining the optical convergence characteristics of the respective zone are not independent of each other, but that they correlate with each other so as to achieve the mentioned claimed condition. Similar considerations apply to the coefficients $B_{ij}$ and $T_{ij}$ since according to the claimed invention they are "selected to smoothly connect the zones", and consequently the values of the coefficients $B_{ij}$ and $T_{ij}$ for one of the zones are correlated to the values of the coefficients of the adjacent zone(s). Therefore the claimed subject-matter, although broad, implicitly defines the values that the different quantities can take.

The board also notes in this respect that the invention does not properly reside in the specific values that each of the different quantities $r_i$, $K_i$, $C_i$, $B_{ij}$ and $T_{ij}$ may take, but rather in the correlation between the values of the coefficients $K_i$, $C_i$, $B_{ij}$ and $T_{ij}$ of the different zones delimited by the values of the radii $r_i$.

3.2 In connection with the finding that the claimed subject-matter did not indicate the values of the

different quantities $r_i$, $K_i$, $C_i$, $B_{ij}$ and $T_{ij}$, the examining division raised further objections of lack of clarity. In particular, the examining division held that claim 1 allowed a high asphericity value for the inner zone which would contradict the requirement of avoiding decentration issues.

However, this requirement is not defined in claim 1 then on file, and neither in independent claims 1 and 10 of the present main request, but in dependent claims, see in particular dependent claims 8 and 14 of the present main request. In addition, the board sees no contradiction between the requirement of these dependent claims relating to the compensation of optical aberrations resulting from lens decentrations and the fact that claim 1 contains no explicit limitation to the value of the asphericity for the inner zone because the mentioned requirement would restrict, among other features, the possible values that the asphericity of the inner zone can take.

The examining division also objected that claim 1 would allow spherical lens surfaces and mono-zonal lenses, and that the values of $r_i$ remained undisclosed, so that the notion of plural zones was deprived of any meaning.

The board, however, cannot follow these objections either, among other reasons because, although the invention does not exclude that the surface profile of some of the zones is - except possibly for the smooth transition with the adjacent zones - spherical (see for instance paragraphs [0041] and [0051] of the description), the term "multi-zonal" excludes multi-zonal lens surfaces comprising one single zone.

3.3 In view of the above considerations, the board does not find convincing the objections of lack of clarity raised by the examining division. In addition, the board is of the opinion that the claims of the present main request are clear within the meaning of Article 84 EPC.

4. *Main request - Article 83 EPC and support in the description (Article 84 EPC)*

4.1 In its decision the examining division held that the description of the application did not provide sufficient information to enable the skilled person to carry out the invention in the whole claimed scope. In particular, the examining division held that the description of the application contained one single detailed example (table 1 on page 14) of a lens surface described by the claimed mathematical expression under consideration, the lens surface comprising three zones, and that the skilled person would not be able to extend the teaching of the sole example to lens surfaces having a number of zones different than three. The examining division concluded that the claimed invention contravened the requirements of Article 83 EPC and was not supported by the description within the meaning of Article 84 EPC.

4.2 The claimed invention relates to an ophthalmic intraocular lens and is therefore addressed to a person skilled in the technical field of the optical design of lenses, and in particular of ophthalmic lenses. The invention is defined in terms of a series of quantities determining the surface profile of the lens (number of zones and, for each of the zones, values of the respective radii $r_i$ and of the coefficients $K_i$, $C_i$, $B_{ij}$ and $T_{ij}$) and, as noted by the examining division, the

values of these quantities are not explicitly specified in the claimed subject-matter. However, as already noted in point 3.1 above, the specific values that the quantities can take are largely restricted by the specific optical conditions also required by the claimed invention. For a predetermined value of the focal length of the monofocal ophthalmic lens - which would generally depend on the therapeutic needs of the particular patient, see paragraphs [0031] and [0047] of the description - the skilled person is initially presented with a certain degree of freedom in the selection of the number of zones and of the radii of the zones, and the description contains detailed technical information on the number of zones and on the values of the radii of the zones (see for instance paragraphs [0016], [0040], [0041], [0050], [0059], etc.) that constitutes guidance for the skilled person in the selection of the same. The skilled person would then

- calculate, using the optical formulas well known in this art - and in particular approaches such as those indicated in paragraphs [0031], [0050], [0058], [0060], [0063] and [0065] of the description -, the appropriate values of the curvature $C_i$ and the asphericity $K_i$ of each of the zones that would ensure that, as required by the claimed invention, the light entering the zones from a distant point source is focused to substantially a single point such that the light substantially falls within the range of the depth-of-focus of a spherical lens having an equivalent focal length, and

- calculate, for each couple of adjacent zones, the values of the coefficients $B_{ij}$ and $T_{ij}$ that would ensure that, as also required by the claimed invention, the adjacent zones would be smoothly connected to each other.

These calculations, although complex and tedious, amount to no more than a routine task for the skilled person working in this field and - as submitted by the appellant - they are commonly carried out using computational software well known in this art such as the specific optical design program mentioned in paragraph [0050] of the description. Following this procedure, the skilled person would obtain different profiles for the multi-zonal lens surface and, by varying the number of zones and/or the radii of the zones, he would obtain further profiles satisfying the claimed conditions. The description contains, in addition, further guidance as regards the selection of particular profiles with improved optical properties (see for instance paragraphs [0017] to [0020], [0029], [0032], [0043] and [0061]).

In the board's view none of these operations go beyond the normal competence and the usual capabilities of the skilled person, and the board is unable to identify in the reasoning of the examining division any specific operation that would impose an excessive burden on the skilled person.

In view of all these considerations, the board concludes that the claimed invention is disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC).

4.3 As regards the examining division's objection that the claimed invention was not supported by the description within the meaning of Article 84 EPC, the board notes that the description gives a specific, detailed example of a multi-zonal lens according to the claimed

invention (see paragraphs [0052] to [0054], Table 1 on page 14 and Fig. 6A and 6B). Furthermore, the description contains numerous passages addressing further aspects of the claimed invention (see for instance the passages of the description cited in point 4.2 above). In addition, as already concluded in point 4.2, the board has no doubts as regards the sufficiency of disclosure of the claimed invention within the meaning of Article 83 EPC. Under these circumstances, the board sees no reason to question that the claimed subject-matter is supported by the description within the meaning of Article 84 EPC.

5. *Main request - Novelty and inventive step*

5.1.1 During the first-instance proceedings the examining division addressed the question of the compliance of the application with Articles 76, 83 and 84 EPC and did not comment on the issues of novelty and inventive step of the claimed invention. Nonetheless, the board has considered appropriate in the circumstances of the case to carry out an examination of the issues of novelty and inventive step over the documents cited in the search report.

5.1.2 The closest state of the art is considered to be represented by document D1. This document discloses an ophthalmic lens for use as an intraocular lens (column 1, lines 7 to 14, and column 2, lines 54 to 56) and a method of designing the lens (column 3, lines 22 to 36, and column 6, lines 21 to 43). The lens is a multi-zonal lens with the front or the back surface of the lens having two (Fig. 2 and 3, and column 4, lines 40 to 46) or more concentric zones (Fig. 4 and 5 together with column 4, line 55 to column 5, line 34). The zones of the lens are configured so that, in comparison with

the corresponding purely spherical lens having a focal point for the central rays and a predetermined depth of focus (see Fig. 1, column 1, lines 18 to 27, and column 4, lines 23 to 33), the peripheral light incident on the lens is re-focused to the focal point of the central rays (see abstract and Fig. 2 and 3, together with column 4, lines 23 to 54). Consequently, the zones are configured so that the lens operates as a monofocal lens and, in addition, they are configured as required by the claimed invention, i.e. to focus light entering the zones from a distant point to substantially a single point such that the light substantially falls within the range of the depth-of-focus of the corresponding spherical lens having the equivalent focal length.

In addition, document D1 discloses that the surfaces of the lens zones are spherical with different optical powers (column 4, line 59 to column 5, line 24), and the document teaches that these surfaces can also be formed with an aspherical shape for the purposes of compensating optical aberrations (see claims 4 and 5, and column 6, lines 21 to 30). It is also implicit in document D1 that the lens surface zones are continuously connected to each other. This is apparent from the schematic representations of Fig. 2 and 3 and also from the fact that according to the disclosure of the document the zones consist of flatter or steeper curves being added to the base curve of the lens (column 4, lines 40 to 50) and the optical power changes progressively without stepped changes (see column 5, lines 8 to 13, together with Fig. 5 and the corresponding description, in particular column 6, lines 1 to 7).

5.1.3 *Claim 1*

Claim 1 of the main request is directed to a method of designing a lens of the type disclosed in document D1. The method of claim 1 differs from the method disclosed in document D1 in that

a) the lens comprises a pair of haptics or fixation members extending outward therefrom, and

b) the design of the lens includes the determination of the sag of the multi-zonal lens surface using the equation defined in the claim, the coefficients $B_{ij}$ and $T_{ij}$ being selected to smoothly connect the zones, and M being an integer selected to provide a predetermined amount of smoothness over the transition between the zones.

As shown in document D2 (Fig. 1, together with column 3, lines 46 to 52), document D3 (Fig. 5, together with paragraph [0063]), document D4 (Fig. 3 and 4, together with column 4, line 65 to column 5, line 5), and document D5 (fixation members extending from the lens 82 represented in Fig. 8b), it was conventional in this art before the priority date of the application to provide a pair of haptics or fixation members in an ophthalmic intraocular lens, in particular for the purposes of fixing the intraocular lens to the human eye. Consequently, the distinguishing feature a) identified above is obvious in view of the prior art.

As regards the distinguishing feature b), the board notes that the zones of the lens of document D1 are smoothly connected to each other, at least to a degree of smoothness compatible with the fact that the lens is configured to be used as an intraocular lens and the optical power of the multi-zonal surface changes progressively and without stepped changes (D1, Fig. 5 and column 6, lines 1 to 7). In addition, it was

conventional in this art before the priority date of the application to provide the surface of a multi-zonal ophthalmic lens, especially of the intraocular type, with smooth transitions between adjacent zones, see for instance document D3 (abstract, and Fig. 8 together with the corresponding description, in particular paragraphs [0070] and [0085]) and document D5 (abstract, column 2, lines 39 to 59, and Fig. 4, 5, 6a and 6b, together with column 4, lines 38 to 55, and column 5, lines 8 to 51). However, none of the documents on file discloses or suggests the optical design of a multi-zonal lens of the type under consideration using the mathematical expression defined in claim 1. In particular, as already noted in point 3.1 above, the first term on the right hand side of the equation is conventionally used in the design of optical surfaces and, in addition, any segment of a regular, continuous curve can be mathematically described to any arbitrarily high degree of approximation in terms of a Taylor's series, and therefore also in terms of two Taylor's series, with a value of M (i.e. of the number of terms in the series) sufficiently high (see for instance document A1, entry "Taylor series" on pages 3420 and 3421). However, none of the documents on file discloses or suggests the use of two Taylor's series in the determination of the surface profile of each of the zones of a multi-zonal lens surface, each Taylor's series being centred at a respective one of the two edges of the lens zone, for the purpose of shaping the surfaces of the lens zones so as to smoothly connect each zone with the adjacent zones as claimed.

For these reasons, the method defined in present claim 1 is new and involves an inventive step over the available prior art (Articles 52(1), 54(1) and 56 EPC).

5.1.4 *Independent claim 10*

Independent claim 10 is directed to a multi-zonal ophthalmic intraocular lens of the type disclosed in document D1. The lens defined in claim 1 differs from the lens disclosed in document D1 in that

a') the lens comprises a pair of haptics or fixation members extending outward therefrom, and

b') the sag of the zones of the multi-zonal lens surface is given by the mathematical expression defined in the claim, wherein the coefficients $B_{ij}$ and $T_{ij}$ of the two Taylor's series ensure that the zones are smoothly connected to each other, and M is equal to 3.

As already found in point 5.1.3 with regard to distinguishing feature a) of claim 1, feature a') was conventional in this art before the priority date of the application.

As regards feature b'), the board notes that, as already mentioned in point 5.1.3 above, any segment of a regular, continuous curve, and therefore also the surface profile of each of the zones of the multi-zonal lens surface of the lens disclosed in document D1, can be mathematically described to any arbitrarily high degree of approximation in terms of a Taylor's series, and therefore also in terms of two Taylor's series and also in terms of the mathematical expression defined in independent claim 10, when values of M sufficiently high are adopted. The claimed subject-matter, however, requires that M is equal to three. As a consequence, the claimed lens is restricted to multi-zonal lenses in which the profile of the zones of the multi-zonal lens surface can be described as the superposition of a conical surface (see the first term on the right hand

side of the mathematical expression) and two finite Taylor's series centred at the respective edges of the zone and only having polynomial terms of an order not greater than 6 (i.e. with only up to four coefficients $B_{i0}$, $B_{i1}$, $B_{i2}$ and $B_{i3}$, and up to four coefficients $T_{i0}$, $T_{i1}$, $T_{i2}$ and $T_{i3}$ for each zone *i*). None of the documents on file discloses or suggests multi-zonal lenses having the claimed smooth multi-zone surface profile.

For these reasons, the subject-matter of present independent claim 10 is neither anticipated nor rendered obvious by the documents of the prior art on file (Articles 52(1), 54(1) and 56 EPC).

5.1.5 The board concludes that the subject-matter of independent claims 1 and 10 of the main request is new and involves an inventive step (Articles 54(1) and 56 EPC). The same conclusion applies to dependent claims 2 to 9 and 11 to 15 by virtue of their dependence on independent claims 1 and 10, respectively.

6. In view of the above considerations, the board concludes that the present main request of the appellant is allowable.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to grant a patent on the basis of the following application documents:

- claims: No. 1 to 15 labelled "New Main Request" filed with the letter dated 15 August 2017;

- description: pages 1, 8, 11 and 13 labelled "New Main Request" filed with the letter dated 15 August 2017, pages 4, 12 and 18 labelled "New Main Request" filed with the letter dated 28 July 2017, and pages 2, 3, 6, 7, 9, 10 and 14 to 17 as originally filed, pages 5 and 19 to 21 as originally filed being deleted; and

- drawings: sheets 1/5 to 5/5 of the application as originally filed.

The Registrar: The Chairman:

M. Kiehl R. Bekkering

Decision electronically authenticated